



# European Mobile Industry Observatory 2011



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# 1. Introduction



## Introduction

The European Mobile Observatory was first published in 2008, and later in 2009, as a comprehensive review of the European mobile communications industry. This report updates the Observatory with the latest statistics and market developments, providing a reference point for participants in the mobile industry, for policy makers and other interested stakeholders. It covers the state of the industry, including the evolution of competition, innovation in new products, services and technologies and the industry's contribution to social and economic development in Europe. Similar reports have been produced for the mobile communications markets of Asia-Pacific, Latin America and Africa. These reports underline the industry's commitment to transparency and to engaging with a wide set of stakeholders in planning its future direction.

The analysis presented here is based in part on data collected from European mobile operators on their financial performance and estimated contribution to the European economy. Confidential data was collected from European mobile operators and aggregated and anonymised to provide non-confidential statistics for individual countries and for Europe as a whole. The report also integrates data from a wide range of existing sources to provide a comprehensive picture of the European mobile industry. These include public sources such as Eurostat, the OECD and research by National Regulatory Authorities as well as commercial databases such as Wireless Intelligence, Bloomberg, Quantifica, EIU and IDC. Where appropriate, data from different sources has been combined to show more complete industry trends.

The regular geographic scope of this study consists of the 30 countries of the EEA.<sup>1</sup> Some figures also include data for Switzerland. In some cases, where data is only available for EU countries, the report may refer to different groups of EU Member States, such as the EU25 and EU27, or Western and Eastern Europe (see the Glossary for a definition of Eastern and Western Europe). Where this report refers to 2011 YTD, it refers to the first six months of 2011.

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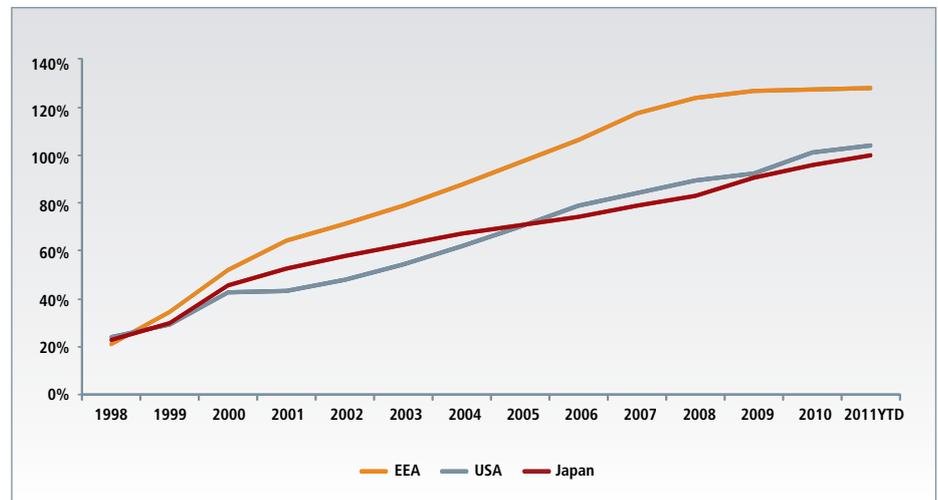
<sup>1</sup> The contracting parties to the EEA Agreement are three of the four EFTA states—Iceland, Liechtenstein and Norway—and the 27 EU Member States.



## Executive Summary

**Mobile communication is now a key European industry, comparable in size to aerospace and larger than pharmaceuticals,<sup>2</sup> with total revenues amounting to €174 billion in 2010.** Today, mobile services are ubiquitously available, with a population coverage rate of nearly 100% and a mobile penetration rate of 128% in Europe (versus 100% in Japan and 104% in the USA). This represents 656 million individual subscriptions (measured as active SIM cards) held by an estimated 456 million Europeans (89% of the population), many of whom have more than one subscription. Mobile services are now being used across all age groups and socio-economic segments of the population. Indeed mobile services are often the only regular communication services for some socio-economic groups.

### Penetration Rate of Active Subscriptions in the EEA, USA and Japan



Source: Wireless Intelligence; EIU



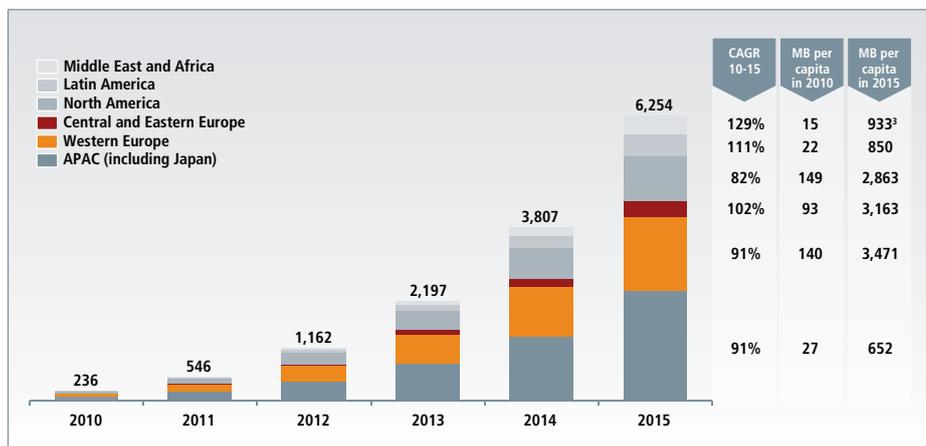
**Innovative mobile data services are changing the dynamics of the industry and the way consumers use their handsets.** Mobile Broadband is becoming widespread, with 92% growth per year since 2006.

**Smartphones, which are forecast to grow at 33% per year, and more recently tablets, which are forecast to grow at 57% per year, are further driving an explosion in mobile data traffic.** According to Cisco, mobile data traffic volumes are expected to increase by over 90% each year for the next 5 years. By 2015, Europeans will consume more data than any other region on a per capita basis.

Investment and innovation in new technologies and services (e.g. LTE networks) is supporting this growth. Traditional mobile companies such as network operators, handset manufacturers and infrastructure suppliers are contributing to this end but no longer fully define the mobile market. Expanding content and service offerings, new software and user interfaces, and easily accessible distribution channels are creating a consumer-driven mobile ecosystem with a diverse set of players – all of which will drive future growth in mobile data.

<sup>2</sup> Aerospace market in Europe is estimated at €47 billion (Source: Aerospace Global Report 2011, IMAP). Pharmaceutical and Biotech market in Europe is estimated at €5 billion (Pharmaceuticals & Biotech Industry Global Report — 2011, IMAP)

### Global Mobile Data Traffic by Region and Per Capita, in Petabytes per month



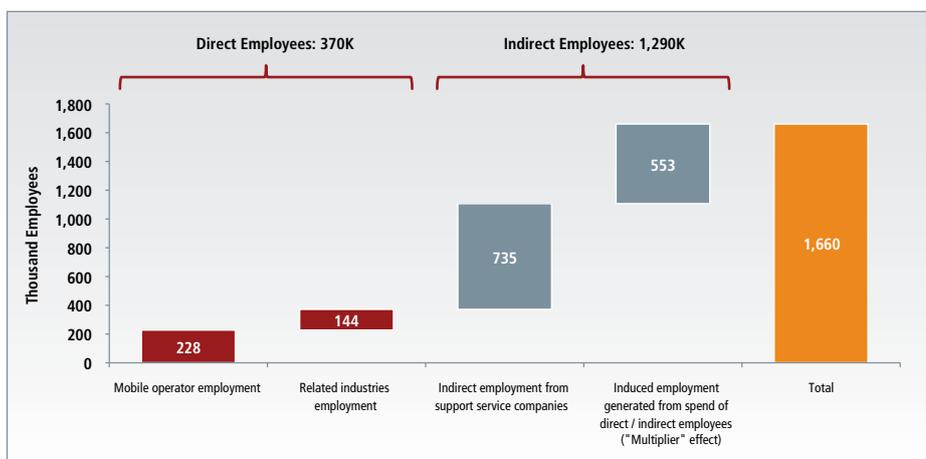
Source: CISCO VNI, 2011; EIU



Voice call volumes grew by an average of 13% per annum from 2000 to 2011, with European consumers making an estimated 144 minutes of outgoing mobile calls per head of population per month in 2011. The growth in mobile messaging traffic (SMS and MMS) was very strong until 2010, with growth of 23% per annum from 2000 to 2009. Since 2009, growth in mobile messaging has slowed to 2% per annum, due to the use of social media and instant messaging services as alternatives to SMS and MMS.

**Despite the economic climate, mobile services continue to make a strong socio-economic contribution to Europe.** The mobile industry supported an estimated 1.7 million jobs for Europeans in 2010 and mobile operators contributed €174 billion (1% of total EEA GDP) to GDP. Contribution to public funding amounting to approximately €65 billion – plus a further €18 billion estimated as the indirect contribution from related industries.

### Direct and Indirect Employment created by the European Mobile Industry, 2010



Source: Operator provided data; Wireless Intelligence; IDC; EIU; A.T. Kearney analysis



**Fierce competition in the mobile market is driving down prices.** Across the EU27, mobile prices fell by an average of 11-13% per annum between 2006 and 2010. In comparison, fixed line prices fell by only 5% a year from 1998 to 2010. Telecommunications services are one of the few household services that have declined in price over the past few years. By comparison, between 2007 and 2010, European Union consumer prices for energy and food increased by an average of 4% and 3% per annum respectively.<sup>4</sup>

**Annual Price Reductions for Baskets of Mobile Services in the EU**

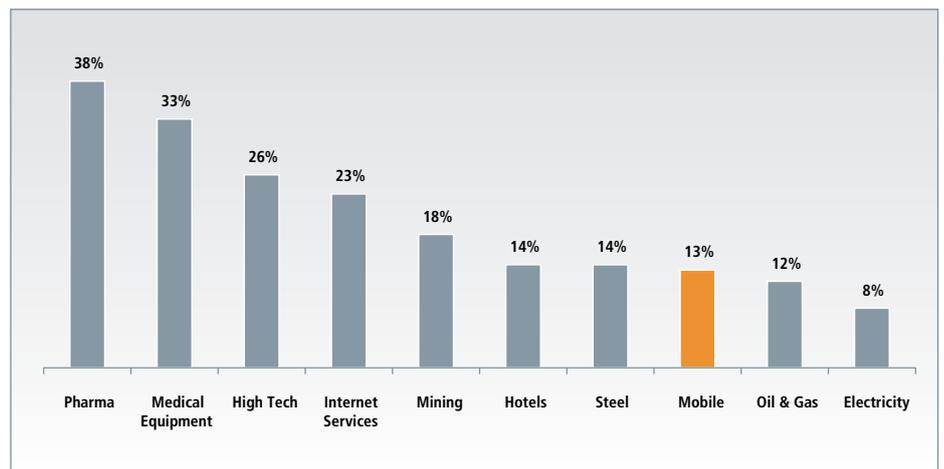
Price Basket	Region	Period	Average Annual Growth Rate
OECD domestic mobile medium usage price basket	EU27	2006-2010	-11%
OECD domestic mobile high usage price basket	EU27	2006-2010	-13%
OECD domestic residential fixed line price basket	EU15	1998-2010	-5%
OECD domestic residential fixed line price basket	EU27	1998-2010	-3%

Source: Telecoms Price Developments from 1998 to 2010, Teligen for the European Commission; A.T. Kearney analysis

Despite these price declines, usage growth enabled the mobile industry to enjoy strong revenue growth, averaging 9% per annum, from 2000 to 2008. In the recent recession, however, revenues declined by 3% in 2009 and remained relatively flat in 2010. It is expected that mobile operators' revenues will continue on this trend through 2011, especially as economic conditions continue to deteriorate in several countries. The economic climate has also intensified trends already seen in a mature and intensely competitive market, for instance consolidation across the value chain – including operators and their vendors.

Data for 2010 suggests that operators generated profits at a similar modest level to 2007 and 2008 – with returns on capital employed (ROCE) of 13%. Contrary to popular belief, such returns lag those of numerous other sectors, as illustrated in the exhibit below.

**ROCE for Mobile and Other Industries (Europe, 2010)**



Source: Confidential Operator data; Bloomberg; A.T. Kearney analysis

**Mobile operator revenue growth rates have been declining for the past few years due to the economic climate, market maturity and greater regulatory interventions.** Cautious consumer spending and reductions in business expenditure, as a result of the uncertain economic climate over the last few years, are continuing to pressure revenues. The European Commission has also targeted mobile termination rates, seeking to introduce major reductions by the end of 2012. These factors can be seen in the fact that European ARPU declined from €27 per month in 2006 to €20 per month in Q2 2011. Recent IDC data estimated that 2009 and 2010 saw a 10% and 7% decline in mobile voice revenues respectively.

**Mobile data revenues are partially offsetting reductions elsewhere with strong growth in broadband connected to sales of smartphones and dongles.** Data now represents 12% of mobile operator service revenues, having been only 4% in 2007. Mobile operators are also facing strong competition for consumer spending and share of total industry margin from other industry players, such as fixed line operators, device manufacturers and developers of operating systems, applications and content.

**To ensure competitiveness and reignite long-term revenue growth, the mobile industry continues to invest in product and service innovation.** Investment in research and development of mobile services can be very high. In 2010, Telefonica invested €4.8 billion in technological innovation, of which €800 million were directly allocated to R&D. Over the last few years, mobile data services have begun to yield the impressive results awaited for many years – a trend that will only continue as new data-oriented products, content and services emerge. As these new services are increasingly “bandwidth hungry” they will require investments into new, higher capacity networks. Mobile operators have already started deploying new technologies, such as Long Term Evolution (LTE), to satisfy the future requirements for mobile voice and data services.

**Mobile industry investment in new technologies and infrastructure can also act as part of economic stimulus to help promote economic recovery.** According to the ITU<sup>5</sup>, investments in ICTs can play a large role in generating economic recovery given their strong externalities, high multiplier effects in returns on investment and reduced leakages. Social returns to investment in ICT infrastructure are likely to exceed the individual private returns on investment, suggesting that the private sector alone is unlikely to generate the socially optimal levels of investment. Infrastructure investments are also likely to generate more robust and durable economic growth than other types of stimulus measures.

**If given the right opportunities, the mobile industry is expected to continue investing strongly in new technologies and new services.**

**Support of future technologies, by operators, vendors and regulatory stakeholders such as the European Commission, is vital for future economic growth.**

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5 ITU Confronting the crisis, ICT stimulus plans for Economic Growth, Second Edition, October 2009

### 3. High Usage and Customer Satisfaction with Mobile Services

#### Key Messages:

Mobile services have enjoyed strong growth since the 1980s, underpinned by substantial network and service investments. With total revenues of €174 billion, mobile ranks amongst Europe's most important industries;

Mobile services are available to nearly 100% of the population and 456 million Europeans have a mobile device. Europe has the highest mobile penetration rate in the developed world – as a result of very competitive price offers, including subsidised handsets and zero commitment "prepay" propositions;

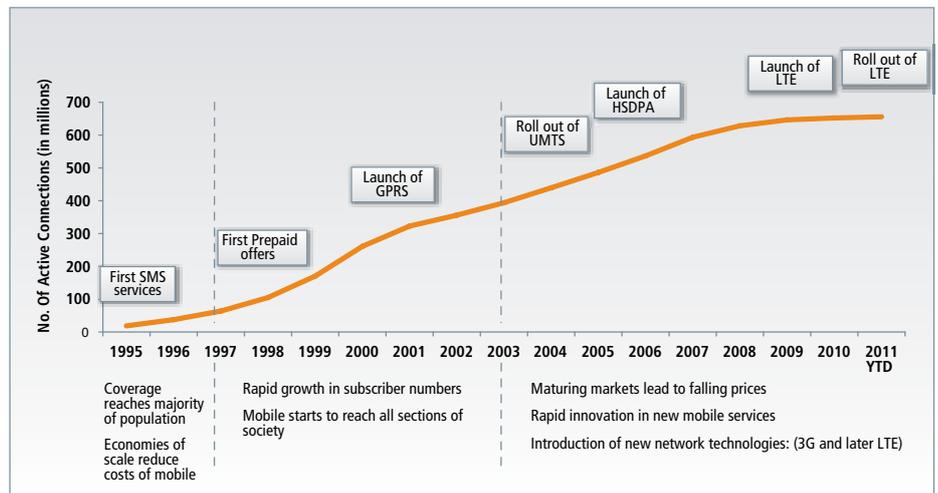
Usage of mobiles has increased strongly. On average, Europeans now make 144 minutes of calls from their mobiles and send 54 mobile messages every month (per head of population). At the same time, use of mobile data services such as mobile broadband is rapidly accelerating (see Section 3);

The benefits of mobile are illustrated by very high levels of customer satisfaction. Consumers are more satisfied with mobile than other services, including utilities, banking and transport.

#### Summary of the Historical Development of Mobile Services

The development of mobile services has led to the creation of an entirely new industry sector, the size of aerospace and larger than pharmaceuticals,<sup>6</sup> in just twenty years. The pace of network and service investments has been particularly rapid and is expected to continue in the future. Mobile services were introduced with first generation analogue networks ("car phones") in the early 1980s. The roll-out of digital, second generation mobile networks (GSM) in the early 1990s paved the way for rapid network and service innovation. In the late 1990s, enhanced digital technologies (2.5G) enabled the introduction of data services. From 2003, mobile operators deployed UMTS networks (3G), which were later upgraded to HSPA starting in 2006 and then HSPA+ in 2008. These investments have led to a 4400 fold increase in data transmission rates, from 9.6 kbps with GSM to over 42 Mbps with HSPA+<sup>7</sup> today. With higher network transmission speeds, mobile operators have introduced a raft of innovative services – from SMS in the 1990s to today's mobile data services, such as mobile email, music or video. In December 2009, TeliaSonera launched the first commercial LTE<sup>8</sup> network in the world, indicating the arrival of a new generation of technology and establishing Europe at the technical forefront of the global mobile industry. LTE further increases transmission rates, which enables innovative, more data intense products and services to be utilised by the mass market, effectively bringing the full power of the Internet to mobile devices. Over the past few years, and especially with the emergence of LTE, Europe has also seen a convergence of fixed and wireless networks, which is becoming more prevalent today. Players in fixed and wireless networks are converging at a commercial level – to offer consumers favourable packages across services – and at a network infrastructure level – to reduce their costs, for example, by integrating service platforms or optimising the transmission of voice, data and video traffic.

Figure 1: Key Developments in Mobile Services



Source: International Telecoms Union; Telecoms Development Bureau; Wireless Intelligence; A.T. Kearney analysis

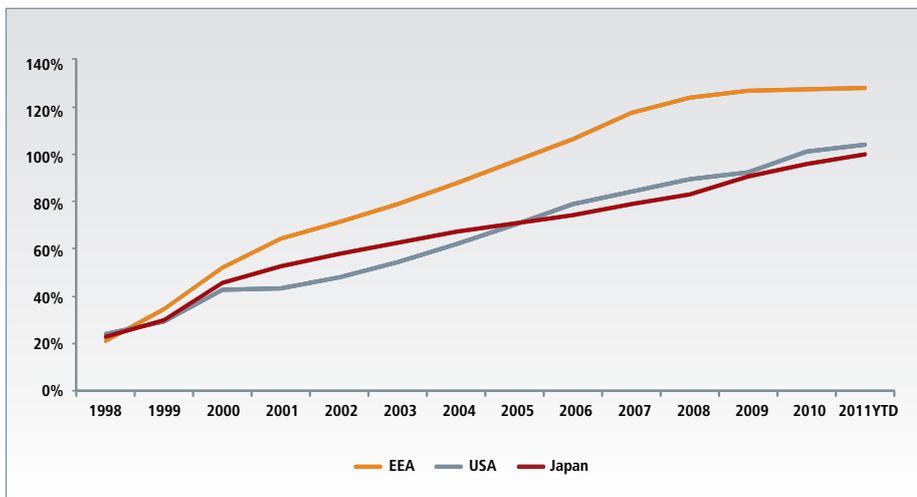
<sup>6</sup> Aerospace market in Europe is estimated at €47 billion (Source: Aerospace Global Report 2011, IMAP). Pharmaceutical and Biotech market in Europe is estimated at €5 billion (Pharmaceuticals & Biotech Industry Global Report — 2011, IMAP)

<sup>7</sup> Download speed.

<sup>8</sup> For more detailed explanations of the technologies discussed in this section, please refer to the GSMAs website, [www.gsmworld.com/technology/index.htm](http://www.gsmworld.com/technology/index.htm)

In the 1990s, Europe had lagged behind the US and Japan in number of mobile subscribers. The launch of services based on the GSM standard, accompanied by cheaper services and handsets, triggered rapid subscriber growth and the creation of a true mass market for mobile services. Mobile penetration rates now stand at 128% in Europe versus 100% in Japan and 104% in the USA. Today, there are 656 million active SIM cards, with 456 million individual Europeans having access to mobile services, as a result of customers having more than one subscription on average.<sup>9</sup>

**Figure 2: Penetration Rate of Active Subscriptions in the EEA, USA and Japan**



Source: Wireless Intelligence; EIU



The European mobile industry's success has stemmed from a number of factors. These include:

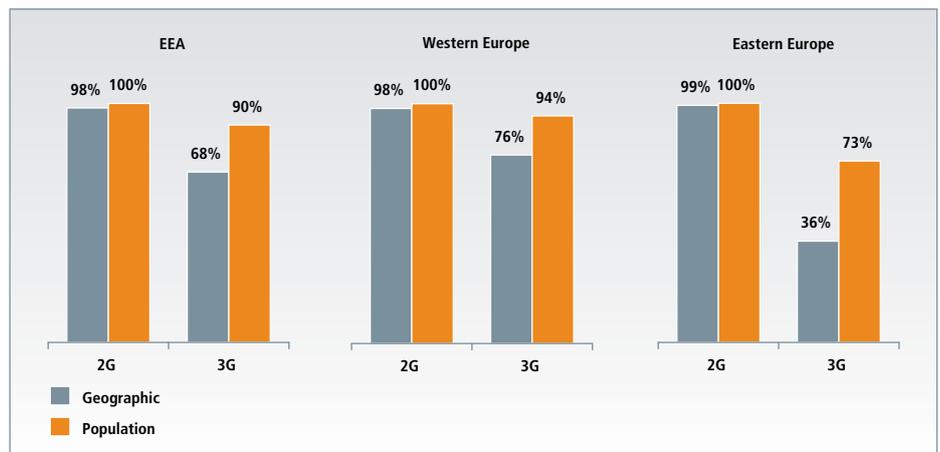
- Rapid adoption of the GSM standard across the EU, leading to economies of scale in handset and equipment manufacturing and therefore lower costs;
- Fast adoption of new technologies, such as 3G and more recently LTE, as demonstrated by the fact that there are already 20 commercial LTE networks in Europe;
- Ubiquitous mobile service availability in Europe with 98% geographic coverage and almost 100% population coverage, whereas coverage in other parts of the world is lower, partly reflecting differences in population density;
- Adoption of calling party pays pricing model;
- Significant handset subsidies to reduce entry costs for new subscribers in many European countries;
- Widespread availability of attractive prepaid offers which require no regular commitment and thus no credit checks (52% of European subscriptions are prepaid).

European mobile operators have been able to make mobile services affordable to all segments of the population, including lower income groups.

### Ubiquitous Availability of Mobile Services

Today mobile services are ubiquitously available – with 98% geographic and nearly 100% population coverage in the EEA. There is now little difference in levels of coverage for voice and messaging (2G services) between Eastern and Western Europe, with population coverage close to 100% in almost all countries.

**Figure 3: Mobile Network Coverage in the EEA, 2010<sup>10</sup>**



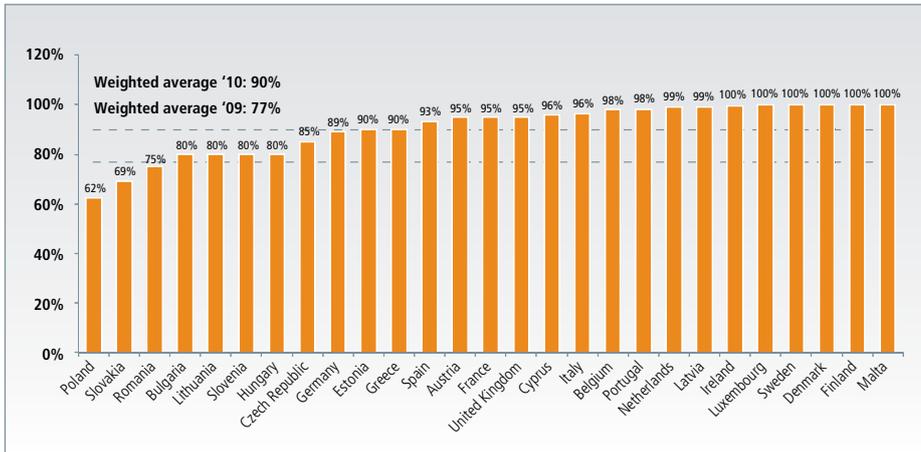
Source: "Digital Agenda Scoreboard 2011" IDATE & European Commission, GSMA Network coverage analysis, A.T. Kearney analysis

Moreover, mobile operators have increased the extent of in-building coverage, by reinforcing network density and installing pico-cells. Voice quality has increased substantially to match fixed line through improved voice codecs.

Coverage of 3G networks has also increased significantly in the last few years and in 2011 YTD amounted to approximately 90% of the European population and 68% of the European land mass. This is especially impressive given the topography and disparate population density of countries such as Sweden, Finland and Austria. 3G coverage is still higher in Western Europe, with 94% population coverage and 76% geographic coverage, but rapidly improving in Eastern Europe, with 73% population coverage and 36% geographic coverage – an increase of 34 and 26 percentage points since 2009 respectively. Mobile operators' willingness and capability to expand their existing 3G networks and invest in new ones will be key to ensuring that segments of society living in lower-density population regions are not "left behind". A recent example of this can be found in the UK. Starting in 2012, Vodafone will deploy their "open-femto" system to rural locations to provide high-quality, data-carrying signals using existing phone lines. The devices can effectively project a 3G (and later 4G) network across remote areas otherwise without mobile phone coverage. Commercialising projects such as these is critical to obtaining truly ubiquitous 3G geographic and population coverage throughout Europe, and with the appropriate spectrum allocations can diminish the digital divide currently experienced in some rural areas.

<sup>10</sup> Note: 2G coverage has not been updated since the 2009 European Mobile Observatory Report, but remains close to 100% for both population and geographic coverage

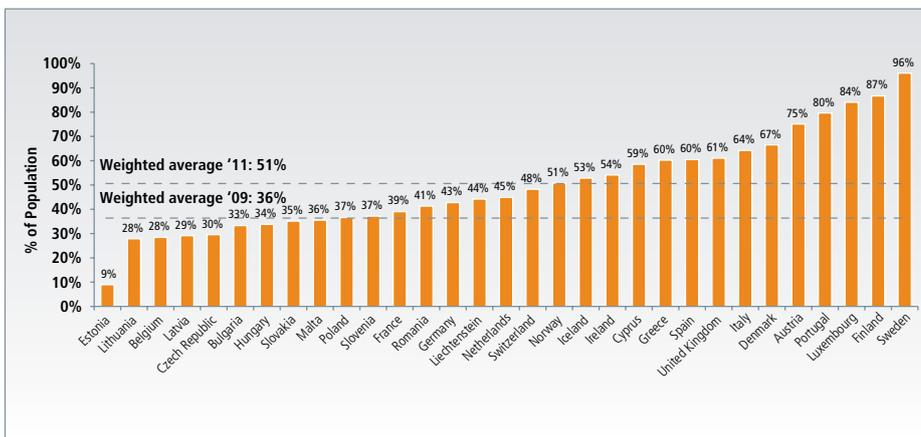
Figure 4: UMTS (3G) Population Coverage in the EU, 2010<sup>11</sup>



Source: "Digital Agenda Scoreboard 2011" IDATE & European Commission

The number of mobile subscribers with 3G-enabled handsets has also been growing rapidly. The penetration rate for 3G-enabled phones has now reached approximately 51% of the EEA population, having been just 36% in 2009. Favourable data usage rates through the introduction of large bundles (“unlimited” usage within fair usage limits) for data services for postpaid subscribers, and low cost data services for prepaid subscribers, has promoted the use of 3G handsets. However, there are still substantial differences between countries as shown in the figure below.

Figure 5: Percentage of the EEA Population with 3G Enabled Phones in 2011 YTD



Source: Wireless Intelligence, EIU

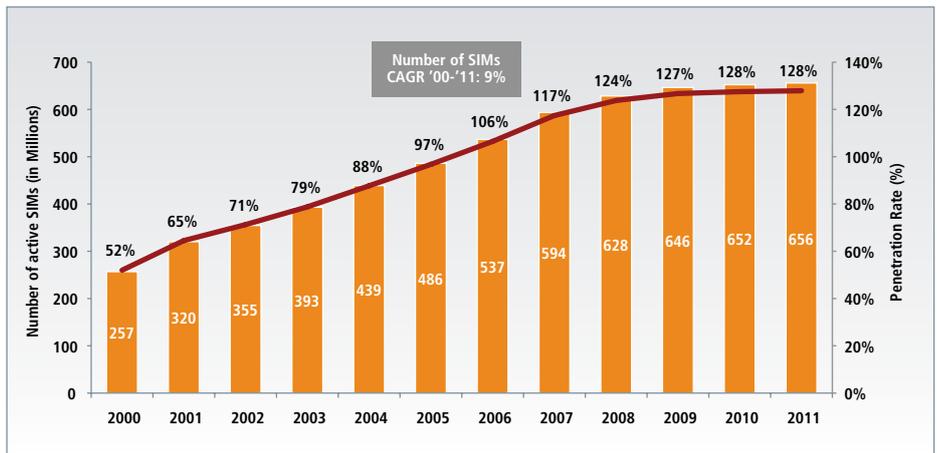
11 Weighted average calculated based on country population.



Approximately 89% of the population uses mobile services – an extremely high penetration rate, considering the significant share of the population, such as very young children, which is unlikely to ever own a mobile phone. Many customers own multiple SIM cards for a variety of reasons, such as having both a private and a business mobile, having separate subscriptions for voice and data services or simply optimising tariffs across offers. SIM penetration in Europe has grown 3% per annum since 2007, indicating that, at a penetration rate of 128%, mobiles are reaching saturation point within the European market (except for M2M applications in machines, cars, etc.). Although SIM penetration rates have stabilised over the past few years, this is likely to change in the coming years as new devices, such as tablets with 3G capability, penetrate the market resulting in multiple device ownership and therefore multiple SIM ownership.

The historical difference in terms of number of connections between Eastern Europe and Western Europe has also started to disappear, with Eastern Europe catching up with the West and reportedly matching the number of connections and market penetration in Q2 2011.<sup>12</sup>

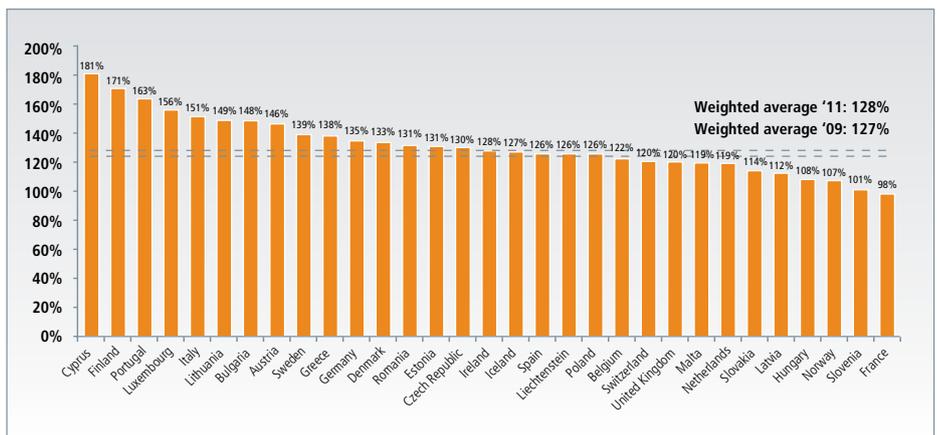
Figure 6: Number of Active SIMs and SIM Penetration Rate in the EEA<sup>13</sup>



Source: Wireless Intelligence, EIU

SIM card penetration rates vary significantly between countries. Cyprus has the highest penetration rate at 181%, while France has the lowest at 98%. These differences are mainly a result of varying levels of multi-SIM ownership, reflecting differing consumer preferences and current and historic operator pricing models.

Figure 7: Penetration Rate of Active SIMs in EEA Countries, 2011 YTD



Source: Wireless Intelligence, EIU

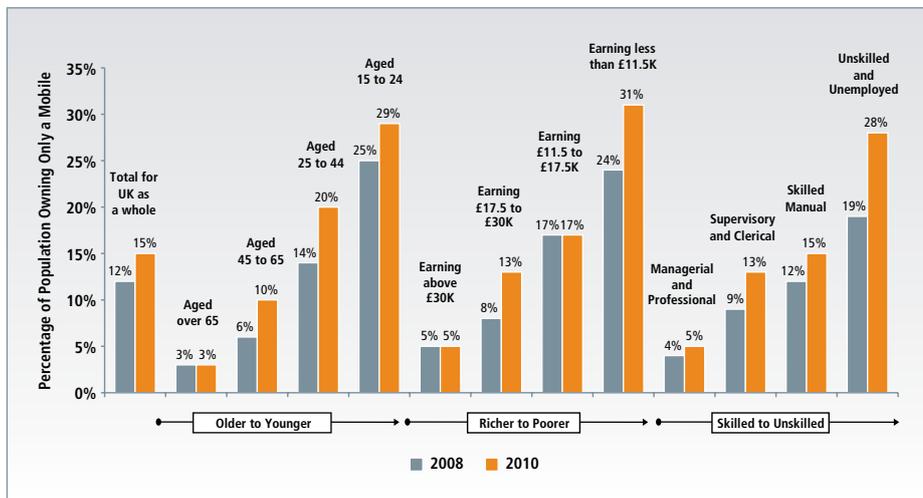
<sup>12</sup> Wireless Intelligence quarterly review, Q2 2011

<sup>13</sup> An active SIM is a SIM that is currently in use, i.e. it represents an active customer relationship and a working mobile phone number. Operators deactivate a SIM if it has not been used for a specified period, usually six months. The SIM penetration rate is the number of active SIMs as a percentage of the population.

In 2010, according to Eurobarometer, the share of the EU27 population having a mobile service was approximately 98% for people aged under 29, 93% for those from 30 to 59, and 63% of people for those over 60. Mobiles have become an essential part of a consumer’s lifestyle, both at work and socially. This is especially the case with the advent of smartphones. In the UK, 60% of teenagers and 27% of adults described themselves in an Ofcom survey as “addicted” to their smartphones, using them more much more regularly than feature phone users and instead of more traditional pastimes such as watching TV and reading newspapers.

People from all social backgrounds rely on mobile for day to day communications. In France, 62% of people with no qualifications and 69% of people with a salary below €900 per month have a mobile phone. While lower than the 83% total population average, this is still a very high level when compared to adoption of other goods and services by the less fortunate.<sup>14</sup> In many European countries, younger and less fortunate segments of the population are much more likely to rely exclusively on mobile for communication services. According to Eurobarometer, 27% of European households, and on average 51% of households in “New Member States”, have access to one or more mobile phones but not to a fixed line.<sup>15</sup> Households with limited budgets place a higher priority on mobile services than on fixed, which shows that mobile operators have successfully made mobile services affordable. Despite the difficult economic conditions over the last few years, penetration of mobile services continued to increase across all segments, especially amongst the lowest socioeconomic groups.

Figure 8: Profile of Consumers Owning a Mobile but not a Fixed Line in the UK, Q2 2008 vs. 2010



Source: The Consumer Experience, Ofcom (2010)

Since the 1980s, most European mobile operators have stimulated mobile penetration by subsidizing handsets. The levels of subsidy vary considerably between operators, countries and offers. The average subsidy for a new post-paid subscriber’s handset is approximately €100, but can amount to €500 in some cases. In some countries subsidies are also available for prepaid consumers.<sup>16</sup> As a result, consumers can today find numerous offers where the handset is free.

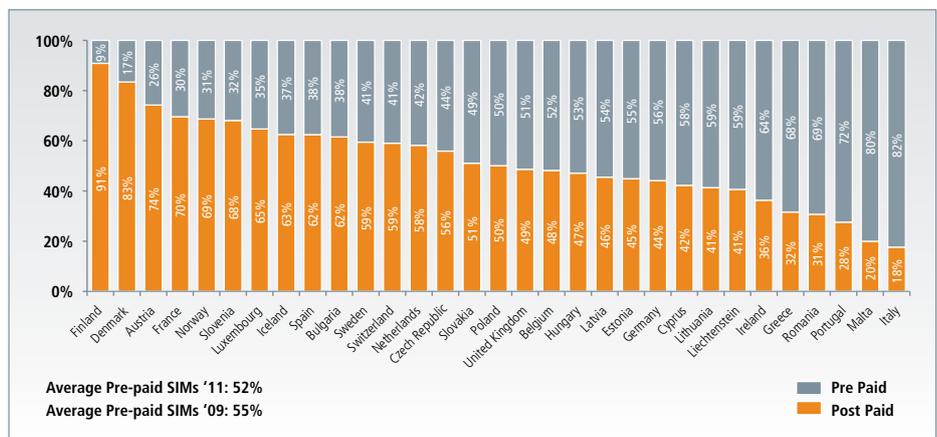
14 La diffusion des technologies de l’information et de la communication dans la société française, CREDOC CGTI (2010) page 38.

15 E-Communications Household Survey, Eurobarometer (2010).

16 The retail price of more advanced smartphones can be as high as €500, but is much lower for feature phones

Meanwhile, the introduction of prepaid offers has allowed more budget-conscious consumers to access mobile services at a low entry cost, while making it easier for them to control their mobile bills. There are now 343 million prepaid subscriptions in Europe but the relative weight of prepaid and post-paid customers across Europe varies widely. In Italy, 82% of total SIMs are prepaid versus only 9% in Finland. This illustrates substantial differences across European countries in business models and customer needs. The high prepaid penetration rate in Italy, for instance, relates to a combination of minimal handset subsidies, favourable prepaid rates and greater consumer interest in offers without significant contractual commitments.

**Figure 9: Percentage of Pre and Post-Paid SIMs in EEA Countries, 2011 YTD**



Source: Wireless Intelligence; EIU

On average, prepaid SIMs now represent 52% of the market in the EEA, having decreased slightly from 55% in 2009. Wireless Intelligence recorded that 80% of operators in Western Europe saw a decrease in their proportion of prepaid connections in 2010. This decrease in prepaid SIMs has been partly driven by the popularity of new postpaid, SIM-only tariffs that have appeared in the market and which enable customers to access flexible (low to high usage) tariffs if they do not require a phone upgrade. There are several other characteristics unique to individual markets that are contributing to this trend.

Postpaid tariffs that largely offset the cost of a smartphone through handset subsidies are becoming utilised more as the popularity and price of smartphones increase. This is especially evident in the UK, where the number of prepaid mobile connections fell 8% from 2009 to 2011. A survey commissioned by Ofcom found huge growth in smartphone take-up since 2010, with 27% of adults now smartphone users - 59% of which joined over the last 12 months. Over three quarters of adult smartphone users are on postpaid contracts, compared to just 35% of regular mobile phone users, indicating that the smartphone revolution is changing the dynamics of payment arrangements in the UK.<sup>17</sup>

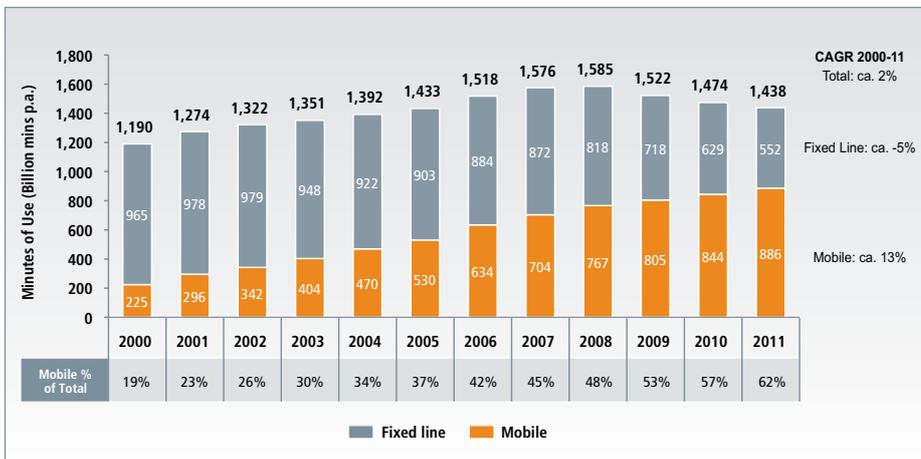
Regulatory measures can also impact the proportion of prepaid and postpaid subscribers in certain European countries. SIM registration programmes to combat fraudulent activity have been introduced in several European countries. As a result of these programmes, unregistered SIM cards (that are most likely prepaid) are removed from operators' reported figures, usually decreasing the proportion of prepaid subscribers in the country. This was the case in Greece, where the mandatory SIM registration programme introduced in late 2009 resulted in an 8% decline in the proportion of prepaid subscribers from 2009 to 2011.

**Vibrant Growth in Mobile Service Usage**

The use of mobile services continues to grow strongly. Voice call volumes grew by an average of 13% per annum from 2000 to 2011, with European consumers making an estimated 144 minutes of outgoing calls per head of population per month in 2011 (131 in 2009). In total, Europeans made 886 billion minutes of outgoing calls from their mobiles in 2011 versus 805 billion in 2009.

The growth of mobile voice calls to some extent substitutes fixed line calls. In fact, whilst mobile voice has continued to increase, fixed line voice has decreased to result in an overall decline in total calls per inhabitant from 260 minutes per month in 2008 to 234 minutes per month in 2011.

**Figure 10: Minutes of Use on Mobile and Fixed Lines in the EEA<sup>18</sup>**

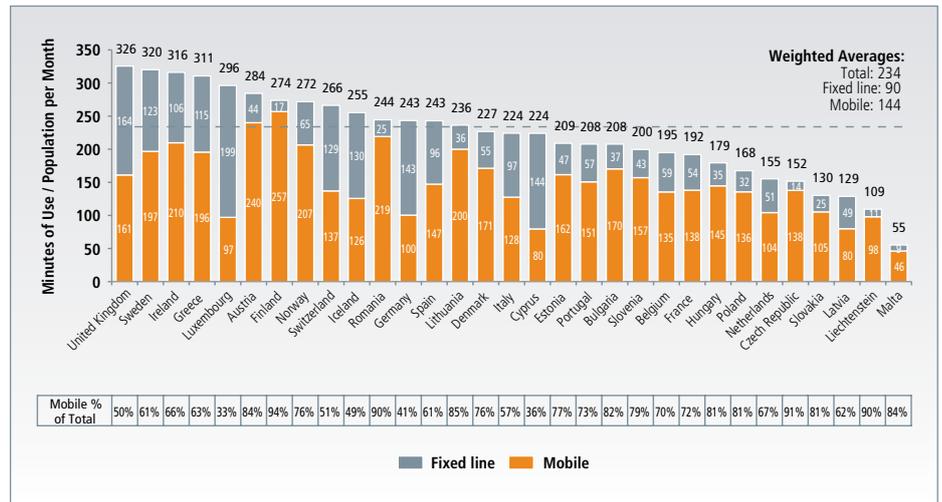


Source: Quantifica; IDC; WI; EIU; A.T. Kearney analysis

There are significant variations across Europe in total voice usage and in the relative weight of mobile versus fixed line. The Finns and Austrians spend the largest amount of time on their mobiles, with 257 and 240 minutes of use per head of population per month, while Maltese and Latvian subscribers spend the least time with 46 and 80 minutes of use per head of population per month. Luxembourgers make most of their calls (67%) from fixed lines, while Finns make most of their calls (94%) from their mobiles. There are many reasons for these differences, including levels of fixed and mobile penetration, differences in prices and consumer preferences.

<sup>18</sup> Minutes of use for outbound traffic only. Minutes of use for fixed line telecoms exclude VoIP traffic.

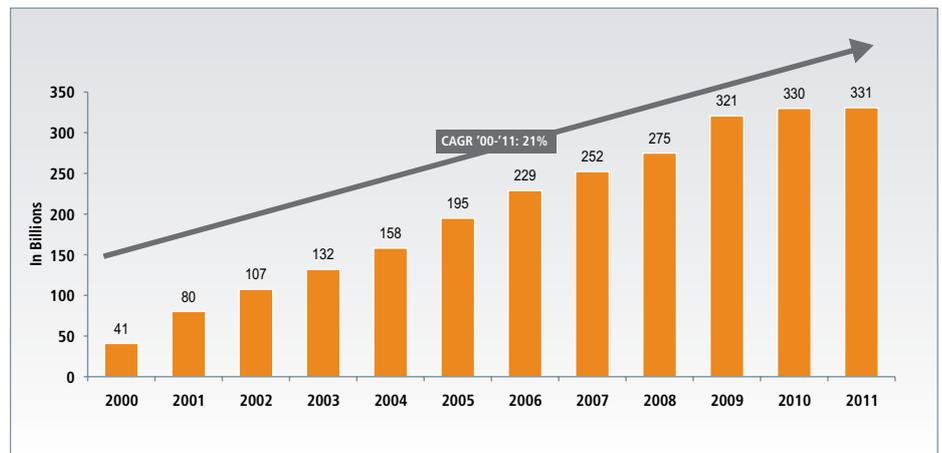
**Figure 11: Minutes of Use by Mobile and Fixed Line per Head of Population/Month in the EEA, 2011**



Source: Quantifica; IDC; WI; EIU

The growth in mobile messaging traffic (SMS and MMS) was very strong until 2010, with growth of 23% per annum from 2000 to 2009. Since 2009, growth in mobile messaging has slowed to 2% per annum. 331 billion messages are now sent per year. This represents on average 54 mobile messages sent per head of population per month. Declining growth is likely due to the explosion of social media and instant messaging services as alternatives to SMS and MMS. This trend has been particularly evident in certain segments of society, particularly youth. KPN, the Dutch operator, experienced declines in SMS traffic of 8% from Q1 2010 to Q1 2011. Over a similar period, penetration of “WhatsApp” increased from 0% in August 2010 to 85% in April 2011 for postpaid customers of KPN’s Hi brand (targeted at young people).<sup>19</sup> In a recent comScore survey on consumer mobile behaviour, 14% of EU5<sup>20</sup> participants use instant messaging and 18% access social networking or blogging sites using their mobiles.<sup>21</sup> Although the vast majority of consumers still send text messages, the comScore report indicates the extent to which alternative services are being utilised as a communication tool.

**Figure 12: Numbers of SMS and MMS Sent per Year in the EEA**



Source: Quantifica; IDC

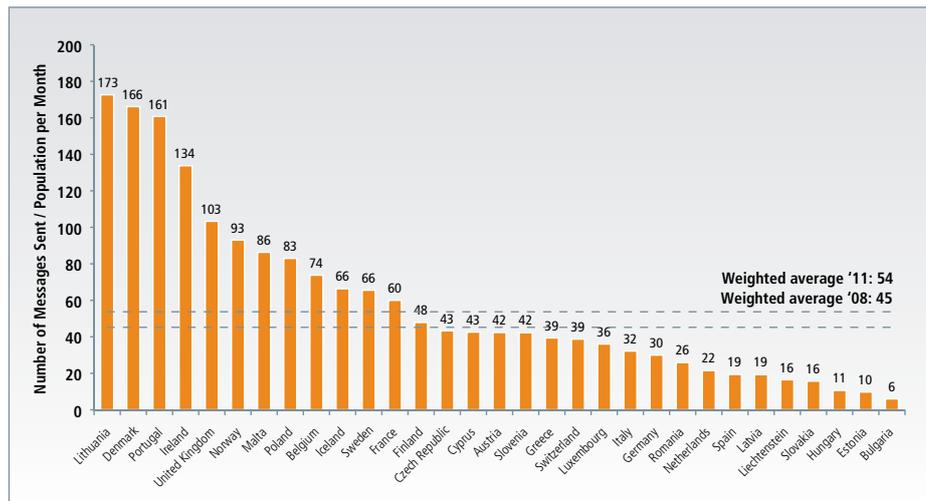
19 KPN Investor Day: Consumer Wireless, May 10th 2011

20 EU5: Germany, France, Spain, UK and Italy

21 The comScore 2010 Mobile Year in Review Report

Again, there are significant differences in patterns of use across countries. In Lithuania mobile users send an average of 173 SMS messages per month, while the level in Bulgaria is only 6 SMS messages per month.

**Figure 13: Number of SMS and MMS Sent per Head of Population/Month in EEA Countries, 2011**



Source: Quantifica; IDC

Mobile services have significantly increased total volume and frequency of communications between individuals. There are an estimated 6 calls per week on a fixed line compared to approximately 20 calls per week on a mobile per European citizen,<sup>22</sup> albeit with wide differences between countries and segments. Mobile usage is no longer confined to calls made on the move. On average, it is estimated that 40% of all calls are made from home or work, in close proximity to a landline. This suggests that customers value the personal nature of mobile communications and the convenience of mobile handsets, including the address book function.

Mobile communications have now become particularly central to the European citizen’s personal and business life. Mobile devices have become a central tool for users and are used as a watch, calculator, alarm clock, personal information management device, GPS navigator, music player, camera, etc. For business users, mobile communication services have become essential, especially for the estimated 50% of employees who spend at least 2-3 days away from their workplace.<sup>23</sup> The popularity of mobile email and internet access devices (such as Blackberry and iPhone)<sup>24</sup> demonstrates the strong customer interest in ubiquitous connectivity.



<sup>22</sup> Assuming the average fixed line call lasts 3.8 minutes (Swedish National Post and Telecoms Agency (PTS), 2011) and average mobile calls lasts 1.83 minutes (CTIA’s Semi-Annual Wireless Industry Survey, 2011)

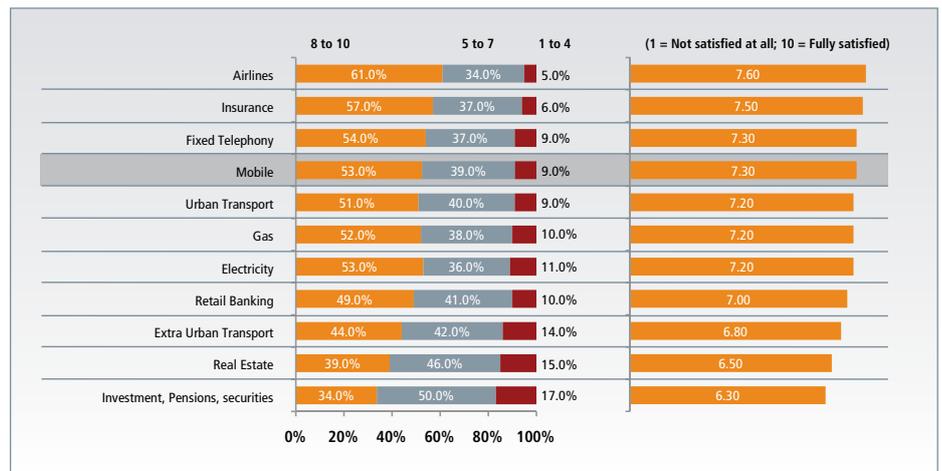
<sup>23</sup> IDC, Worldwide Mobile Worker Platform, 2009-2013 Forecast

<sup>24</sup> Company and / or brand names used throughout this paper may be registered trade or service marks – please refer to company websites for details

**Customer Satisfaction with Mobile Services**

Customers express good levels of satisfaction with mobile services, particularly when compared to other services. A survey conducted for the European Commission showed that consumers ranked mobile joint third in overall satisfaction, against a range of other services such as fixed telephony, utilities, banking, insurance and transport.

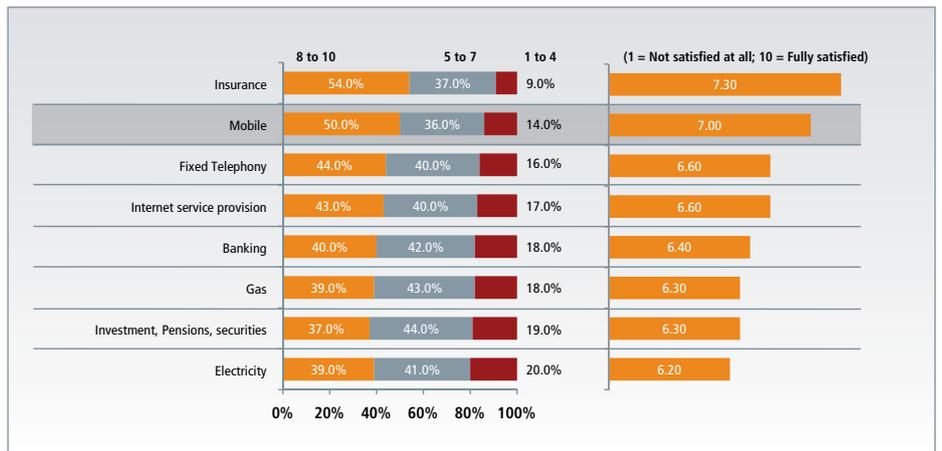
**Figure 14: Levels of Customer Satisfaction with Mobile and Other Services in the EU25, 2010<sup>25</sup>**



Source: The consumer markets scoreboard, Directorate-General Health and Consumer Protection, European Commission, 2010

When comparing mobile services to other “switching” services the presumed ease of switching product or supplier is high. Over 85% of consumers perceived switching supplier as relatively easy, especially when compared to other services such as banking or utilities.

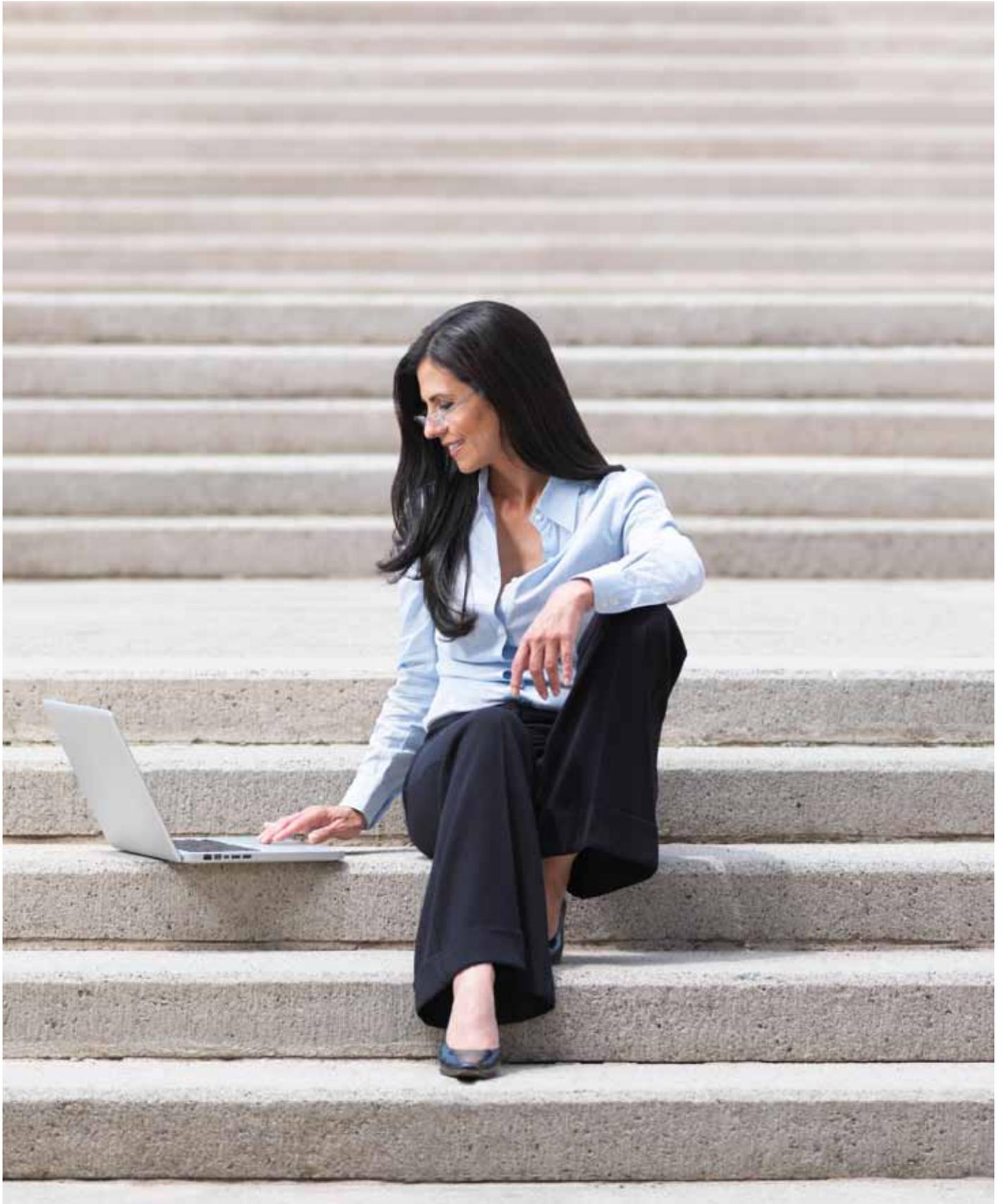
**Figure 15: Presumed Ease of Switching with Mobile and Other Services in the EU25, 2010<sup>26</sup>**



Source: The consumer markets scoreboard, Directorate-General Health and Consumer Protection, European Commission, 2010

25 The survey comprised over 29,000 interviews across the EU25.

26 The survey comprised over 29,000 interviews across the EU25.



## 4. Development of a Mass Market for Mobile Data

### Key Messages:

The mobile industry has transformed the way in which we live, work and play by continuously improving and introducing new services and products. Innovative data services have changed the dynamics of the industry and the way consumers use their handsets;

Traditional mobile companies such as network operators, handset manufacturers and infrastructure suppliers no longer fully define the mobile market. Expanding content and service offerings, new user interfaces, and easily accessible distribution channels are resulting in a consumer-driven mobile ecosystem with a diverse set of players, all competing intensely for share of the market;

Mobile broadband can be accessed using many devices – laptops, smartphones and tablets. Mobile broadband via dongles has grown at 92% per year since 2006 and smartphone shipments to Western Europe grew by 65% per year from 2009 to 2011;

Mobile data traffic volumes, driven by huge growth in mobile broadband and smartphones, are forecast to grow at over 90% for the next 5 years. This magnitude of growth is driving investment in new technologies such as LTE and advanced devices such as tablets;

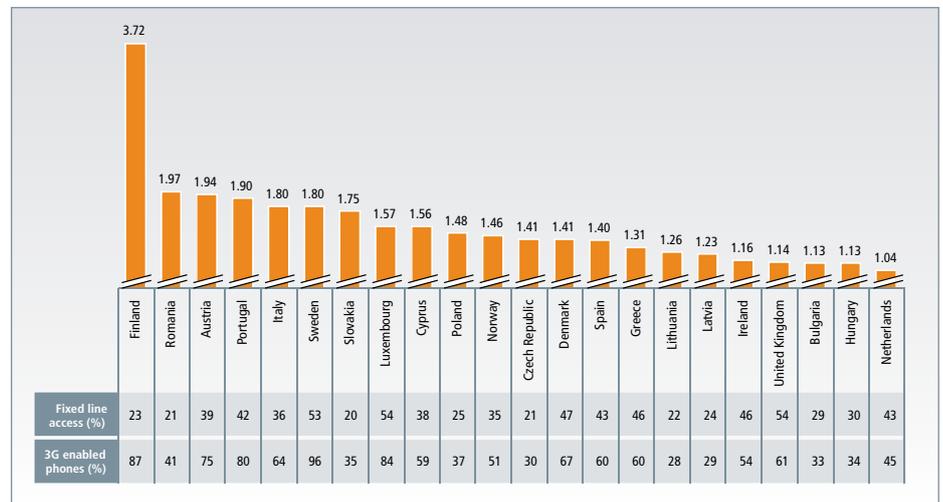
In Europe, future innovation is likely to come from the implementation of new technologies such as LTE and advanced devices. 20 operators have already launched commercial LTE networks, and widespread deployment of LTE is expected throughout Europe by 2014;

The explosion in mobile data that Europe is witnessing will continue to be driven by investment and innovation from players across the mobile ecosystem. This includes mobile operators, data service providers, device manufacturers, and support service companies.

### Rapid Growth of Mobile Broadband and the Smartphone Evolution

The last twenty years have seen a boom in both mobile services and Internet usage in developed countries. Until recently, Internet usage was largely limited to fixed line broadband. This has been changing over the last 5 years and usage of mobile broadband has accelerated rapidly. In fact, in 2008, the ITU reported that global mobile broadband subscribers had exceeded fixed broadband subscribers for the first time.<sup>27</sup> In Europe penetration of fixed line services currently stands at 49%, whilst penetration of 3G enabled phones stands at 51% and 3G population coverage at 90%; both of which are growing at a much faster rate than fixed line services.

Figure 16: Ratio of 3G Mobile Device Access vs. Fixed Line Access for selected European countries, 2010

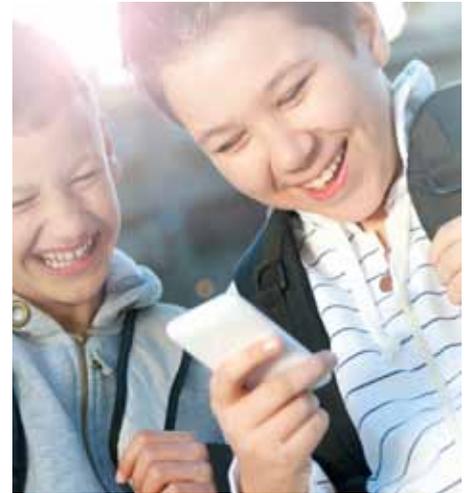
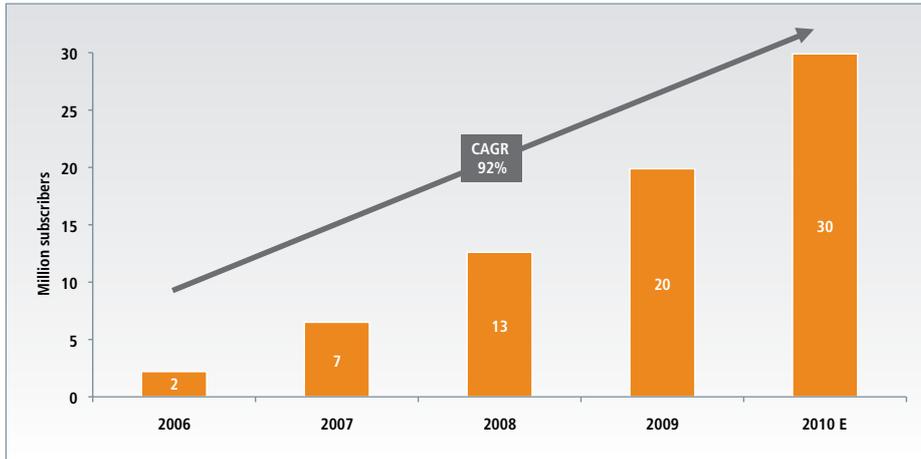


Source: ITU; Wireless Intelligence; EIU

In many markets, mobile networks are the default gateways used to connect to the Internet. This is already the case in Romania and Slovakia, where fixed line access reaches only 1 in 5 households. For Romanians, penetration of 3G devices is twice as high (at 41%) as penetration of fixed line services (at 21%).

Strikingly, in Finland, penetration of 3G enabled devices has already exceeded 85%, while fixed line penetration is below 40%. Although the number of devices with Internet access is greater for mobile than fixed, and the time spent online is likely comparable, it must be noted that fixed line Internet access currently occupies the vast majority of global Internet traffic. However, there is increasing evidence that smartphones and tablets are being used at home to access the internet in place of fixed line services. Expected trends in mobile broadband, such as those already seen in Finland, challenge the common belief that in developed markets with high-speed fixed line broadband connection, mobile will remain a complementary Internet access channel, and the default Internet access channel in the home will remain a fixed line. Mobile broadband penetration in Europe through data cards / dongles has grown by 92% from 2006 to 2010 – driven by increased network speed and capacity, better devices (such as USB-based “dongles” or SIMs embedded in laptops), a reduction in prices and the introduction of new bundles and offers, including prepaid.

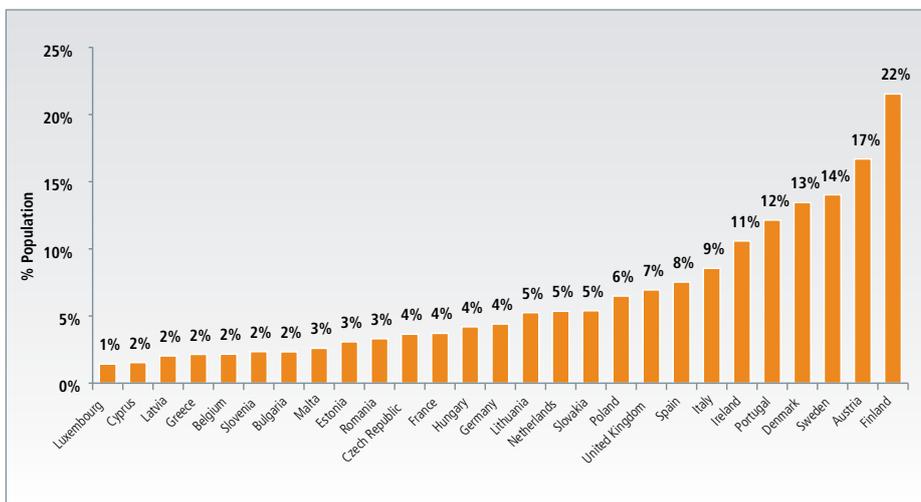
Figure 17: Mobile Broadband Subscribers in Europe via data cards and dongles



Source: InfoCom's Broadband Monitoring Service, 2008; Disruptive Analysis, Mobile Broadband Computing 2008; Broadband Access in Europe, situation at 1 July 2010, European Commission; EIU; A.T. Kearney analysis

Penetration of mobile broadband through data cards and dongles is still at early levels and varies significantly across Europe. On average penetration is 6% in the EU. Some countries have penetration rates of around 10%, such as Italy, Ireland and Portugal. Finland has the highest penetration rate at 22%, while Luxembourg has only 1% penetration.

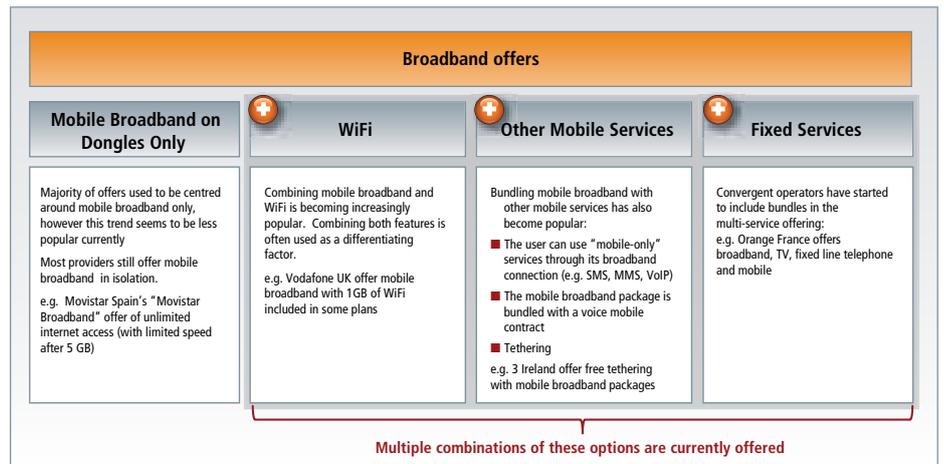
Figure 18: Mobile Broadband Penetration via data cards and dongles, Q2 2010



Source: Broadband Access in Europe, situation at 1 July 2010, European Commission

Furthermore operators are continuing to enhance their mobile broadband offerings for data cards/dongles and mobiles by bundling the service with other mobile and non-mobile services, as outlined in the exhibit below. Growth in mobile broadband via data cards and dongles is expected to continue but at the same time consumers are increasingly using smartphones to access the internet.

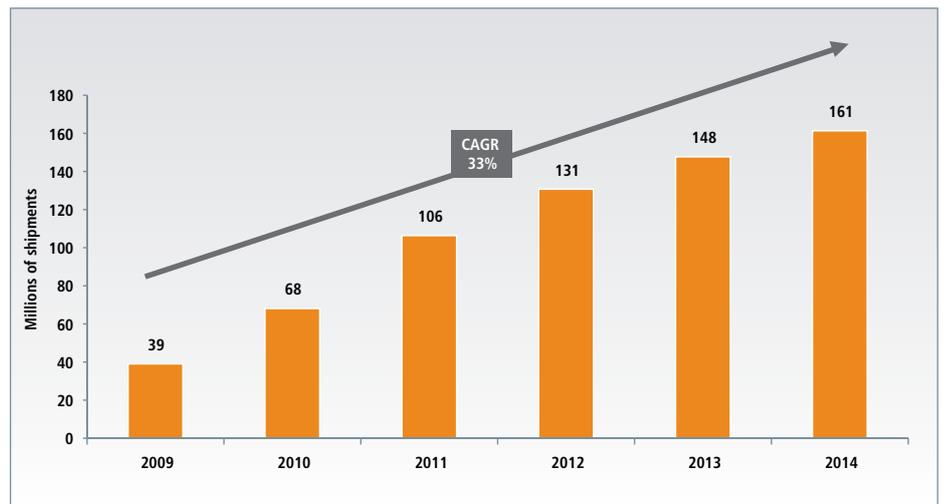
**Figure 19: Broadband Offer Structure**



Source: Operator websites; A.T. Kearney analysis

With more consumers demanding mobility, mobile broadband is becoming increasingly utilised by smartphone as well as laptop users. In fact, over the past few years there has been dramatic growth in the number of smartphones in Europe. In 2010, the estimated number of smartphones in Western Europe was 68 million and forecasts put this number at 161 million by 2014. This will represent a growth of 33% per year.

**Figure 20: Number of Smartphones in Western Europe, Current and Forecast**

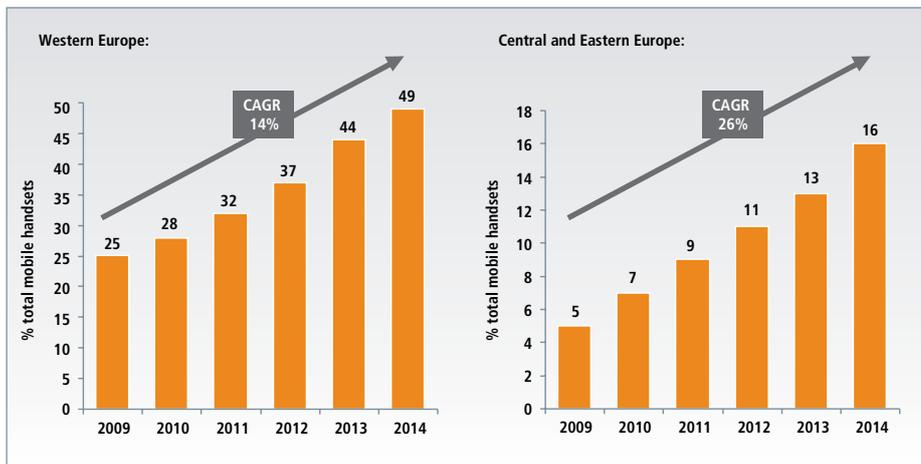


Source: IDC, December 2010

Smartphones are replacing feature phones across Europe, albeit at a faster pace in Western Europe. In 2010 an estimated 28% of all mobile handsets were smartphones in Western Europe. In larger markets such as Italy, the number of smartphone sales as a proportion of all mobile sales is as high as 47% and growing.<sup>28</sup> Smartphone penetration in Eastern Europe is growing rapidly from a small base, with estimated growth of 26% per year. The uptake in mobile internet in these developing markets has largely been driven by handset affordability as a mass market for smartphones emerges across the pricing spectrum. In some countries this is especially the case given the cost of smartphones relative to the cost of a fixed line connection. Smartphone affordability has largely been driven by manufacturers competing to gain market share and operators providing customers with innovative tariffs with various levels of subsidization.



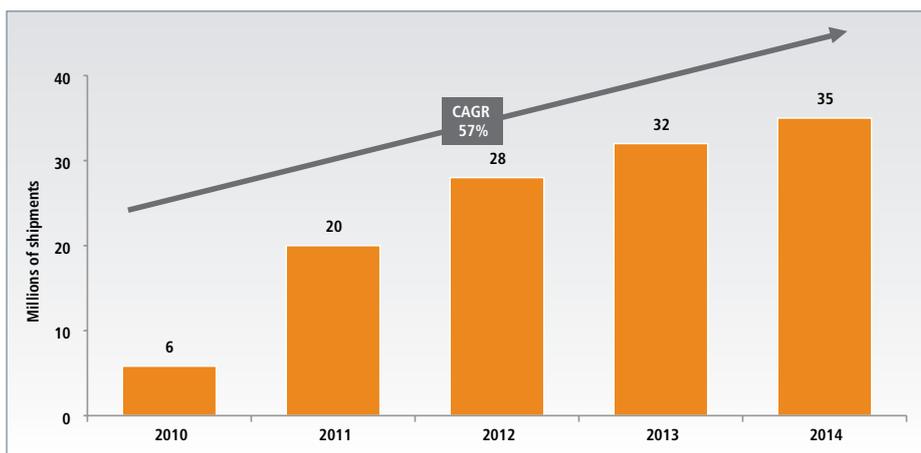
Figure 21: Smartphone Penetration in Europe, Current and Forecast



Source: Cisco Visual Networking Index, 2010

As smartphones become more sophisticated, the boundary between laptops, netbooks and smartphones is blurring. The recent introduction of “tablets” is an example of the speed of technological development that surrounds mobile broadband. All devices offer consumers mobility and internet connectivity, but with their own distinct features. Since the launch of the first tablet, the Apple iPad, in April 2010, sales in tablets increased by 250% from 2010 to 2011. Strong growth in tablets is expected to continue for the next few years, driven by increasingly diversified product offerings at affordable rates (both from hardware and operating system development), consumer interest in tablets over traditional computers, and uptake in the business segment. A recent report by Morgan Stanley found that two thirds of companies surveyed expect to allow tablets on their corporate IT networks within the next year.<sup>29</sup>

Figure 22: Number of Tablets in Europe, Current and Forecast



Source: Tablet demand and disruption, Morgan Stanley, Feb 2011

28 Percentage of Install Base of Smartphones over all Mobile Handsets, Cisco VNI mobile, Informa Media and Telecoms, In-stat, Gartner, 2010

29 Tablet demand and disruption, Morgan Stanley, February 2011



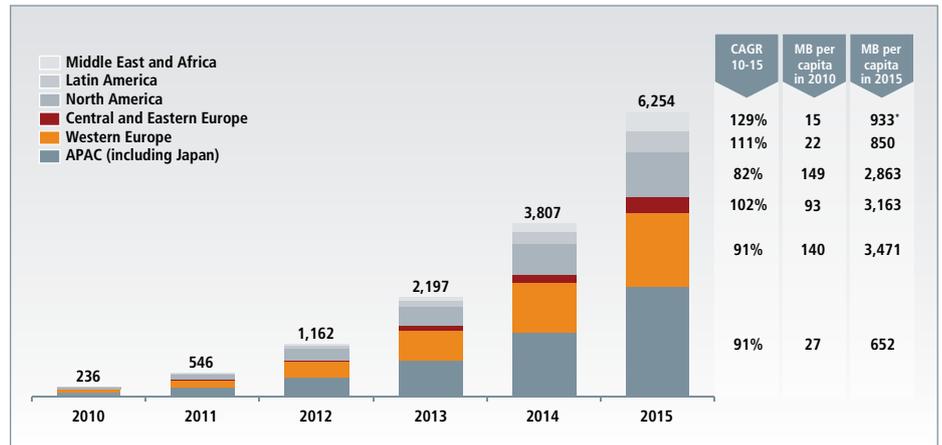
The success of mobile broadband on laptops, smartphones and now tablets has been long awaited in the industry and will represent a welcome opportunity to recoup some of the large investments made in 3G and now 4G networks. However, the success of mobile broadband will also represent a challenge for operators as the service is bandwidth hungry and will intensify the necessity for the rollout of future network infrastructure and usage of newly released spectrum.

**Explosion of Mobile Data Traffic Volumes**

As the number of smartphones and tablets has increased, so has the volume of data traffic passing through the network. In Sweden, mobile data traffic volumes in 2010 increased 91% from 2009 levels. Similarly, in the UK, Ofcom noted a 67% increase in data traffic volumes for mobile operators between 2009 and 2010, and estimated that data volumes have increased 38-fold since 2007. This is not only down to an increase in traffic per user - of all postpaid subscribers in the UK, 73% are actively using data services. Eastern European countries are witnessing the same trend with an estimated annual growth rate of 102% for the next four years. For one Polish operator, mobile data traffic increased 92% from 2009 to 2010 to reach levels over three times higher than 2008.

Growth of this magnitude will ensure Europe remains at the forefront of global mobile data traffic consumption. According to Cisco, by 2015 around a quarter of the world's mobile data traffic is estimated to pass through European networks. This is impressive considering that Europe is home to just over 10% of the world's population. On a per capita basis Europeans will consume over 3,000 MB each month by 2015, slightly ahead of North Americans (2,863 MB per month) while consumers in Asia Pacific are forecast to use only 652 MB per month.

**Figure 23: Global Mobile Data Traffic by Region and Per Capita, in Petabytes per month**

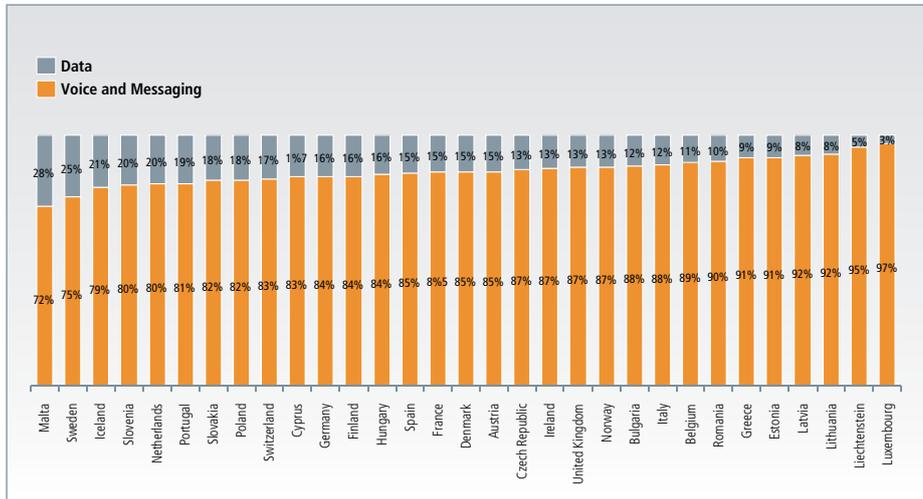


Source: CISCO VNI, 2011; EIU

Delivering this boom in data traffic represents a significant challenge, and opportunity, for European mobile operators. As intense competition and saturation on voice has driven down margins, many operators have been looking to mobile data for the next wave of revenue growth. Data and value added service revenues comprise a growing share of total service revenues for mobile operators, although there remains a wide variation between countries and operators. For example, Malta's data revenues account for more than a quarter of their total service revenues. Conversely, Luxembourgish operators so far appear more voice-focused, with just 3% of revenues reported as coming from data services so far.

\* Estimated using forecast 2012 population of Middle East and Africa

**Figure 24 Data as a Percentage of Total Mobile Service Revenues in Europe, 2011**



Source: IDC

Growth in mobile data traffic is a testament to the innovation and investment in 3G network rollout in the last decade. Progression in hardware and supporting platforms by equipment and device manufacturers in the broader mobile ecosystem has helped develop the mass market for mobile data that we see today.

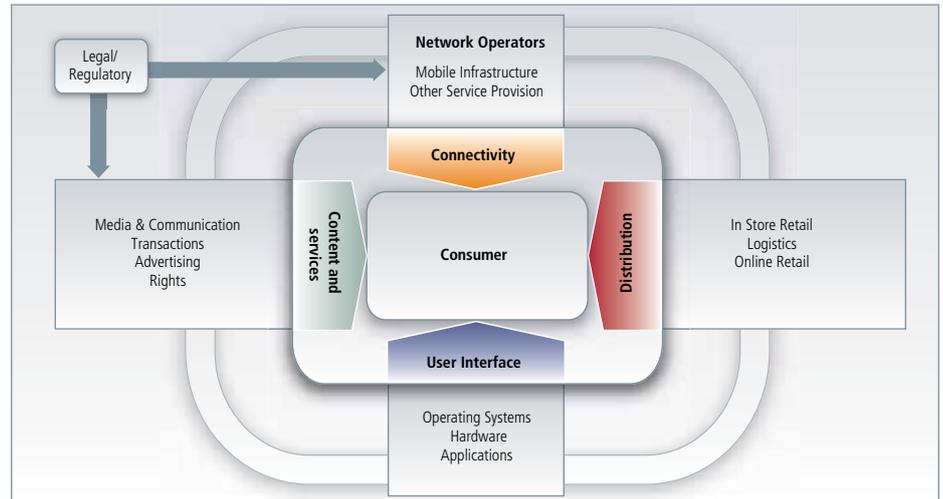
**Expanding an Increasingly Innovative Mobile Data Ecosystem**

The popularity and subsequent evolution of mobile data services has created a dynamic and rapidly expanding mobile ecosystem. Mobility has become core to every industry. Mobile applications are being adopted to improve supply chain efficiencies in business-to-business markets, mobility initiatives are driving workforce productivity in business-to-employee markets, and consumer applications are creating new services to improve retention and loyalty in business-to-consumer markets.

With the popularity of smartphones and their supporting services, European consumers today look less at the specific features and functions and more at the all-round “experience” a device can offer its customer. Players from throughout the ecosystem are continuously evolving to deliver a valuable, fully connected digital experience for consumers.

Traditional mobile companies such as network operators, handset manufacturers and infrastructure suppliers no longer fully define the mobile market. Expanding content and service offerings, new user interfaces, and easily accessible distribution channels are resulting in a consumer-driven mobile ecosystem with a diverse set of players.

Figure 25 Illustrative Diagram of the Mobile Data Ecosystem



Source: A.T. Kearney

Growth in mobile data has and will continue to be driven by investment and innovation from players across the entire mobile ecosystem. This includes players that are involved in connectivity, distribution, the user interface, content and services, and legal / regulatory stakeholders. The remainder of this section will discuss in more detail the following themes that have enabled rapid growth in mobile data services:

- Mobile operators providing connectivity and data services
- Software developers creating mass marketable applications (“apps”)
- Content and service innovators
- Operating system developers providing the required supporting software
- Device manufacturers (OEMs) and distributors providing data-ready handsets

### Continuously Improving Connectivity

Operators’ commitment to innovation has been backed by years of investment in new technologies. As a result, the mobile industry has transformed the way in which we live, work and play by enabling instant access to information, new services and applications. With data traffic expected to account for just over 90% of total global wireless network traffic by 2015,<sup>30</sup> 3G/W-CDMA networks are expected to reach their capacity and throughput limits from 2014.<sup>31</sup>

This magnitude of mobile data growth is driving further investment by operators in advanced network technologies, such as LTE (Long Term Evolution). The fourth generation network technology is a step towards increasing mobile broadband availability through better use of resources and much higher mobile speeds than 3G networks. According to the European Commission and various technical bodies, LTE will deliver increased capacity at greater speeds (up to 100 Mbps peak, in the right conditions), allowing more users to acquire mobile broadband connectivity. LTE Advanced could also allow users to benefit from high quality TV or video-on-demand while on the move.

Continuing the long-term trend of technology improvement, new technologies such as LTE use radio spectrum more efficiently by increasing the capacity per MHz. Spectrum allocations such as the digital dividend can enable signals to travel further than current frequencies and reduce the number of antenna sites needed to achieve the same network coverage, reducing energy consumption. New spectrum allocations will also bring mobile

<sup>30</sup> GSA Evolution to LTE Report, 12th January 2011

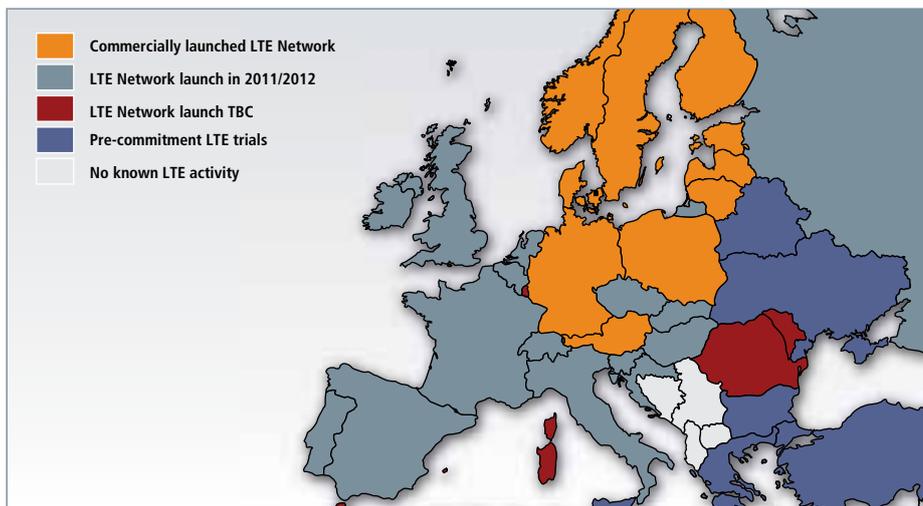
<sup>31</sup> White paper for the GSMA: The momentum behind LTE worldwide, January 2011

broadband to less populated regions and contribute to the reduction of the “digital divide” between rural and urban areas. By early 2010, 20% of the population in rural areas of the EU still could not access a DSL Internet connection, with this figure as high as 50% in some Member States.

Leading mobile operators and manufacturers around the world have already committed to using the LTE standard. Some countries in Europe are at the technical forefront, with TeliaSonera in Sweden and Norway being the first network operator in the world to commercially launch an LTE network (December 2009). Currently, 20 operators have commercially launched LTE network systems in 10 European countries.<sup>32</sup> A further 29 operators are planning to commercially launch LTE networks by the end of 2012. In addition, there are numerous pre-commitment LTE trials already in progress. The status of LTE today indicates that there will be widespread deployment of LTE networks for the majority of Western and Central European customers to use by 2014.



Figure 26: Commercial LTE Status, as of August 2011



Source: GSA Evolution to LTE Report, 31st August 2011

Operators have already begun investing in LTE-Advanced, the first evolutionary step from LTE. This technology offers even greater capacity, download speeds of up to 1 Gbps, and the ability to operate on wider and non-contiguous spectrum allocations. Several LTE-Advanced test systems are operating or planned across the world and, in June 2011, Ericsson demonstrated a working version of LTE-Advanced in Sweden. Depending on the allocation and harmonization of spectrum in Europe, LTE-Advanced deployment could start as early as 2013.

Spectrum availability is essential to the success of LTE as a new technology platform. The ability to reform existing GSM spectrum and take advantage of new spectrum allocations, especially the “digital dividend” frequencies that are freed by the switchover from analogue to digital TV, are important developments that will shape LTE deployment strategies and new service offerings.

Europe traditionally enjoyed leadership in mobile communications over other regions in the world, in particular the USA. Today, however, some European countries are lagging behind the USA and Asia Pacific in the commercial rollout of LTE. In the USA, for example, three operators have already launched commercial LTE networks, and a further three are committed to launching in 2012.<sup>33</sup> According to Informa Telecoms & Media, the USA will have two thirds of total global LTE subscriptions by the end of 2011.<sup>34</sup> In addition, unlike the USA, European operators are using a patchwork of spectrum for LTE networks, which is likely to impact future LTE infrastructure and device development costs and further enable the USA to progress faster through LTE-Advanced and other future technologies.

32 Wireless Intelligence

33 MetroPCS, Verizon Wireless, AT&T, have launched commercial LTE networks, with Sprint, US Cellular and Leap Wireless expected to launch commercial networks in 2012

34 “Verizon’s successful LTE launch has changed the US competitive landscape”, Press Release, Informa Telecoms & Media, November 8th 2011



Nonetheless European operators and other ecosystem players are investing significantly in LTE and LTE-Advanced. To promote the development of future technologies in Europe, Member States have earmarked over €9 billion for researching information and communication technologies until 2013.<sup>35</sup> These technologies will further drive growth in demand for data services.

As well as driving growth in mobile data by rolling out faster networks to improve connectivity and coverage, continuous innovation in operators' data pricing and packages has been a key influencing factor in the adoption of mobile data services, particularly in a time when consumers are experiencing constraints on disposable income. The prevalence of "unlimited" data tariffs (with fair usage policies or limited speed after several GB's)<sup>36</sup> for heavy-usage customers is helping, together with faster access speeds, to solidify the position of the mobile data market as a commercial substitute to fixed line internet access. Several operators across Europe offer very large monthly mobile data usage with contracts.

For example, in Austria, 3 offer up to 6GB of data usage per month with their standard €40 monthly contract. Customers on 3 are also eligible to use their data packages on partner networks when they travel around Europe. Offers such as these are encouraging Europeans to consume larger amounts of data whilst travelling, contributing to a seamless online experience across the region. Similar offers for prepaid customers are also widespread. For example, Vodafone Portugal offers prepaid customers "Vita Total Smartphone" bundles from €7.50 for 12 days that include 500 MB of mobile data traffic.

Tariff innovation has also helped to provide customers with flexibility in their data consumption. O2 UK provides data bundles that can be added onto postpaid contracts – the bundle can be used either with the consumer's smartphone or with the consumer's computer via tethering. In addition, O2 also offer unlimited data usage through their WiFi network, "The Cloud".

Operators have also encouraged adoption and usage of mobile data amongst lower-end, more price-conscious customers by offering affordable, bite-sized data tariffs. In Romania, Vodafone customers can subscribe to a monthly volume based data plan that starts at €1.50 for 50MB or €3 for 250MB.

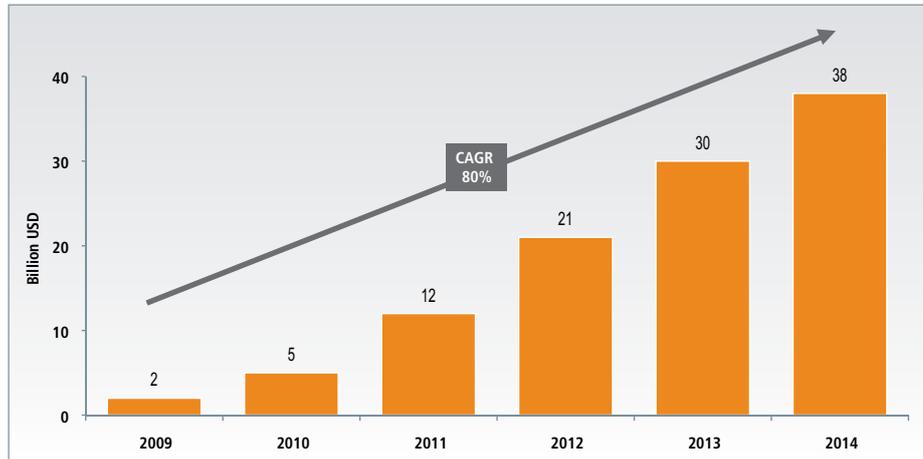
### The Mobile Apps Revolution

The rapid growth of the smartphone applications ("apps") market in the past four years has fundamentally changed the way in which people access and consume content. This has contributed to a shift in competitive dynamics that is directly impacting network operators, operating system/app store developers and handset manufacturers. Currently, the global mobile apps market is estimated at \$12 billion and is expected to grow by 80% per annum to \$38 billion by 2014. This is impressive, especially considering that the global music publishing market is estimated to be just \$22bn by 2015.<sup>37</sup>

<sup>35</sup> Europe's 7th research framework programme, European Union

<sup>36</sup> With fair usage policies, "unlimited" data bundles accommodate the usage of the vast majority of users but restrict unusual traffic patterns

<sup>37</sup> Global Entertainment and Media Outlook 2011-2015 estimates that global recorded music revenues will reach \$22.1 billion by 2015, taking into account that revenues in this industry have been declining since 2006

**Figure 27: Mobile Applications Revenue Worldwide, Current and Forecast**

Source: Pew Research Center's Internet American Life Project, April 29-30, 2010 Tracking Survey; The Nielsen App Playbook, December 2009

Technology standards and operating systems are fast developing to capitalize on the apps revolution. 'Garage developers' and niche content/service providers continue to have the same opportunity as global content providers and publishers to establish the popularity of their app among consumers. The resulting micro-businesses are leading to new levels of innovation and positive economic impact.

As apps have become prevalent in consumers day-to-day activities, businesses of all types have jumped onto the apps "bandwagon" to attract new and retain existing customers. A few prominent examples include airline companies using apps to issue tickets and boarding passes, apps designed by banks to increase the ease at which users can access their own accounts on the move, and retailers designing apps to allow customers to research and buy their products anywhere and anytime.

Another significant development likely to occur as a result of the apps revolution is a change in the mechanism by which apps are distributed. Most of the players in the market today have their own online app stores to distribute apps to their customers. Although there are many business models co-existing in the market, apps stores currently assist with the submission, quality checking, distribution and settlement process for developers.

The majority of these platforms have been set up by manufacturers and operators. A step change from this came with the creation of the Wholesale Applications Community (WAC), an open global alliance comprised of the world's largest mobile phone network operators and manufacturers – many of which are headquartered in Europe – and dedicated to empower developers to create and distribute compelling digital content.

The objective of WAC is to help standardise the mobile applications market by leveraging its group scale with global initiatives to help simplify the submission, distribution and settlement processes for developers. As well as developing and distributing a web-based platform that operates across different mobile operating systems, WAC has built a centralised submission repository that allows developers to submit applications once and have them distributed globally via WAC member operator and OEM managed storefronts.

WAC does not focus on any particular operating system. It aims to build the tools to allow developers to create more compelling applications and monetise their content across a range of platforms and technologies, including Android, HTML5 and Flash. Vodafone, for example, is rolling out direct operator billing for Android Market in Europe. This will enable customers to purchase apps without entering payment details, and will give developers direct access to Android users who can now charge Android purchases straight to their phone bills or prepaid accounts.



### Vibrant Content and Service Innovation

Mobile apps are just one of the manifestations of how the mobile device is an increasingly important channel for information, entertainment and transactions. Innovation around the development of mobile-based services will continue to be a key factor in driving mobile data usage. Some of the key service innovation areas of recent years include:

- **Communication.** Beyond traditional voice services, mobile VoIP and email services, there are a growing number of communication tools available to mobile users. In-built applications such as BlackBerry “Social Feeds” are increasingly prevalent and enable consumers to coordinate all their online social activities into one, manageable service. In addition, there has been a recent trend of integration of social networks with the user interface. For example, Windows Phone integrates the user’s social networking sites with their contact list to incorporate the relevant information and create a “hub” of social feeds that, to a certain extent, diminishes the need to open the original social network’s app.
- **Mobile entertainment.** Mobiles constitute an ideal entertainment platform for usage on the move. Initially, mobile operators and content providers focused on providing basic mobile music, gaming and short video services. Increasingly, mobile services now include multimedia rich content. The global digital gaming industry, as well as ‘garage developers’, have created games for mobile phones similar to the ones in gaming consoles or PC. Nowadays, everyone with a smartphone has direct access to YouTube, music download services, social networking sites such as Facebook, and more recently gaming experiences traditionally only available on games consoles such as Playstation. As connection speeds continue to rise, and WiFi and mobile broadband coverage improves, gaming and mobile video (including live streaming) will become increasingly utilised services. This is likely to have a major impact on data traffic, given the bandwidth required for mobile video streaming, especially as high-definition video takes off.
- **Mobile payments, including m-commerce, Near Field Communications (NFC), m-ticketing and mobile financial services.** Mobiles offer new, more convenient mechanisms for carrying out payments, transfers, ticketing and other transactions. Public authorities are using mobile services to provide more convenient, cost effective means of payment for transport and parking, banks are offering mobile banking services, and mobile ticketing and check-in is now widely used by airlines and the travel industry. According to Juniper Research, 480 million mobile users across the world will be using their mobiles for mobile ticketing by 2013 – 1 in 7 mobile subscribers will use m-ticketing specifically for airline boarding passes.<sup>38</sup>

Mobile phones that enable tap-and-go m-payments through NFC technology are another m-commerce service offering. This technology has been available in Europe since early 2011 and by 2014 it is estimated that 1 in 5 smartphones worldwide will be NFC-enabled.<sup>39</sup>

The momentum for more SIM-based mobile NFC services is growing exponentially, with over 50 mobile operators already committed to SIM-based NFC services. In February 2011, Orange announced that over half of all new European smartphone models to be added to their range by the end of 2011 will be NFC-enabled, even if the relevant services are not yet in existence. To this end, mobile operators are proactively encouraging service providers to roll out NFC services.

In France, there are already examples of commercial NFC services. BPCE, a French banking group, and Visa have teamed up to deploy city-wide pilots of NFC microSD cards in Nice and Strasbourg, The pilot, which has been endorsed by all French mobile operators, enables customers to conduct NFC transactions on certain existing mobile devices.

<sup>38</sup> Juniper Mobile Ticketing for Transport Markets report, 2011

<sup>39</sup> Juniper NFC Retail Marketing & Mobile Payments Report, 2011

NFC technology can enable far more than just contactless payment. It could revolutionise transportation by replacing paper and electronic tickets, and improve continuity of healthcare by providing information on patient medication routines. It could also change the way retailers interact with consumers through the use of smart objects, such as NFC installed software on poster advertisements.

One of the biggest challenges facing the adoption of NFC, as a day to day technology, is how to drive the scale of service rollout across all service industries. Historically, the key to success and to ensuring future growth has been fully interoperable services and collaboration between both mobile and service industries. The GSMA believes that SIM-based standardisation of these services, and the creation of a common framework for implementation and product interoperability, can create market conditions that deliver indirect, non-financial value across a range of market stakeholders, including the end consumer.

- **Mobile retail, including m-advertising, m-coupons and smart posters.** Retailers are already exploiting mobiles as a channel to launch advertising campaigns. M-advertising offers retailers the ability to communicate with customers in more personalized and interactive ways, through a wide range of different mobile advertising options including m-coupons, location-based advertising, SMS texts, video clips, and "click-to-call" advertising. To truly differentiate themselves and ensure brand engagement with consumers, advertisers are creating and sponsoring new interactive mobile experiences connected to social networks to further increase the brand's reach.
- **Mobile monitoring and surveillance.** Mobile technology is enabling companies to monitor equipment, people and the natural environment remotely. Healthcare providers are using mobiles to monitor patients remotely, while security and law enforcement agencies are using mobiles to track criminals and carry out surveillance. Smart home products are also allowing consumers to remotely control access to their homes' security system through their device. With mobile technology, these new applications are allowing companies and public sector bodies to reduce costs while increasing safety / security and the speed / quality of service for consumers and citizens. A unique use of mobile monitoring can be found in Bulgaria. The "e school diary" offered by Mobitel enables parents to track the education of the child. The service includes automatically notifying parents of their childrens' school marks, attendance and health care via voice, email or SMS notifications.
- **Cloud computing.** Mobile cloud computing allows on-demand network access to a shared pool of computing resources (such as storage, applications, and services) through mobile devices. Cloud computing can lead to more complex applications and features becoming commercially available for less technically advanced smartphones. It can also enable faster and cheaper application rollout for developers.

Cloud services are a new, yet rapidly expanding market. Although not yet available in Europe, the Amazon Cloud Player has been introduced for Android users in the US. It provides customers with 5GB of free Cloud drive storage space that can be accessed from any computer and also allows free storage of music purchased within the Amazon MP3 store – which can then be accessed via computer or using the relevant Android app.





Figure 28 Examples of Recently Announced Cloud Services



Source: Company websites

In addition to traditional IT vendors, mobile operators are looking to capitalise on cloud computing. They can offer more personalised packages and a single payment process for customers. In early 2011 Telefonica announced their multi-platform cloud services that can be uniquely tailored to individuals across all their connected devices. With Google and Apple also recently announcing cloud services, it is clear that these services can add immense value by helping players across the ecosystem to provide a unique service proposition to their consumers.

Figure 29: Case Studies of Innovative Mobile Services

 <p><b>Mobile Entertainment – Games.</b> Now it's already possible to achieve the traditional console gaming experience as the Xperia Play, Playstation certified smart phone provides customers with dedicated gaming keys and an analogue touch joystick. In the future, with 4G, the choice of games and graphics available on demand will enhance the gaming experience further</p>	 <p><b>Mobile Surveillance – Mobile M2M surveillance.</b> Mobitel Bulgaria's M-Tel KeyControl product offers customers remote control access to their electronic lock system at home. The service enables the locking and unlocking of the entrance door remotely via SMS instructions, and notifications when the door is opened and if home alarms are triggered. Mobitel also offers a mobile CCTV service to monitor several home/office cameras in real time</p>
 <p><b>Mobile Payments – Mobile Banking and NFC.</b> Samsung, Orange and Barclaycard have joined forces to enable consumers to make contactless "tap-and-go" payments of up to £15 at a time. The service is available in certain stores and top up is pay-as-you-go. It is expected that most future Samsung devices available to consumers will have access to NFC technology.</p>	 <p><b>Mobile Advertising – Interactive advertising apps.</b> Companies are creating mobile advertising campaigns that are more active and social to engage consumers with the content and therefore the partnered brand. Heineken's StarPlayer app enables football fans to interact in real time with match play and compete with other spectators through a variety of games. It also enables your results to be published on social media platforms.</p>
 <p><b>Future Apps – Mobile Shopping.</b> Carrefour in France launched m.carrefour.fr where users have the ability to see 360-degree product views, find in-store promotions, check inventory, and order products. The app compliments PC use and customers can start shopping on a PC and finish on their mobile, or vice versa. Customers can present their loyalty card via their mobile at checkout to receive points and directly access their account. Future editions of the app will include integrated video and geo-location capabilities.</p>	<p><b>Mobile Cloud – Amazon Cloud.</b> Amazon Cloud Drive provides users with online storage for eligible music, which you can stream on demand anywhere from a smartphone (with Android OS), Kindle or iPad via the Amazon Cloud Player. Currently, Cloud Player is available only in the USA. However, Amazon is expected to expand the service to Europe.</p> 

Source: Company websites, press releases

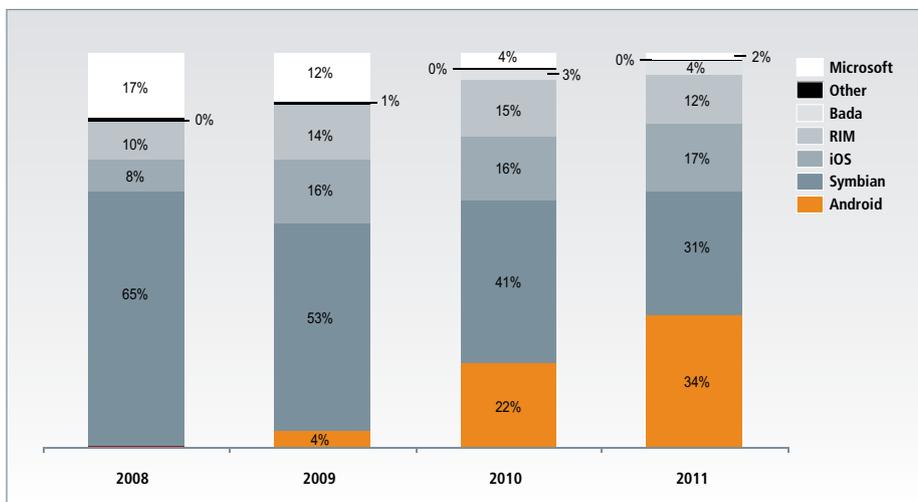
If successful, these service innovations have the potential to generate substantial revenue growth for the mobile industry as a whole. This will provide further growth opportunities and job creation potential for the European mobile industry.

High levels of consumer mobility also enable other sectors of the economy to benefit from new mobile service offerings. In Germany, Kuffer Marketing released an app that provides iPhone users with locally targeted coupons with mobile barcodes. Companies can use services like these to increase brand awareness of new products and applications to relevant segments of society. Mobile coupons are increasingly utilised by retailers. In the case of Kuffer Marketing, their app was downloaded 50,000 times in the three days after its launch, driving it into the Top 5 downloaded apps in Germany. Consumer ability to access price comparison websites on-demand has enabled “smarter” shopping. As a result, over the next few years, retailers will likely need to invest in m-coupons and other innovative means to maximise their in-store sales and protect their customer base.

**Operating System Competition**

The operating system landscape has seen many changes over the last couple of years as a result of the growth in smartphones and consequential market power of certain manufacturers. There are four players dominating the landscape for smartphone operating systems.

**Figure 30: Evolution of Smartphone Market Share by Operating System in Europe**



Source: Mobile Communication Device Open OS Sales to End Users by Operating System, Eastern and Western Europe, Gartner, Q2 2011

As a result, the European smartphone OS market is becoming increasingly consolidated, a trend that is expected to continue for the next few years. Android, for example, is now the most widely used platform - representing 34% of all smartphone shipments in Europe in 2011.<sup>40</sup> The Android OS is core to two large device manufacturers in the European smartphone market, Samsung and HTC (not exclusively Android), which had a combined market share of 29% in Q2 2011.<sup>41</sup> On the other hand, fragmentation within open source OS is occurring as device manufacturers aim to differentiate their OS platforms to consumers. Microsoft’s Windows7 platform, despite its recent alliance with Nokia, is still a small player in the European market with around 1% market share in Western Europe. Nokia has announced a new suite of handsets with this OS, which is expected to have an impact in the market.

40 Mobile Communication Device Open OS Sales to End Users by Operating System, Q2 2011, Gartner

41 Mobile Communication Device Open OS Sales to End Users by Operating System, Q2 2011, Gartner

Apple iOS is one of the stronger contestants in the European market, thanks to the success of the iPhone. Sales of the iPhone have now exceeded 100 million and its success is still expected to continue. The launch of the iPhone 4 generated long queues of people waiting overnight to purchase the new handset.

However, the landscape of the operating systems could be about to change again with the introduction of HTML5. HTML5, the collective name for a set of emerging Web standards, is a developer platform that enables apps to run directly from the Web browser. It can support many features, such as video, graphics and multimedia content, without having to resort to proprietary plugins and application programming interfaces (APIs). HTML5 enables developers and content providers to deliver a consistent experience across different devices, while emulating the current generation of (“native”) apps’ ability to download and cache data or use when not connected to the Web.<sup>42</sup>

Many more developments in operating systems are expected to emerge due to the dynamic and highly competitive nature of this sector. The trends and developments will be similar across the world and will likely be influenced by innovation occurring outside of Europe. If Europe is to regain leadership of this sector, ongoing support to the few remaining players will be crucial.

### **OEM Repositioning**

The vendor environment has changed significantly over the past few years, mainly due to the introduction and uptake of smartphones. OEMs have been focused on providing a comprehensive selection of handsets and operating systems to satisfy customer demand. As a result smartphones have captured significant market share in Europe (see sub-section on “Rapid Growth of Mobile Broadband and the Smartphone Evolution”).

These changing dynamics have prompted manufacturers in Europe and elsewhere to redefine their strategies to reinforce their position in the mobile ecosystem. Manufacturers are now working more closely with developers, operators, and content and service providers to transition from a device-centric to an ecosystem-centric business model.

In 2011, Nokia, whose strengths lie in hardware and supporting technologies, entered into a partnership with Microsoft, whose strengths lie with the software and user interface. Manufacturers are also looking to partner with specific content and service providers to further define themselves to consumers. For example, HTC recently teamed up with Beats to improve the audio experience of its smartphones, and with Dropbox to offer cloud storage for users.

Partnerships such as these provide a platform for vendors and developers to differentiate themselves to consumers, whilst at the same time providing continuous value to all players involved across the ecosystem. To achieve a similar result and offer consumers a more complete, fully connected digital experience, manufacturers are looking to integrate mobility products into their wider portfolio, such as gaming consoles and televisions.

The dramatic change in the operating system landscape has also impacted the OEM market. To compete in the evolving market, device manufacturers have enacted different strategies; some have chosen to use their own operating system (e.g. Apple, RIM) while others have decided to go with one/multiple open source operating systems (e.g. Samsung, HTC, LG are some of the manufacturers that use Android as an OS). As a result, the line between handset manufacturers and operating system providers has started to blur. This has led to the emergence of a diverse array of business models, in part to avoid commoditisation. One such model has been to vertically integrate up the value chain. Business models that enable companies to manufacture hardware and develop their own operating systems are increasingly prevalent. Google, for example, acquired Motorola (although patent rights are also part of this decision).

Technological advancements that reduce the proprietary nature of mobile applications and service provision could on the other hand help device OEMs and network operators maintain the ability to produce their own, distinctive user interface.

The above trends are shifting the balance of power in the OEM market, and more established manufacturers are not necessarily maintaining dominant market positions. For example, Nokia had a market share of 34% of global mobile phone shipments in Q2 2010 but it has seen that drop 20% in just one year.<sup>43</sup> Although Nokia still has a strong hold on the market with 24% market share worldwide, new players are capturing market share – in particular in the smartphone space. Apple is perhaps the most obvious example with 20% market share of smartphone shipments in Western Europe in Q2 2011.<sup>44</sup>

ZTE and Huawei, who already operate in the European market as ODMs, have recently announced their intention to launch branded handsets in the UK market, with other markets potentially following in the near future. The European market is particularly attractive to many manufacturers due to its high levels of competitiveness, the density of customers, and their propensity to replace handsets, in part a result of handset subsidy models many European operators have employed. ZTE is currently the fourth largest mobile phone vendor globally and can be expected to be amongst the new entrants contesting for future market share.<sup>45</sup>

The success of some handset manufacturers has given OEM's an increased "ownership" of the customer. As a result, the balance of power has been altered and some mobile operators are undertaking new initiatives to retain their customer base. For example, to avoid loss of the "ownership" of their customers through commoditisation, maintain the negotiation power with device manufacturers, and balance the power of different operating systems players, mobile network operators are increasingly providing their own devices. This places operators in direct competition with traditional device manufacturers for both feature and smartphones. For example, in many of its European subsidiaries, Orange currently offers four own brand mobile phones (two of which are smartphones) that are available in different colours and with different features across postpaid and prepaid plans.



43 IDC Worldwide Mobile Phone Tracker, July 28 2011

44 IDC Q2 2011 smartphone shipments, September 2011

45 IDC Worldwide Mobile Phone Tracker, Q3 2011, October 27 2011

## 5. Substantial Socio-Economic Contribution

### Key Messages:

**Mobile services are increasing the accessibility of voice and data communication services, thanks to lower up front and recurring monthly costs compared to fixed-line;**

**The mobile industry also makes a very substantial contribution to the European economy, generating an estimated 1.7 million jobs for Europeans. Key contributions include:**

- **Mobile operator GDP contribution of approx. €174 billion (1% of total EEA GDP);**
- **Contribution to public funding amounting to approx. €83 billion – of which €65 billion from mobile operators directly;**
- **Direct employment of 370,000 Europeans and induced employment of 1.3 million more.**

**The industry continues to work hard to reduce its carbon footprint. Important progress has been made with initiatives such as network sharing agreements, solutions to reduce radio network power consumption, a universal charger solution and 'green' handsets;**

**Mobile services are making an important contribution to improving the health and safety of European citizens – by increasing emergency service response times, enabling remote mobile health services, and by permitting the development of innovative services to protect vulnerable groups such as children or the elderly;**

**The mobile industry demonstrates strong commitment to consumer protection – as exemplified by comprehensive initiatives to protect children from inappropriate content, reduce handset theft and curb spam.**

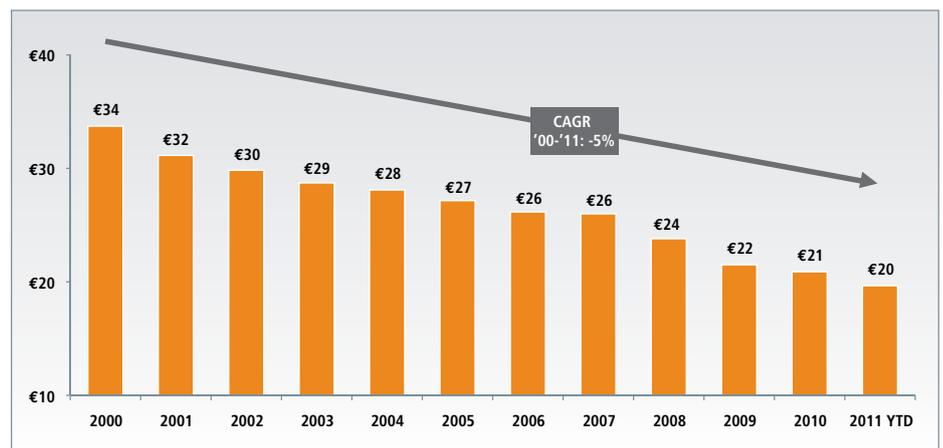
### Increasing the Accessibility of Communications Services

Mobile technology makes communications services significantly more accessible, offering a lower entry cost to households facing economic difficulties, with minimal or no monthly spend commitments compared to fixed line services. This remains particularly true in developing countries, where the relatively low quality and limited coverage of the fixed line network has meant that mobile operators are able to offer superior quality at a competitive cost and thereby introduce a highly successful alternative to fixed line voice communication. In addition, mobile prepaid services have alleviated barriers preventing marginalized groups from gaining a fixed line telephone – such as having a fixed address, a bank account and a credit history – although certain crime prevention measures have increased the administrative requirements to register a prepaid subscription.

Western European markets have, on the whole, shown an increase in mobile penetration rates but have experienced a slow decline in fixed line telephone access over the past 5 years. Within Europe, mobile generally exceeds fixed line telephone penetration. In some cases the differences are extreme. For example, in Estonia only 1 in 3 households had a fixed line in 2010, while mobile phone penetration stood at nearly 128%. Even after taking into consideration the fact that in some markets customers frequently carry more than one SIM card, the proportion of people connected to mobile networks far exceeds those connected to fixed networks.

As shown below, Average Revenue per User (ARPU) across Europe has been declining consistently over the last decade and now stands at an average of €20 per month, 42% less than in the year 2000. The decline is even more significant if we consider that the average usage of voice and data services has seen a dramatic increase over the same period (as discussed in the previous sections). The decrease in ARPU partly reflects the multi-SIM trend in Europe. As mobile services that require additional SIMs become increasingly common, ARPU is unlikely to reflect the actual cost per customer and another metric may become more relevant. The decline in ARPU can also partly be explained by users optimising their bundles, resulting in a sharp decline in out of bundle calling.

Figure 31: Evolution of ARPU in Europe<sup>46</sup>



Source: Wireless Intelligence; EIU; A.T. Kearney analysis

<sup>46</sup> Weighted average ARPU based on country population. Note: 2009 data based on a sample of 23 EEA countries

According to Eurobarometer, 27% of European households, and on average 51% of households in “New Member States”, have access to one or more mobile phones but not to a fixed line, a significant increase versus 2008, where these figures were 24% and 39% respectively.<sup>47</sup> By contrast, only 9% of households have fixed line access but no mobile subscription.

The competitive mobile market has therefore been more successful than the Universal Service Obligation for fixed line telecoms in making telecoms services accessible to less fortunate segments of society.

Mobile will also play an important future role in bridging the digital divide. Today, 38% of European households do not have access to the Internet at home because of the high costs of subscription fees and personal computers, compared to 51% in 2008.<sup>48</sup> With increased availability of 3G / HSPA mobile devices and services and the future roll-out of services on the digital dividend spectrum, mobile can also provide a lower entry cost option to broadband for low income customer segments and rural inhabitants. Prepaid mobile broadband tariffs enable mobile users to access the Internet on an ad hoc basis without making a long-term commitment to paying a monthly charge, and without having to own a personal computer.

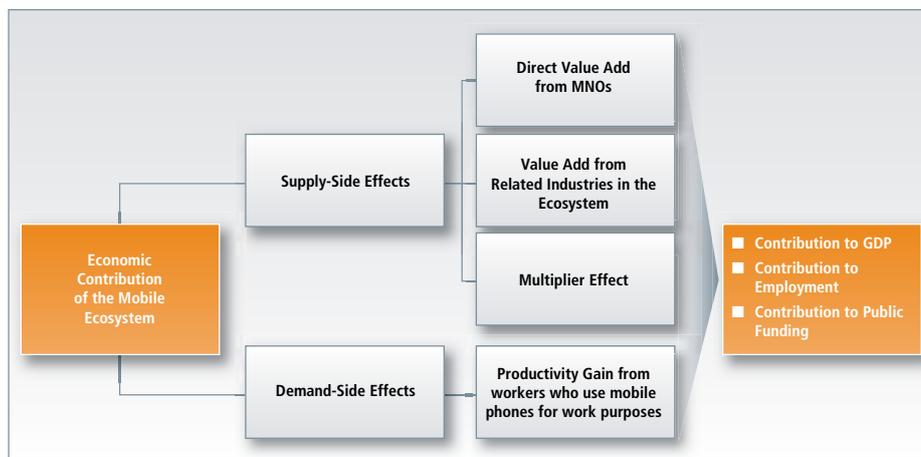
#### Major Contributor to the Economy and Employment<sup>49</sup>

The mobile industry’s economic contribution can be measured in terms of both supply and demand. On the supply side, this consists of:

- GDP contribution of approximately €74 billion (1% of total EEA GDP);
- Contribution to public funding estimated at approximately €3 billion – of which €5 billion is from mobile operators directly;
- Direct employment of 370,000 Europeans, and induced employment of 1.3 million.

In total, the mobile industry contributes to the employment of an estimated 1.7 million Europeans.

Figure 32: Framework for estimating the Mobile Industry’s Economic Contribution<sup>50</sup>



Source: A.T. Kearney

47 E-Communications Household Survey, Eurobarometer (2010).

48 E-Communications Household Survey, Eurobarometer (2010).

49 For the 2011 European Mobile Industry Observatory Report we have updated the value chain based on current market dynamics and in line with the Asia Pacific, Latin America and Africa 2011 Mobile Industry Observatory Reports. This reduces the scope of the contribution we attribute specifically to mobile. For a detailed methodology, please refer to Section 7

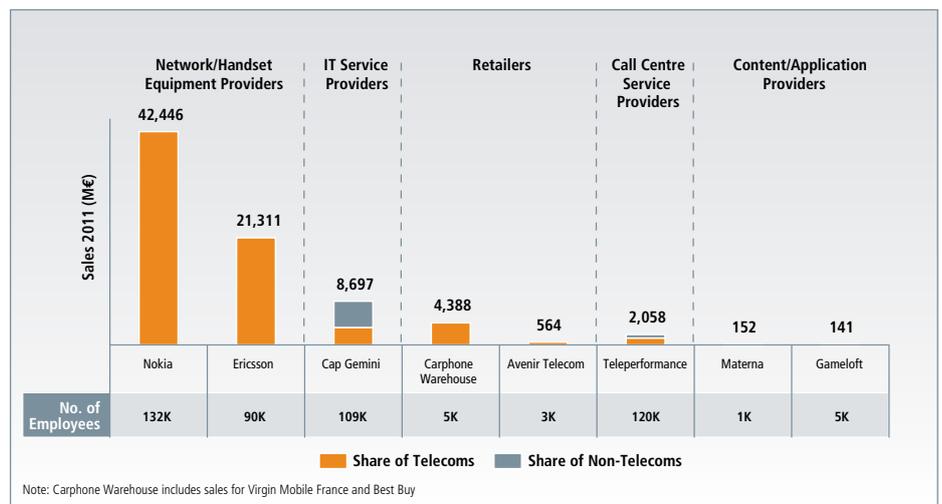
50 For this report only the supply-side effects are calculated. The impact of productivity gains is more relevant in developing countries where alternative fixed line communication systems are less prevalent

With steady revenue growth, the mobile industry has been making an increasingly important contribution to total GDP in Europe. The European mobile operators' total revenues grew from €88 billion in 2000 to €174 billion in 2011. The mobile industry now contributes approximately 1% of total EEA GDP.

Mobile operators rely heavily on a wide range of suppliers, such as network and handset equipment manufacturers, retailers, providers of key services such as IT development or call centre operation and content/application provisioning. The growth of the European mobile industry has enabled the creation and development of global industry champions.

For instance, Ericsson and Nokia are leading providers of mobile network equipment and handsets globally. Similarly, the development of outsourced call centre services has been driven by the telecoms industry, which accounts for 50% of the market (of which half is mobile). Teleperformance, the second largest call centre provider globally, has developed rapidly thanks to its strong presence in telecoms and now employs 120,000 staff. The mobile industry has also seen the rapid growth of specialized mobile content and application start-ups such as Materna or Gameloft.

**Figure 33: Sales and Employees for Selected European Suppliers to Mobile Operators, 2011**

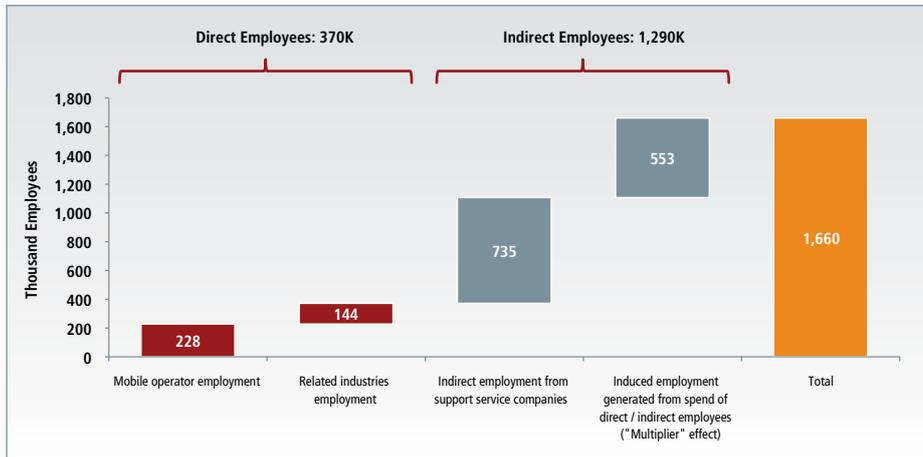


Source: Companies' websites; A.T. Kearney analysis

The mobile industry contributes to the employment of an estimated 1.7 million Europeans:

- 370,000 employed directly by mobile operators and their direct suppliers, of which 230,000 directly employed by mobile operators
- 735,000 indirect jobs, from support services and the mobile industry's contribution to public funding;
- 555,000 are generated by the multiplier effect, i.e., by the mobile industry's direct and indirect employee spend. This is based on ratios from economic research as outlined in section 6 on methodology.

**Figure 34: Direct and Indirect Employment created by the European Mobile Industry, 2010**



Source: Operator provided data; Wireless Intelligence; IDC; EIU; A.T. Kearney analysis

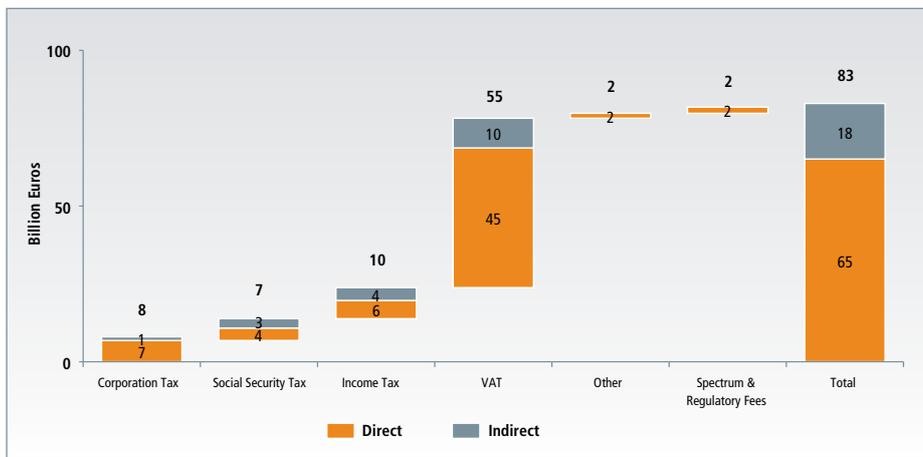


**Contribution to Public Funding**

The mobile industry is making a major contribution to European public finances, through a variety of levers including VAT/indirect tax, corporate tax, social security taxes of direct and indirect employees, income taxes and regulatory fees.<sup>51</sup>

In 2010, A.T. Kearney estimates that the industry’s total contribution to public funding amounted to €83 billion. The mobile industry’s direct contribution to public funding amounted to an estimated €65 billion, around 80% of this being the net VAT and corporation tax contribution. Social security and income tax levied on those directly or indirectly employed by mobile operators generated an estimated €17 billion for public finances. Beyond mobile, the remainder of the contribution reflects taxation of economic activity induced by the mobile industry.

**Figure 35: Mobile’s Contribution to Public Funding in the EEA, 2010<sup>52</sup>**



Source: Operator provided data; IDC; EIU; KPMG; Factiva; A.T. Kearney analysis

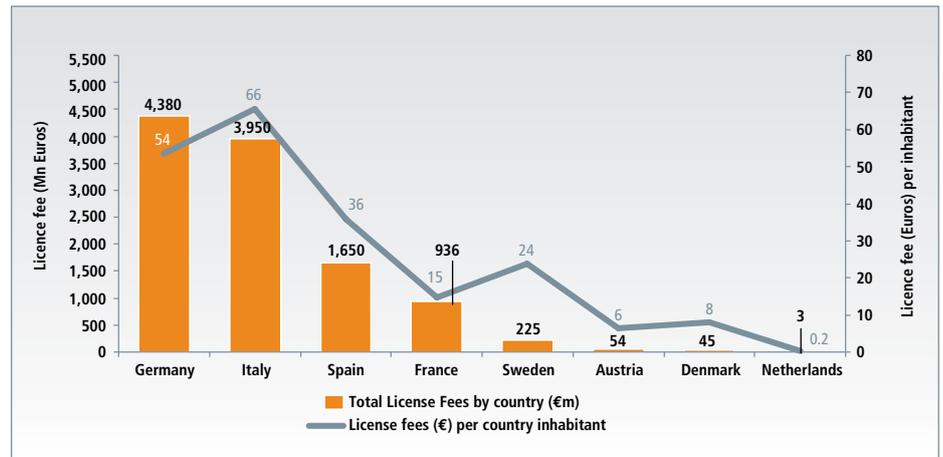
<sup>51</sup> Other taxes include local property taxes and special taxes for masts and base stations in some countries

<sup>52</sup> Order of magnitude estimates. Spectrum and Regulatory fees defined as annual spectrum license fees (excluding up-front one-off license fees) and other regulatory fees; VAT is the VAT levied on domestic services. Social security tax includes personnel and social security taxes paid by employers and contributions from employees. Other taxes include local property taxes and additional taxes that are not detailed in other sections



In addition, mobile operators contributed substantially to EU public finances with over €100 billion paid in 3G license fees in the early 2000s. Equally, mobile operators are in the process of bidding for 4G licenses, with fees of €11.2 billion amounting from auctions in just 8 member states since 2008, with the majority taking place in 2011. 4G license allocations are ongoing and expected to further contribute to EU public finances.

**Figure 36: 4G License Fees for Selected European Countries**



Source: Press releases; EIU

### Mobile Services Impact on Productivity

By providing easy access to telecoms on the move, mobile services have allowed companies to use their employees' time more efficiently, respond more quickly to unforeseen events and minimise unnecessary travel. For large numbers of travelling workers, ranging from technicians to chief executives, mobile has made it much easier to coordinate activities, allocate resources effectively and reduce wasted travel and time.

Mobile has also allowed the creation of new business models in the service sector, such as one-person and small businesses which would not be viable if they had to rely on fixed-line communications from a single site.

Governments are also taking advantage of the productivity gains possible via mobile services and applications via e-Government programmes. There are many examples of European countries that have been implementing e-Government programmes which not only provide productivity gains but also address administrative costs. These can include paying fees via a mobile device or completing simple registration tasks via SMS messages. An example of such a programme is mParking, which exists in many Member States and allows citizens to pay by mobile and obtain a receipt via SMS. SMS services to find last-minute temporary workers are an example of m-government programmes directly improving employment rates. In Stockholm each morning, SMSs are sent to the pool of registered will-work-tmps for the day care and special needs area, with the first responding tmps securing the work.

New mobile applications are allowing companies to offer services in a more efficient way. A particularly fast growing market is telematics, which has experienced significant growth over the last few years. In the automotive sector, for example, Telenor Connexion is offering a host of innovative features. Some offers are more user-centric, such as connected navigation, insurance telematics and infotainment (internet connectivity and media streaming within the car), whilst other offers are more car-centric, such as remote diagnostics. Telenor Connexion also provides customers with an online portal with instant access to manage the integrated SIM card, monitor real-time operational status and set threshold alarms for the vehicle.

It is estimated that around 4.3 million cars in Europe had on-board telematics at the end of 2010.<sup>53</sup> Currently the most common applications for on-board telematics systems are theft prevention, emergency caller/driver assistance, and motor insurance tracking. Other telematics applications that have not yet reached commercial maturity include: secure remote diagnostics and maintenance, connected navigation and online entertainment, and leasing/rental fleet management. For example, M-Tel's Auto Control system allows users to track the position of vehicles, their cruising speed and direction. The system also provides automated reports about vehicles that exceed a predefined speed or are used outside of working hours.

Electronic road charging based on GSM/GPS tracking is another initiative that is gaining momentum and it is expected that in a couple of years time it will be possible to travel around Europe paying all tolls electronically. Similar technology can also be used for vehicle taxation in the future. Continuous development in this market is likely to bring many more novel services. The insurance industry is investigating innovative uses of telematics, particularly PAYD (pay-as-you-drive) insurance models which provide bespoke insurance premiums based on a driver's behaviour and can significantly reduce costs for consumers. The Public Insurers' (Germany) "Mein CoPilot" system, which provides security and safety services like automatic crash notification and stolen vehicle tracking, is being implemented for all auto insurance customers as of 2011.<sup>54</sup>

It is difficult to quantify the precise impact of mobile services on innovation and productivity in developed countries, because of the wide range of factors that influence productivity growth. However, Waverman, Meschi and Fuss estimate that a developing country that had an average of 10 more mobile phones per 100 of population between 1996 and 2003 would have enjoyed per capita GDP growth that was 0.59% higher than in an otherwise identical country. They also suggest that for developed markets, impact on productivity is substantial, without offering a precise estimate. For instance they estimate that Canada would have enjoyed a 1% higher average GDP per capita growth rate if it had matched Sweden's higher levels of mobile penetration from 1996 to 2003.<sup>55</sup>

Other academic studies have linked economic growth to mobile adoption. A study by Williams (2005) investigates the relationship between mobile telecoms infrastructure and Foreign Direct Investment (FDI) in Africa. It concludes that FDI tends to be higher in countries where the mobile penetration is higher.<sup>56</sup>

It is likely that continued advances in mobile technology will lead to further productivity improvements across the economy. For example, mobile access to the Internet is making it easier for workers to communicate with colleagues, gain information and use time productively on the move.<sup>57</sup>

53 "Car Telematics and Wireless M2M", Berg Insight, November 2010"

54 <http://www.insurance-telematics.com/topics/insurances/public-insurers-in-germany-to-offer-telematics-services/13-894.htm>

55 The Impact of Telecoms on Growth in Developing Countries, Leonard Waverman, Meloria Meschi and Melvyn Fuss.

56 The Relationship between Mobile Telecommunications Infrastructure and FDI in Africa, Williams, 2005

57 Impact in emerging markets is even more substantial given lower fixed line penetration

### The Green Agenda

The mobile industry has made a significant effort to reduce its carbon emissions in recent years. Mobile operators have launched a plethora of high profile initiatives, including low energy and renewable powered base stations, infrastructure optimization and network sharing. Telenor and Telia announced an agreement in 2011 for network sharing in Denmark and there are a number of similar agreements already in operation among European operators.

Infrastructure optimization and network sharing represent an attractive proposition for most operators, as they combine reduction of carbon emissions with cost savings. Nonetheless, implementation is complex and in some countries there are regulatory and anti-trust restrictions.

In November 2010, the GSMA launched the Mobile Energy Efficiency Network Benchmarking Service that provides mobile operators with a measure of their network energy efficiency. The service helps operators to identify their efficiency gains and develop a targeted programme to reduce emissions and operating costs. In cooperation with China Mobile, Telefonica and Telenor, the GSMA has identified four key performance indicators to compare mobile networks against. For underperforming networks, savings (on potential energy cost and carbon emissions) could typically amount to 20% to 25% per year.<sup>58</sup>

Other "green" initiatives include the Universal Charger Solution. The GSMA and 27 mobile operators and manufacturers<sup>59</sup> have committed to implementing a standard for a Universal Charger for new mobile phones. The new standard aims to reduce the use of energy when the device is not connected or when it is fully charged. It will also reduce the need for multiple charger accessories by adopting a single industry-wide micro-USB interface. It is estimated that the adoption of the Universal Charger will lead to a 50% reduction in standby energy consumption and will eliminate up to 51,000 tons of chargers every year<sup>60</sup>. The Universal Charger Solution (UCS) is already appearing in new data-enabled phones today and will be widely available in the market by 2012.

Manufacturers of handsets are also improving the eco friendliness of their handsets. These phones aim to save energy and reduce carbon footprint by introducing features such as reminders when the phone is fully charged, solar energy or low-power-consuming chargers, fewer environmentally sensitive materials, and reduced / fully recyclable packaging. With the advent of the SonyEricsson's GreenHeart and Samsung Blue Earth portfolios of mobile phones in 2009, "green" handsets are now commonplace for both regular mobile phones and smartphones.

Finally, initiatives to recycle handsets have been adopted throughout the industry, with recycling points in stores for old mobile phones, buy-back campaigns and discounts on "new for old" swaps. Additionally, manufacturers are increasingly using recyclable materials for mobile phones. New businesses have developed out of these initiatives to recycle handsets. Examples include "Envirophone" and "Sellmyphone", the former of which offers cash to consumers in return for old or unused mobile phones and the latter of which acts as a price comparison site for all buyers present in the market.

The telecoms industry also contributes indirectly to the reduction of the carbon footprint of other industries. Indeed "Mobile's Green Manifesto"<sup>61</sup>, launched in November 2009, demonstrates the key role that mobile communications can play in this respect. The induced reduction in CO2 emissions for those other industries has been estimated as equivalent to 5 times that of the telecoms industry.<sup>62</sup>

58 [http://www.gsm.org/our-work/mobile\\_planet/energy\\_efficiency.htm](http://www.gsm.org/our-work/mobile_planet/energy_efficiency.htm)

59 Initiative launched at the Mobile World Congress 2009 in Barcelona and includes 3 Group, AT&T, HTC, KTF, LG, mobilkom Austria, Motorola, Nokia, NTT DOCOMO, Orange, Qualcomm, Rogers Wireless, Samsung, Softbank Mobile, SonyEricsson, Telecom Italia, Telefonica, Telenor, Telstra, T-Mobile, Vodafone, Banglalink, Mobilink, Mobinil, Orascom Telecom, Tunisiana and Wind.

60 GSMA analysis from UNEP, Gartner, European Commission Integrated Product Policy Pilot on Mobile Phones, University of Southern Queensland data

61 Mobile's Green Manifesto, GSMA, November 2009  
[http://www.gsmworld.com/documents/mobiles\\_green\\_manifesto\\_11\\_09.pdf](http://www.gsmworld.com/documents/mobiles_green_manifesto_11_09.pdf)

62 "SMART 2020: Enabling the low carbon economy in the information age", The Climate Group and GeSI, 2008

An example of mobile applications reducing the carbon footprint of other industries is the use of Machine-2-Machine (M2M) transmission systems for smart logistic applications and fleet management. “Smart grids” and Intelligent Metering can reduce energy consumption by real-time measurements of consumption, enabling better planning and forecasting for energy producers. Fleet management systems can contribute to the reduction of fuel consumption: these systems combine satellite tracking with onboard telematics to monitor fleets and plan routes more efficiently. By using such fleet management systems, the UK supermarket chain Asda has reduced travel by almost 30 million kilometers, the equivalent of 28 kilotonnes of CO<sub>2</sub> emissions and fuel cost savings of 23% over three years.

**Figure 37: Healthcare Networking Information System**




In Croatia, Ericsson’s e-health system (Healthcare Networking Information System) is supporting primary health care. To date, some 2400 healthcare teams in 20 counties and Zagreb have been networked.

The system allows e-prescription and e-referrals to be sent directly to pharmacies and labs / hospitals instead of carrying paper documents, retrieving and updating patient medical data (electronic healthcare record system), and e-booking / reporting.

CO<sub>2</sub> emissions reductions from decreasing patient travel and paper consumption can amount to almost 16,000 tonnes per year, based on life cycle assessment. This service is also expected to benefit the Croatian healthcare system indirectly, for example by increasing organizational efficiency and improving the number of patients per doctor / nurse / pharmacist.



### Improving the Health and Safety of European Citizens

Mobile services are making a significant contribution to improving the health and safety of European citizens, by supporting advanced telemedicine applications, enabling faster response times to emergency situations, safeguarding vulnerable groups and increasing the efficiency of medical services.

Telemedicine can enable the provision of medical services in remote areas and its services are expected to grow at a fast pace in the future.<sup>63</sup> Telemedicine applications range from telemonitoring to teleconsultation. Examples include:

- The epSOS project, involving 12 European countries, which enables healthcare professionals to gain access to relevant patient information (in their local language) whilst European citizens are abroad;
- The use of mobile wireless AirStrip Technology on hospital monitoring machines to allow the remote monitoring of patients. The system can be used to remotely monitor the vital signs of foetus and mother during high risk pregnancies;
- The use of digestible nano chips that are placed inside pills to monitor medicine intake and/or to trigger intake reminders via SMS.

Orange Austria offers a remote patient monitoring system, Healthe, for the chronic diseases diabetes and hypertension, and is planning the expansion of the system to include other diseases, such as chronic obstructive pulmonary disease, and is considering further expansion to the lifestyle and wellness sectors. Vodafone Germany has several ongoing initiatives that help improve the lives of consumers with chronic diseases. Examples include the “Meine Klinik” app for smartphone users and a Diabetes Management Systems that collects, monitors and reports blood glucose levels to the patient and relevant physicians. Operators are already helping consumers to monitor and improve their wellbeing through designated applications and services, for example, Si.Mobil Slovenia’s SMS services to monitor the ingestion of carbohydrates – originally a platform for diabetics.

SMS alert services to remind patients about medical and dental appointments and display results are improving the efficiency of health services. Examples include Mobiltel Bulgaria’s medical and vaccination appointment SMS reminders and Telenor Sweden’s dental appointment SMS reminders.

In addition to remote monitoring, Telefonica is helping clinics and hospitals improve their productivity in internal processes. Colabora, a tool developed by Telefonica, allows doctors to share many kinds of results, from resonances and electrocardiograms to any other kind of photo or video medical result.

There are also many examples of the industry’s contribution to improving safety and safeguarding vulnerable groups. For example, Vodafone Germany, in collaboration with Vitaphone, offer a simple handset for the elderly in combination with a medical hotline (“Vodafone Care”) that offers services 24/7 and is assisted by medical practitioners.

Orange Austria has designed a mobile app called “Orange Helpsaver” that provides users with a list of public emergency contacts for 52 countries across Europe and the US and enables individual “in case of emergency” numbers to be stored. The app also uses GPRS to pinpoint the exact location of the user, who can then offer it to emergency services. Furthermore, the app includes phone numbers for blocking credit cards and or debit cards and international insurance numbers.

Other than individual operator initiatives, the European eCall project is probably one of the best examples of safeguarding European citizens as it will potentially represent an important development towards saving lives. The project introduces a new in-car safety system that will automatically dial emergency services after a crash. Emergency services will then be able to dispatch resources to the exact location of the accident, potentially cutting the service response time by 50% in rural areas and 40% in urban areas. The new initiative is expected to save up to 2,500 lives per year in the European Union. In September 2011, the Commission announced plans to adopt legislation mandating eCall in all new models of cars and light vehicles from 2015 onwards.

### Protection of Children

Mobile operators, together with the European Commission, have created a European Framework for Safer Mobile Use by Younger Teenagers and Children. Within the Framework, operators have offered to provide mechanisms for parents to control access to content by children on their mobiles; provide advice and raise awareness regarding the safe use of mobile communications by children; support the classification of commercial content according to national standards; and support national authorities in the fight against illegal content on mobiles.

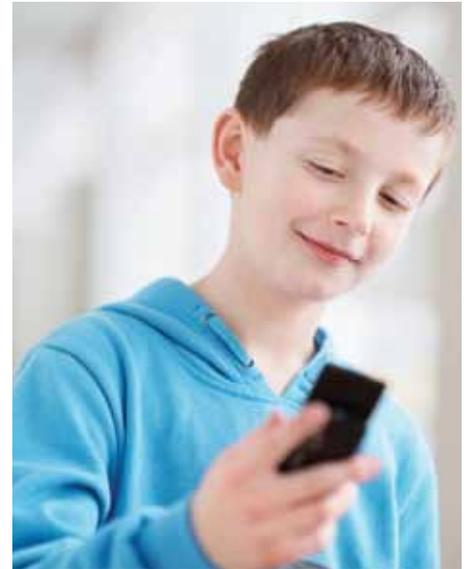
As part of the agreement, the mobile operators and content providers agreed to develop self-regulatory codes of conduct to roll out the Framework at national level. In its implementation report to the European Commission dated June 2010, three years after the signature of the Framework, GSMA Europe explained that operators in all the 27 EU Member States, covering 96% of all EU mobile customers, have now developed codes of conduct to deliver the Framework.<sup>64</sup> There are now 83 participating mobile operators, with a further 8 signed up to a national code of conduct.

Under the initiative, operators are taking a wide range of measures to ensure that parents and guardians can control their children's access to mobile content, an especially important task considering the popularity of smartphones amongst teenagers and children. A central component is a classification framework for content, consistent with standards in other media (such as video games and films), which identifies mobile content that is unsuitable for under-age consumers and can therefore be blocked. A number of National Codes include requirements that are beyond the scope of the EU framework, demonstrating mobile operators' willingness to go the extra mile in encouraging the safe and responsible use of mobile devices by children. For example, Hungary has developed a code of ethics on marketing towards children, and in Germany a government initiative in coordination with the telecommunications industry ("Ein Netz für Kinder") is underway to create a list of secure surfing areas for children.

This initiative has received strong praise from Neelie Kroes, the EU Commissioner responsible for Telecommunications and Media: "Keeping young people safe online is a key commitment of the Digital Agenda for Europe, which is why I welcome [the GSMA's] report which demonstrates that the mobile phone companies are taking their responsibilities seriously."

The GSMA is also heavily involved in other self-regulatory programmes designed to make it safer for children to use mobile phones and the Internet. For example, the GSMA is a member of FOSI, which works to make the online world safer for children and their families by identifying and promoting best practice, tools and methods in the field of online safety, while also respecting free expression.

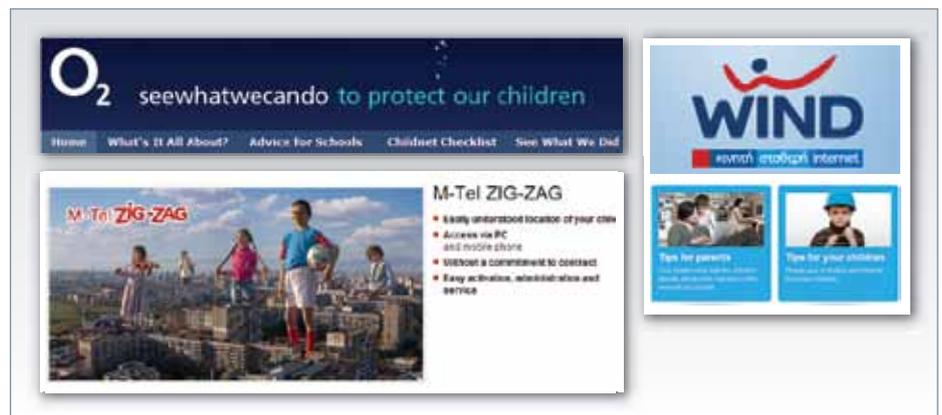
In addition, in February 2008, the GSMA and leading mobile operators launched the "Mobile Alliance Against Child Sexual Abuse Content" to obstruct the use of the mobile environment by individuals or organisations wishing to consume or profit from child sexual abuse content (child pornography). Members of the Alliance are working to prevent access



to web sites identified as hosting child sexual abuse content, while also implementing “Notice and Take Down” processes that enable the removal of any child sexual abuse content posted on their own services. Alliance members are also supporting and promoting ‘hotlines’ for customers to report child sexual abuse content discovered on the Internet or on mobile content services.

The only way to successfully curb child sexual abuse content is through a wide-ranging public-private partnership in which many organisations systematically work together. Therefore, the Mobile Alliance is working with a wide range of stakeholders, including the Financial Coalition Against Child Pornography and the Internet Watch Foundation (IWF), the UK Internet hotline for the public to report their exposure to online child sexual abuse content hosted anywhere in the world. One of the functions of the IWF is to produce a list of URLs containing illegal child sexual abuse content. The URLs are assessed according to UK law, and a list is made available to IWF members (and under licence to specific non-members) so that they can develop technical solutions to prevent their users from being inadvertently exposed to this type of content.

**Figure 38 Selected Examples of Mobile Operators Promoting Safe Use of Mobiles for Youngsters**



Operators have also launched individual initiatives, usually advising on their websites on the safe use of mobile and Internet for youngsters. In Poland, Orange has several educational campaigns to promote safe use of the internet. For lower secondary school teachers there is an educational campaign called “Stop the Cyber Violence” and an e-learning platform for students as well as teachers that already has over 140,000 registered users. Orange Poland also puts on vacation programmes that train over 4,000 children to use the internet more safely.

To inform parents, teachers and other adults responsible for children of the potential risks for young people and provide them with practical advice, O2 has launched a dedicated “Protect our Children” website. It offers a checklist for parents to undertake when buying a mobile phone for their child and enables blocking of adult internet content and further parental control over the mobile phone. M-Tel Bulgaria’s “Zig Zag” also enables parents to track their child via a special prepaid SIM card. Some operators are also organising social initiatives to teach parents and children about the internet. Vodafone Germany have gone one step further and developed a mobile phone with Samsung complete with protection measures for youths. Measures include the barring of adult content on the mobile internet portal, a special youth tariff “CallYa Superflat Teens” that prevents excessive phone bills, and a brochure for parents to teach children how to use mobile phones responsibly.

Building on their extensive contributions to work in this area, the GSMA and its members continue to examine new approaches and have been participating in discussions with the wider ICT industry on the development of a set of broad industry principles for promoting child online safety.

### Tackling Handset Theft

With the widespread use of mobiles in public places, and increasingly valuable handsets, users have unfortunately experienced significant levels of theft, sometimes involving the threat of, or actual, assault. Mobile operators have taken an active lead to deter theft, by preventing the reuse of stolen mobile phones. In the event of theft, operators will block calls from the account, bar the SIM card and disable the phone. The GSMA maintains a database of the international mobile equipment identity (IMEI) serial numbers for all GSM devices. It also holds a “blacklist” of IMEIs that have been reported lost or stolen, and which should be denied service on mobile networks. This allows networks to share their individual blacklists of blocked handsets, ensuring that devices blocked by one network will not work on other networks, even if the SIM card has been changed.

Mobile operators have taken additional measures to minimise risk and give confidence to mobile handset users, in particular, in new mobile phone technologies. Near Field Communication (NFC) enables contactless payment where mobile phones are used as credit or debit cards. If a mobile is reported as lost or stolen, in addition to blocking the mobile handset across all UK networks, the contactless payment functionality will be disabled almost immediately. By working with the government, the mobile phone and banking industry have also agreed to set guidelines which would include the requirement of pincodes for any transactions above the maximum contactless payment value (currently £10) and any customer who signs up for contactless payment phones will be encouraged to register their details on the National Mobile Phone Register to allow for easier identification of stolen phones. Over 25 million members in the UK alone have registered since the setup in 2003.



### Initiatives Against Mobile Spam

Mobile spam (unsolicited commercial communications sent via SMS or MMS) is today minimal, particularly when compared to email spam. To prevent this becoming an issue, the GSMA has developed a Mobile Spam Code of Practice, which brings together the world’s leading operators in a coordinated effort. Under the Code, the signatories commit to:

- Include anti-spam conditions in all new contracts with third party suppliers;
- Provide a mechanism that ensures appropriate customer consent and effective customer control of their own marketing communications;
- Work co-operatively with other operators, including those who are not signatories to the Code;
- Provide customers with information and resources to help them minimise the levels and impact of mobile spam;
- Undertake other anti-spam activities, such as prohibiting the use of the mobile network for initiating or sending mobile spam, and adopting GSMA recommended technical measures for detecting and dealing with fraudulent mobile spam; and
- Encourage governments and regulators to support the industry’s initiative.

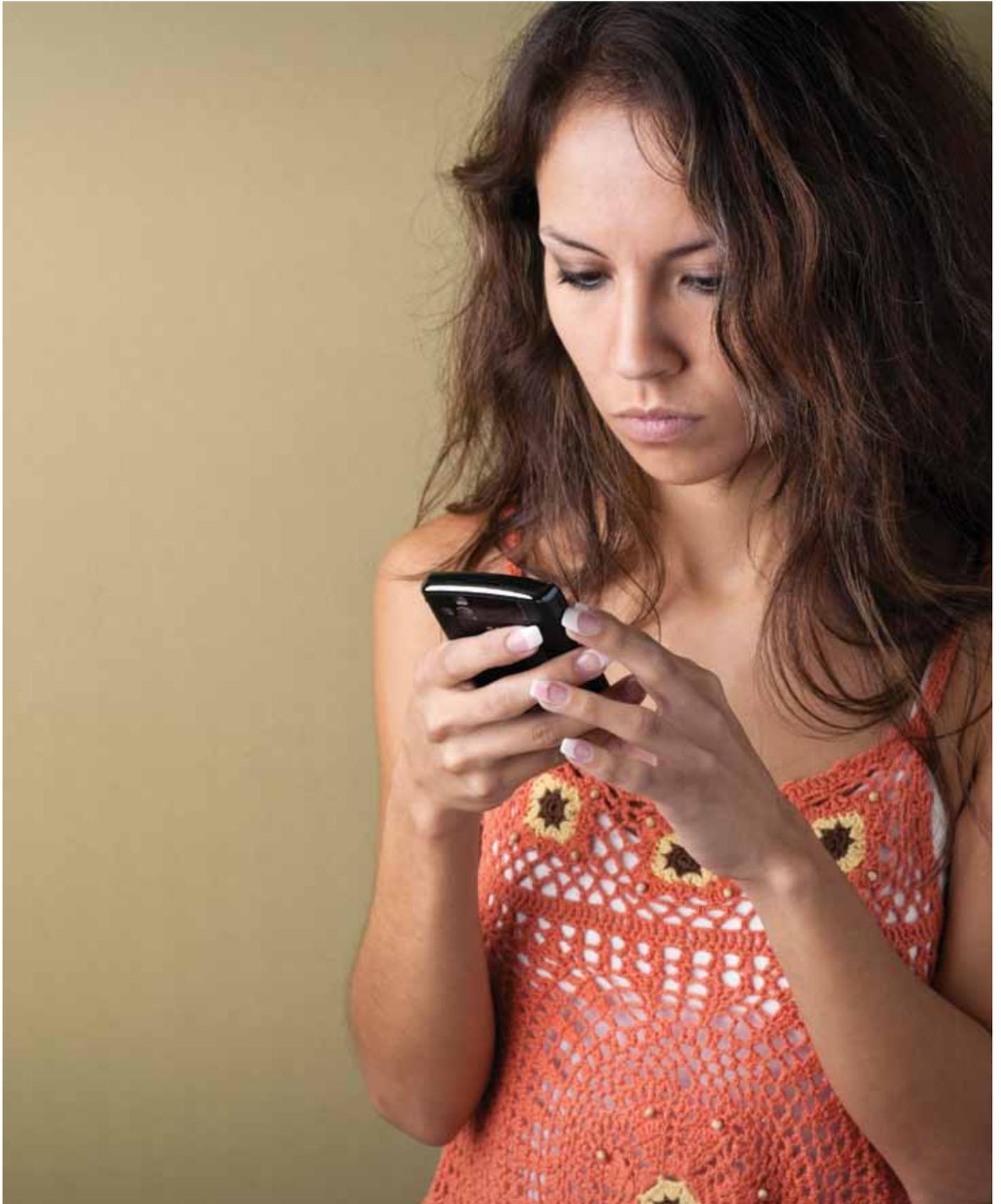
Leading operators from around the world, whose group operations together cover over 70 countries and represent over 900 million mobile users, have joined forces to tackle mobile Spam and have signed the Code of Practice. The GSMA has also developed an anti-Spam toolkit, which is available to all GSMA operator members, and is not conditional on signing up to the Code of Practice.

Building on this existing code of conduct and other initiatives to combat spam, the GSMA more recently developed the Spam Reporting Service to provide a worldwide clearinghouse of messaging threats and misuse which have been reported by mobile users. The GSMA Spam Reporting Service is concluding its pilot stage with leading mobile operators, such as AT&T Mobility, Bell Canada, Korea Telecom, SFR, Sprint, Vodafone and KISA (Korean Internet Security Agency).

Operated on behalf of the GSMA by Cloudmark, the GSMA Spam Reporting Service analyses reports of SMS misuse submitted by mobile subscribers of participating networks via a specific short code. The service acknowledges the submissions and informs the subscriber's mobile operator so that they can take appropriate action, such as investigations, warnings and blocking of senders who have been repeatedly reported by end users as sending unsolicited or fraudulent messages.

Each mobile operator participating in the pilot receives correlated reports with data on threats and misuse originated both within and outside of their network; these reports include data on misuse patterns, volumes and top originators of spam, regionally and worldwide and enables mobile operators to select the best prevention measures for their specific needs. Combined with other spam mitigation solutions, such as spam filtering, the GSMA Spam Reporting Service has the potential to significantly curb the number of unwanted messages received by consumers and maintain the integrity of legitimate mobile valued added services which use messaging to reach consumers.

The measures to ensure safe and environmentally responsible use of mobile communications are all based on voluntary measures adopted by the industry. This reflects the industry's recognition that it is a major contributor to society in the widest possible sense and not simply in its economic impact on jobs, investment and contribution to public funding.



## 6. Rising to the Challenge of Intense Competition

### Key Messages:

The mobile industry enjoyed strong revenue growth of 10% per annum until 2007 – however, market maturity and intense competition on pricing triggered a decline in growth in 2008 and negative growth in 2009. Revenues remained relatively flat in 2010 at €174 billion – a trend that is expected to continue through 2011;

Growth in total European mobile revenues has been lagging behind the rest of the world, for example, Asia Pacific mobile revenues grew 14% per year from 2008 to 2010;

Negative revenue growth rates actually mask continuing growth in volumes, outweighed by significant price declines, reflecting strong competition between mobile network operators and the additional pressure from MVNOs (Mobile Virtual Network Operators) over the last five years;

This competitive intensity is clearly evidenced by growing customer churn rates and steeply declining prices – to an extent rarely witnessed in any other industry. Across the EU27, mobile prices fell by an average of 11% per annum between 2006 and 2010;

Mobile operators generate profits which are lower than generally assumed – with returns on capital employed (ROCE) at 13% in 2010, significantly below those of some other capital intensive sectors;

To mitigate margin erosion in the context of steep price decreases, mobile operators are continuing to reduce costs and engage in major transformations of their operations. On average, operators have reduced costs per customer by 9% since 2008 and continue to do so through 2011;

In addition, operators have also started to look at consolidation as a possible way to improve their scale and competitive position. In many cases this has involved network sharing agreements and also M&A activity in Europe.

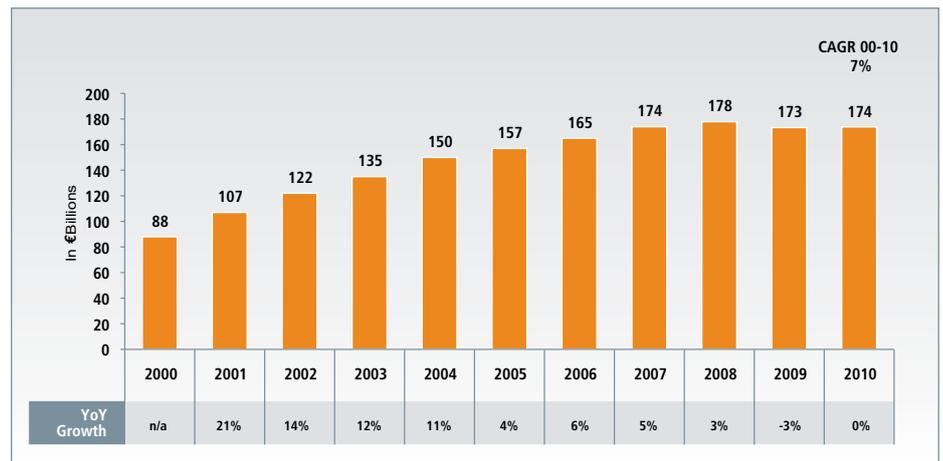
### Impact of the Economic Recession on the Industry

Europe continues to record slow economic growth and, with risks such as the eurozone debt crisis still dominating headlines, is expected to fall back into economic stagnation. The crisis that started in 2008 clearly affected most industries in Europe, and the mobile industry was no exception. The remainder of this section will provide an overview of the key performance metrics by which the evolution of the industry can be assessed.

### Decelerating Revenue Growth

European mobile operators' revenues grew from €88 billion in 2000 to €178 billion in 2008. However, in 2008 the trend changed and total mobile revenues declined by 3% in 2009. In 2010, revenues remained relatively flat, increasing by 0.3% to €174 billion. It is expected that mobile operators' revenues will continue on this trend through 2011, especially as economic conditions continue to deteriorate in several countries. Growth in the European mobile market is lagging behind the rest of the world. For example, total mobile revenues from the AP17 countries<sup>65</sup> increased on average 14% from 2008 to 2010.<sup>66</sup>

Figure 39: Growth in European Mobile Operators' Total Revenues<sup>67</sup>



Source: Quantifica; IDC; A.T. Kearney analysis

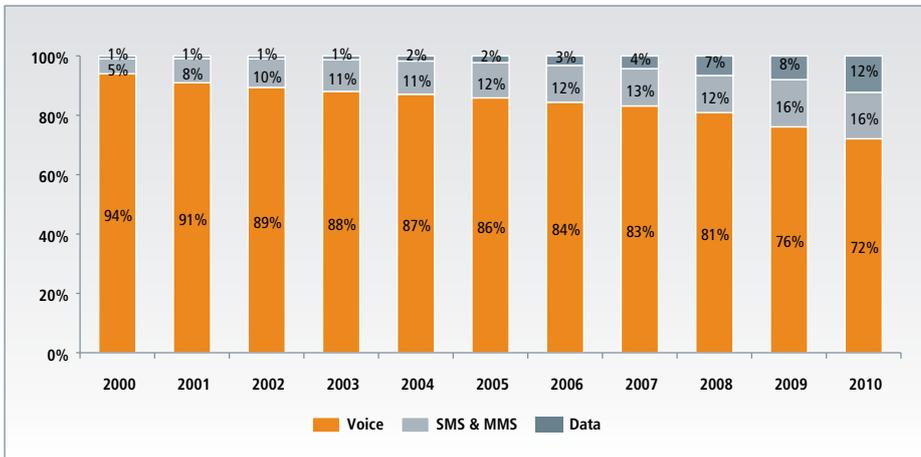
Across Europe it is still the case that voice calls account for the majority of mobile revenues. However, whereas in 2000, voice calls accounted for 94% of operators' service revenues, by 2010, SMS and data had grown to account for 28% of total service revenues. Several operators reported huge growth in data service revenues throughout the recession. Notably, Spanish operators saw an impressive 31% increase in data service revenues from 2009 to 2010.

<sup>65</sup> AP17 is comprised of 17 countries in Asia Pacific that account for 99% of mobile connections in Asia Pacific: Australia, Bangladesh, China, Hong Kong, India, Indonesia, Japan, South Korea, Malaysia, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam

<sup>66</sup> Asia Pacific Mobile Observatory 2011, GSMA, A.T. Kearney

<sup>67</sup> Includes mobile operators' voice and data service revenues as well as non-service revenues such as those generated by the sale of handsets. Not adjusted for inflation or exchange rate movements.

**Figure 40: Percentage Breakdown of Service Revenues for European Mobile Operators**



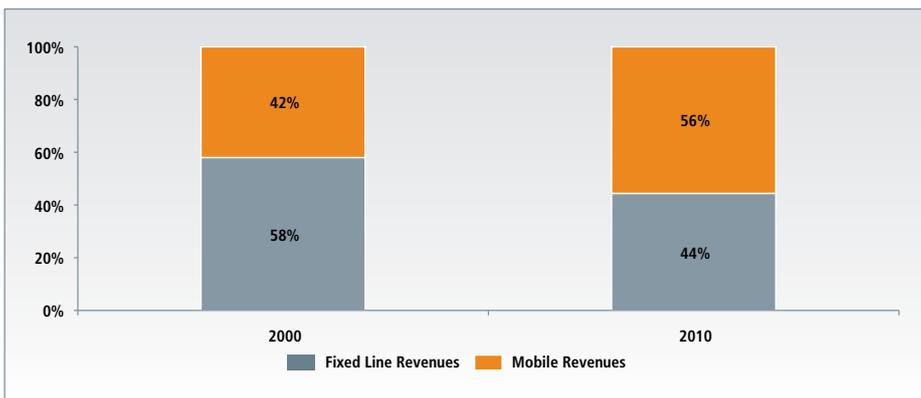
Source: Quantifica; IDC; A.T. Kearney analysis



As mentioned previously, average revenue per user has decreased from €34 per month in 2000 to €21 per month in 2010.<sup>68</sup> Intense competition between mobile operators has led to rapidly decreasing mobile prices for voice and data services, which have offset the increase in take up and usage of mobile services.

The mobile sector has had the largest share of total telecoms revenues since 2007, a trend that has been seen for the last few years. In 2010, the mobile sector accounted for 56% of total telecoms revenues, confirming that mobile remains ahead of fixed line services as the main access tool for personal telecoms services.

**Figure 41: Mobile and Fixed Line as a Percentage of Total Telecoms Revenues in the EEA<sup>69</sup>**



Source: Quantifica; IDC; A.T. Kearney analysis

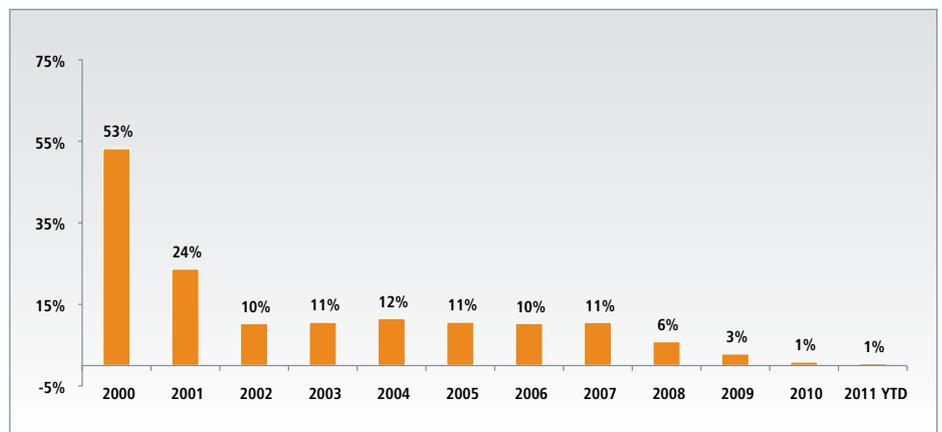
<sup>68</sup> Wireless Intelligence

<sup>69</sup> Includes total revenues for mobile (including non-service revenues). Fixed line revenues include VoIP and data revenues

**Evolution of the Number of SIMS**

From 2002 to 2007, growth in the number of active SIMs in EEA markets had been relatively stable at a rate of around 11%, but the trend has been significantly altered since 2008. In 2008, growth fell to 6% and has effectively stopped from 2009 onwards, reaching growth of just 1% in 2010. As discussed in Section 2 this stabilisation in SIM growth is likely to change in the coming years as new devices, such as tablets with 3G capability, penetrate the market resulting in multiple device ownership and therefore multiple SIM ownership.

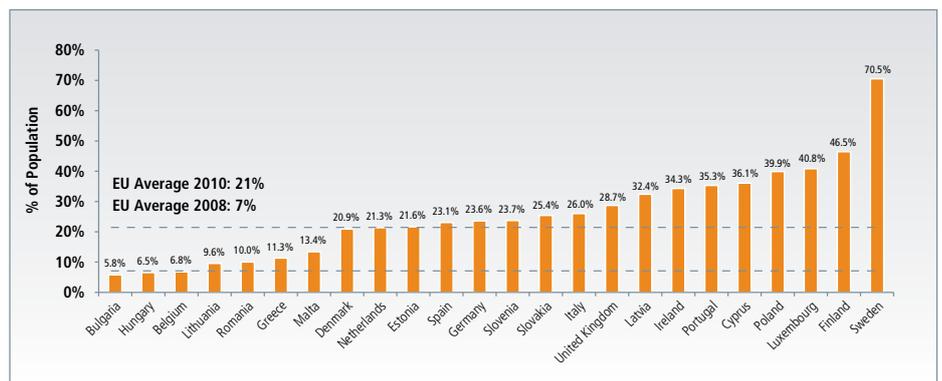
**Figure 42: Evolution of Number of Active SIMs in EEA countries, Year on Year Growth**



Source: Wireless Intelligence

Consumers are increasingly using mobile networks for data access. In fact, the number of active users of data services in Europe has tripled from 7% in 2008 to 21% in 2010, reaching 70% in Sweden. This mirrors the substantial growth in the number of mobile users with a 3G-enabled device.

**Figure 43: European 3G Active Users, 2010<sup>70</sup>**



Source: Broadband Access in the EU: situation at 1 July 2010, European Commission

<sup>70</sup> 3G Active Users - users using broadband dedicated data services via data modems/ cards/keys and other active 3G equivalent users using mobile terminals in last 90 days. Some operators' internal data does not distinguish between 3G and 2.5G in services as mobile email. However the data in this graph is only 3G, as collected by the European Commission.

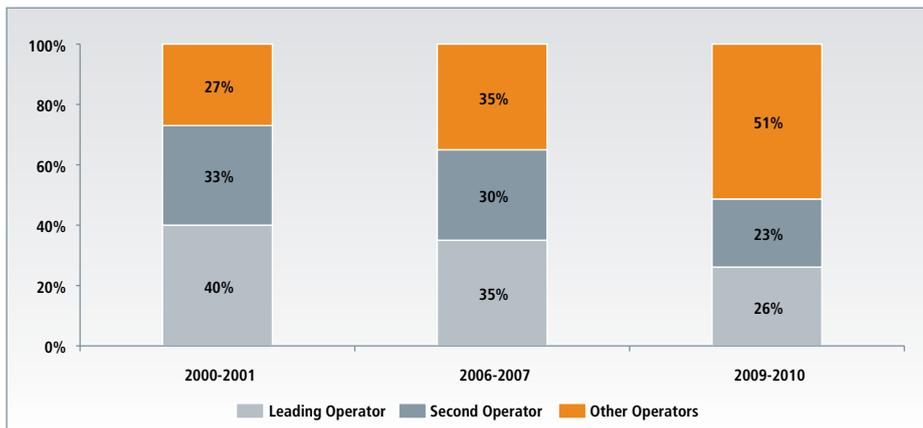
**Strong Competitive Intensity**

In the early 1980s, the mobile industry in Europe typically saw one or two operators per market – reflecting the high fixed costs involved in deploying mobile networks and initially modest expectations for consumer demand. With the emergence of a mass market for mobile services in the mid-1990s, competition from new entrants has grown steadily and led to a major de-concentration of the industry.

Across Europe, smaller mobile operators including recent entrants have successfully attracted new subscribers. From 2000 to 2001, the largest and second largest mobile operators were able to capture the highest share of net additions (new subscribers). However, by 2006-2007, the smaller operators had become equally or more successful than the larger operators in attracting new customers on a net basis, a trend that strengthened and continued through 2010-2011.



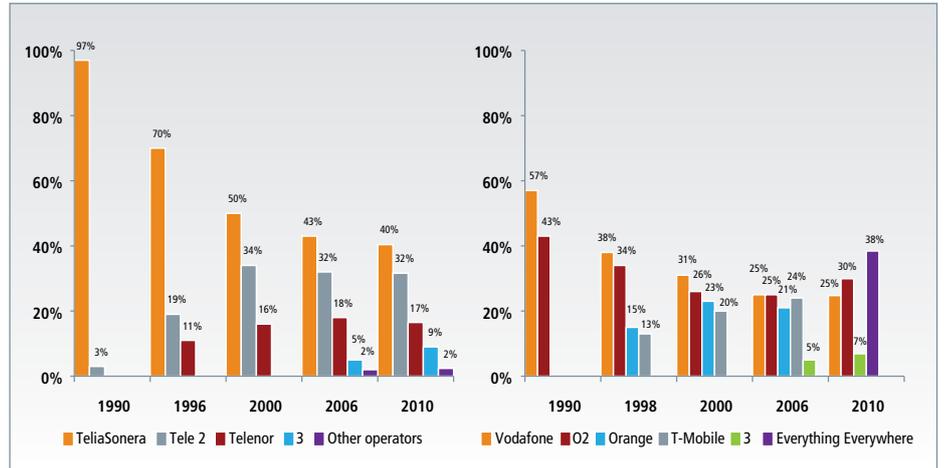
**Figure 44: Leading and Other Mobile Operators’ Market Shares of Net Additions in the EEA**



Source: Wireless Intelligence; A.T. Kearney analysis

The examples of Sweden and the UK demonstrate how competition has increased in the mobile industry, but also how recent consolidation has reshaped the UK market. In Sweden, Telia and Tele2 held 97% and 3% of the mobile market respectively in 1990. By 2010, Telia and Tele2’s market shares were 40% and 32% respectively, while Telenor had gained a market share of 17%. Hutchison Whampoa’s “3”, which entered the market in 2003, captured 9% of the market in 2010. In the UK, the two major operators, Vodafone and O2 (formerly BT Cellnet) had 72% of the market in 1998. By 2009, the share for these two operators had dropped to 51%, as Orange, T-Mobile and “3” made substantial market share inroads. In 2010, Orange and T-Mobile merged, forming the largest mobile operator “Everything Everywhere” with 38% market share.

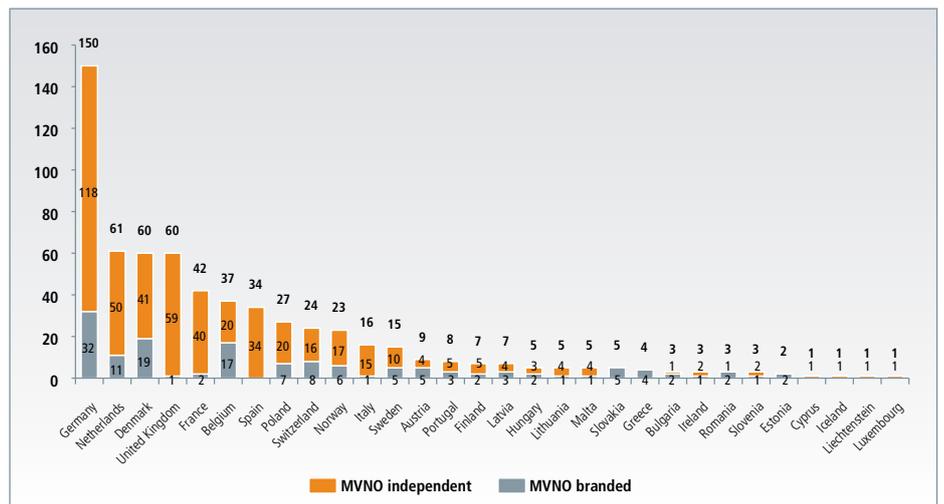
Figure 45: Historical Evolution of Market Shares in Sweden and the UK<sup>71</sup>



Source: The Economics of Mobile Telecommunications, Harold Gruber (2005); The Swedish Telecommunications Market 2010, Swedish Post and Telecoms Agency; The Communications Market Report 2011, Ofcom

In addition, the entry of Mobile Virtual Network Operators (MVNOs) from the late 1990s has placed increasing competitive pressure on mobile network operators. MVNOs are companies that offer mobile services without owning a physical radio network. They purchase bulk volumes of minutes and data traffic from existing network operators on a wholesale basis, which they then resell to customers. Some larger European countries now have more than 50 MVNOs.

Figure 46: Number of Independent and Branded MVNOs in the EEA, 2011<sup>72</sup>



Source: Wireless Intelligence

71 Market shares are for numbers of subscribers (including MVNOs).

72 A "branded MVNO" is wholly-owned and operated by a parent MNO whose network it uses but is frequently regarded as an MVNO in the eyes of consumers as it is marketed independently from the parent MNO. Branded MVNOs may be used by MNOs through partnerships with well-known brand owners from other industries such as media/entertainment and retail. "Independent MVNO" are independent of any MNO.

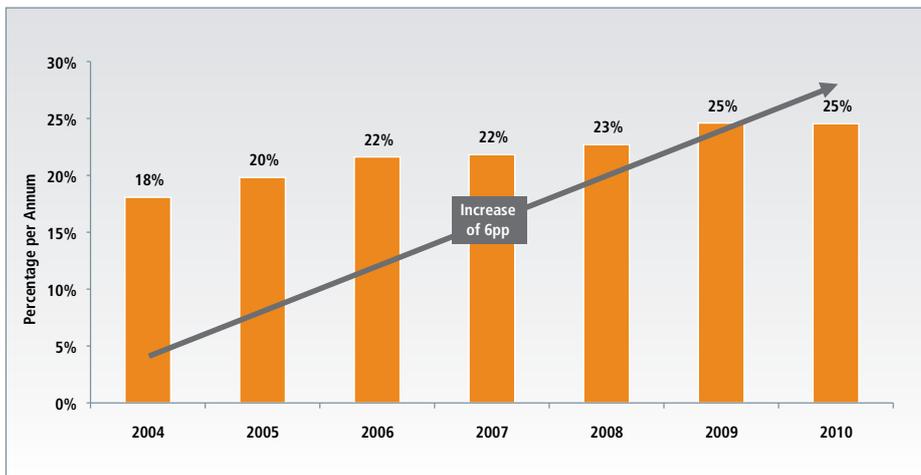
Despite their relatively recent entry, some MVNOs have already succeeded in gaining a substantial share of the retail market from network operators. In Germany, for example, the Freenet Group has succeeded in capturing 14% of the German market.<sup>73</sup> In some cases, MVNO's have succeeded in developing a pan-European presence. Lycamobile, one of Europe's largest international MVNO's, has acquired 6 million subscribers across 8 markets since its launch in 2006. In a similar vein, Truphone has also entered the market at a pan-European level with a new, innovative business model. In a bid to eradicate roaming charges, the Tru SIM enables users to have a local number, and therefore local rates, in several countries without changing your phone. The Tru App, another product offering, allows smartphone users to make free or low-cost calls and send free texts over WiFi or 3G.



**Growing Churn Rates and Steep Price Reductions**

Growing churn rates and steep price reductions provide clear evidence of the strong competitive intensity prevailing in the European mobile industry today. Consumers are finding it easy to shop around for the most attractive offers. Price comparison websites such as www.uSwitch.com have made it extremely easy for consumers to select the most competitive offers based on their personal usage patterns and requirements. Consumer research also suggests that customers find it easier to compare different mobile offers than to compare offers for other services. The number of consumers switching mobile operator has risen dramatically and churn rates now amount to 25% on average across Europe. The increase of churn rates has been partially driven by consumers swapping to different deals as disposable income is limited (such as SIM-only offers with no handset subsidy). On the other hand, this has encouraged all companies to compete vigorously to attract and retain customers.

**Figure 47: Evolution of Average Customer Annual Churn Rates in EEA countries<sup>74</sup>**



Source: Wireless Intelligence

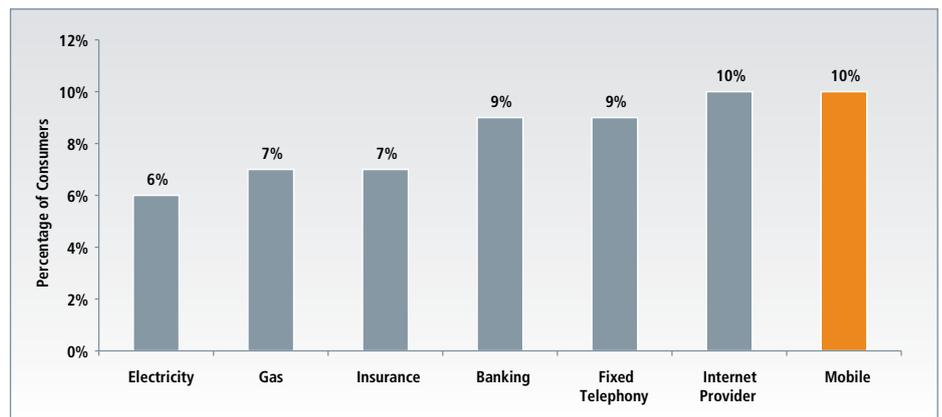
Churn rates in the mobile industry are substantially higher than for comparable services, such as utilities or financial services. In a recent Ofcom survey of consumer behaviour in the UK, 10% of participants responded that they had changed their mobile provider in the last year.

<sup>73</sup> Freenet reported a customer base of 15.64m as of March 31st 2011. Based on Wireless Intelligence, this equates to 14% of the German subscriber base

<sup>74</sup> Customer churn is the proportion of total customers changing operator per annum. Based on a sample of 17 countries in the EEA.

Although a consumer survey is not directly comparable with operator data on churn rates, it provides an indication of how regularly consumers switch providers for different services. Less than 7% of participants responded that they had changed their electricity or gas provider, for instance.

**Figure 48: Percentage of Consumers that Changed Supplier in the last year in the EU27, 2010**



Source: The consumer markets scoreboard, Directorate-General Health and Consumer Protection, European Commission, October 2010

In addition, the implementation of number portability since 2003 has allowed consumers to keep their mobile number when switching to a new mobile operator. Growing numbers of consumers are “porting” their number when changing operator. According to the European Commission, over 16 million EU consumers ported their mobile numbers in 2010 alone, an increase of 15% from 2008.<sup>75</sup> One of the most prominent reforms of the Telecoms Package adopted in late 2009 was the right for European consumers to change their fixed or mobile operator in one working day, while keeping their old phone number. This implementation deadline for Member States was in May 2011 and is expected to further ease the switching process for consumers.

With intense competition and high levels of switching, prices in the mobile industry have declined at a particularly steep rate across Europe. In December 2010, the consultancy Teligen published detailed research for the European Commission on telecoms price developments from 1998 to 2010. The report compares the prices for baskets of mobile services over time, and highlights rapid reductions in mobile prices across the EU.

For example, prices for a medium usage basket of mobile services declined by 11% per annum in the EU27 from 2006 to 2010; the high usage basket saw a similar price decline of 13%. The report indicates that national fixed line call prices in the EU27 have decreased by an average of just 3% per annum from 1998 to 2008. Telecommunications services are one of the few household services that have declined in price over the past few years. By comparison, between 2007 and 2010, European Union consumer prices for energy and food increased by an average of 4% and 3% per annum respectively.<sup>76</sup>

**Figure 49: Annual Price Reductions for Baskets of Mobile Services in the EU<sup>77</sup>**

Price Basket	Region	Period	Average Annual Growth Rate
OECD domestic mobile medium usage price basket	EU27	2006-2010	-11%
OECD domestic mobile high usage price basket	EU27	2006-2010	-13%
OECD domestic residential fixed line price basket	EU15	1998-2010	-5%
OECD domestic residential fixed line price basket	EU27	1998-2010	-3%

Source: Telecoms Price Developments from 1998 to 2010, Teligen for the European Commission; A.T. Kearney analysis

<sup>75</sup> Digital Agenda Scoreboard, European Commission (2011) page 12.

<sup>76</sup> Harmonised Indices of Consumer Prices (HICP), Eurostat

<sup>77</sup> The report compares prices using the OECD's low, medium and high mobile price baskets, which contain varying numbers of calls, SMS and other services, reflecting different usage levels. Prices adjusted for inflation.

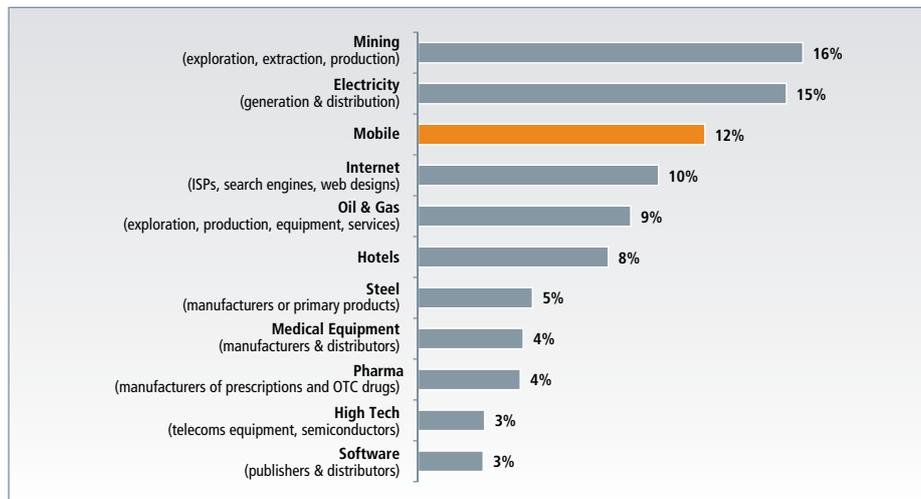
### Returns in the Mobile Industry Not as High as Assumed

The industry's current profitability is in line with some other sectors but is neither exceptional nor excessive. One reason for the misconception here is the emphasis on Earnings Before Interest, Tax, Depreciation (of capital assets) and Amortisation (of intangible assets such as licences) - EBITDA.<sup>78</sup>

Since mobile operations are capital intensive, with heavy investment requirements to launch and then maintain a network and the supporting IT platforms, the emphasis on EBITDA is of limited value for economic analysis. It may be useful for day-to-day management decisions to ignore these "sunk" costs and seek to maximise EBITDA but it is certainly not appropriate to judge an industry's long term economic performance. National regulators typically – and rightly – look at returns on capital in this sector and others, and investors also pay increasing attention to such metrics.

The mobile industry is one of the most capital intensive industries, with capital expenditures representing 12% of sales on average in 2010. The mobile industry's investment demand is considerably higher than for other fast-moving, innovation-based industries such as pharmaceuticals, high tech, software and internet services. In 2010, for example, Europe's high tech and software industries cut investment to just 2% of sales.

Figure 50: Capital Intensity of Mobile and Selected Industries, Europe, 2010<sup>79</sup>



Source: Confidential Operator data; Bloomberg; AT Kearney analysis

Not only is mobile highly capital-intensive, but the pace of asset replacement and investments in new technologies is extremely rapid. Having rolled out new analogue networks in the 1980s, mobile operators upgraded their infrastructure to second-generation digital networks in the early 1990s. These investments were then followed by GPRS / EDGE upgrades, roll-out of UMTS networks in the early 2000s and, more recently, investments in LTE. Mobile operators are making significant bets on the revenue generation potential of new services associated with each of these investments.

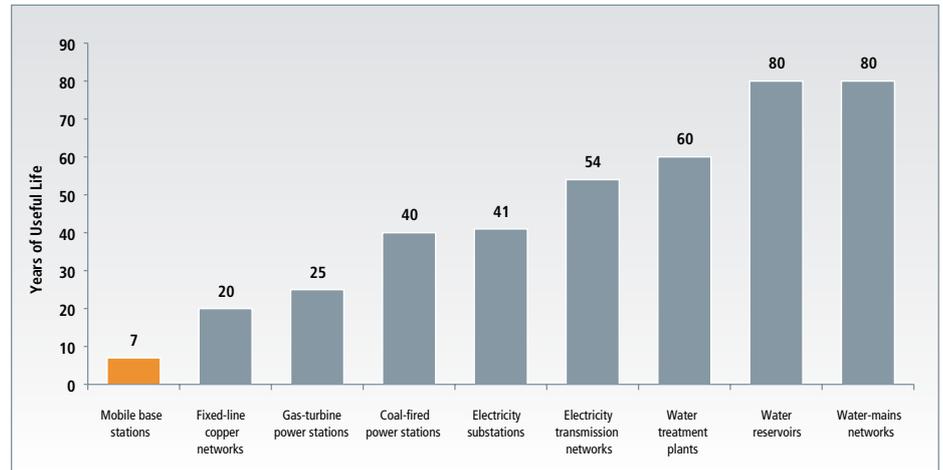
The rate of asset depreciation in the mobile industry is faster than for other industries. In many industries, infrastructure has a relatively long lifespan. In electricity generation, coal fired and gas turbine power stations have a useful lifespan of 25 to 40 years. In fixed-line telecoms, the copper wire network has a useful lifespan of at least 20 years. Meanwhile, water and sewerage systems developed in the nineteenth century are still being used today in many cities. Mobile operators' base stations have a useful life of seven years or less – operators must continually replace existing infrastructure as technology advances and consumers demand more data intensive services.

<sup>78</sup> According to confidential operator data, Bloomberg company financial data and A.T. Kearney analysis, the European mobile industry's average EBITDA margin is in the mid-30%'s (although there is a broad range depending on various operator-specific factors including, but not limited to, regional variations in costs, market maturity, degree of vertical integration/outsourcing) which is higher than some capital intensive industries (e.g. EBITDA for power generation and distribution is around 22%) but lower than others (e.g. EBITDA for mining is around 40%)

<sup>79</sup> Weighted average capex / sales. All industry data id for the EEA only.



Figure 51: Useful Life Spans of Mobile versus Other Utilities Infrastructure



Source: Energy System Development in Germany, Europe and Worldwide, IER (2007); Transmission and Distribution 2007, UBS Investment Research; Australian Commissioner for Sustainability, Press reports; A.T. Kearney analysis

In addition to its capital intensity, mobile is also still a somewhat risky industry. Utility companies generate most of their profits from well established products and services. By contrast, mobile operators have launched waves of new services, most notably investing substantially in 3G and 4G networks which were mainly intended to support broadband services delivered to mobile devices – services and devices which did not exist at the point of investment. Given their innovative nature, there is a high degree of uncertainty regarding future demand for these services. Operators make repeated investments in new technology, infrastructure and spectrum licences to deliver such services, with no certainty regarding long-term profitability. Operators must also consider the risk of future regulation when making these investments. Even a decision to enter a market as a third player, while often a “safe bet” in hindsight, depended on business cases that seemed ambitious at the time and which have not worked out in every European country. There have been exits from the market, such as the German 3G licence-holders (Mobilcom, Quam) who chose to return their licences and write off a massive investment. Other examples include Blu in Italy and Orange in Sweden which exited completely.

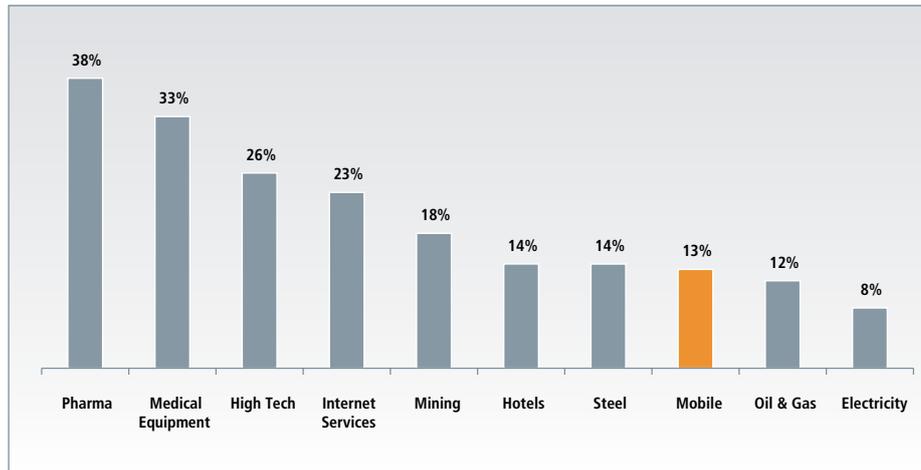
Mobile operators also face risks because of the pace of change in the wider communications value chain. Just as mobile operators rolled out new networks over the last 20 years, emerging technologies raise the possibility of creating alternative networks which could compete with mobile. For example, Wi-Fi technology allows consumers to access the Internet on the move when they are within the range of a Wi-Fi hotspot. Manufacturers of very popular smartphones have also been able to extract favourable terms for exclusive supply arrangements to operators, taking a significant share of the available margin pool.

Return on capital employed (ROCE) provides a useful measure of financial performance, particularly in high-risk, capital intensive industries, capturing how successfully companies are using capital to generate profits.

In 2010, European mobile operators generated ROCE which was lower than many other industries considered. This is based on analysis of confidential operator financial data specifically related to European mobile operators.<sup>80</sup> European operators generated ROCE of 13% in comparison with ROCE in excess of 18% for industries including software, pharmaceuticals, mining and high tech. These returns only just cover the mobile industry’s cost of capital or WACC.<sup>81</sup> Given that the costs of capital in the other industries appear to be broadly in line with mobile, it is clear that profitability for the mobile industry is under more pressure than for many other industries on a long-term, structural basis – notwithstanding the relative economic health during the recent recession. Some mobile operators are suffering greater margin pressure and therefore may have ROCE below their target cost of capital. Others have made balance sheet adjustments to write down the value of recently acquired mobile assets – such operators may demonstrate very low ROCE for the year of adjustment.

<sup>80</sup> Financial analysts do publish ROCE estimates but these are based on publicly quoted telecoms companies which include fixed and mobile, EU and Non-EU operations.

<sup>81</sup> Weighted Average Cost of Capital or WACC, represents the firm’s blended cost of funds or the minimum return (or “hurdle rate”) it must achieve in order to satisfy its investors’ (shareholders and debtholders) expectations.

Figure 52: ROCE for Mobile and Other Industries, Europe, 2010<sup>82</sup>

Source: Confidential Operator data; Bloomberg; A.T. Kearney analysis

### Intense Cost Reduction Efforts

To protect margins in the face of persistent price reductions, mobile operators are continuing to scale back capital expenditures and operating costs. According to A.T. Kearney's Cost Benchmarking of European mobile operators in 2008, the most significant cost reductions were achieved in marketing, as operators broaden the scope of their efficiency programmes, followed by support (or overhead) functions and networks/IT. Similarly, in 2010, the most significant reductions have been achieved in network, support (or overhead) and IT.

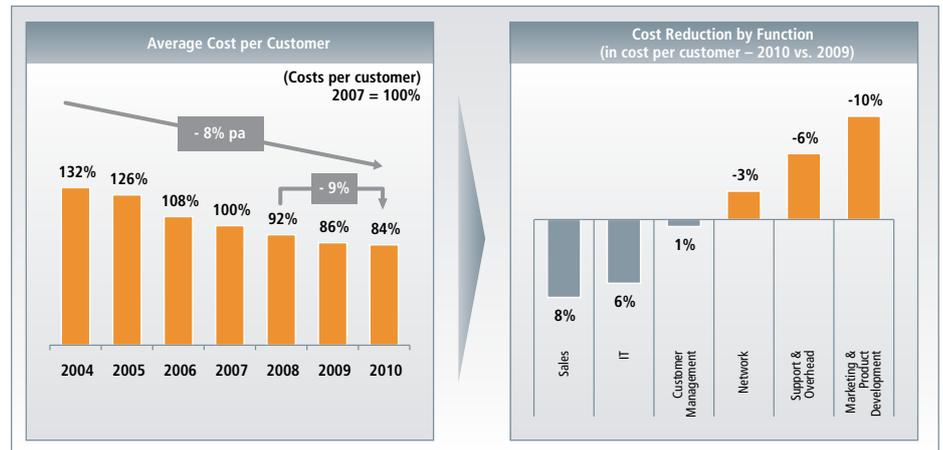
To achieve these cost reductions, mobile operators have engaged in extensive operational transformation efforts, such as:

- Re-designing key operating processes to achieve greater levels of effectiveness and efficiency;
- Renegotiating terms with key suppliers – as the largest proportion of mobile operators' costs are external spend;
- Achieving higher economies of scale in network operations – through outsourcing or network sharing agreements with competitors;
- Offshoring selected labour intensive activities such as call centres or IT development;
- Increasing use of lower cost equipment vendors which operate offshore manufacturing facilities.

Nevertheless, despite cost per customer (measured by active SIMs) having decreased, overall cost levels remained relatively flat in 2010, due to reinvestment.

<sup>82</sup> All industries shown are for EU / EEA only. ROCE defined as EBIT x (1 – Effective Tax Rate) / [Total Assets – Current Liabilities], where total assets include goodwill and intangible assets. ROCE for mobile taken from confidential operators data for 2011; Refer to section 6 for more detail on the methodology employed. Note: ROCE has increased over the last few years for some industries, in particular Pharma, Medical Equipment and Internet. In these industries there has been a trend in non-current assets decreasing, resulting in an overall increase in ROCE.

Figure 53: Evolution of Mobile Operator Costs



Source: A.T. Kearney – European Cost Benchmarking for European Mobile Operators

### Consolidation Trends in the Industry

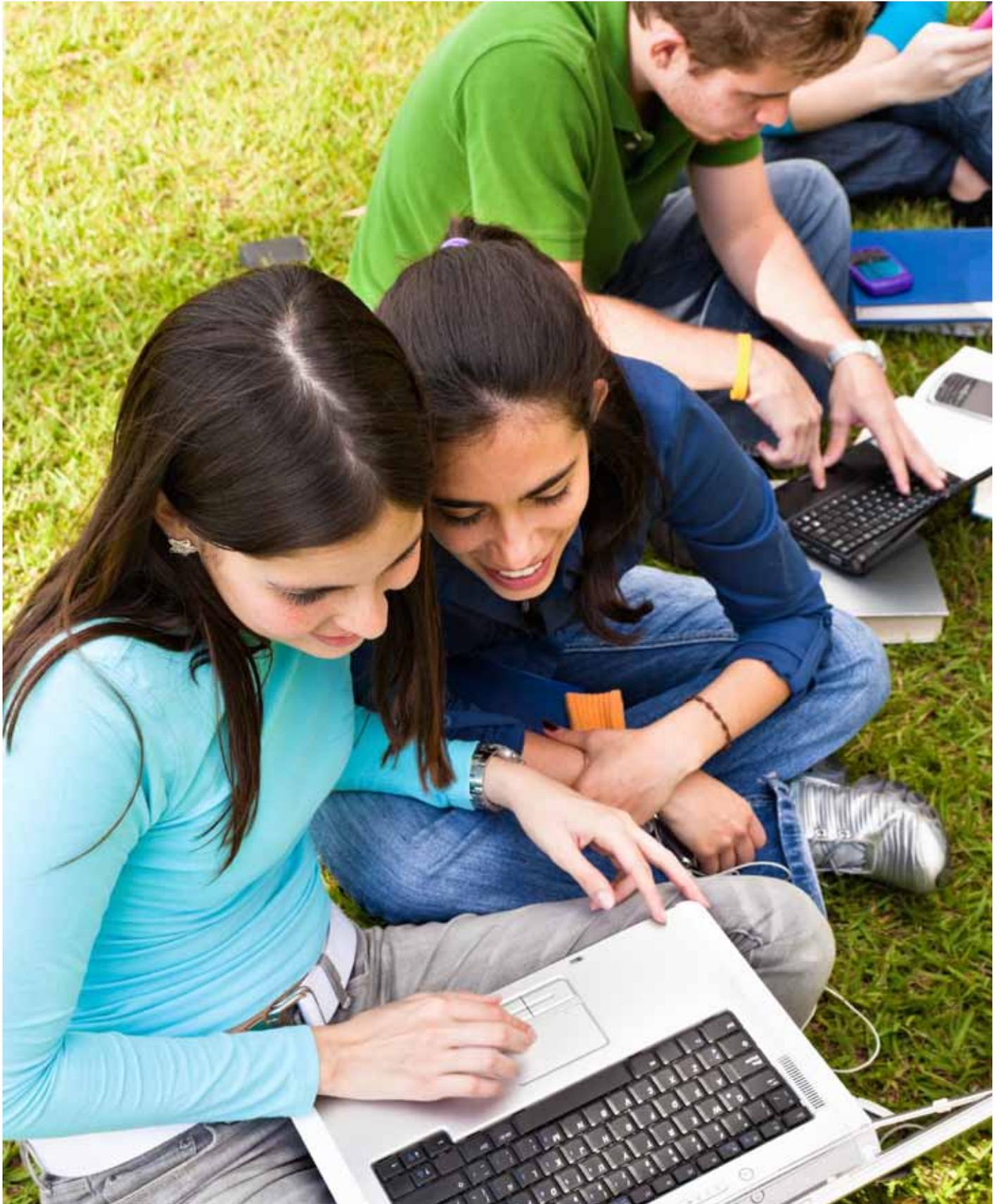
Operators are looking at consolidation as a possible route to improve in-country scale and competitiveness. In many cases this has also involved M&A activity, for instance in the Netherlands, Austria and most recently the UK.

Consolidation in such a mature and highly competitive industry is common, especially given the high investment requirements for LTE and LTE-Advanced in the coming years. In addition to lowering operating costs by deploying new technology, operators are adopting network infrastructure sharing to reduce up-front capital investments. There are already two cases of European operators sharing LTE network infrastructure: Polish operators CenterNet and Mobyland, and Swedish operators Tele2 and Telenor's joint venture Net4Mobility. In some cases operators have reported sharing up to 80% of their network sites.

Three consolidation trends will affect the industry in the next few years: in-country consolidation, increasing fixed-mobile convergence and some degree of multinational expansion to expand groups' footprint. These trends would be a combination of:

- Companies with insufficient cash flow looking to consolidate in order to be able to afford the next generation of technological innovation;
- Market push towards fixed-mobile integration, both for mobile companies trying to enter the fixed market and fixed operators developing a mobile proposition to offset the decline in their market;
- Need for expansion across borders to reduce risk and leverage key scale effects through a multinational footprint.

Where consolidation produces stronger operators with the appetite and ability to invest, this will enhance consumer benefit and the contribution made by the industry to social and economic welfare in Europe.



## 7. Mobilising Europe's Digital Agenda

### Key Messages:

**The mobile industry is playing its part in meeting the challenges identified in the Digital Agenda by delivering fast internet access, enhancing trust and security, enabling the digital single market and helping address key societal issues, such as healthcare and climate change;**

**European regulatory authorities and policy makers have tremendous influence on the investment profile and long-term development of the mobile industry. They need to carefully balance the potential short term objectives of further regulation with those of longer-term growth, investment and job creation as they reach key decisions, for instance on spectrum allocation and net neutrality;**

**By matching US investment levels in ICT, European states could add an additional €760bn to their collective GDP by 2020.**

Implementation of the Digital Agenda will be a key contributor to achieving Europe's 2020 strategy for smart, sustainable and inclusive growth. A digital single market based on fast internet connections and interoperable applications will spur innovation, economic growth and improvements in the daily life of citizens and businesses. Smart services and applications will help enable Europe to transition towards a low-carbon, energy-efficient economy.

The mobile industry is playing its part in meeting the challenges identified in the Digital Agenda by delivering fast internet access, enhancing trust and security, enabling the digital single market and helping address key societal issues, such as healthcare and climate change.

### Fast Internet Access

Widespread mobile broadband coverage and innovative devices such as smartphones, dongles and tablets have driven exponential growth in data traffic on mobile networks. To meet this demand, the mobile industry continues to invest in network capability, in particular LTE, and increase connectivity and broadband access for consumers on the move and at home, both in cities and also in rural areas where other networks may not be available. With a sufficient proportion of the digital dividend spectrum allocated on fair economic terms, mobile will help bridge the digital divide, extending mobile network coverage and bringing broadband to rural areas and less affluent customers. The new spectrum would also help operators provide dependable mobile broadband services in buildings, thus meeting high expectations of consumers who are increasingly accustomed to ubiquitous mobile coverage. Increased speed and capacity, in part through the roll-out of LTE, will facilitate the development of innovative services such as mobile TV.

### Enhancing Trust and Security

As part of the Digital Agenda, Europe is consolidating and strengthening its online trust and security. To ensure Europeans can trust online services, the European Commission is seeking a "better coordinated European response to cyber-attacks and reinforced rules on personal data protection", while also considering obliging website operators to inform their users about security breaches affecting their personal data.

Mobile customers are increasingly seeking consistent privacy experiences when using applications and mobile services. To ensure user privacy and security and protection of their data, the mobile industry is working to address trust and security challenges and find a common approach that works for both consumers and businesses, and is in accordance with changing consumer expectations, new business models, and legal and regulatory requirements. For example, the mobile industry is leading the development of specific tools to educate parents to protect their children online and on mobile (see Section 3 for more detail).

### Enabling a Digital Single Market

To achieve a digital single market, the European Commission is opening up legal access to online content by simplifying copyright clearance and management and cross-border licensing. The Commission is also facilitating electronic payments and invoicing by simplifying online dispute resolution.

With over 655 million active connections in Europe today, mobile is in a unique position to help develop new business models to support the growth of the single market. Mobile provides a platform for the extension of eCommerce businesses to 'on the move' applications, content and services. Mobile can also be a major channel for eMoney, which can facilitate commerce by enabling consumers to research and pay for goods and services via their mobile phone, and can encourage cross-border travel through the ease and speed of ticketing. As each mobile connection has an individual billing relationship with an operator, mobile services can be used to complete transactions, either in nearby locations or on the internet. Furthermore, mobile operators are continuously launching new products and services to improve service offerings and satisfy growing consumer demand.

Complete harmonisation of consumer protection rules across the EU would ensure legal certainty for businesses and would enhance consumer trust in online transactions. The mobile industry actively supports the EU Consumer Rights Directive, which will contribute to the growth of borderless eCommerce by providing a high level of consumer protection whilst reducing compliance costs for cross border sales and pan-European offers.

### Mobile's Benefit to Society

The Digital Agenda calls for the smart use of technology and the exploitation of information to reduce energy consumption, support ageing citizens, empower patients and improve online access for people with disabilities.



Mobile is more than simply an access technology for the internet. It performs an important enabling function to help other industries reduce their environmental impact and operating costs. In fact, by 2020 mobile technologies could lower emissions in other sectors by an estimated 5 times the mobile industry's own footprint.<sup>83</sup> Using SIM cards and radio modules embedded in machines and devices, mobile (through M2M services) can deliver smart traffic management and logistics, and can be utilised in smart power grids, meters and buildings. At the same time, the mobile industry itself is becoming more environmentally friendly through innovations and initiatives such as more energy efficient cell sites and network sharing – to name but a few.

With some disadvantaged groups now more likely to be connected to mobile than to a fixed line, the mobile platform is becoming an important means for the delivery of eGovernment services. As core public services such as health become mobile-enabled, mobile is helping drive costs down in this sector. Over and above the cost savings, mobile healthcare can deliver better overall patient care and wellness, and improve the reliability of healthcare services and the working conditions for healthcare professionals.

### Future Contribution to the Economy

As discussed throughout this report, mobile industry developments have a major impact in a variety of ways on Europe's economy. From reducing CO2 emissions directly and indirectly, contributing to productivity gains in related industries and public services and potentially bringing broadband access to all urban and rural citizens, the mobile industry will continue to play a crucial role in bridging the digital divide and building the digital society.

The mobile industry is estimated to have spent \$72 billion worldwide in 2010 on mobile broadband technologies. Investment in mobile broadband infrastructure accounts for over half of all mobile infrastructure investments. The deployment of LTE and LTE-Advanced is expected to not only secure current employment but also to create new jobs worldwide.

European regulatory authorities and policy makers have tremendous influence on the investment profile and long-term development of the mobile industry. Investment in future technologies, both from operators and regulatory stakeholders such as the European Union, are vital for future economic growth. By matching US levels of ICT investment (of which mobile is inclusive), European states could add an additional €760bn to their collective GDP by 2020 - an extra 5% above forecasts.<sup>84</sup>

Government policy directly influences the effectiveness of ICT investment and its productivity benefits. Regulators need to carefully balance the potential short term objectives of further regulation with those of longer-term growth, investment and job creation as they reach key decisions, for instance on spectrum allocation and net neutrality. Regulations that do not compromise the key role the mobile industry is playing, and are up to date with technological advancements, can ensure maximum benefit from ICT driven innovation and investment across Europe.

<sup>83</sup> Mobile's Green Manifesto, GSMA, November 2009  
[http://www.gsmworld.com/documents/mobiles\\_green\\_manifesto\\_11\\_09.pdf](http://www.gsmworld.com/documents/mobiles_green_manifesto_11_09.pdf)

<sup>84</sup> Oxford Economics

## 8. Glossary

Acronym	Description
3G	3rd Generation Mobile Telecommunications
4G	4th Generation Mobile Telecommunications
ARCEP	Autorité de Régulation des Communications Électroniques et des Postes (NRA in France)
ARPU	Average Revenue per User
Eastern Europe	Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
EC	European Commission
EDGE	Enhanced Data rates for GSM Evolution, a data transmission technology
EEA	European Economic Area
EIU	Economist Intelligence Unit, a research company
FDI	Foreign Direct Investment
Feature phone	Typically a low-end mobile device
GB	Gigabyte
GDP	Gross Domestic Product
GPRS	General Packet Radio Service, a packet data transmission service
GPS	Global Positioning System
GSM	Global System for Mobile Communications, second generation standard for networks
HSPA	High Speed Packet Access, a mobile broadband technology
HTML5	Fifth revision of the HTML standard (a next generation Internet technology)
ICT	Information and Communications Technologies
IDC	International Data Corporation, a telecommunications research company
IMEI	International Mobile Equipment Identity, a unique identifier for a mobile phone
IWF	Internet Watch Foundation, a UK charity aimed at "minimizing the availability of potentially criminal Internet content"
LTE	Long Term Evolution, "4th generation" standard for wireless communications technology
M&A	Mergers and Acquisitions
M2M	Machine-to-Machine transmission
MMS	Multimedia Messaging Service
MNO	Mobile Network Operator
MVNO	Mobile Virtual Network Operator
NFC	Near Field Communication
ODM	Original Design Manufacturer – a company that designs and manufactures a mobile device that is specified and sold by another company (i.e. a white label product)
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
OS	Operating System
PAYD	Pay-As-You-Drive, an insurance model

ROCE	Return on Capital Employed, a profitability measure
Smartphone	Typically a high-end mobile device with more advanced computing ability and connectivity compared to a feature phone
UCS	Universal Charger Solution
UMTS	Third generation mobile cellular technology
VAT	Value Added Tax
WAC	Wholesale Applications Community, a community of mobile software developers
WACC	Weighted Average Cost of Capital
Western Europe	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom



## 9. Report Methodology and Sources of Information

### Overall Methodology and Sources of Information

The mobile industry observatory report has been conducted independently by international management consultants A.T. Kearney. The data in the report has been extracted from both primary and secondary research. Primary research consisted of collecting data from 21 European mobile operators<sup>85</sup>. The confidential information submitted by the operators was aggregated and anonymised to provide non-confidential statistics for individual countries or Europe as a whole. Secondary research included publicly available sources such as Eurostat, the OECD and research by National Regulatory Authorities and other recognized databases such as Wireless Intelligence (part of the GSMA), Bloomberg, Quantifica and IDC.

The data collected from European mobile operators was used for determining the capital intensity and ROCE of the mobile industry. Primary research enabled the extraction of detailed data to provide accurate capital intensity and ROCE for the mobile industry. Primary data from mobile operators was also used to determine some elements of the social-economic contribution. Furthermore, some of the insights shared in this document are supported by A.T. Kearney management consulting experience within the telecoms sector.

For the evolution of mobile operator costs, A.T. Kearney's Global Competitive Benchmarking database<sup>86</sup> was used. A.T. Kearney has been conducting benchmarking exercises for mobile operators since 2002. The initiative started in the European markets but now extends to mobile operators around the world.

Publicly available sources included those of a macro-economic nature such as Eurostat and the OECD as well as reports such as the European Commission's Digital Scoreboard and the Eurobarometer e-communications household survey. Telecoms specific databases such as Wireless Intelligence, Quantifica and IDC were used for both country and European level mobile market figures. Where appropriate, data from different databases has been combined to show more complete industry trends. From this data, A.T. Kearney calculated the necessary metric/s, average, CAGR or percentages as displayed in the figures or commentary.

### Socio-Economic Contribution

This paper estimates the European mobile industries creation of employment (both direct and indirect) and contribution to public funding. It should be noted that the socio-economic contributions are of necessity estimates.

Previous European Mobile Industry Observatory Reports (2008 and 2009) quantified the value chain for the industry based on total European mobile market revenues and macro-analysis of the industry as previously defined by Ovum research.<sup>87</sup>

For the 2011 European Mobile Industry Observatory Report we have updated the value chain based on current market dynamics and in line with the Asia Pacific, Latin America and Africa 2011 Mobile Industry Observatory Reports. This consisted of mapping the value

<sup>85</sup> Counted at a country rather than group level

<sup>86</sup> A confidential exercise repeated annually by mobile and fixed line operators

<sup>87</sup> The Economic Contribution of Mobile Services in the Europe Union, Ovum, 2005

add across the value chain from the purchase of services and devices (e.g. handsets) by consumers all the way through to the companies that create the components that go into making the network equipment and devices. As a result, the scope of the value chain has been reduced in comparison to previous European Mobile Industry Observatory Reports.

The value chain considered in this report includes the following companies:

- Suppliers of infrastructure and support services, including public and enterprise network equipment and support services for this infrastructure and ICT infrastructure consultants;
- Mobile network operators (MNOs) with some revenues flowing to fixed line network operators (FNOs) for interconnection fees;
- Wireless handset device manufacturers;
- Distributors and retailers of wireless handset devices;
- Providers for mobile content and service applications, limited to mobile internet advertising, mobile TV, mobile music and ring tones, and wireless and mobile games only.

The proportion of value add that flows outside of Europe was removed to determine the European retained value add along the value chain.

#### Employment

The number of mobile operator direct employees was estimated from employment data collected from mobile operators and extrapolated to a country level. The country level data was then aggregated to a European level. The operator sample with directly provided employee data represented less than half of total European mobile operator revenues.

Employment from related industries was derived through bottom-up analysis of the industry. Revenues for 31 European countries<sup>88</sup> for each segment of the value chain were determined from secondary sources, and key financial metrics (such as wage cost as the percentage of total revenues) were ascertained from selected companies relevant to each segment.

The number of employees generated due to related industries was determined from dividing the corresponding total wage cost per country by the average salary per country for Telecommunications Industry professionals, as defined by Payscale.<sup>89</sup> The country level data was then aggregated to a European level.

Indirect employment was derived by first determining the value add of each segment of the value chain using the following calculation:

$$\text{Value Add} = \text{EBIT} + \text{Wages} - \text{Capex} + \text{Depreciation}$$

The value add, minus the total wage cost used to determine direct employment, was then divided by the average wage rate. It was assumed that owners and funders spend their returns from the industry in a way that generates further employment.

In addition to the above, there is the 'multiplier' effect, whereby jobs are generated by the mobile industry's direct and indirect employee spend. This multiplier is calculated based on standard ratios – a multiplier of 1.5 was used,<sup>90</sup> which is on the conservative side of the Association Française des Opérateurs Mobiles figure of 1.7 and in line with the UK Office of National Statistics estimate for the telecommunications sector of 1.5.

88 30 countries of the EEA plus Switzerland

89 For two countries, Telecommunication professionals' salaries were unavailable so the IT industry was used as a proxy

90 Note: previous Mobile Industry Observatory Reports used a multiplier of 1.6

### Contribution to Public Funding

The contribution to public funding should be considered an order of magnitude estimate. Mobile operator income taxes, social security taxes and local property taxes were obtained from operator provided data and extrapolated to a country level and then European level pro-rata based on revenue.

Other mobile operator contributions to public funding were obtained from national operator data and extrapolated based on revenue. This includes other taxes, annual spectrum license fees, and annual regulatory fees. The annual spectrum license fee estimate excludes upfront one-off license fees such as those paid in recent 4G spectrum auctions.

For all segments of the value chain, VAT was calculated first at country level, by multiplying the country revenues for each segment by country specific VAT rates, and then aggregated to a European level. For mobile operators, VAT for mobile operators is the VAT levied on domestic mobile services. Corporate tax was calculated by multiplying profit before tax by country specific corporate tax rates at a country and then European level for each segment of the value chain. Similarly, income tax was calculated by multiplying total wage costs by income tax rates, and social security taxes by multiplying total wage costs by the relevant tax rates. Social security tax includes personnel and social security taxes paid by employers and contributions from employees. Local property taxes from the other companies along the value chain were not included.

For all categories, excluding “other” governmental and regulatory and spectrum fees, a multiplier of 1.5 was then applied to calculate each segment of the value chain’s contribution to public funding.

### Return on Capital Employed (ROCE)

ROCE is a ratio that indicates the profitability of a company’s capital investments. It is calculated as:

$$= \frac{\text{Operating Profit After Tax}}{\text{Capital Employed}}$$

The numerator, or the return, represents the operating profit after tax but before borrowing expenses (interest). The denominator, the capital employed, is total assets (current assets plus non-current assets, including goodwill and intangible assets) minus current liabilities. The denominator shows how much capital is being employed in the operation of the business.

We include goodwill in our definition of capital employed for three reasons:

1. Goodwill is an important factor in the nature of the mobile industry – MNOs have gone through major acquisitions in order to take advantage of scale economies
2. Exclusion of goodwill could be misleading as this is capital that the firms concerned have had to deploy in order to remain viable in this industry
3. In order to make the ROCE metric comparable to target returns (often referred to by the measure weighted average cost of capital, or WACC), goodwill is included as the cost of raising the debt and equity capital to make the acquisitions (which have resulted in the goodwill) are included in calculations of WACC

Because ROCE measures profitability in relation to invested capital, ROCE is important for capital-intensive companies, or firms that require large upfront investments to start producing goods. ROCE should always be higher than the rate at which the company derives its capital from lenders and shareholders (i.e. the WACC), otherwise shareholders will see the value of their investment decline the more the company invests.

The profit after tax and the capital employed was part of the primary data collected from European mobile operators. Because the data was collected directly it was possible to obtain mobile specific figures from telecoms operators that have both mobile, fixed and potentially other businesses. The profit after tax and capital employed was used to calculate a European mobile industry (weighted average) ROCE.

For calculating ROCE for comparator industries, the financial data was obtained from Bloomberg and an industry weighted average ROCE was calculated as described above. Industry standard classifications (namely ICB and GICS)<sup>91</sup> were used to define the comparator industries. Internet services refers to online service providers and enabling technology services, which are two segments of the internet value chain.

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91 ICB (Industry Classification Benchmark) was created by the FTSE Group and Dow Jones Indexes. GICS (Global Industry Classification Standard) was developed by Morgan Stanley Capital International.

# The European Mobile Observatory

## Key Performance Indicators

**€174B**

Total Revenues  
2010

**0.3%**

Revenues YoY Growth  
2009-2010

### SERVICE REVENUE BREAKDOWN



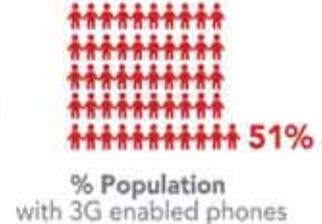
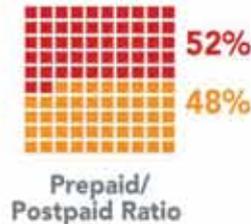
**€20** -5% p.a. (from €34) 2000-2011

ARPU 2011 ANNUAL CHANGE

**25%** 2010 +6pp 2004-2010

AVERAGE CUSTOMER ANNUAL CHURN RATE

## PENETRATION & GENERAL STATS 2011



## COVERAGE



## USAGE



## MOBILE BROADBAND



## ECONOMIC CONTRIBUTION 2010



## About this Study

The European Mobile Observatory was a joint research study between the GSMA, A.T. Kearney and Wireless Intelligence.

Any questions on the content of this document can be directed to the authors of the study.



### About the GSMA

The GSMA represents the interests of mobile operators worldwide. Spanning more than 220 countries, the GSMA unites nearly 800 of the world's mobile operators, as well as more than 200 companies in the broader mobile ecosystem, including handset makers, software companies, equipment providers, Internet companies, and media and entertainment organisations. The GSMA also produces industry-leading events such as the Mobile World Congress and Mobile Asia Congress.

For more information, please visit Mobile World Live, the online portal for the mobile communications industry, at [www.mobileworldlive.com](http://www.mobileworldlive.com) or the GSMA corporate website at [www.gsmworld.com](http://www.gsmworld.com).

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## ATKEARNEY

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November 2011