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OPERATORS' DIGITAL TRANSFORMATION: UNLOCKING EUR15 BILLION THROUGH PARTNERSHIPS WITH OSPs

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1 Executive summary

After a period of slow growth in the Western European telecoms market, operators are looking to the Internet and digital services to fuel a new period of growth. In this report, we show that operators could benefit strongly from further interactions with online service providers[1] (OSPs), directly through partnerships, and indirectly by adapting their business to consumers' fast-growing demand for online content and services. This process of 'digital transformation' has begun, and many interactions of this type are underway. We estimate that if operators in Europe, the Middle East and Africa (EMEA) accelerate this process and deepen their partnerships with OSPs, they could improve annual cashflows by EUR7 billion to EUR15 billion in 2021, with the larger impact requiring close partnerships with OSPs. Doing so would unlock value not only for operators, but also for OSPs (large and small) and for consumers, who would benefit from better access to the online content and services they want to consume.

Over the past five years, telecoms operators have seen significant impact from the ongoing adoption and greater use of the Internet, including on mobile devices, by consumers. This has been broadly positive for many operators: fixed operators have successfully slowed the historical trend of declining revenues as they have positioned themselves as providers of super-fast broadband connectivity and content. For mobile operators, the story has been more mixed, although growth in developing markets remains robust as more people come online and disposable incomes grow.

Several factors have played a role in the impact on operators: the global economic context and weak economic growth in Europe, which constrained consumer spending; the availability of infrastructure; and increased competition, including from new online services. The pressure on operators' revenues has not been caused by direct competition from OSPs, but rather by indirect pressures: for example, people use more or less the same volume of SMS, but most new messaging traffic is on messaging apps, which are free – this creates a large positive welfare impact on consumers.

Looking forward, telecoms operators are revising their strategies to take advantage of digital services and the Internet. They are aiming to reposition themselves as digital service providers, rather than communications service providers alone. In doing so, they are looking to develop their core business, enhance their technology and operations, and develop new business opportunities.

OSPs have a clear role in this through *direct partnerships* and *indirect influences*. They have developed technology and platforms that have been proven to work highly reliably at scale. These can be brought to bear to transform the business of telecoms operators to be more efficient, more flexible, and remain highly reliable. OSPs have also developed rich content and apps for which telecoms operators can act as a valuable sales and service channel.

[1] We define online service provider as any company that offers Internet-based content, software, apps, or services.

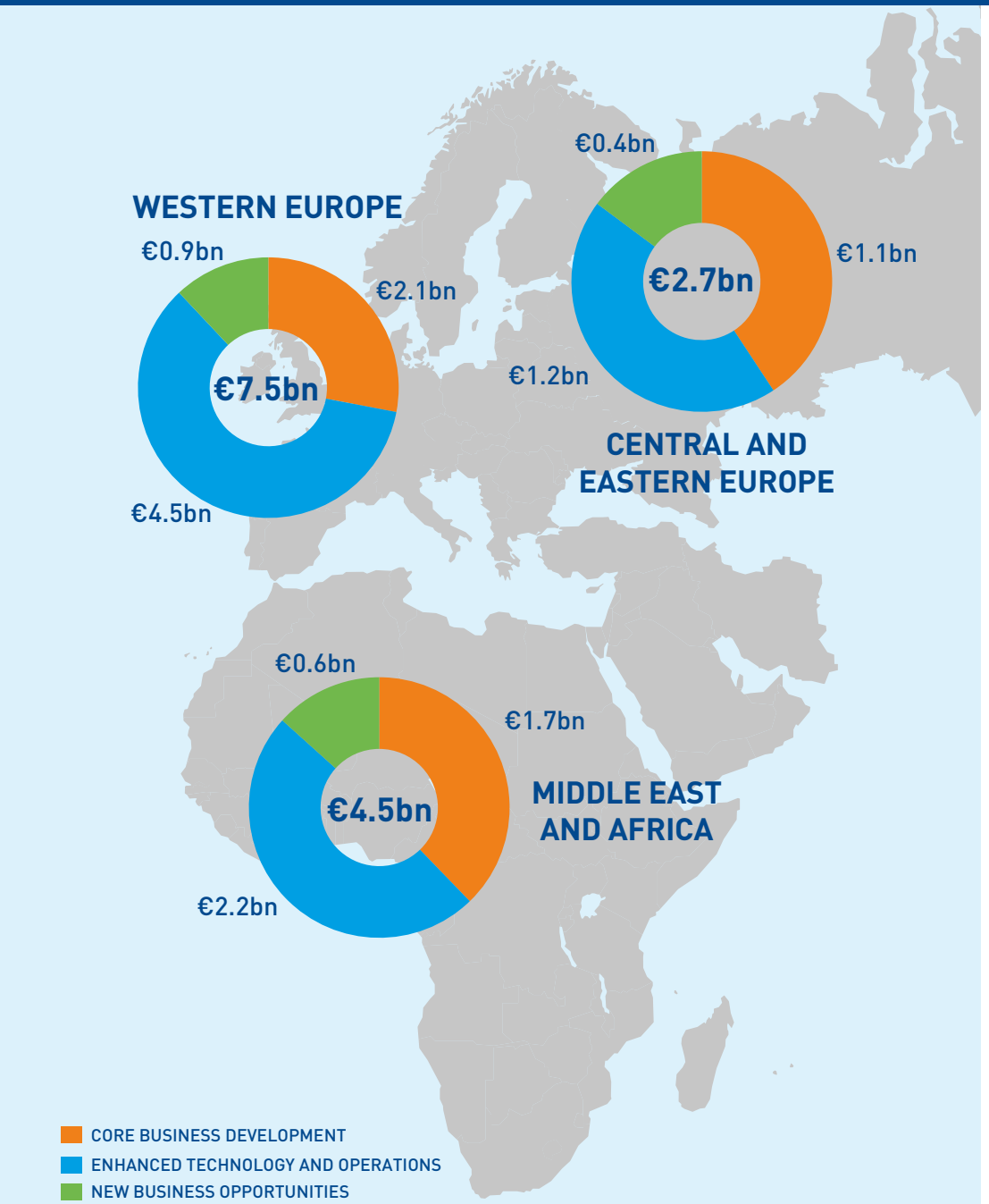
We have identified eight categories of co-operative market developments between OSPs and telecoms operators: high-end broadband (e.g. 'upselling' faster broadband plans due to increased demand for data), bundled content (e.g. bundling Netflix with a broadband service), network transformation (e.g. investing in NFV/SDN), productivity in the network (e.g. machine learning, use of data to optimise the network), infrastructure investment financed by OSPs (e.g. the upcoming MAREA and existing FASTER cable systems), omnichannel customer interactions (e.g. investment in online sales and service platforms), new consumer businesses (e.g. smart homes), and new enterprise businesses (e.g. cloud services).

Many of these partnerships and interactions can help improve the economics of telecoms markets in a sustainable and durable way (e.g. revenues earned serving new demand, or sustainable cost cutting). Others can help operators compete better with one another, delivering increased value for end users, but with limited financial impact on the market as a whole. These are interactions that cause competitive advantage, which is then competed away. All of these interactions also have a value for OSPs: operators invest to increase the reach and quality of broadband services, which in turn increases the addressable market of OSPs; telecoms operators also provide access to a customer base, to marketing, sales, billing and customer service channels and expertise, at a very granular level in each country. This is highly valuable to large-scale OSPs that lack such granular on-the-ground presence.

The future impact of these interactions and partnerships could be significant. We have estimated that, under a scenario where **indirect interactions become more common and intense**, telecoms operators could see an increase in annual operating free cashflow (OFCF) in 2021 of **EUR4 billion in Western Europe**, and potentially **EUR7 billion in EMEA** as a whole. Under a scenario where **operators and OSPs collaborate more directly and intensely**, telecoms operators could see an OFCF impact by 2021 of **EUR8 billion in Western Europe**, and potentially **EUR15 billion in EMEA**.

Our analysis shows that the 'digital service provider' ambition of many operators can be significantly furthered by working alongside OSPs: designing services around content, or bundling it; adopting technology proven at scale by large OSPs to improve network reliability, the agility of IT processes and the efficiency of operators; and making full use of the Internet's unique ability to break down barriers between markets to launch new services, bolstered by some of the most valuable consumer brands in Europe.

INTENSIVE COOPERATION WITH ONLINE SERVICE PROVIDERS: A €15BN OPPORTUNITY BY 2021 FOR EMEA TELECOMS OPERATORS



HIGH-END BROADBAND

monthly subscription premium

€11.3 for mobile

€9.9 for fixed

€1.8bn

additional cash flow for European operators

BUNDLED CONTENT

31% broadband churn reduction when bundling with content

€1.5bn additional cash flow for European operators

NETWORK TRANSFORMATION

€1.9bn

in European network savings in 2021 if 50% of new investments are virtualised

NETWORK PRODUCTIVITY IMPROVEMENTS

In 2021 in Europe, real time quality of experience monitoring and similar innovations could save

€1.3bn

OMNICHANNEL CUSTOMER INTERACTION

Can lead to up to 20% reduction in operator customer care calls and

€1.9bn

cost saving in Europe in 2021

INFRASTRUCTURE FINANCED BY OSPs

Telecoms operators can save

€0.6bn

in Europe through OSP-financed infrastructure in 2021

NEW BUSINESS OPPORTUNITIES

Telecoms operators could receive over **10%** of customer spend via direct carrier billing

Telecoms operators could earn **€1.5m to €3m** per large enterprise cloud customer

€1.4bn additional cash flow for European operators

2 The Internet has created both opportunities and disruption for telecoms operators, encouraging digital transformation

Throughout the very diverse countries of Europe, the Middle East and Africa (EMEA), the telecoms industry has undergone a period of significant change over the past five years.

In the less mature markets of Central and Eastern Europe, the Middle East and Africa (MEA), revenues have grown, strongly in some cases. This has been driven by growing take-up of services, economic growth, and new opportunities to expand into adjacent markets. Conversely, the mature markets of Western Europe have seen revenue pressure in both fixed and mobile markets.

Several factors have been at play: the broader economic conditions have been unfavourable in most Western European countries for a protracted period, some large countries have seen increasing competition in their fixed and mobile markets, and new competition by online service providers[2] (OSPs) – such as WhatsApp reducing consumers' willingness to pay for SMS in mobile markets.

Telecoms operators have responded by devising strategies to prosper in a varied and uncertain future characterised by further commoditisation of their core business. The crux of these strategies, for most operators, is to try to harness digital technology and Internet content and services to resist this commoditisation, improve efficiency and enter new markets.

2.1 Telecoms markets in the EMEA region have had different experiences, with growth in developing markets and pressures in Western Europe

The EMEA region is large and varied, from the advanced and mature markets of Western Europe, to the developing, fast-growing markets of Africa. The experience of telecoms markets in the region has been similarly varied. Total telecoms revenues in EMEA are shown in Figure 2.1 below.

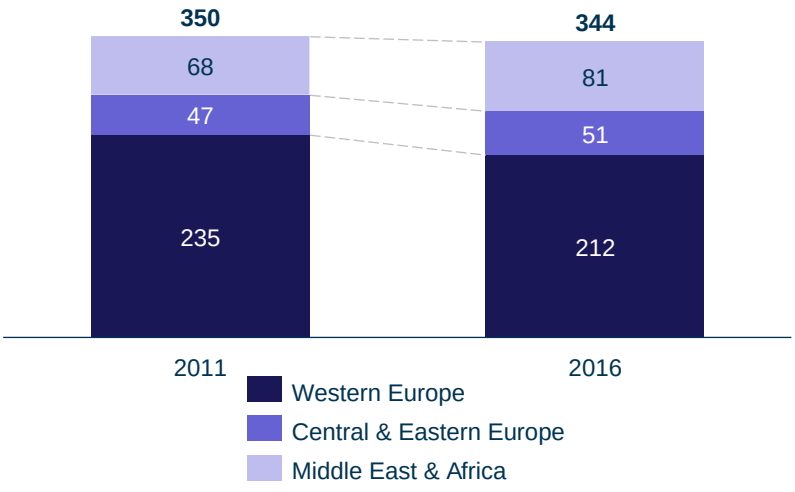
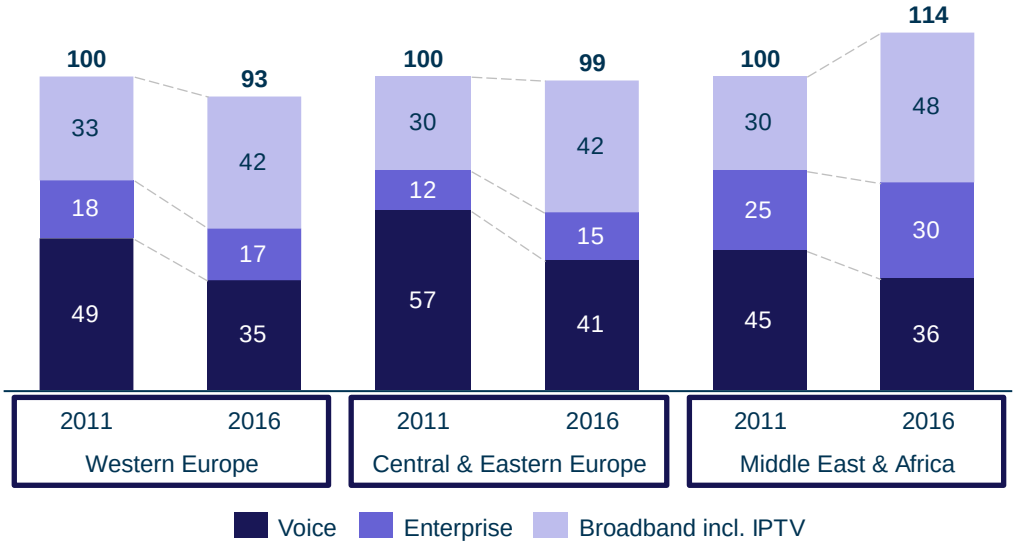


Figure 2.1: Revenues for telecoms services (fixed and mobile) in EMEA, in nominal EUR billion at constant 2015 exchange rates [Source: Analysys Mason, 2017]

[2] We define online service provider as any company that offers Internet-based content, software, apps, or services.

Fixed revenues (Figure 2.2) have fallen by about 1% per annum in Western Europe, continuing a sustained trend that is finally tailing off. They have been relatively stable in Central and Eastern Europe, and have grown materially (over 2% per annum) in MEA. One key trend that is present in all markets is the growing importance of broadband revenues as traditional revenues from voice traffic have declined. This increase in broadband revenues has been driven by many factors, including investment in broadband networks, especially (in developed countries) super-fast broadband infrastructure, and rising demand for IPTV subscriptions and online content, as discussed later in this report.

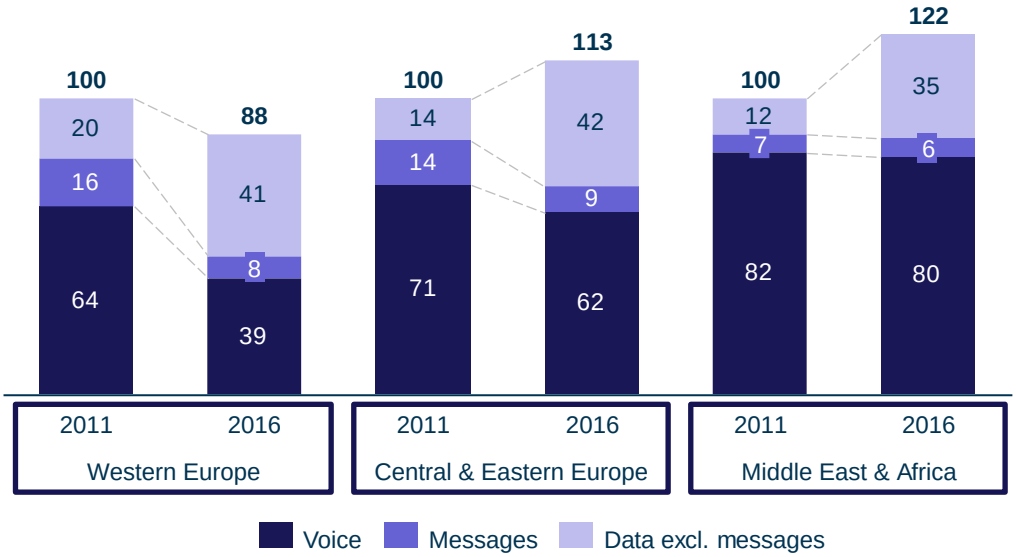
Figure 2.2: Fixed revenues, indexed to their 2011 level (nominal terms at constant exchange rates) [Source: Analysys Mason, 2017]



Mobile markets have grown strongly in Central and Eastern Europe and MEA, whereas Western Europe has seen revenue decline, driven partly by the fact that these markets are very mature, with very little growth in users, difficult economic conditions, and new competition from OSP services such as messaging apps.

As with fixed telecoms, mobile markets in all regions have seen a rebalancing of revenues away from traditional voice and messaging revenues, with data revenues growing extremely strongly. This has been most pronounced in Western Europe, but has also occurred in other markets as well, including the least developed countries. This rebalancing of revenues has been driven by investment in 3G and 4G networks, the spread of smartphones in this period, and the rising demand for ever-richer content. This is shown in Figure 2.3 below.

Figure 2.3: Mobile revenues, indexed to their 2011 level (nominal terms at constant exchange rates) [Source: Analysys Mason, 2017]



While there has been disruption in the telecoms markets of Western Europe, much of the revenue impact we observe appears to have been influenced by several significant external shocks. Most notably, operators have suffered from the global financial and economic crisis, with much of the impact visible between 2007 and 2010. In several large markets, such as France, competition has intensified in the period because of the entry of new operators. Finally, although the vast majority of mobile operators have invested in 4G networks within a similar timeframe across markets, fixed operators have adopted different approaches to investments in super-fast broadband, which has proven an important driver of fixed operator revenues as customers upgraded to premium plans.

The mobile market has been most negatively affected in Western Europe because this disruption coincided with the combined impacts of the financial crisis, a levelling off of growth as nearly everyone was already a mobile user, and increased competitive pressures in large markets such as France.

To a large extent, digital disruption benefited consumers by making complex mobile tariffs easier to understand and compare, and removing the ability of operators to recover their costs through services for which demand was relatively inelastic (SMS) rather than those where substitutes existed (e.g. fixed voice, or even SMS as a substitute to a call). Consumers benefited strongly from mobile messaging services, while maintaining their use of SMS, albeit at a much reduced price.

2.2 Core telecoms services are likely to be further commoditised in the next five years, affecting overall industry revenues by up to EUR8 billion in Europe by 2021

The future for the telecoms market, at least in Western Europe, is likely to involve a stabilisation of revenues, with the declines of the past persisting but slowing. In the next five years, absent

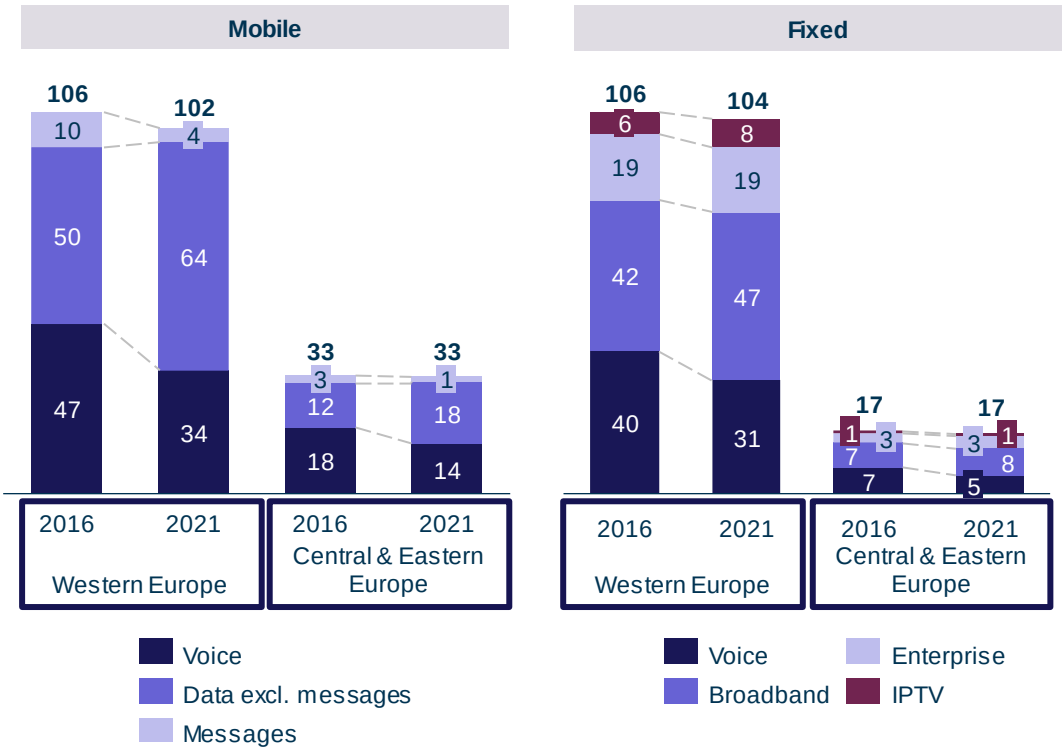
significantly increased co-operation between OSPs and telecoms operators (which we discuss in the subsequent two sections), we expect current market trends to continue. The commoditisation of core services will persist, leading to a small overall revenue decline in Western Europe, and the end of growth in Central and Eastern Europe

The key driver for ongoing commoditisation, in our view, will be continued strong competition, as substitution of voice and SMS services by data has already largely worked its way through operators' revenues. Western European regulators have shown themselves to be resistant to further consolidation: see, for example, the European Commission's blocking of the proposed merger between Three and O2 in the UK, the failed sale of Bouygues Telecom and the upcoming entry of Iliad in Italy further to the merger between Wind and Three. Although many in the market are pushing for the European Commission to be more flexible in allowing mergers, we expect competition to remain intense over the next five years.

In addition, we do not expect significant disruptive technological changes in telecoms network technology, such as 5G or ubiquitous gigabit fibre, to be broadly available in the next five years.

Figure 2.4 shows our forecast for fixed and mobile markets in Western Europe, showing the continued, but slowing, decline in overall revenues and the continued shift from voice to data revenues. We expect growth in Eastern Europe to level off after a period of steady growth.

Figure 2.4: Fixed and mobile revenue forecasts, EUR billion at constant 2015 exchange rates [Source: Analysys Mason Research, 2017]



We use these forecasts for fixed and mobile telecoms in Western and Eastern Europe as the base case for our calculations of the potential future impact of interaction and co-operation with OSPs, set out in Section 4.

2.3 In response to these challenges, operators aim to transform into digital service providers offering excellent connectivity efficiently while investing in new services

The trends described above present challenges to telecoms operators, especially in Western Europe. They have large amounts of capital tied up in physical networks, which must earn a return. They also have a cost structure that is largely fixed in the short term (but can be altered over the longer term), which presents challenges in the face of declining revenues. In addition, competition is increasing in many Western European markets, with new infrastructure-based entrants in, for example, France, Denmark, Finland and Sweden, and increasing competition from mobile virtual network operators (MVNOs) in Austria and Denmark. There has also been regulatory and competitive pressure to invest in next-generation access networks in most European markets.

Telecoms operators describe their strategies in different ways, but there is a broad consensus within the industry as to what that strategy should be. Operators must improve efficiency and search for new sources of growth to thrive in a world where their core business is becoming commoditised. They are doing this by transforming themselves from communications service providers to digital service providers. The actions required to do this can be divided into three broad categories:

- *Core business developments*, where telecoms operators aim to offer the best-quality connectivity services, with sufficient capacity to meet growing data demand, while maintaining revenues from traditional services (voice and SMS) as much as possible.
- *Enhanced technology and operations*, where telecoms operators improve the efficiency and reduce the cost of their core networks and core business processes.
- *New business opportunities*, where telecoms operators launch new and innovative services for businesses and consumers. This takes advantage of operators' privileged position as owning customer relationships, the low barriers to entry in adjacent markets thanks to the Internet (including through partnerships), and their strong brands.

We use these strategic areas to categorise the interactions and areas of co-operation between telecoms operators and OSPs that we discuss in Section 3, below.

We set out two case studies of operator strategy below: Orange and Deutsche Telekom.

Box 1: Orange

Orange is a global integrated operator with its home market in France (46% of group revenues), where it is the leading integrated operator and historical incumbent. Orange's strategy addresses the areas described above and is called 'Essentials2020'. Its focus is to provide a customer experience that involves ever-present ubiquitous connectivity to all the services that are essential to customer needs. This includes designing and providing digital services that are essential to their customers.

In its core business, Orange has prioritised offering richer connectivity. Orange aims to improve its data speeds, and has allocated EUR15 billion to invest in networks between 2015 and 2020. In the fixed market, it is investing in fibre roll-out and TV offerings. In the mobile market, this involves increasing 4G coverage to 95% of the population in its European businesses, and launching 4G in MEA.

To enhance its technology and operations, Orange is investing in 'reinventing the customer relationship'. Orange aims for 50% of customer interactions to be digitised by 2018, compared to 30% today. Orange is investing in data solutions to anticipate customer needs, and to identify a customer across all channels.

In new business areas, Orange has two areas of focus: 'accompanying the transformation of enterprise customers' and 'diversifying by capitalising on assets'. The first involves investing to increase the share of revenues that comes from IT services by 10 percentage points by 2020. This involves investment in private and hybrid cloud services for multinational customers, cyber-security, and collaborative work tools for businesses. The second involves using Orange's brand and customer relationships to launch in two adjacent markets: 'connected objects' or the Internet of Things (IoT), and mobile financial services. For the latter, Orange has acquired a stake in a bank.

Box 2: Deutsche Telekom

Deutsche Telekom is a global integrated operator with its home market in Germany. Its goal is to be the 'leading European telecoms provider'. It has four areas of focus that fit into the three categories described above. These are 'integrated IP networks', which is related to the core business, 'best customer experience', which is related to technical and operational effectiveness, and 'win with partners' and 'lead in business', which mostly relate to the 'new business' component.

In the first area, Deutsche Telekom is improving its access networks. It aims to differentiate itself through measured network quality. This includes rolling out super-fast broadband and 4G networks globally, and Wi-Fi hot spots in Germany, and building a single pan-European IP network with central management. Deutsche Telekom plans to extend LTE coverage to 50% of the population across its footprint and to 85% of the population in Germany by 2017 with speeds of up to 150Mbit/s, which it intends to increase to 300Mbit/s in the future. In 2015, Deutsche Telekom set aside EUR23.5 billion over five years to invest in Germany on fixed and mobile network development, small cells, and digitisation of infrastructure[3].

In the second area, Deutsche Telekom is aiming to reduce churn, attract customers, and increase revenues by investing in fixed–mobile convergence and omni-channel customer service. As part of this it is simplifying and improving customer service platforms, and making it easier for customers to serve themselves online.

Finally, Deutsche Telekom is targeting new business areas in the consumer and enterprise segments. It is more focused on partnerships than Orange and currently has around 30 partners, and less on developing services alone. For consumers, Deutsche Telekom is creating platforms that can be used by third parties. This includes a TV platform launched in Germany, a smart home platform called 'Qivicon', and gaming portals. For businesses, Deutsche Telekom is investing in enterprise cloud services with technology and software partners, security solutions and IoT with companies such as BMW.

3 Source: https://www.bloomberg.com/news/articles/2015-01-18/deutsche-telekom-plans-27-billion-network-spending-in-germany

3 Partnerships between OSPs and telecoms operators are key to rapid and successful digital transformation

As discussed in Section 2, telecoms operators have established a broad consensus on what their future strategy should be. This strategy embraces digital transformation in three main areas: **core business development**, **enhanced technology and operations**, and **new business opportunities**. Some initiatives are implemented by the telecoms operators themselves, others are pursued through partnerships with OSPs. The many examples that can be seen today, based on our research, experience and interviews with operators, broadly fall into eight categories, each affecting a range of cost and revenue drivers in distinct ways. This is shown in Figure 3.1.

Figure 3.1: Overview of categories of example, organised into strategic areas [Source: Analysys Mason, 2017]

Strategic areas	Categories of interaction
1. Core business development ▪ Includes impacts on revenues and take-up of core connectivity products	**1. High-end broadband:** ▪ Interactions that affect broadband, voice, and messaging **2. Bundled content:** ▪ Bundling OSP content with core telecoms operator services ***3. Online advertising*** ▪ *Use of online advertising to more effectively advertise core services* ***4. New online sales channels*** ▪ *Use of online channels to sell their core services* ***5. Low cost handsets in developing countries*** ▪ *In developing countries, OSPs are developing low cost handsets in conjunction with telecoms operators*
2. Enhanced technology and operations ▪ Includes impacts on network and operational technology and processes	**1. Network transformation:** ▪ New technologies that improve the efficiency and flexibility of the core telecoms network **2. Productivity improvements in network operations and maintenance:** ▪ New technologies that automate key non-network operational areas **3. Omnichannel:** ▪ New technologies that more effectively track and serve customers across different channels (e.g. shops, social media, phone, online) **4. Network infrastructure financed by OSPs:** ▪ Interactions that reduce the cost or improve the quality of the core infrastructure, driven largely by OSP investments in infrastructure
3. New business opportunities ▪ Includes revenues earned from new businesses in adjacent markets	**1. New markets for consumers:** ▪ Brand extensions and new business opportunities aimed at consumers **2. New markets for enterprise:** ▪ Brand extensions and new business opportunities aimed at businesses

***Key**: italicised categories are not quantified*

The above opportunities, closely linked to a fundamental change in how operators work and to the new markets they can address thanks to the Internet, provide an opportunity for the industry as whole to increase revenues, and reduce costs. Over time, this will help counterbalance the continued maturing and commoditisation of traditional telecoms markets described in Section 2, particularly in Western Europe where economic growth remains subdued.

Other interactions between OSPs and telecoms operators are unlikely to have a lasting effect if implemented by all operators in the market. The first operator to take advantage of it will experience a gain at the expense of its competitors, which will then respond accordingly. These interactions are very important for operators, and are described in the box below, although they will probably not improve the economics of the telecoms sector as a whole. These interactions may, however, result in lasting benefits to consumers or society.

Box 3: Examples of competitive advantages enabled by OSPs

Digital advertising is the core of many OSP business models. Digital advertising, whether on a desktop or to mobile, can deliver highly targeted and relevant advertising to consumers that can be more effective than traditional mass advertising. Telecoms operators can take advantage of this new form of advertising in their core business. They can replace traditional advertising expenditure with online expenditure, and potentially achieve a greater return. The use of digital advertising, when combined with omnichannel customer interactions (see Section 3.2.3) can have an even greater return. Indeed, all telecoms operators do this to a lesser or greater extent. The benefits of this, however, are felt primarily as a competitive advantage. As such, the revenues or churn benefit are sustainable only to the extent that only some operators in a given market are able to implement digital advertising effectively. Any operator that did not spend on digital advertising would be at a disadvantage.

Telecoms operators also have access to new online sales channels through which to sell their traditional services. This channel can target specific demographics very precisely, especially when combined with digital advertising. Again, most telecoms operators are selling their services online. As with digital advertising, however, the cashflow benefits are 'competed away' once all telecoms operators in a given market are selling their services online. All these activities are supported by data on consumers, which supports increasing micro-segmentation and targeting of tailored promotions to consumers.

We distinguish between *direct* interactions, where telecoms operators and OSPs enter a partnership with each other to pursue an opportunity, and *indirect* interactions, where telecoms operators respond to an opportunity or a threat created independently by OSPs. By definition, *direct* interactions benefit both parties, whereas *indirect* interactions can have a positive or a negative impact on telecoms operators (and indeed on OSPs, although this is not our main focus). An example of an indirect interaction, which is described in more detail below, is the opportunity for telecoms operators to up-sell high-end broadband packages, driven by consumer demand for ever richer online content.

In the remainder of this section, we discuss the eight categories of interactions, direct and indirect, which we expect to have a tangible, lasting impact on the economics of the telecoms sector in the next five years. In doing so, we set out a series of concrete examples of interactions and partnerships that are already starting to emerge.

3.1 Interactions related to core business development

Operators' core business consists of the provision of broadband connectivity, together with devices such as smartphones and set-top boxes. Part of the reason why operators' revenues are under pressure is that they have traditionally found it difficult to provide differentiated broadband access services. This is evolving, however, as operators leverage the requirements of some OSP services, in particular high-definition video streaming, to promote differentiated, **high-end broadband** products at materially higher price points.

In many cases, connectivity is bundled with a range of services, some of which are traditional telecoms services (e.g. telephone line with free weekend calls), while others include pay TV, online video services such as Netflix, or music streaming services such as Apple Music. We have grouped these propositions under the heading of **bundled content**.

We explore both in turn in the remainder of this section. In addition, in developing markets, OSPs and operators are actively engaging to develop low-cost smartphones to expand affordable access to the mobile Internet to many more, lower-income people, as illustrated in the box below.

Box 4: Low-cost handsets and training to support mobile broadband take-up in developing MEA

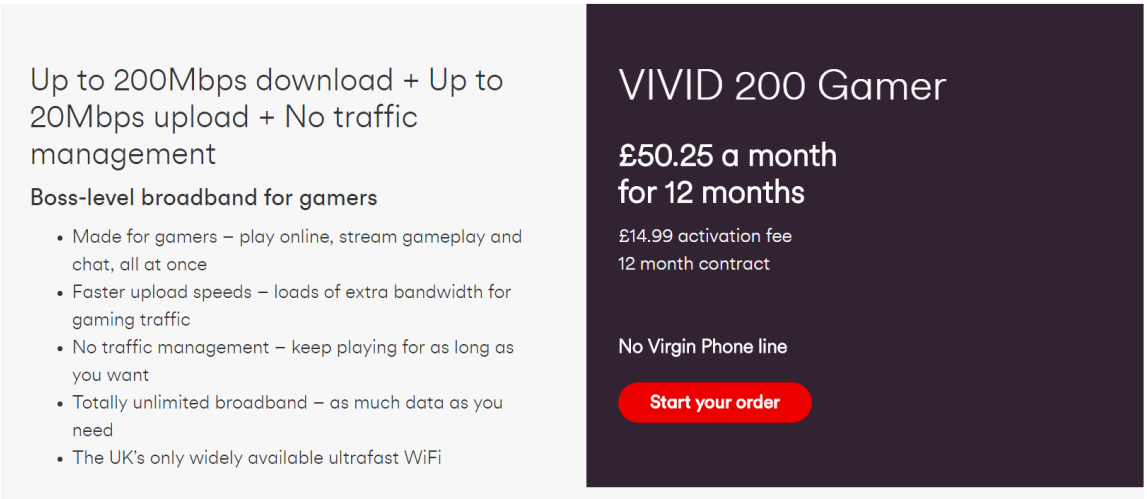
Operators and OSPs are partnering to offer low-cost handsets, especially smartphones, in developing markets. The cost of smart devices remains a significant barrier to the take-up and consumption of rich online content for lower-income consumers, and cheaper smartphones can create a virtuous circle, where more people consume richer content and upgrade to larger data bundles. Given the multiple players involved in the production of smartphones, these initiatives require direct partnerships between telecoms operators, OSPs, and handset manufacturers. Examples include MTN, which is partnering with Google, Jumia (an African eCommerce group), and Infinix (a Chinese manufacturer) to offer cheaper handsets using the Android operating system across its footprint. Likewise, Orange is co-operating with Google to develop low-cost smartphones, also using Android. By making mobile broadband more affordable, these initiatives can help drive take-up in these markets.

Initiatives to provide low-cost smartphones can be enhanced by providing training to potential Internet users in developing countries. Google has invested in this, having trained 1 million end users in Africa to date. The Mozilla Foundation has also run a small trial training users in Bangladesh, where it found that end users who received training used 17% more data than those who did not, and were more likely to purchase additional data.[4]

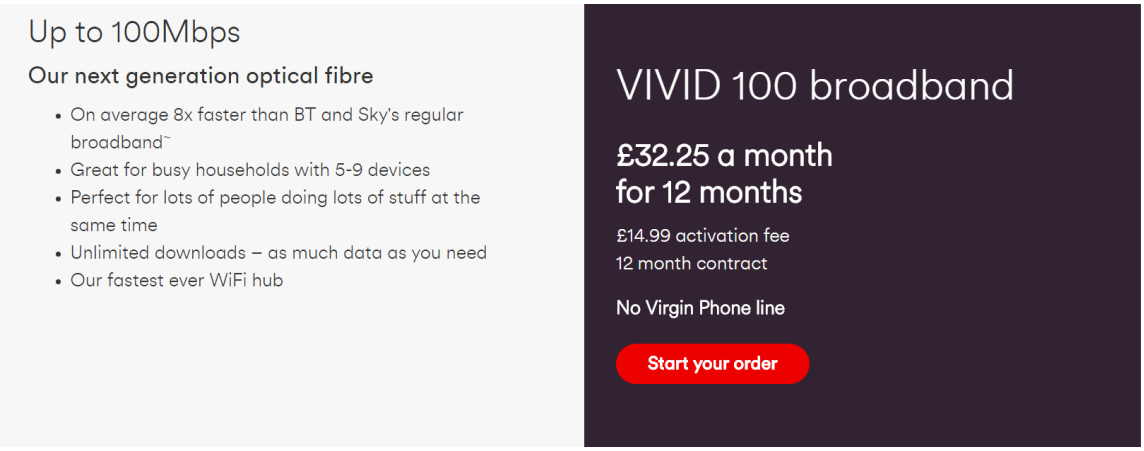
3.1.1 High-end broadband

OSPs have an impact on the core connectivity business of telecoms operators. Customers buy their fixed and mobile data connectivity services to access online content. Where they want to consume rich content that demands good network performance, such as 4K video today, and innovations such as virtual reality streaming in the future, people tend to upgrade their broadband service to a higher-end one. This is typically a higher-speed package (e.g. 100Mbit/s vs. 20Mbit/s), or one with a higher data allowance (e.g. unlimited vs. 2GB/month). Some operators have also been marketing packages aimed at gamers, with lower latency and better access to online games servers. An example 'gamer' package from Virgin Media in the UK is shown below, compared to the basic product.

Figure 3.2: Virgin Media Gamer vs. basic package [Source: Virgin Media, 2017]



[4] Source: https://stuff.webmaker.org/whitepapers/smartphones_content_skills.pdf



Mobile operators have also used data allowances (and, more rarely, speed) as reasons for users to upgrade to high-end mobile broadband offers, but perhaps the most common approach is the bundling of premium devices, such as iPhones, Google Pixels and Samsung Galaxy S-series smartphones.

Without compelling online content, apps or devices, customers would not upgrade to high-end broadband packages. This is an *indirect* interaction. The ability for telecoms operators to upsell premium packages is improved by the everyday activities of OSPs, without the need for an explicit partnership. It is also likely to benefit the industry as a whole, as it involves overall rising demand from consumers.

There is significant evidence as to the importance of this effect. Primary research data collected by Analysys Mason Research in 2015 in Western Europe, with a sample size of over 1000 customers in each country, shows a strong correlation between usage of OSP audio-visual services and the take-up of high-end broadband services. This correlation is shown for fixed services in Figure 3.3 and mobile services in Figure 3.4.

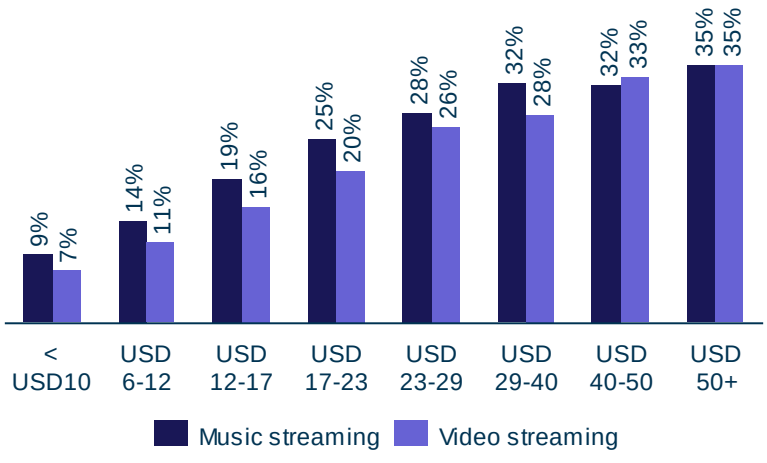


Figure 3.3: Penetration of OSP video and music services of mobile customers by average monthly consumer spend (USD) in Western Europe, percentage of subscribers [Source: Analysys Mason Research, 2015]

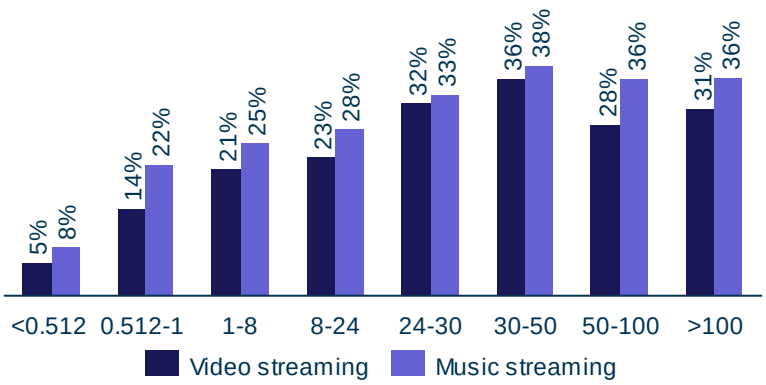


Figure 3.4: Penetration of OSP video and music services by fixed broadband subscription speed (Mbit/s) in Western Europe, percentage of subscribers [Source: Analysys Mason Research, 2015]

There are also real price differences between high-end (super-fast speeds for fixed or large data bundles for mobile subscriptions) and low-end broadband packages (lower speed for fixed or smaller volume for mobile subscriptions). An analysis of 23 fixed tariff packages across four European countries shows an average increase in monthly expenditure per consumer per month of EUR9.90 (Figure 3.5). In mobile, an analysis of eight tariffs in three countries shows an increase of EUR11.30 on average (Figure 3.6).

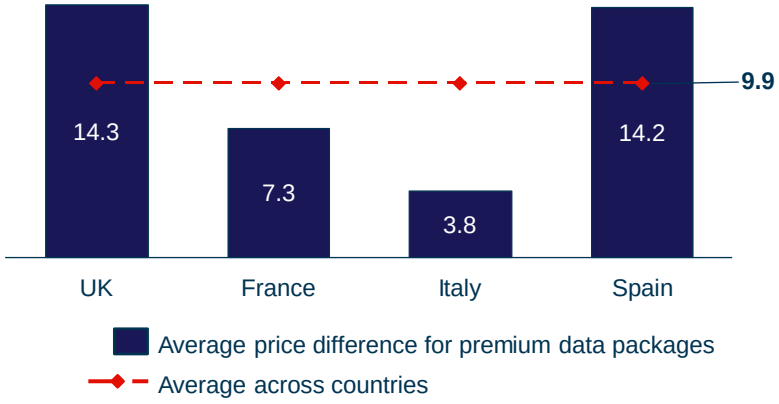


Figure 3.5: Price difference for upgrading fixed subscription to higher data speeds, EUR at 2015 exchange rates excluding VAT [Source: Analysys Mason Research, 2017]

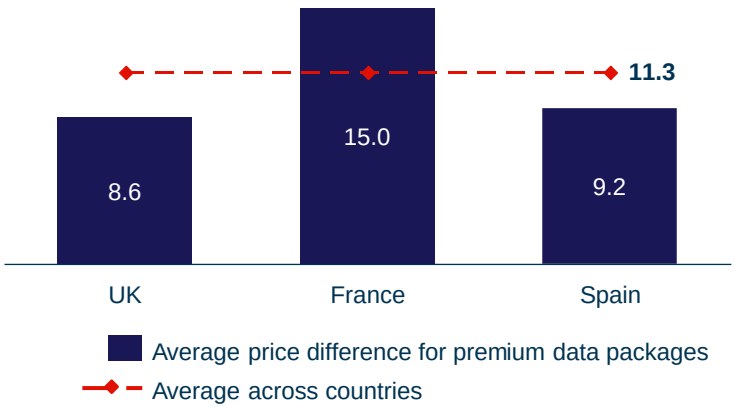


Figure 3.6: Price difference for upgrading mobile subscription to higher data bundles, EUR at 2015 exchange rates excluding VAT [Source: Analysys Mason, 2017]

Box 5: BT investment in super-fast broadband

BT has, since 2009, been upgrading its broadband network to meet growing demand for data at higher speeds. It now has widespread coverage of fibre rolled out to the cabinet, covering 96% of UK households[1] as at September 2016, offering broadband speeds of up to 76Mbit/s. It has seen a take-up of the premium service of 31% of its subscriber base, at an incremental expenditure per customer of approximately GBP10 per month (EUR13.77 per month at 2015 exchange rates).

3.1.2 Bundled content

The rich content produced by OSPs creates opportunities for telecoms operators beyond broadband plans. Because telecoms operators have very strong brands and deep customer relationships, they are attractive sales channels for OSPs seeking to market subscription services to users, especially later adopters who may not sign up online or through an app. Telecoms operators and OSPs partner *directly* by bundling OSP content with Internet access. These types of partnership are varied, in both the range of OSP content being bundled with telecoms services, and the commercial terms of the partnership.

Telecoms operators can bundle OSP content with broadband and TV and receive a commission from OSPs. This could be anywhere between 10% to 50% depending on the deal (typically 10–20% in Western Europe). In addition to new revenues, telecoms operators gain differentiation and stickiness of their subscriber base.

Any differentiation is typically competed away over time as all telecoms operators in a market launch bundles of their own, but churn reduction and revenue share from sales create a benefit for the telecoms market as a whole.

Not every broadband subscriber, fixed or mobile, is interested in purchasing content in a bundle with their connection, of course. For those broadband subscribers who take a pay-TV service, research shows that over 30% also subscribed to Netflix, according to a survey conducted by Analysys Mason Research in 2015 of customers of seven telecoms operators[5] who bundle Netflix with broadband (Figure 3.7). The research showed that Netflix take-up was 17 percentage points higher for customers of operators with a bundling deal compared to operators without a bundling deal. For these incremental Netflix subscribers, the telecoms operator earns a commission.

5 Virgin Media, Orange France, Deutsche Telekom, BT, TalkTalk, Bouygues, and DISH

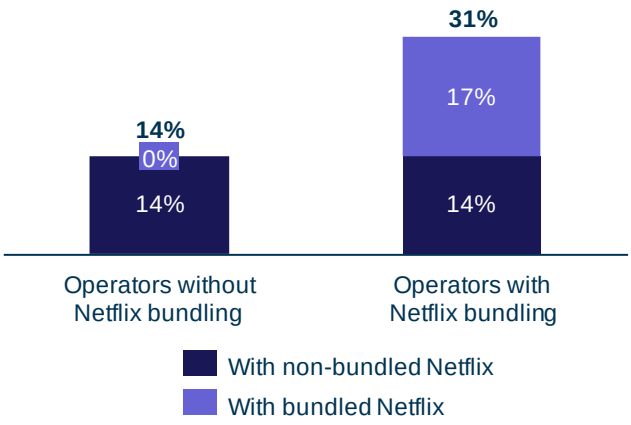


Figure 3.7: Penetration of Netflix subscriptions among pay-TV subscribers, share of subscribers [Source: Analysys Mason Research, 2015]

This example illustrates that the benefits for an OSP of offering content through telecoms operators can be significant. In practice, the relative value of such partnerships for OSPs and operators depends on the attractiveness of the content itself, and the market positioning. An entirely new service can benefit hugely from being marketed by a large established operator, and a more mature service can continue growing beyond early adopters in the same way.

While today services such as Netflix and Spotify are the most common types of online content bundled by operators, these partnerships are multiplying because they also offer operators the ability to provide differentiated bundles, to counter the commoditisation of their Internet access products. This also interacts with the positive effects described above under '**High-end broadband**' by linking content and connectivity very explicitly.

The offering of bundled content can also reduce churn. The same primary research conducted by Analysys Mason Research found that, for telecoms operators that have partnerships to offer bundled Netflix, intention to churn is 31% lower for customers who take the bundle compared to customers that do not take the bundle (Figure 3.8).

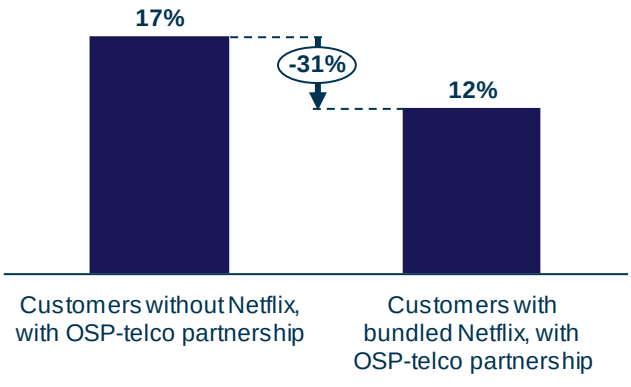


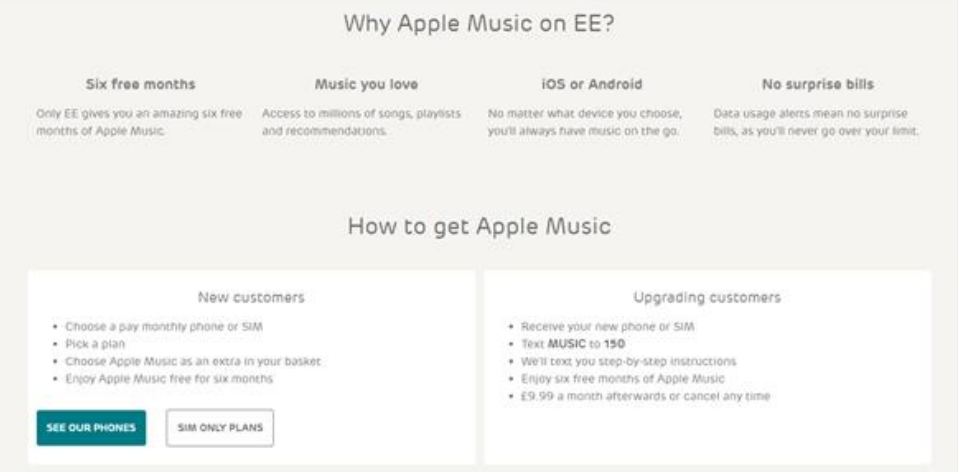
Figure 3.8: Change in intention to churn for subscribers who take-up Netflix when it is offered through bundling, share of subscribers with intention to churn [Source: Analysys Mason Research, 2015]

Box 6: Liberty Global bundling Netflix

Liberty Global owns a number of cable operators across Europe, including Virgin Media in the UK. In 2013, in the UK, it launched Netflix on the Virgin Media set-top box. Customers can watch Netflix on their televisions through the set-top box, paying for it on their Virgin Media bill. Virgin Media takes a share of this revenue. In September 2016, Liberty Global announced that it had signed an agreement with Netflix to offer this service across its entire footprint (more than 30 countries in Europe, Latin America, and the Caribbean).

Box 7: EE offering Apple Music to new and re-contracting customers

EE, a mobile operator in the UK owned by integrated market leader BT, bundles Apple Music with its postpaid mobile plans. It is available to new customers and those who renew their contracts with either a SIM-only plan, or with an iOS or Android phone. It is free for the first six months, after which it is charged at GBP9.99 per month (EUR13.76 per month at 2015 exchange rates). The service is not zero-rated, which means that customers will still draw on their data bundles while using it. This means that it can drive the demand for data and prompt customers to upgrade to high-end price plans, even during the free period. EE's offer collateral is shown below.



3.2 Interactions related to enhanced technology and operations

In addition to improving the sales of broadband access products and benefitting from bundled content deals, operators are increasingly using OSP-inspired technology to enhance their technology and operations. This includes using new technology such as virtualisation to transform the network, improving productivity in network operations and maintenance, changing the way customer interaction is done, and taking advantage of network infrastructure financed by OSPs.

Network transformation is predicated on the transition from specialised, often vendor-specific hardware, to software-defined network platforms. These are already operated on a global scale by

large OSPs, and enable a flexibility, scalability and cost-effectiveness that is much improved on traditional telecoms equipment.

In operating and maintaining their network, operators are also increasingly deploying or exploring new methods of working in order to reduce cost and improve effectiveness. These **productivity improvements in network operations and maintenance** are being targeted through a range of initiatives, in direct partnership with OSPs or indirectly by leveraging Internet-enabled technology.

Part of these productivity improvements relate to customer relationships. By ensuring that the customer information is in one place, easily accessible and high quality, operators can engage with their customers across multiple channels, from marketing and sales to customer support, and provide a better customer experience. We have grouped these initiatives under the term of **omnichannel customer interactions**.

Finally, OSPs invest in network infrastructure and equipment themselves. This investment is sometimes direct, where they roll out infrastructure themselves (or as joint investments with telecoms operators), and often indirect, when they buy capacity (typically under long leases) from operators. **Network infrastructure financed by OSPs** supports the quality of telecoms operators' customer experience with online content, but also reduces the investment and transit costs that operators require to ensure such good quality.

3.2.1 Network transformation

Telecoms networks are being transformed by technology pioneered by OSPs for web-scale services, and now being implemented by both traditional and new technology vendors. Implementing network functions in software (virtualisation and software-defined networking) makes the network flexible, and allows low-cost general computing equipment to be used instead of proprietary hardware. Capacity can be redeployed quickly and cheaply, customers can reconfigure or upgrade their services remotely without the intervention of an engineer, and operators can launch new propositions much more quickly. The ability to create new products and services at a lower cost is expected to lead to greater product innovation, to the benefit of competition and to consumers; cost reductions create an upside for the market as a whole. Figure 3.9 shows a highly simplified schematic of a virtualised network. Network and computing functions are implemented in software in the virtualisation layer, with another layer of software allocating hardware resources dynamically to functions (the orchestration layer).

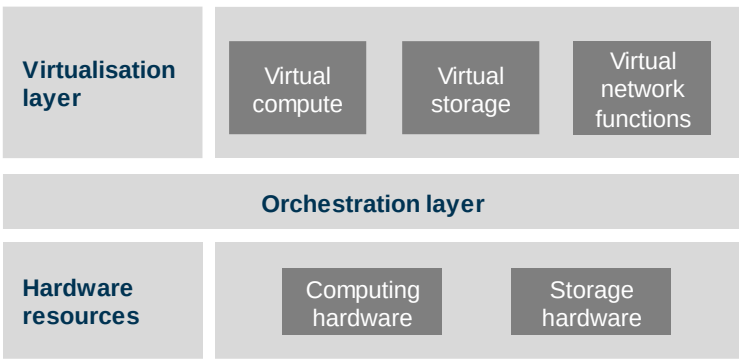


Figure 3.9: Simplified schematic of a virtualised network [Source: Analysys Mason, 2017]

Operators mostly interact with traditional equipment vendors (e.g. Ericsson, Huawei) on their journey towards virtualised, software-defined networks. Some new vendors are emerging, mostly focusing on software: for example, CENX, WebNMS, Affirmed Networks, to name a few. These new vendors are very similar to OSPs, and even large established OSPs themselves are increasingly working with vendors and operators to increase the adoption of technologies they pioneered into telecoms networks equipment (e.g. Google and OpenFlow, Facebook and the Telecom Infra Project). These interactions can therefore be *direct* where the telecoms operators deal directly with OSPs, or *indirect* where traditional network vendors adopt OSP technologies or OSPs and telecoms operators work together in industry forums on these technologies.

The cost reduction and productivity benefits of these interactions can be sustainable, and accrue to the market as a whole. However, any differentiation achieved is likely to be competed away as all operators in a given market deploy the technology.

There has been significant industry research effort put into quantifying the potential benefits of network transformation. In 2015, consulting firm Arthur D. Little, together with Bell Labs, produced research into the potential cost savings in fixed and mobile networks. They investigated the savings that could be achieved by transforming the network, and then by transforming the relevant organisational processes. Figure 3.10 shows their findings, with cost savings expressed per fixed line and per mobile SIM.

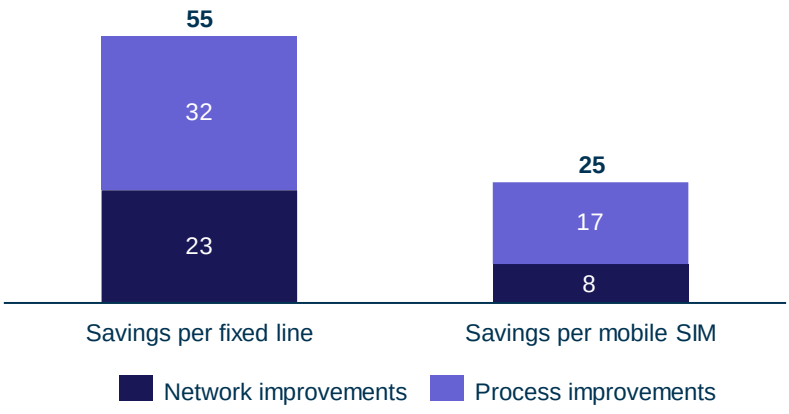
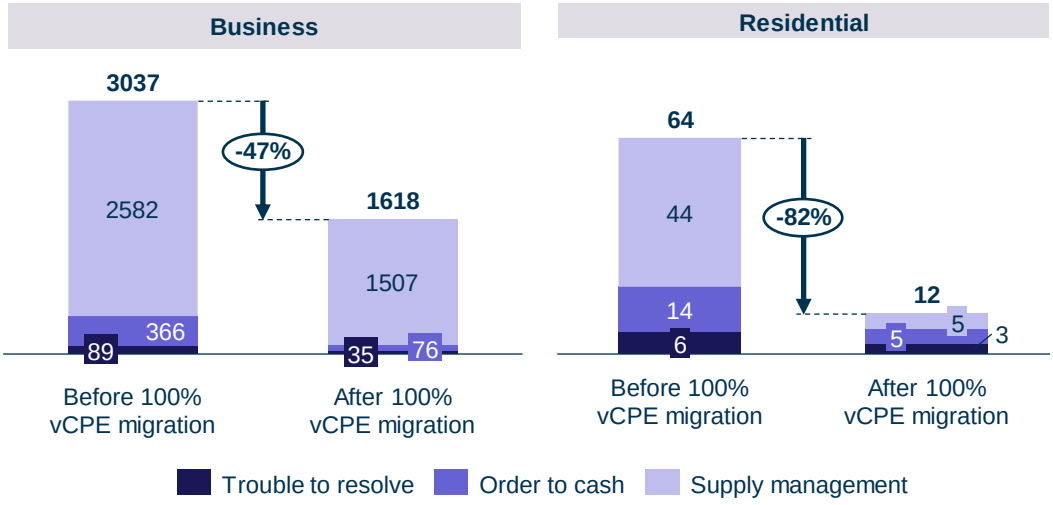


Figure 3.10: Operating expense saving for operators due to NFV/SDN implementation, EUR per annum [Source: A.D. Little, Bell Labs, 2015]

Analysys Mason Research has also investigated the savings that could be achieved through network transformation. In this case, they examined the potential savings from the use of virtual customer premises equipment (CPE). This is the equipment installed at the end customer's premises in fixed networks. Virtualisation of the CPE allows cheaper equipment to be deployed, and configuration and maintenance to be automated. The findings are illustrated in Figure 3.11 for residential and enterprise customers.

Figure 3.11: Annualised CPE-related cost per CPE, EUR [Source: Analysys Mason Research, 2017]



These figures show the potential cost saving on a per-line or per-device perspective. Generally, we would expect the process of network virtualisation to be gradual for telecoms operators, with progress made on new sections of the network first. Very few operators publish statements about progress towards network virtualisation. However, AT&T has announced that it had virtualised 34% of its network to date, with a target of 75% by 2020.

Box 8: Deutsche Telekom investing in NFV in Central Europe

Deutsche Telekom is investing in NFV technologies to offer data connectivity services to small and medium-sized enterprises (SMEs) in three European countries (Croatia, Hungary and Slovakia). Deutsche Telekom's use of NFV allows its SME customers to access flexible and scalable network bandwidth through a self-service portal. They can use the portal to track performance of the service, increase the number of users or bandwidth, or upgrade their package. Changes are provisioned automatically and in real time. The investment has also had network opex savings in the SME business.

Box 9: Structured collaborations with OSPs

OSPs are driving the adoption of new network technology through structured collaborations. Facebook, through its Telecom Infra Project (TIP) and Google through its CORD and mCORD initiatives, are engaging with equipment vendors and operators to push advanced SDN and NFV technology into telecom networks. CORD stands for Central Office Re-architected as a Data Centre. It is an open system that seeks to bring 'hyper-scale' data-centre economics to core networks. It builds the network functions using software running on commodity server infrastructure. TIP is a co-operation project among a wide variety of telecoms operators and technology companies that seeks to improve the economics of the access, backhaul, and core networks.

In addition, Google has shown that its machine learning and artificial intelligence (AI) techniques can be used to optimise the performance of data-centre power and cooling systems with a significantly better performance than human engineers. Google has been able to reduce power costs by 40% in large-scale data centres, some of which could be replicated in telecoms networks. A structured collaboration between telecoms operators and Google in this area could yield cost savings in various aspects of network optimisation.

3.2.2 Productivity improvements in network operations and maintenance

OSPs have developed a range of data-driven technologies that can help make telecoms operators more efficient through productivity improvements, optimisation, and automation. For example, it is typically difficult for telecoms operators to gather data on the quality of experience received by its customers while consuming online content. While operators have extensive data regarding performance at the network layer, they do not know the user's app level performance for OSP services running over their network, as these services are end-to-end and very often encrypted. In certain cases, the first an operator may know of a user problem with a service is when they receive a support call.

Data on app-specific quality of experience (QoE), and data collected by apps on smartphones, can be used to optimise the roll-out of new sites (mobile), and of incremental capacity (fixed). This can have benefits for consumers as well as operators, as the quality of their Internet experience improves.

In addition, Internet-enabled IT innovations – including cloud IT, remote monitoring, automated network diagnostics, and augmented reality – can be used to make operators more efficient, particularly for labour-intensive maintenance and repairs. This can be achieved through better scheduling and organisation of work, reductions in the need for rework, and automation of certain organisational functions. Vodafone Portugal has implemented a cloud-based system for its facilities management function (see example below) that has achieved these benefits.

These technologies can be applied broadly across the industry, resulting in cost savings in several parts of the business. They largely constitute *direct* partnerships between OSPs and telecoms operators. Productivity improvements and savings achieved by these technologies can improve the economics of the whole industry by reducing cost and capital expenditure (capex).

There is relatively little evidence that is publicly available regarding the impact of these technologies at the moment. However, the capabilities of one of the available tools is illustrated below (Figure 3.12). This shows the dashboard output of the YouTube Video Checkup tool (see example below) for mobile users in Malaysia. The QoE of YouTube users can be tracked by geographical location and telecoms operator, on an anonymised basis. This granularity of the resulting aggregated information can be very useful for operators in optimising their networks. More generally, the many other tools and technologies available can be similarly useful for telecoms operators.

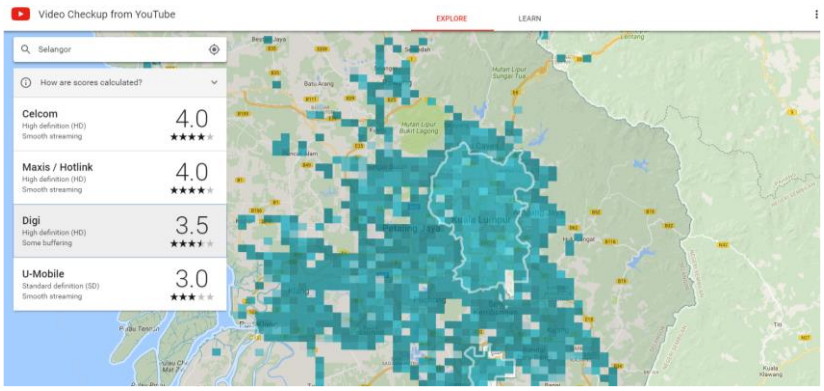


Figure 3.12: YouTube map with operators' scores indicating their video streaming quality (0 – the lowest, 4 – the highest) [Source: YouTube, 2017]

Box 10: YouTube Video Checkup tool

Google gathers network quality data for its YouTube users, such as which network they are on, their location, and the quality of experience they are receiving. Google can then share aggregated and anonymised data with its telecoms operator partners, giving them detailed information about the QoE performance of their network. This data can be used to improve the performance of the network, which can improve customer experience and reduce churn. In addition, operators can use this information to better plan network capacity upgrades, further saving cost and improving customer experience.

Box 11: Remote diagnosis and repair of broadband CPEs

Many fixed operators have invested in technology that allows automated diagnosis and repair of broadband CPEs. Customers call an automated interactive voice response (IVR) line, which initiates a remote diagnosis and repair. This can improve the customer experience by removing the need for disruptive engineer visits. It can also significantly reduce network maintenance costs, for the same reason. This is an indirect interaction, as it involves the deployment of data-driven technology, rather than a direct partnership with an OSP.

Box 12: Vodafone Portugal implementing cloud IT for facilities management

Vodafone Portugal announced in January 2017 that it had implemented a cloud-based IT system to help manage the service providers and suppliers in its facilities management business (e.g. cleaners, caterers, maintenance contractors). This system allowed service requests and follow ups to be automated, reducing rework, unanswered requests for service, and increasing the use of preventative maintenance work. Systems like this can help operators improve productivity and save costs in many areas of their organisation.

3.2.3 Omnichannel customer interactions

OSPs are increasingly using online platforms such as forums, self-care videos, chat, social media and apps to improve sales and customer service, following in the footsteps of retailers. By combining information from online and traditional channels (shops, call centre), operators can improve their customer interactions – this is called omnichannel customer interactions. This can also involve the automation of customer service and sales functions, for example, through the use of online chatbots to interact with customers. This involves the deployment of Internet-enabled technology and the use of online platforms by telecoms operators, both of which can be seen as a *direct* or *indirect* interaction depending on whether there is an explicit partnership.

Omnichannel customer service and sales can have a number of impacts. Customer-care costs can be reduced as more customers use self-care. Processes can be optimised and customer satisfaction increased through having a unified view of all customer interactions across all channels. For example, with an omnichannel approach, the telecoms operator can keep track of a customer service or sales interaction that begins on one channel (e.g. online) and ends on another (e.g. on the phone). Consumers also benefit from smoother and more efficient customer service calls, and a quicker, more responsive sales process.

Cost benefits achieved through omnichannel customer interactions are sustainable and can be felt by the entire industry. Benefits arising from increases in customer satisfaction, while real, are likely competed away as all operators implement the technology, to the ultimate benefit of consumers.

We can gain some evidence of the benefits that might arise from the implementation of omnichannel customer interactions by looking at the real experience of telecoms operators. Virgin Mobile in the UK has implemented an omnichannel solution. This allows customer service agents to see all previous customer conversations, across all channels. It also allows better analysis and understanding of customer experience along the entire sales or service process. After implementation, Virgin Mobile found a significant reduction in the number of customer service calls and emails received per day. We estimate that this could result in an 18% reduction in the number of customer service staff required (Figure 3.13).

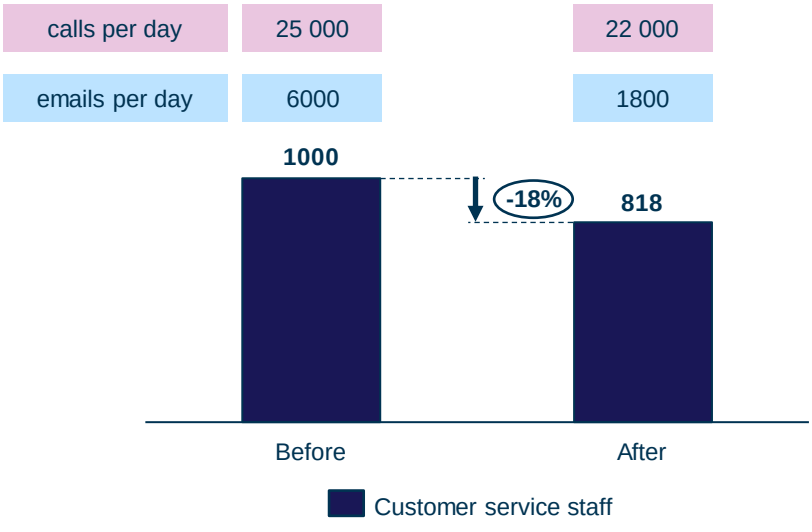


Figure 3.13: Decrease in customer service employees at Virgin Mobile due to implementation of customer service software [Source: eGain, 2017]

The potential churn benefit of omnichannel interactions is also visible when examining the reasons customers give for their churn intentions. Omnichannel interactions improve customer service satisfaction. Poor customer service is a significant driver of churn intentions. Market research conducted by Analysys Mason Research in 2015 asked over 1000 customers per country their reasons for their churn intentions. Between 17% and 22% of churners intend to churn because of poor customer service (Figure 3.14).

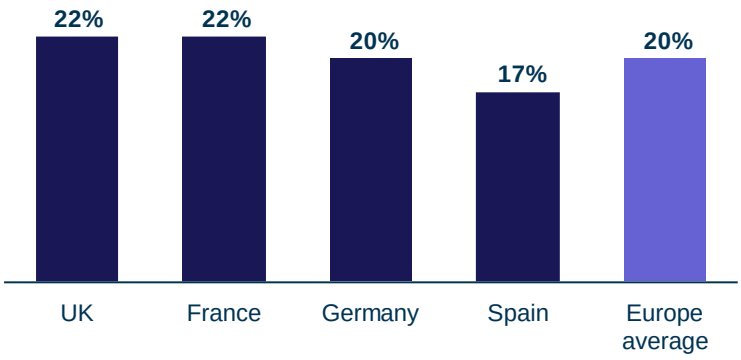


Figure 3.14: Share of mobile subscribers intending to churn due to poor customer service [Source: Analysys Mason Research, 2015]

Box 13: Three Ireland investing in omnichannel and IT transformation

In 2016, Three Ireland announced that it would invest EUR65 million in refreshing its IT systems after its merger with O2. This is a broad programme of modernisation that also includes an investment in omnichannel customer service solutions. Three Ireland has not published information on the impact of these investments. However, it aims to increase the proportion of customers who self-service, and to increase customer engagement.

Box 14: GiffGaff's positioning supported by self-care

GiffGaff is an MVNO on the O2 network that sells prepaid SIM cards online. It uses software to interact with potential subscribers on the company's website to help structure their tariff in an automated way.

GiffGaff's customer self-care capability is built on its community of subscribers who interact on the company's online forum. Customers can solve 50% of questions with an average response time under 3 minutes. Active subscribers are then rewarded with points that can be exchanged for airtime credit, cash or donated to charity. Consequently, GiffGaff runs a very lean organisation. According to its financial filings, GiffGaff has 72 employees, of which 49 are in customer operations. This compares to, for example, Lebara, an organisation with a similar number of customers, which has 748 employees (albeit over 4 countries as opposed to GiffGaff's one).

3.2.4 Network infrastructure financed by OSPs

OSPs are themselves investing in their own network infrastructure, including backbone networks (e.g. submarine cables) and delivery infrastructure (e.g. content delivery networks, or CDNs). Backbone networks built by OSPs bring direct capex savings for larger telecoms operators, as the infrastructure is necessary for a high quality of user experience online. If OSPs did not build these networks, telecoms operators would have to.

Where OSPs lease these networks, they generate a revenue for telecoms operators, in a *direct* interaction. CDNs cache content closer to the edge of the network, lessening the need for telecoms operators to buy IP transit to bring the content from remote OSP locations. This can result in a cost reduction for telecoms operators that is likely to be sustainable for the industry as a whole. This interaction is *indirect* as it arises from activities that OSPs undertake as part of their core business.

In 2014, Analysys Mason published research that estimated the total spend of OSPs on this network infrastructure. Figure 3.15 shows the spend by OSPs on backbone networks and delivery infrastructure in Europe on an annualised basis. It includes both direct capex (money spent by OSPs on their own investments) and indirect capex (money spent leasing capacity on telecoms operator infrastructure).

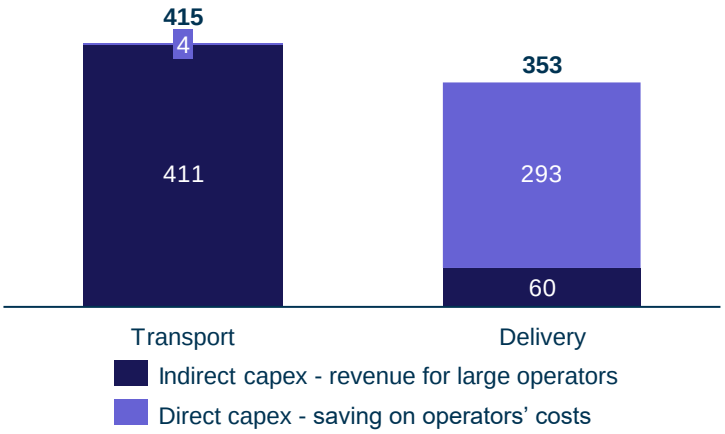


Figure 3.15: Annualised capex by OSPs in Europe, 2015, EUR million [Source: Analysys Mason, 2014]

OSPs spend significant sums on technology and traffic delivery infrastructure. Netflix has built its own CDN, Open Connect, that it allows telecoms operators to connect to (see example, below). Netflix invests a significant and growing amount in technology, as illustrated in Figure 3.16, including streaming infrastructure, which is a significant part of the total.[6] As more OSPs do the same, the benefits for the telecoms industry are likely to rise.

6 Streaming delivery costs increased by USD97 million (EUR91.5 million at 2015 exchange rates) in the US between 2013 and 2015

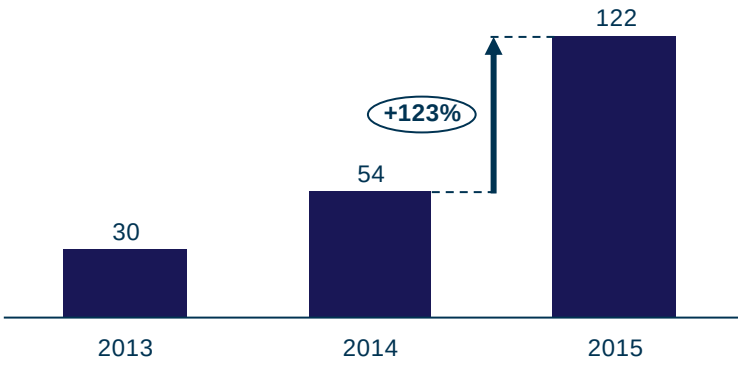
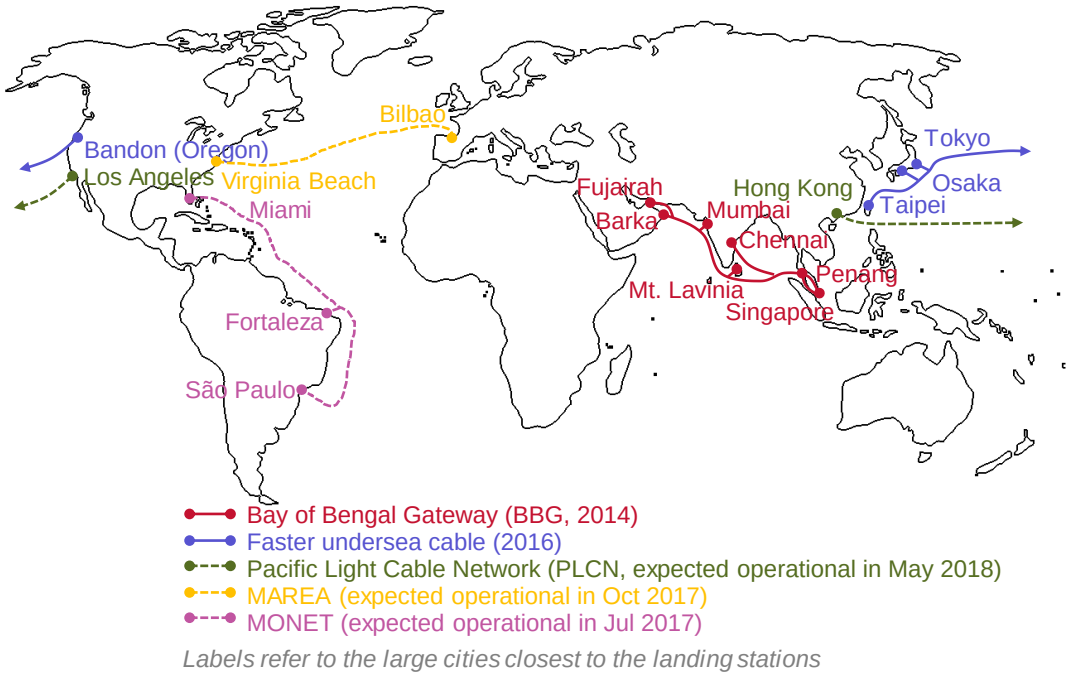


Figure 3.16: Netflix's technology costs, including streaming delivery apportioned to Europe based on paying subscribers, EUR million [Source: Analysys Mason based on Netflix data, 2017]

Box 15: OSP investment in submarine cables

OSPs are investing in long-distance submarine fibre-optic cables that carry Internet traffic around the world (telecoms operators are clearly also large investors in these). OSPs are investing in many major new cables, mostly focused on the Asia–Pacific region. These include Pacific Light (a EUR375 million investment in a cable between Hong Kong and the USA) and FASTER (a EUR280 million co-investment with a consortium of telecoms operators that runs between Japan and the USA). Investments in the Atlantic include the MAREA and MONET cables. The routes of these cables are shown below.

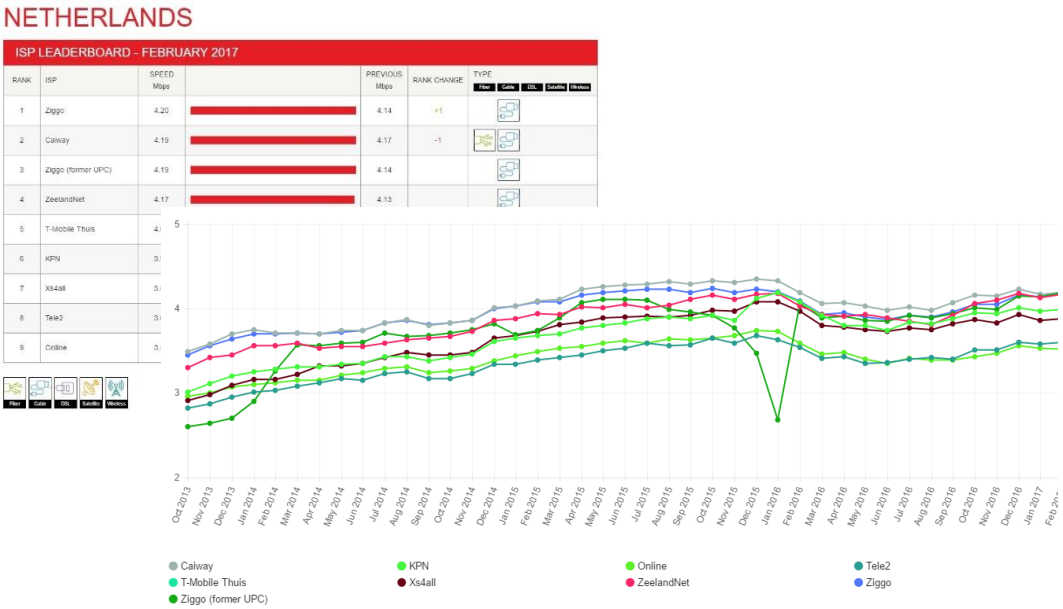
Figure 3.17: Map showing a number of OSP-invested cable systems [Source: Company data, 2017]



Box 16: Netflix's Open Connect CDN

Netflix has created a global CDN called Open Connect, which brings Netflix content to the networks of telecoms operators. Operators can interconnect either through Internet exchanges or directly at private interconnect points. There is no cost to telecoms operators for connecting with the CDN. Netflix's motivation is to ensure its content is delivered to end customers at the highest-possible QoE. Netflix tracks the quality of its streaming on telecoms operator networks, which shows the improvement over time, through the use of its CDN and other factors. This is illustrated below for the Netherlands.

Figure 3.18: Netflix ISP speeds in the Netherlands since 2013 [Source: Netflix ISP Speed Index, 2017]



3.3 Interactions related to new business opportunities

Besides improving the revenues and costs in their core business, telecoms operators are also actively exploring new markets. Many fixed operators are already very active in pay TV, which is now core or 'near-core' for most of them. Beyond pay TV, operators are expanding the services they offer both to customers and to many different types of OSPs.

New consumer markets include the provision by operators of billing facilities for app stores and other types of transactional services through direct carrier billing. Operators are also exploring entirely new markets where their brand, customer relationship, and technology can help them gain a foothold, such as banking or smart home technology.

New enterprise markets include primarily partnerships to distribute, sell and support software solutions created by OSPs (which includes large companies such as Google or Salesforce, as well as smaller providers such as SugarCRM). As more and more companies deploy Internet-based connectivity solutions (e.g. IP VPNs and SD-WANs) instead of managed business network services,

deeper relationships tied to software solutions can help operators retain strong relationships with their enterprise customers.

In developing markets, particularly in MEA, many operators are already actively exploiting their unique billing relationships with end users who are often unbanked and do not have credit cards, as well as their cash-handling networks, to offer direct carrier billing as well as financial services such as mobile money and mobile insurance (see the box below).

Box 17: Direct carrier billing and mobile money in developing MEA

Operators such as Safaricom and Türk Telekom have privileged relationships with many consumers who do not have access to credit cards or other electronic payment systems. This is facilitated by a well-developed network of agents, who are set up to handle cash for mobile top-ups, and are being leveraged to expand the scope of services billed through mobile credit, including via direct carrier billing. In addition, the same network is being used to support significant investments in mobile financial services, focusing on mobile money / wallets. Consumers can access their funds to pay each other, or third parties, via an SMS or USSD channel. These services are aimed at people without bank accounts who typically have simple 2G feature phones.

To succeed in this area requires a strong brand with a high level of trust, and a very wide network of agents who can receive and hand out cash to and from customers who want to deposit and withdraw funds. Mobile operators in developing countries have both of these. The most significant operators of mobile money services are Vodafone, MTN, and Orange, all of whom offer the service in multiple countries in Africa and elsewhere. This is not typically a direct partnership with an OSP, as operators can implement the service themselves. However, certain OSPs are trying to enter this market, with WeChat launching the service in China and in Africa.

3.3.1 New consumer-focused business opportunities

Telecoms operators have strong brands, deep customer marketing, service, and billing relationships, their networks, and collect significant amounts of data about their customers. They also have large retail networks and, for fixed operators, a significant field force that routinely visits customers to install and repair CPEs. This can all be leveraged to enter new consumer markets, facilitated by the much lower barriers to entry that the Internet allows for many services markets. New market entries could occur either in partnership with OSPs (*direct* interactions), or individually by telecoms operators (*indirect* interactions), taking advantage of OSP platforms.

There is a very wide range of opportunities that telecoms operators could invest in. This could include smart homes and other IoT services. It could also involve moving into mobile financial services.

Closest to operators' core business is direct carrier billing, a mechanism to enable consumers to purchase goods and services online from third parties, while paying through their telecoms bill (but without explicit bundling). We discuss a number of examples here, providing numerical evidence of their size or potential size. However, the general market opportunity here in Western and Eastern Europe for telecoms operators could be significant overall. These opportunities provide new demand for telecoms operators. As such, they are likely to benefit the industry as a whole and not be competed away.

Direct carrier billing makes the billing and payment facilities of an established operator available to OSPs that wish to charge for content, such as apps, music tracks, videos, and in the future also e-commerce transactions. For groups of consumers who have limited access to credit cards (e.g. in emerging markets) or are reluctant to make purchases online, this can be a very attractive way to expand OSPs' addressable market, while generating revenues and cashflows for telecoms operators.

Ovum, a research firm, has produced a forecast of the global market for direct carrier billing (below in Figure 3.19). The market opportunity in Western Europe is sizeable, growing from EUR2.7 billion in 2016 to EUR3.7 billion in 2020, according to Ovum.

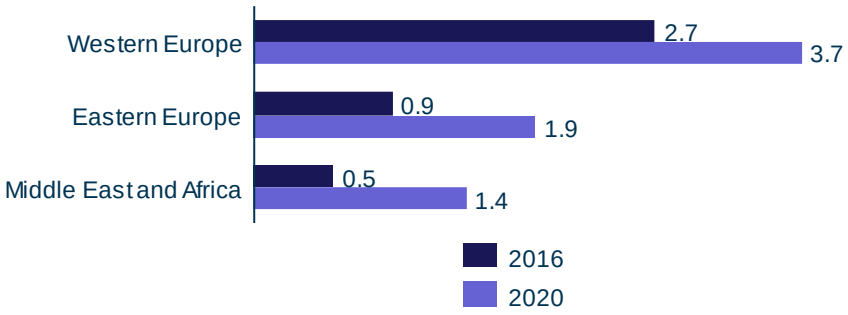


Figure 3.19: Carrier billing revenues by region, EUR billion [Source: Ovum, 2016]

We can put this in perspective with one of the drivers of direct carrier billing: mobile apps. Telecoms operators can use direct carrier billing to let customers purchase apps and make in-app purchases through their telephone bill. Applying an assumed 10% revenue share, which we understand from interviews to be a typical value, we can estimate the addressable market size for apps alone at approximately EUR3.2 billion globally in 2016 (shown in Figure 3.20).

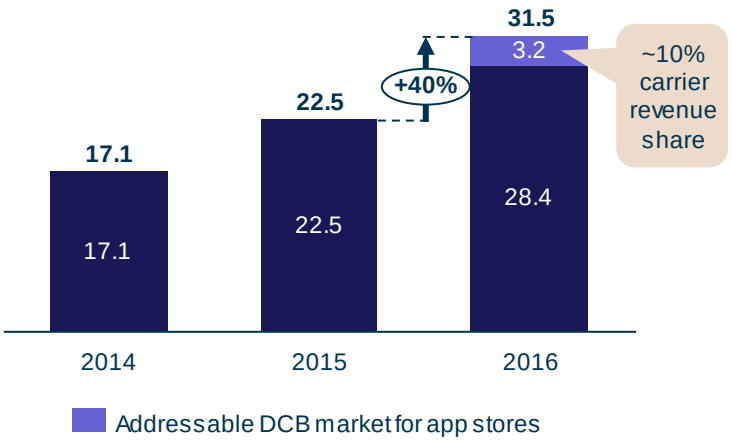


Figure 3.20: App store global revenues (Google Play and Apple), EUR billion [Source: AppAnnie, 2017]

It is worth noting that app stores make up only a part of the revenue from direct carrier billing. In addition to apps, customers can use the service to pay for tickets, transportation, gift cards, and many other products and services.

Box 18: Swisscom's implementation of carrier billing

Swisscom has implemented direct carrier billing in its mobile business. This enables customers to pay for online content or apps directly using the telephone bill, rather than supplying a credit card. The service makes payments more convenient and secure, and provides a payment mechanism for those without credit cards (mostly young adults and students). Swisscom earns revenues by taking a proportion of the payment made to the merchant.

Another set of examples of opportunities in consumer markets is in smart homes. This involves automating certain home functions (e.g. utility metres, security, digital assistants, and others) that connect either via the home broadband connection or a mobile SIM. Certain telecoms operators do this with their own product development. Others engage in partnerships. We set out some examples of this below.

Box 19: Deutsche Telekom's smart home platform

Deutsche Telekom launched Qivicon, its smart home platform, in Germany in 2013, and the Netherlands in 2015. It is an open platform that allows third parties to offer connected home services, with a royalty fee paid to Deutsche Telekom per customer. Deutsche Telekom has signed up 36 partners so far.

Box 20: Eneco's smart thermostat

Dutch power utility, Eneco, has implemented a smart thermostat solution that allows the control and monitoring of home heating and power systems through an attractive user interface. By the end of 2015, it had approximately 200 000 installations. Among smart thermostat customers, Eneco has achieved a 30-point improvement in net promoter score (from a negative to a positive) and has seen a 60% reduction in churn.

3.3.2 New enterprise-focused business opportunities

Telecoms operators can also use their existing capabilities and assets to enter new enterprise markets. In this area, telecoms operators have large sales and service forces, which can be used to provide pre- and post-sales support for new services, as well as the sale itself. Telecoms operators also have their brands, reputation among businesses, and sales contacts.

As with consumers, there is a very wide range of potential services that telecoms operators could offer. This could include hosting and selling software as a service (SaaS, for example, hosted applications targeted at specific industry verticals) to large or small enterprises, providing IT integration and consulting services in conjunction with this. It could also involve a wide range of IoT apps, such as connected cars or industrial automation. Like for consumers, these opportunities could be pursued in partnership with OSPs (*direct* interactions) or separately (*indirect* interactions). Increasingly, large enterprises demand a wide range of IT and communications services which they want to buy in a single contract. The offering of IT and cloud services can provide a way for telecoms operators to both earn new revenues, and protect their own core businesses. Different telecoms operators are likely to invest in different things, but taken together, new opportunities in enterprise markets could be significant, creating new demand that will generate sustainable benefits.

Similar to consumer markets, the wide range of potential opportunities makes general quantification more difficult. However, we can gain an idea of the potential of these markets by looking at the experience of several operators that have already made heavy investments. Telefonica, CenturyLink, and Orange have all made significant investments in enterprise cloud services, either organically or through acquisition. These telecoms operators now have significant businesses selling cloud and IT services to large and small enterprises alike. The revenues they have each achieved are illustrated in Figure 3.21. We also set out some other concrete examples in the boxes below.

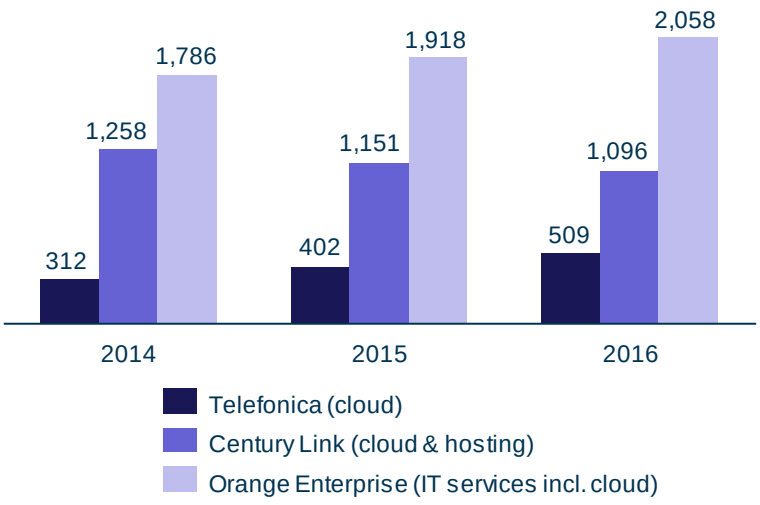


Figure 3.21: Telefonica, CenturyLink, and Orange cloud and IT revenues, EUR million [Source: Telefonica, 2017]

Box 21: T-Systems hosting and selling cloud-based CRM software

Since 2014, T-Systems has had a partnership with Salesforce.com in Germany, Austria, and Switzerland. T-Systems provides the data-centre infrastructure to host the Salesforce.com server estate in Germany. T-Systems also acts as the primary reseller for Salesforce.com in these three countries. Likewise, since 2014, T-Systems has also acted as the hosting and resale partner for SugarCRM. T-Systems has the same role in this partnership – hosting the software and acting as a reseller.

Box 22: Vodafone and Google cloud G Suite partnership

Vodafone partners with Google in India to offer cloud services using G Suite, a set of apps built by Google for enterprises, to its business subscribers. The service is delivered in a pay-per-use SaaS model. Vodafone charges customers EUR2.20 per month for a standard plan and EUR9.40 per month for an unlimited plan. Vodafone's role is in both the pre- and post-sale function, from product onboarding to migration and services support

4 Operators in EMEA could gain up to EUR15 billion in cashflows in 2021 by collaborating with OSPs

We have seen how co-operation and interaction between OSPs and telecoms operators can facilitate a shift from communications service provider to digital service provider, and thereby generate benefits for both parties. The extent of this co-operation is a crucial determinant of the future success of the sector, as we explore further and seek to quantify in this section.

4.1 The digital service provider: two visions of the future

Telecoms operators have a vision to become digital services providers by developing their core business, enhancing technology and operations, and launching new businesses. We have developed two scenarios for how this might play out, depending on the level of interaction with OSPs. We call these '**deepening interaction**' and '**intensive co-operation**'.

Deepening interaction: the impact of OSPs' content and technology on telecoms operators becomes progressively greater

By taking greater advantage of indirect interactions and deepening *existing* direct partnerships, telecoms operators can make significant progress in developing their core business, and making their operations and technology more effective. They can do so, in part, by harnessing the technology, content, and apps developed and offered by OSPs. There is also an opportunity to launch in new business areas.

- In the core business, telecoms operators are likely to continue to successfully push the take-up of high-end broadband packages, driven by the ever-growing demand for richer content. At the same time, more operators will launch bundles of OSP content and fixed and mobile broadband connectivity, seeing greater take-up and usage of these.
- In terms of enhanced technology and operations, telecoms operators will start to invest in virtualising their networks, although this process will be driven by network vendors rather than direct partnerships with OSPs.
- Telecoms operators will successfully launch new businesses close to their core business (such as direct carrier billing for consumers, or the resale of cloud services to enterprises), but not necessarily co-operate with OSPs in less related markets (such as financial services).

These investments will result in telecoms operators achieving their strategic goals and growing their cashflow, without relying on much greater degrees of direct interactions with OSPs.

Intensive co-operation: OSPs and telecoms operators multiply areas of cross-functional partnerships

In this second scenario, operators are also taking greater advantage of indirect interactions, but are also actively and intensively co-operating with OSPs in order to create new opportunities for direct partnerships. This enables benefits to be realised faster, as technology, processes and know-how can be shared more effectively and more extensively between OSPs and operators.

In this scenario of 'intensive co-operation', both indirect initiatives and direct partnerships flourish and grow:

- In the core business, telecoms operators will combine high-end broadband with bundled OSP content, aggressively pushing the two in single packages in close partnership with a large number of OSPs. This will drive content revenues and accelerate the growth in the demand for data, having a compound effect on business growth.
- In terms of enhanced technology and operational efficiency, OSPs and telecoms operators work closely together, bringing to bear OSP technology and knowledge to the network and operations of telecoms operators. This could include using machine learning for network and organisational optimisation, direct partnerships to develop and implement the best virtualisation technology, and strong partnerships in sales and customer service.
- Telecoms operators will successfully launch new businesses, both close to their core business (such as direct carrier billing for consumers, or the resale of cloud services to enterprises), and in a wide range of less related markets (such as financial services). These will be successful and experience growing revenues and returns.

4.2 Operators could see cashflow benefits from interactions with OSPs of EUR7 billion to EUR15 billion across the EMEA region in 2021

The cash flow impact of co-operation (shown in Figure 4.1) will be attractive for the telecoms industry. Telecoms operators in EMEA could earn an additional **EUR7 billion** in cashflows under the deepening interaction scenario in 2021, and **EUR15 billion** OFCF in 2021 under the intensive co-operation scenario. Most of this is likely to come from enhanced technology and operations, which have a direct impact on operators' cashflows.[7]

[7] Our model conservatively considers that revenue benefits incur variable costs (cost of sale, opex) that are similar to existing revenues; on the other hand, costs have a direct impact on free cashflows

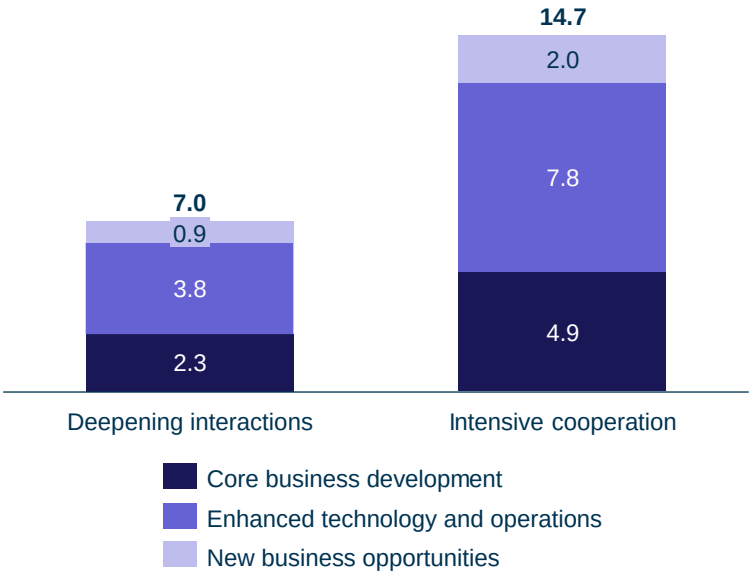


Figure 4.1: Forecast cashflow impact of interactions in 2021 in EMEA, deepening interaction scenario, EUR billion [Source: Analysys Mason, 2017]

The new cashflow that comes from co-operation can help to restore growth to the industry, relative to the base-case forecast we developed in Section 2.2. This base-case forecast assumes further commoditisation of the core business, and slowly declining revenues. Figure 4.2 shows how co-operation under either scenario can return industry cashflow to growth, with cashflows in the intensive co-operation scenario 48% higher than in the base case in 2021[8].

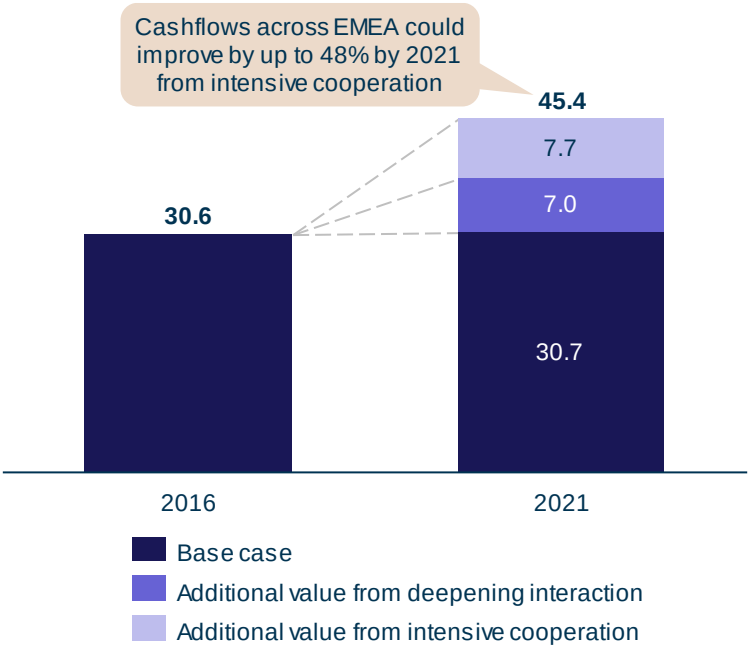


Figure 4.2: Cashflows in EMEA in the base case, deepening interaction and intensive co-operation scenarios, EUR billion [Source: Analysys Mason, 2017]

These impacts are elaborated further below.

8 In comparison to the declining revenue forecasts, we forecast stable cashflows in the base case across Europe, Middle East and Africa. This is due to the declining revenues forecast for operators in developed countries, who have lower EBITDA margins, being balanced by increasing forecast revenues by operators in emerging markets with higher EBITDA margins.

4.2.1 Core business development could yield an increase in cashflows of EUR1.6 billion to EUR3.2 billion in 2021 in Europe

Developing the core business is a significant opportunity for telecoms operators to transform themselves into digital service providers. Further take-up of high-end broadband will be driven by customers' ever growing demand for richer content, and the sale of OSP content bundled with connectivity services will grow as operators invest in bundling.

In the deepening interaction scenario, we expect operators to pursue these opportunities independently – to promote the sale of both high-end broadband and bundles of OSP content, but not to combine the two in a single attractive package. We also expect bundled OSP content to enjoy good take-up as telecoms operators promote content bundles more than they currently do.

Development of the core business under this scenario will be attractive, with extra 2021 cashflow of **EUR1.0 billion** in Western Europe and **EUR0.6 billion** in Eastern Europe (Figure 4.3).

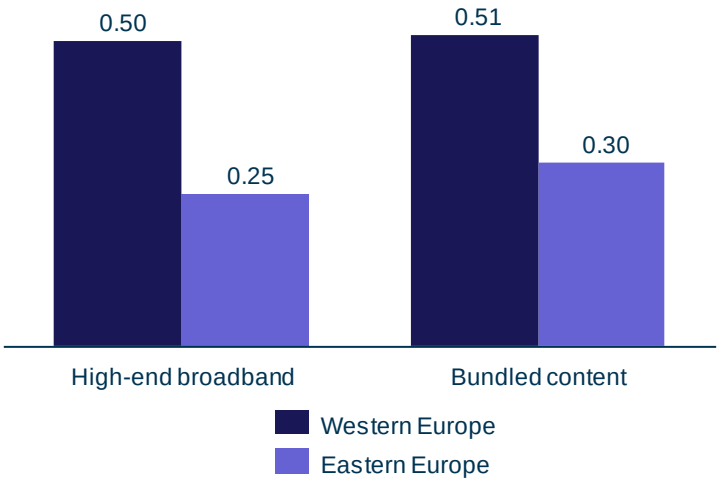


Figure 4.3: Cashflow impact of core business development in 2021, deepening interaction, EUR billion [Source: Analysys Mason, 2017]

In the intensive co-operation scenario, we expect telecoms operators to aggressively promote both high-end broadband and bundles of OSP content together, offering the two in a single attractive package. Development of the core business under this scenario will have a greater impact, with extra 2021 cashflow of **EUR2.1 billion** in Western Europe and **EUR1.1 billion** in Eastern Europe (Figure 4.4).

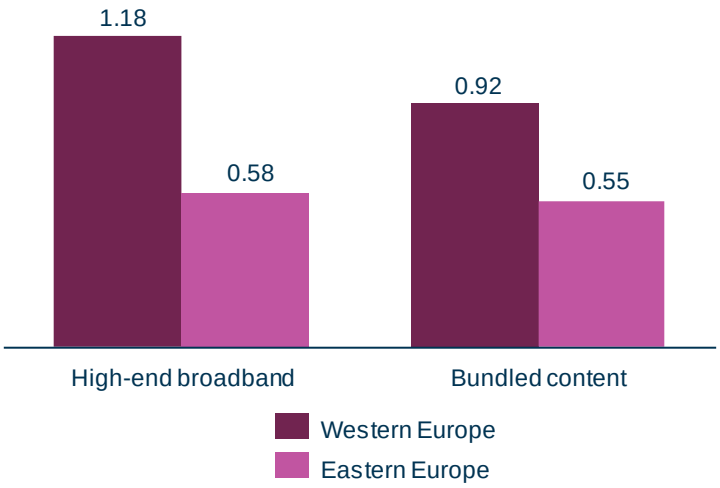


Figure 4.4: Cashflow impact of core business development in 2021, intensive co-operation, EUR billion [Source: Analysys Mason, 2017]

Our main assumptions are developed below.

► *Key assumptions: high-end broadband*

Current take-up of high-end fixed broadband across Europe is 34%,[9] which is linked to the demand for rich online content. For mobile it is 17%.[10] We have assumed that:

- With deepening interactions, fixed take-up will increase moderately to 40% and mobile to 20% as telecoms operators continue to invest in current high-end fixed broadband packages.
- With intensive co-operation, we assume operators aggressively promote high-end broadband and content packages (bundled together to encourage take-up of high-end plans), resulting in take-up of high-end fixed services to rise to 50% and mobile to 30%.

As mentioned in Section 3.1.1, the average premium for a high-end fixed broadband package in Western Europe is EUR9.90 per month, and EUR11.30 per month for a high-end mobile package.[11] We assume these premiums are retained into the future under both scenarios, even though what qualifies as 'standard' and 'high-end' will evolve over time. That is, we expect the speeds or bundle sizes offered in all plans (including both standard and high-end) will increase significantly over time. However, we assume that the price differential between the highest speeds or largest bundles and the lower speeds or lower bundles will remain constant, even as these speeds and bundle sizes increase.

Finally, we have examined benchmarks of mobile telecoms operator price plans to determine the average wholesale cost of a premium handset that a telecoms operator must provide to a customer upgrading his or her mobile service. The wholesale cost of this upgrade, assumed to be EUR162,[12]

9 Source: European Commission

10 Source: Fortumo research, proportion spending more than EUR33 per month on a mobile service

11 Source: Telecoms operator websites

12 Source: Telecoms operator websites

is borne by the mobile operator for each upgrading customer as a subscriber acquisition or retention cost.

Our assumptions are set out below.

Assumption	Base case	Deepening interaction	Intensive co-operation
Uptake of high-end packages for fixed broadband (driven by demand for rich OSP content)	34% (Western Europe)	40% (Western Europe)	50% (Western Europe)
Average price difference for high-speed broadband packages (excl. VAT)	EUR9.90 (Western Europe)		
Take-up of high-end data packages in mobile (driven by demand for mobile OSP content)	12% (Western Europe)	20% (Western Europe)	30% (Western Europe)
Price difference for high-end mobile packages (excl. VAT) provided by operators	EUR11.30 (Western Europe)		
Incremental wholesale cost of a high-end handset bundled with a higher-price mobile package	EUR162 (Western Europe)		

Figure 4.5: Key assumptions: high-end broadband [Source: Analysys Mason, 2017]

► *Key assumptions: bundled content*

As mentioned in Section 3.1.2, current take-up of content bundles, where they are offered, is 17% of subscribers,[13] over and above the take-up that would have occurred without bundling. In the base case, we assume this proportion would remain stable over time. In a world of deepening interaction, where operators promote these bundles more aggressively, we assume this would grow to 25%. In a world of intensive competition, where operators explicitly combine high-end broadband and content bundles, we expect this to grow to 35%, consistent with the additional take-up of high-end broadband services under this scenario (10 percentage points over the deepened interaction scenario): as operators strike more partnerships to bundle attractive content, they can use these bundles as an incentive to encourage more subscribers to take their high-end packages.

We assume that with deepening interaction, the churn reduction experienced by those who take up the bundle is 31%, similar to what it is today according to our consumer research.[14] With intensive co-operation, we assume this churn reduction is greater, due to the impact of richer bundles that include better broadband services as well as content, providing an attractive package of content and access for users.

We also assume that under the deepening interaction scenario, the commission received by the telecoms operator for the content remains at 10%.[15] This will increase to 15% under the intensive

13 Source: Analysys Mason Research

14 *Ibid*.

15 Source: Telecoms operator interviews

co-operation scenario as the position of telecoms operators is improved by the additional take-up of the service and their success as a sales channel for bundled content, as they help OSPs target harder-to-reach consumers who would not otherwise consider paid online content.

Finally, we assume that the monthly fee for the content within the bundle (at EUR8.30 for fixed and EUR7.80 for mobile)[16] remains as it is today under both scenarios, without inflation.

Our assumptions are set out below.

Assumption	Base case	Deepening Interaction	Intensive co-operation
Commission to telecoms operator	10%	10%	15%
Take-up of content bundle	17% (Western Europe)	25% (Western Europe)	35% (Western Europe)
Monthly fee for content bundle – fixed	EUR8.30 (Western Europe)		
Monthly fee for content bundle – mobile	EUR7.80 (Western Europe)		
Reduction in churn for subscribers who take bundled content (based on churn intentions)	0%	31%	35%

Figure 4.6: Key assumptions: bundled content [Source: Analysys Mason, 2017]

4.2.2 Enhanced technology and operations could yield an increase in cashflows of EUR2.9 billion to EUR5.6 billion in 2021 in Europe

Enhancements to the technology and operations of the organisation is critical for telecoms operators to transform themselves into digital service providers. We focus here on four areas: network infrastructure financed by OSPs, network transformation, productivity improvements in the network, and omnichannel customer interactions.

We expect that network investments financed by OSPs (which are already being pursued today) will continue in the deepening interaction scenario. We assume there will be a strong acceleration in co-investment for intensive co-operation as telecoms operators and OSPs work together on more projects, such as long-distance backbone networks and CDNs.

Network transformation will accelerate in the deepening interaction scenario compared to the present, but with investments in virtualisation made by telecoms operators through traditional network vendors. In the intensive co-operation scenario, telecoms operators and OSPs will partner to invest in network virtualisation together, bringing the full benefit of OSP technology to bear.

16 Source: Benchmark of telecoms operator bundle pricing taken from telecoms operator websites

In improving the productivity of the network, under both scenarios telecoms operators will yield capex savings from self-healing networks and the use of data to optimise the network. In intensive co-operation, telecoms operators will in addition partner with OSPs to implement machine learning technology to optimise the performance of the network – a more advanced technology that requires a deeper level of co-operation.

In their investments in omnichannel customer interaction, in intensive co-operation telecoms operators will invest more heavily in direct partnerships with OSPs, sharing data and platforms. Under the deepening interaction scenario, telecoms operators will continue to invest in their own IT systems to track users across multiple channels, but without forming further explicit partnerships across multiple OSP platforms.

Technology and operational enhancement under the deepening interaction scenario will be attractive, with extra 2021 cashflow of **EUR2.3 billion** in Western Europe and **EUR0.6 billion** in Eastern Europe (broken down in Figure 4.7).

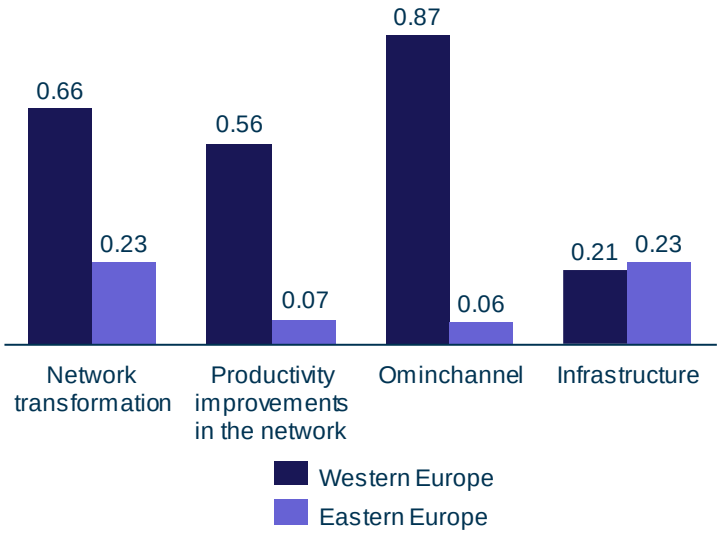


Figure 4.7: Cashflow impact of technology and operational enhancement, 2021, deepening interaction, EUR billion [Source: Analysys Mason, 2017]

In the intensive co-operation scenario, the impact will be greater, with extra 2021 cashflow of **EUR4.5 billion** in Western Europe, and **EUR1.2 billion** in Eastern Europe (broken down in Figure 4.8).

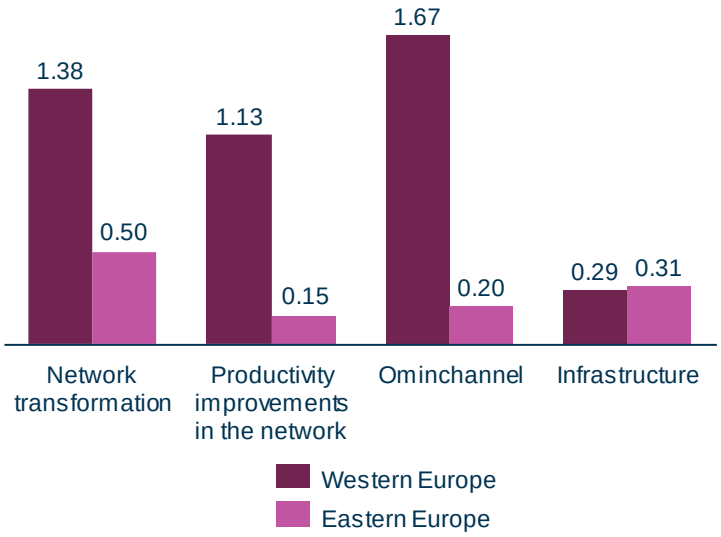


Figure 4.8: Cashflow impact of technology and operational enhancement, 2021, intensive co-operation, EUR billion [Source: Analysys Mason, 2017]

Our main assumptions are developed below.

► *Key assumptions: network transformation*

We have seen in Section 3.2.1 that, for the sections of the network that are virtualised, cost reductions can be significant. Based on the research available, virtualisation could save EUR23 in annual technical opex per fixed line and EUR8 in annual technical opex per mobile SIM.[17]

The proportion of lines these savings could apply to is a proxy for the proportion of the network that is virtualised: for example, this is 34% to date for AT&T, with a target of 75% by 2020.[18] Given AT&T appears to be ahead of most operators in this process, we have conservatively assumed that in the deepening interaction scenario, 5% of the existing network and 25% of network expansion will be done through virtualised functions by 2021, driven by traditional telecoms vendors. In the intensive co-operation scenario, we assume that 10% of the existing network and 50% of network expansion will be done through virtualised functions, driven by direct partnerships with OSPs in technical forums and technology-sharing ventures.

Our key assumptions are set out below.

17 Source: research published by A.D. Little in partnership with Bell Labs

18 Source: AT&T press releases

Assumption	Base case	Deepening interaction	Intensive co-operation
Proportion of already existing lines or SIMs where savings can be made	0%	5%	10%
Proportion of new lines or SIMs where savings can be made	0%	25%	50%
Saving in technical opex per fixed line			EUR23
Saving in technical opex per mobile SIM			EUR8

Figure 4.9: Key assumptions: network transformation [Source: Analysys Mason, 2017]

► *Key assumptions: productivity improvements in the network*

Here we have modelled the impact of two initiatives that fall into this category. We have assumed that technical opex and capex can be saved through investment in self-healing automated networks, and the use and analysis of end-user QoE data. Given that very few public statements have been made about the impact of these technologies due to their early stages of development, we make conservative assumptions that 5% of opex and capex can be saved under deepening interaction, and 10% of capex can be saved under intensive co-operation, where OSPs and operators share data more extensively, potentially in real time, to optimise the network.

Assumption	Base case	Deepening interaction	Intensive co-operation
Cost saving due to self-healing networks (% of technical opex)	0%	5%	5%
Cost saving on network densification capex from end-user QoE data analysis	0%	5%	10%

Figure 4.10: Key assumptions: productivity improvements in the network [Source: Analysys Mason, 2017]

► *Key assumptions: omnichannel customer interactions*

We have seen in Section 3.2 that omnichannel customer interactions can reduce customer care opex (by approximately 18% in the example presented)[19] and reduce churn, with approximately 20%[20] (on average across Europe) of churners intending to churn for customer service reasons. We have used these figures to conservatively estimate potential cost reductions (applied to 5% and 2.5% of non-technical opex for customer care and IT costs respectively), and a reduction in churn of 8% for deepening interaction and 10% for intensive co-operation.

19 Source: Virgin Mobile

20 Source: Analysys Mason Research

analysys mason

We have assumed that the impact is significantly greater under intensive co-operation as the creation of more direct partnerships allows telecoms operators to reach and serve more customers over multiple online platforms, significantly increasing the effectiveness of the technology.

Assumption	Base	Deepening interaction	Intensive co-operation
Incremental reduction in customer-care cost from omnichannel CRM	0%	–10%	–20%
Proportion of non-technical opex in customer care		5%	
Reduction in IT opex from omnichannel CRM	0%	–15%	–30%
Proportion of non-technical opex that is in non-network IT		2.5%	
Reduction in churn rate from omnichannel CRM (based on intention to churn and measured impact)	0%	–8%	–10%

Figure 4.11: Key assumptions: omnichannel [Source: Analysys Mason, 2017]

► *Key assumptions: network investments financed by OSPs*

In Section 3.2.4, we have seen that OSPs make significant investments in transport and delivery infrastructure, having invested an average of over EUR290 million per annum in direct investments and over EUR470 million per annum in indirect investments in the three years to 2015 in Europe.[21] We make the conservative assumption that this will fall on an annualised basis in the next five years, to 70% of the historical amount under deepening interactions. Under the intensive co-operation scenario, we assume that this co-investment will be at a higher rate, equal to 90% of the historical annual figure, reflecting the launch of a greater number of new co-investment partnerships. We assume that direct investments by OSPs result in an equal capex saving for telecoms operators, based on the fact that this is investment telecoms operators would otherwise have needed to make themselves. Indirect investments by OSPs result in revenues for telecoms operators. Our assumptions are set out below.

Assumption	Base case	Deepening interaction	Intensive co-operation
Direct investments by OSPs in transport and delivery in 2021 – result in capex and opex savings by operators (EUR million per annum)	0	208	268
Indirect investment by OSPs in transport and delivery in 2021 – result in additional revenues by large operators (EUR million per annum)	0	330	424

Figure 4.12: Key assumptions: infrastructure financed by OSPs in Europe [Source: Analysys Mason, 2017]

[21] Source: Analysys Mason

4.2.3 New consumer and enterprise businesses could yield an increase in cashflows of EUR0.7 billion to EUR1.4 billion by 2021 in Europe

Finally, the transformation into digital service providers gives telecoms operators the opportunity to invest in new business opportunities in new consumer and enterprise markets. There is a wide range of opportunities that telecoms operators could invest in, such as smart homes, direct carrier billing, mobile banking services, enterprise cloud services, and many others. In the deepening interaction scenario, telecoms operators invest in opportunities close to their core business (such as direct carrier billing and the resale of enterprise cloud software). In the intensive co-operation scenario, they both invest in a wider range of opportunities further from the core business (such as financial services), and invest more heavily in opportunities close to the core business, in deeper partnership with OSPs.

Investment in new business areas under the deepening interaction scenario will yield attractive benefits, albeit smaller than the other two areas, with extra 2021 cashflow of **EUR0.5 billion** in Western Europe and **EUR0.2 billion** in Eastern Europe. In the intensive co-operation scenario, the impact will be greater, with extra cashflow in 2021 of over **EUR0.9 billion** in Western Europe, and nearly **EUR0.4 billion** in Eastern Europe (broken down in Figure 4.13).

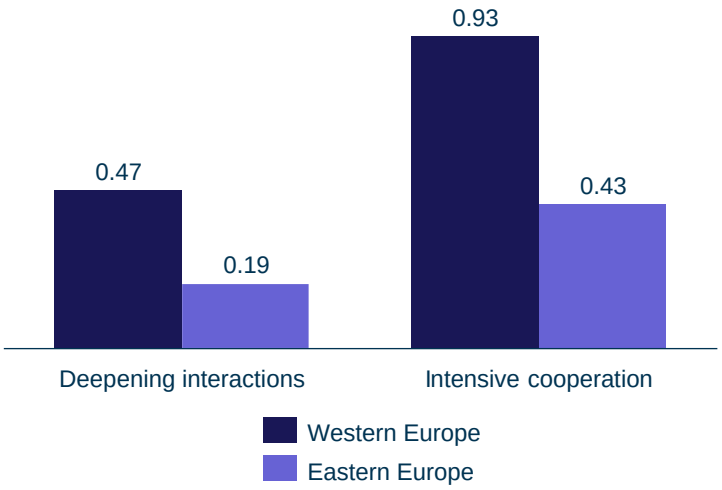


Figure 4.13: Cashflow impact of new business opportunities, 2021 EUR billion [Source: Analysys Mason, 2017]

Our main assumptions are developed below.

► *Key assumptions: new consumer markets*

In the interests of conservatism, we have explicitly modelled only one type of partnership in new consumer markets: direct carrier billing. We have assumed in all scenarios that the revenue share received by the telecoms operator for transactions in direct carrier billing is 15%.[22]. Our interviews suggest that this commission varies significantly, but that 15% is a reasonable average figure. Our assumed figure for average monthly customer spend on apps and services using direct carrier billing also comes from our interviews, and is equal to EUR18.00 for deepening interactions and EUR22.50

[22] Source: Interviews with telecoms operators and direct carrier billing vendors

for intensive co-operation in Western Europe,[23] based on the assumption that telecoms operators push these apps and content more aggressively. For the same reason, we expect take-up of direct carrier billing to be 15% of subscribers under deepening interaction, and 20%[24] under intensive co-operation.

Our assumptions are set out below.

Assumption	Deepening interaction	Intensive co-operation
MNO commission on direct carrier billing	15%	
Spend per month per DCB customer (EUR)	18.00 (Western Europe) 9.00 (Central and Eastern Europe)	22.50 (Western Europe) 9.00 (Central and Eastern Europe)
Proportion of customers that use DCB	15% (Western Europe) 5% (Central and Eastern Europe)	20% (Western Europe) 10% (Central and Eastern Europe)

Figure 4.14: Key assumptions: new consumer markets [Source: Analysys Mason, 2017]

► *Key assumptions: new enterprise markets*

Again, we have conservatively modelled only one interaction explicitly in this category, close to the telecoms operator core business. In this case, we have modelled the sale of cloud services to both large enterprises (with more than 250 employees) and small enterprises (between 9 and 250 employees). We have assumed there is a population of 171 000 businesses in the average country in Western Europe.[25] We have based our other assumptions on interviews with telecoms operators that offer these services: the average annual revenue per contract and the average margin taken by telecoms operators. We have assumed these do not vary between scenarios. The key difference between scenarios is the take-up of telecoms operator services among the population of businesses, based on deeper partnerships resulting in a more attractive customer proposition.

Our assumptions are set out below.

23 Source: Interviews with telecoms operators and direct carrier billing vendors

24 Source: Interviews with telecoms operators and direct carrier billing vendors

25 Source: Eurostat

Assumption	Base	Deepening interaction	Intensive co-operation
Total enterprises between 9 and over-250 employees in the average country of interest		171 000	
Proportion who take up cloud services from telecoms operators	0%	5%	10%
Telecoms operator margin		10% (Western Europe) 15% (Central and Eastern Europe)	
Annual revenues per contract (EUR)		3780 for SMEs and 3.6 million for enterprises (EUR1.8 million for enterprises in Central and Eastern Europe)	

Figure 4.15: Key assumptions: new enterprise markets [Source: Analysys Mason, 2017]

4.3 Operators in MEA undertaking similar initiatives with OSPs could see cashflow benefits of up to EUR4.5 billion annually in 2021

Operators in MEA will be able to benefit from similar interactions. Although the specific examples of interaction likely to be launched and become successful in MEA may differ from those in Europe, it is likely that the interactions between operators and OSPs will fall under the same categories discussed above, and likely to be driven by similar revenue-maximisation and cost-minimisation aims to those explored above. As such, we have conservatively estimated[26] that operators in MEA can achieve an additional cashflow in 2021 of **EUR1.9 billion** under deepening interaction, and of **EUR4.5 billion** under intensive co-operation (illustrated in Figure 4.16).

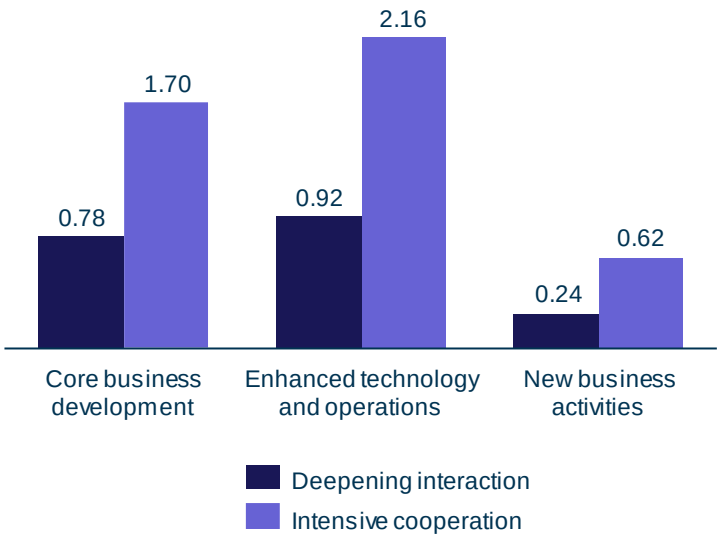


Figure 4.16: Forecast cashflow impact of interactions in 2021, MEA, both scenarios, EUR billion [Source: Analysys Mason, 2017]

26 Potential additional value from operator-OSP interactions in the Middle East and Africa is estimated form the bottom-up additional value calculated for European operators, scaled down to revenues of operators in ME&A. However, interactions, particularly in new business products or services, are likely to achieve even higher additional value in ME&A as operators' deep distribution base and reputation can be leveraged into providing additional services in an otherwise poor-infrastructure region

5 Conclusions: telecoms operators and OSPs could benefit materially if they successfully co-operate on key initiatives

Our analysis suggests that the gains from indirect interactions and direct co-operation with OSPs are likely to be significant for telecoms operators as they transform themselves into digital service providers. OSPs have a significant role to play in this transformation, through partnerships related to their technology, services, and content. Indeed, the benefits of digitisation will be all the greater if telecoms operators and OSPs co-operate and form partnerships, rather than telecoms operators trying to harness the potential of digital services without the involvement of OSPs.

Despite having suffered revenue declines, telecoms operators in Western Europe can return to growth through digital transformation in co-operation with OSPs. The greater the level of co-operation, the greater the benefits. Telecoms operators in Eastern Europe and MEA are also well placed to benefit. Consumers will benefit from this transformation, as new services will be launched, costs will be reduced, and customer service and network quality will improve.

We estimate free cashflow benefits to telecoms operators across Western Europe in 2021 to be around **EUR4 billion** if existing interactions deepen and further indirect interactions develop, and around **EUR8 billion** if many more direct partnerships can flourish. More broadly in EMEA, operators' cashflows could increase by **EUR7 billion** with deepened interactions, and **EUR15 billion** with intense co-operation.

These estimates could vary depending on how quickly and how widely partnerships are implemented, and the extent to which the benefits are passed from telecoms operators to consumers through competitive pressures. However, we believe our estimates to be conservative, since we have assessed the size of the opportunity only for a subset of the range of interactions and co-operation opportunities. We have also used conservative assumptions throughout.

It is clear, on the whole, that the future benefits from direct and indirect collaboration with OSPs could compensate for, and maybe exceed, the negative impacts seen by operators in the past few years from a range of factors, such as low economic growth and increased competition including from OSPs.

The positive impact on cashflows we estimate – of between EUR7 billion and EUR15 billion in 2021 – shows that the 'digital service provider' ambition of many operators can be significantly furthered by working along and with OSPs: designing services around content, or bundling it; adopting technology proven at scale by large OSPs to improve network reliability, the agility of IT processes and the efficiency of operators; and making full use of the Internet's unique ability to break down barriers between markets to launch new services, bolstered by some of the most valuable consumer brands in Europe.