Introduction

Welcome to the 17th edition of Inside Telecommunications. This quarterly sector review draws on EY’s deep industry insights to provide incisive market intelligence about the critical issues impacting the sector around the world.

Industry research highlights that operators lost US$14 billion in mobile voice and messaging revenues globally in 2014 due to the impact of over-the-top (OTT) players. In this light, many carriers are now overhauling their voice propositions, launching VoLTE and Wi-Fi calling to provide a richer calling experience.

At the same time, the market for Internet of Things is forecast to triple in value between now and 2020, reaching US$1.7 trillion. In this edition we explore the new technologies and regulatory environments that are required to support long-term growth of connected devices.

Digital capabilities have never been more important for operators as they look to come even closer to their customer while tapping new sources of growth in adjacent markets. In 2015, convergence has become a white-hot industry priority, and landmark M&A attests to a sector that continues to redefine itself through increased scale and product scope.

Against this backdrop, we hope you find this material useful. Please do not hesitate to share your feedback with me or any of my colleagues at EY.

Prashant K. Singhal
Global Telecommunications Leader
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The telecommunications industry has performed well worldwide in 2015. Recovery has been the watchword in Europe, with consolidation aiding market repair and the sector poised to return to growth next year after six years of revenue decline.1

At a global level, spending on telecommunications services is expected to rise 3% this year, with Asia-Pacific supplanting Latin America as the fastest-growing region.2

Meanwhile, EY’s global telecommunications study Navigating the road to 2020 reveals that operators see new digital services transforming their revenue mix, with more than one-third of industry leaders seeing digital accounting for more than 20% of revenues by 2020.

While sources of growth are rapidly shifting, customer centricity has never been more important, particularly when disruptive competitors continue to shape demand scenarios. Among operators, 68% believe that customer experience management is their number one strategic priority over the next three years, while more than four in five cite it as a top-three priority.

While customer experience management, cost control, network upgrades and organizational agility all score highly as must-dos, other areas appear to be less central on the strategic radar.

**Figure 1: Global telecom operator strategic priorities**

<table>
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<th>% respondents</th>
<th>Customer experience management</th>
<th>Cost control and business efficiencies</th>
<th>Network upgrades and modernization</th>
<th>Increased organizational agility</th>
<th>Improved IT systems and processes</th>
<th>New services development</th>
<th>Acquiring and retaining talent</th>
<th>M&amp;A, joint ventures and partnerships</th>
<th>Other</th>
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Source: EY

1. European Telecommunications Network Operators (ENTNO).
3. Navigating the road to 2020, EY, September 2015 (survey data based on interviews with more than 40 senior industry executives).
Mobile operators continue to face threats to their core revenues on a number of fronts. While much has been made of the impact of OTT mobile instant-messaging services on SMS revenues in recent years, mobile players also fear the impact of voice over internet protocol (VoIP) calling applications on their voice revenues. Industry research suggests that operators lost US$14b in revenues globally in 2014 because of the decline in voice and messaging traffic, up 26% on the shortfall registered the preceding year, and many leading OTTs now offer both voice and messaging services.

5. “Operators to suffer $14bn in lost revenues this year, as OTTs take market share,” Juniper Research Findings,” Juniper Research press release, 21 October 2014.

Emulating the OTT experience is another area where telcos are learning from their start-up rivals, particularly in the voice and messaging sphere. Orange’s Libon app is a case in point – it’s a VoIP and instant-messaging service that has been available since 2012 and has users in more than 100 countries.
Crucially, operators are leveraging a range of new standards and technologies as they revamp their voice propositions. The GSM Association’s Rich Communications Service (RCS) specification has been available since 2012, and while industry watchers have been quick to question its early impact, operators continue to leverage the platform. In March, China Mobile partnered with ZTE to launch a national platform, announcing a target of 15 million users by the end of 2015, while Russia’s MTS has been testing the standard in recent months. Beyond the world of apps and rich-text platforms, traditional mobile voice calling is undergoing a significant technological overhaul. Voice-over-LTE (VoLTE) represents the industry-agreed-upon progression of voice services, enabling the use of greater bandwidth, which translates into higher quality audio and faster call setup times. In addition, the use of IP Multimedia Subsystem (IMS) technology means operators can support voice and data on a single network, generating cost savings in the process.

The industry has witnessed a surge in VoLTE deployments of late. Across the globe, 25 operators have now commercially launched HD mobile voice while 103 operators in 49 countries are investing in deployments, studies or trials of VoLTE. Markets such as South Korea and the US were the scene of initial VoLTE launches, but the technology is now spreading to all regions. Vodafone has commercially launched VoLTE in Spain while a number of UK operators now offer it. At the same time, scores of operators worldwide are also offering HD voice via their existing high-speed downlink packet access (HSDPA) networks.

If VoLTE represents a long-expected paradigm shift in mobile voice technology, a more recent phenomenon has seen operators provide Voice-over-Wi-Fi (VoWiFi) calling. Wi-Fi already accounts for some 50% of smartphone data traffic, the majority of which is generated at home. With mobile data coverage levels often patchy inside buildings, operators recognize the importance of Wi-Fi as a platform for voice calling.

EE became the first operator in the UK to launch Wi-Fi calling in April, citing research that shows four million people in the UK lose their mobile connection in at least one room of their house, while one in five people work from home at least one day of the week. The service uses the handset’s native dialer, meaning that, unlike OTT services, it is not reliant on smartphone apps that both caller and receiver have downloaded. T-Mobile US, which launched Wi-Fi calling in 2014, revealed in March that seven million of its customers were users of the service while 10% of its voice calls ran over its VoLTE technology.

Such data points show just how quickly the mobile voice market is changing in countries where new handset calling technologies have been deployed. Looking ahead, Cisco sees VoWiFi as having a dramatic effect on the mobile IP voice market.

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6. “China Mobile to take on WeChat with RCS.” Total Telecom, 17 March 2015.
11. “EE launches Wi-Fi calling to make calls and texts available in every home,” EE press release, 7 April 2015.
The strengths of VoWiFi lie in the fact that it is a native application and thus has keypad and contact-list integration. At the same time, research shows that mobile users are making more frequent and longer voice calls with VoWiFi, with many now replacing OTT app calls with Wi-Fi calling.\textsuperscript{13} The opportunities are clear enough for operators to provide a differential customer experience to a wide addressable market via a technology that is highly complementary to cellular.

However, there is much for operators to consider as they continue to overhaul their voice propositions. Aggregating the monthly active users of the world’s top five OTT messaging apps with voice functionality gives a figure of some 2.3 billion, equivalent to 30% of global mobile connections.\textsuperscript{14}

For mobile operators, coexistence with a new world of OTT players is a fact of life, and engagement with the apps ecosystem may become even more vital as new scenarios for disruption present themselves. Interest is growing in WebRTC, a real-time communications standard that enables voice and video calling between device browsers without the need for additional software or plug-ins. While many see it as further evidence of disruption, some operators have already signaled their willingness to embrace it.

The sheer range of options available to operators as they revamp their calling options – from partnerships with OTTs and providing OTT-like apps to leveraging RCS-compliant VoLTE and Wi-Fi calling – creates new challenges. Clear communications of service benefits will be vital while customer interfaces must be intuitive and service bundles easy to understand.

Increasing device support for native VoWiFi calling will also be vital – Apple’s backing earlier this year has acted as an important game-changer – while seamless handover between VoLTE and VoWiFi can open the door to a new type of user experience that may make it easier to differentiate against OTT services. However, marrying these new capabilities within existing domestic or international mobile packages, or indeed residential quad-play bundles, will determine how far richer voice functionality can help operators position their services at a premium.

### Telcos inject OTT into their TV and video offerings

Fixed-line operators have long seen TV services as routes to stickier relationships with residential customers and greater share of wallet. Pay-TV propositions form an important anchor service in household bundle packages, with operators also acquiring TV businesses as part of the wave of M&A sweeping the sector.

EY’s recent report based on interviews with industry leaders, \textit{Global telecommunications study: navigating the road to 2020}, underlines the importance of TV and video services to operator growth agendas – they score highest as a source of incremental revenue growth, ahead of enterprise cloud. Meanwhile, online video is a significant driver of overall IP traffic growth: by 2019, video will account for 80% of all consumer internet traffic, up from 66% today.\textsuperscript{15}

\textsuperscript{13} “Wi-Fi calling finds its voice”, Ericsson, July 2015.

\textsuperscript{14} EY analysis.

At the same time, operators continue to make strides with their internet protocol TV (IPTV) offerings, with industry watchers predicting that IPTV will grow its share of global pay-TV revenues from 10% in 2014 to 13% in 2020.16 In April, Telecom Italia launched an IPTV offering in conjunction with Sky as part of its quad-play offering17 while, in June, US-based CenturyLink launched its Prism TV service as an alternative to cable and satellite TV offerings.18

As competition heightens in the pay-TV market, established players are looking to new ways to differentiate. Key to the success of the long-term TV strategies is the ability to add value through over-the-top (OTT) and multiscreen offerings, and the pace of innovation here is quickening. Consumer research consistently demonstrates that the OTT options add value to existing pay-TV propositions through greater convenience and the appeal of new content.

As such, operator partnerships with OTT players have shifted away from communications and social platforms toward media in recent quarters. Tie-ups with subscription video on demand (SVOD) providers such as Netflix are seen as ways of differentiating offers in an increasingly crowded market. Operators view such cooperation with less fear of revenue cannibalization than legacy TV providers; indeed, for many broadband providers, TV services are ultimately a route toward protecting broadband market shares.

Netflix has been a front-running OTT in terms of operator partnerships. In 2013, it struck its first deal with a pay-TV provider, the UK’s Virgin Media.19 This was followed by a number of deals with smaller US cablecos before the last few months of 2014 saw a spate of deals with telcos in France and Belgium. Further partnerships have been inked this year, including a tie-up with Telecom Italia in July and Japan’s SoftBank in August. In September, Netflix announced a partnership with Vodafone in Spain and is also ramping up its partnership with Vodafone UK, which offers a “two screen” streaming service for mobile customers.20

Such deals highlight Netflix’s continuing efforts to expand its addressable market — both by geography and distribution platform — through a technology agnostic approach, yet tie-ups with other streaming video players are also entering the fray. In May, US-based AT&T announced a deal with Hulu to bring the streaming service to its customers via a website and mobile applications.21

![Proportion of global operators that see TV and video services as their number one digital revenue growth opportunity](image1)

Source: Navigating the road to 2020, EY (based on interviews with 40 telecoms industry leaders)

![IPTV as a proportion of global pay-TV revenues in 2020](image2)

Source: Digital TV Research

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Figure 4: Consumer take-up drivers for OTT TV services

Question: Why do you use these third-party rental or monthly subscription services such as Amazon Prime Instant Video, iTunes, Netflix, Vudu, CinemaNow, Blockbuster, Redbox and YouTube? (Choose all that apply.)

| Convenience | 60.1 |
| Cheaper     | 51.1 |
| Ability to watch certain TV shows | 47 |
| Better selection | 38 |
| Easier to find what you’re looking for | 31.9 |
| Ability to watch on iPad, Tablet | 27.1 |
| Ability to watch on smartphone | 18.1 |
| No cable, satellite service | 14.1 |
| Other | 7.8 |

Source: Digitalsmiths (Q1 2015 survey of 3,144 consumers in the United States and Canada, aged 18 years and over)

Operators are also looking at new ways of broadening the customer experience in TV and video services beyond tie-ups with OTT platforms. Dutch incumbent KPN ran trials of its own OTT TV service, Play by KPN, in April this year. Designed to provide a personalized content experience — either as live TV or on-demand video — it will be made available to all consumers regardless of whether they subscribe to KPN.22

Beyond in-house app development, acquisitions and joint ventures are also providing operators with new capabilities in the video market. Last year, AT&T created an online media joint venture with the Chernin Group, with a commitment of US$500m in funding to acquire, invest in and launch over-the-top video services. In September, the JV announced the purchase of a majority stake in Fullscreen, a content creator platform that is a leading YouTube partner network.23 Meanwhile, Verizon has outlined how its US$4.4bn acquisition of AOL in May is designed to strengthen its mobile video capabilities.24

Asian telcos are also making new footholds in the video market. Hong Kong-based PCCW acquired a majority stake in Vuclip, a mobile video-on-demand platform in March. Vuclip is a premium service available in six countries and has partnerships with 13 regional carriers. The acquisition marks an expansion of the PCCW’s OTT strategy in which it provides music streaming in its home market via MOOV alongside a streaming video service that partners its pay-TV proposition.25

In Asia, Singtel has set up a joint venture start-up called Hooq with Sony Pictures and Warner Brothers. Viewed as a regional competitor to Netflix, it offers US film and TV content alongside local content, and it employs the carrier’s billing relationship to charge customers — a perceived advantage in some emerging markets where credit card penetration is low.26

Operators are also acquiring companies that provide technologies to support OTT service delivery. In June, Australia’s Telstra acquired Nativ, which provides cloud-based media logistics and workflow software and services through its Ooyala subsidiary. Ooyala now has a technology stack that supports video productions, preproduction and broadcast planning for hybrid OTT and on-air video services.27

All told, operator strategies in TV and video are at a dynamic point of their evolution, fueled by fast-growing consumer appetite for SVOD, growing levels of fixed-mobile convergence and ongoing consolidation as the “battle for the home” heats up. OTT services have a vital role to play as operators widen their propositions, particularly as the low end of the pay-TV market becomes increasingly competitive.

Ensuring the optimal balance and packaging of standalone OTT video propositions and premium pay-TV features will take time and will depend on the competitive dynamics of local pay-TV markets. Partnerships with OTTs have a proven role to play and will be an important facet of more defensive strategies designed to increase customer loyalty. At the same time, building in-house capabilities in video-streaming delivery through acquisitions will be vital for some carriers, particularly those with ambitions in the digital advertising market.

Looking further ahead, many operators are now working out how they can make the most of demand for video at home and on the move. In this light, quad-play strategies and technological developments in LTE broadcast will also play an influential role in how operators position OTT video in years to come.

22. “KPN unveils OTT TV app plans,” European Communications, 17 April 2015.
2. Technology

Operators and vendors size up low-power, wide-area technologies for Internet of Things

In recent years, there have been signs that operator technology choices have become more straightforward. The benefits of 3G and 4G infrastructure have been clear to all while fiber infrastructure upgrades are benefiting from new technologies that help extract greater performance levels from last-mile infrastructure.

However, any sense that faster data speeds and growing levels of fixed-mobile convergence mean that operators face a diminishing set of choices would be wide of the mark. The mobile industry continues to ponder the use cases and spectrum needs signaled by 5G, yet even these question marks feed into a wider debate about the technology requirements of the internet of things (IoT).

By its very nature, IoT refers to a myriad of use cases, customer interfaces and technology standards. The network and device performance requirements of smart metering and connected car solutions are quite different from those required of home automation services. In this light, a new generation of technologies is emerging that are sensitized to the needs of specific IoT services.

Low-power, wide-area (LPWA) technologies are seen as playing an increasingly prominent role in the IoT environment. By sacrificing network throughput rates in favor of lower costs, reduced power needs and wider geographic coverage, LPWA is well-suited to use cases such as smart metering and street lighting, where long battery life for modules is essential and low-latency communication is less important.

Looking ahead, LPWA connectivity is expected to have a palpable impact on the smart mobile device landscape, with Cisco forecasting that LPWA will account for 8% of global mobile device connections by 2019, up from 2% in 2017.28

Figure 5: Global mobile devices market share according to technology

LPWA’s potential to help reduce the costs of connectivity should help make specific M2M solutions more attractive, and operators are adapting their M2M portfolios accordingly with the help of a new breed of vendors. In February, Telefonica, SK Telecom and NTT DoCoMo together contributed to a US$115m round of funding in French vendor SIGFOX. Founded in 2009, SIGFOX has deployed networks in France, Spain and the UK – 300,000 devices are already connected to its European infrastructure – and is rolling out a network in the US, with plans to cover 90% of the population within the next three years. With networks running on unlicensed bands in the 868MHz to 902 MHz range, SIGFOX does not require spectrum licenses.29

In March, French operator Bouygues Telecom announced the launch of an IoT network based on long-range (LoRa) technology, another start-up that provides an IoT platform based on LoRa that caters to smart deployments ranging from single enterprises through to city projects.30 One of the investors backing Actility, Foxconn, plans to take the vendor’s platform to Taiwan, China and the rest of Asia.

Established vendors are certainly taking note of opportunities in LPWA. In June, Samsung invested an undisclosed amount in SIGFOX. Last year, Chinese network equipment provider Huawei acquired Neul Networks, a UK-based LPWA provider that uses its own technology called Weightless. British incumbent BT is working with Neul as part of an agreement with the Milton Keynes Council to install an open IoT network that can deliver a range of public sector services.31

While LPWA standards are coming into focus as a cost-effective route to serve low-power use cases, other technologies can also address wide-area connectivity. ZigBee mesh – a wireless local area standard – can be combined with wireless backhaul to address similar market segments, for example.

Crucially, operators and vendors are also considering new iterations of LTE that can provide more cost-effective support for IoT. In February, Vodafone announced it would become the first operator to deploy Huawei’s low-cost cellular IoT technology, citing use cases such as water meters and fire extinguishers. Both parties intend for this technology to be published as open industry standard by 3GPP so that the wider mobile ecosystem can adopt it.32 Meanwhile, Finnish vendor Nokia and Korea’s KT Corp. are cooperating on LTE for machine-to-machine communications (LTE-M), with plans to launch the world’s first field trial of the service by Q4 2015.33

Figure 6: Power consumption and performance characteristics of different IoT technologies

![Figure 6](image)

Source: EY analysis

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32. “Vodafone extends its network capability to further support the Internet of Things,” Vodafone Group, February 2015.
The sheer range of technologies now seen supporting an IoT environment – from cellular technologies and Wi-Fi through to emerging LPWA and mesh networking standards – creates new challenges for operators. The role that LPWA technologies can play in overall IoT visions requires careful delineation: operators may well feel that non-LPWA use cases represent the best opportunities to take advantage of IoT demand since they can leverage existing spectrum assets while the need for additional service assurance presents a better opportunity to monetize their capabilities. At the same time, many LPWA use cases may pivot on city-based deployments, meaning operators may have to consider the merits of business cases at a local level.

Nevertheless, LPWA-oriented services such as smart parking and smart metering could well form an important part of overall smart home and smart city initiatives. As such, existing supplier relationships will need to be reappraised while the acquisition of specialist capabilities may also come to the fore. All the while, keeping abreast of the latest standardization initiatives will be vital, particularly as efforts to standardize LTE for an M2M environment come to the fore alongside newer iterations of LPWA standards themselves.

Unlicensed LTE fuels industry friction

LTE’s impact on the mobile industry in recent years has been dramatic. There are now more than 422 operators in 143 countries worldwide with commercial 4G services in place, with 106 operators launching new services in the 12 months to July. At the same time, operators are turning to carrier aggregation techniques to improve 4G performance levels while leveraging LTE to support a new breed of telephony services.

In recent months, a range of industry players have considered the role that LTE could play in unlicensed spectrum bands. The rationale behind a marriage of LTE and unlicensed spectrum hinges on making the most of scarce spectrum resources in a 4G environment. In this scenario, overloaded 4G networks can take advantage of unused spectrum in new bands such as 5GHz through carrier aggregation, ultimately resulting in faster download rates for mobile users. Originally proposed by US vendor Qualcomm under the name LTE in unlicensed spectrum (LTE-U), a number of vendors are now promoting the technology, with Ericsson referring to it as License Assisted Access (LAA). While it is already included in 3GPP Release 12, a more specific version of the technology is expected to feature as part of 3GPP Release 13.

For their part, operators see plenty of upside in unlicensed LTE. Last year, Verizon created the LTE-U Forum to work with a number of vendors on the technical aspects of LTE-U. Earlier in 2015, the US wireless carrier announced it would deploy LTE-U in the 5GHz and 3.5GHz bands from 2016 while T-Mobile also prepares to roll out the technology. Korean operators are also trialling LTE in unlicensed spectrum, LG Uplus conducting a demonstration of LTE-U technology using 5.8GHz spectrum that achieved data rates of 600Mbps in May. Similar performance levels were achieved in a test conducted by Vodafone Spain a few months earlier.

However, the prospect of LTE leveraging unlicensed frequencies is causing controversy, not least because there are fears it could disrupt Wi-Fi services occupying the same frequencies. Some research done to date suggests that interference could be a problem while other studies suggest that the avoidance mechanisms of both technologies could help mitigate the issue.

Nonetheless, the LTE-U Forum has already issued coexistence specifications in order to promote equitable sharing of spectrum between LTE-U and Wi-Fi, as well as among LTE-U operators themselves. Yet despite such attempts to allay industry fears, the global Wi-Fi Alliance has suggested that pre-standard deployments of unlicensed LTE risk undermining service quality for billions of Wi-Fi users worldwide.

While technical issues are hardly a surprise given LTE-U’s emerging status, the technology’s impact on operators’ mobile data strategies may be harder to gauge. Some industry watchers believe that LTE-U will be used as a best-efforts addition to existing licensed spectrum, with the latter used for real-time voice and data services.

At the same time, telcos, cablecos and Wi-Fi specialists with national Wi-Fi footprints may remain skeptical until technical issues have been fully resolved. However, operators’ attitudes pan out, regulators will face a growing challenge to ensure a level playing field for all users of unlicensed spectrum users while also safeguarding the needs of consumers in terms of service quality.

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Net neutrality debate heads to India

Net neutrality has rarely been out of the headlines in recent months. In February, the US’s Federal Communications Commission (FCC) voted in favor of strong net neutrality rules in order to safeguard an open and free internet where ISPs treat all bytes equally. This followed months of uncertainty following a US Federal Appeals Court decision to strike down the FCC’s original 2010 net neutrality legislation.

European regulators are also grappling with how best to enshrine open-internet principles. The EU has historically favored an approach that provides scope for operators to manage traffic levels, seen by some as opening the door to a tiered internet out of step with the concept of a neutral web.

As part of single digital market discussions in June, the European Commission struck an agreement with the European Parliament and European Council in which the three main EU institutions agreed that operators could offer “specialized services” on the internet while attempting to guarantee an open internet where “paid prioritization” of services will not be allowed.36 In October, suggested amendments to these new rules were rejected by the European Parliament, which passed into law the package agreed in June. Despite the EU’s emphasis on a level playing field, many commentators believe that the mix of principles at work within European rules undermines the notion of a clear commitment to net neutrality.

News flow from developed markets has in many ways reaffirmed the previous status quo regarding net neutrality – a bold emphasis on a free internet in North America set against a more nuanced interpretation in Western Europe. Yet the net neutrality debate is not confined to these regions, and EY research shows that a substantial portion of emerging-market operators are concerned about open-internet rules.

**Figure 8: Operator attitudes to net neutrality by geography**

Question: Which regulatory issues will be most likely to impact the industry in the next two to three years?

Source: EY global telecommunications study: navigating the road to 2020 (based on interviews with 40 industry leaders)

In recent months, Indian attitudes to net neutrality have come to the fore. As in other markets, India has witnessed strong take-up rates of over-the-top (OTT) services, with industry watchers forecasting that voice revenues could halve going forward due to cannibalization effects. On the other hand, service affordability remains a white-hot issue, with operators keen to explore new pricing models via OTT partnerships to stimulate take-up of mobile data packages.

Earlier this year, e-commerce app provider Flipkart was in negotiations to join mobile operator Bharti Airtel’s Airtel Zero platform, which enables mobile apps to pay for customer data usage, in turn allowing consumers to use applications for free. However, news of the tie-up prompted a consumer backlash over fears that such agreements would undermine the openness of the internet, and Flipkart later announced it was ending talks to join the platform.

During the same period, India’s regulatory bodies have also been considering how best to legislate for the provision of OTT services. In April, the Telecom Regulatory Authority of India (TRAI) revealed that in one month it had received one million petitions from the public in favor of an open internet as part of a consultation on OTT regulation. In its original paper published in March, TRAI had suggested that internet companies pay for service licenses to avoid throttling by mobile operators.

Meanwhile, established Indian media companies such as NDTV and Times Internet announced that they were leaving Internet.org, Facebook’s initiative to spread web services to geographies lacking internet access, which also relies on partnerships with operators to waive end-user charges for less affluent customer segments. Mobile operator Reliance Communications had launched the Internet.org initiative in certain regions of the country in February in conjunction with the social networking giant.

Since the furor, India public sector viewpoints on net neutrality have shifted. In July, the country’s Department of Telecommunications (DoT) published a report that revealed it supported net neutrality in principle, yet recommended that some voice over internet protocol (VoIP) be taxed. Later in the month, India Communications and IT Minister Ravi Shankar Prasad revealed that the DoT’s version of the report was not the final version.

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40. “Flipkart ends talks to join Bharti Airtel marketing platform,” Reuters, 14 April 2015.
The sheer level of citizen engagement in the open-internet debate underlines how emotional the issue is. Yet the parameters of the argument are shifting. In mature markets, net neutrality has historically been the scene of strongly opposing attitudes between technology companies eager to expand addressable markets and operators mindful of return on network investment.

Figure 9: Status of net neutrality legislation worldwide

However, end-user anxieties regarding zero-rating approaches in India call into question the very notion of sponsored internet charging models that have brought operators and OTTs together to boost service affordability. For its part, Facebook is working to dispel notions that Internet.org is creating a two-tiered internet. However, India’s DoT believes that partnerships between operators and content providers create “gatekeeper” roles that create market distortions and ultimately may impede innovation.

Nevertheless, regulatory stances on the subject vary from market to market. In its recent pronouncement on the European single market, the EU suggested that zero rating “does not block competing content and can promote a wider variety of offers for price-sensitive users” while also underlining that steps would be needed to ensure that consumer choice is not “significantly reduced” in such scenarios.42

Looking ahead, the issue of zero rating is likely to gain more scrutiny in both mature and emerging markets. Already, regulators in markets as diverse as Chile and the Netherlands have ruled against zero-rating packages. However, in the United States, a case-by-case approach to zero rating has been promoted as part of open-internet rules, and other regulators may follow suit, recognizing that this is a complex issue where a range of arguments can be made regarding end-user benefits.

Ultimately, the zero rating debate is itself a sign that net neutrality regimes are becoming increasingly complex and nuanced, with regulatory attitudes varying from market to market. Operators would do well to note shifting end-user and regulatory sentiments as they consider new forms of partnership-driven pricing models.

Source: EY analysis

42 “Roaming charges and open Internet: questions and answers,” European Commission, 30 June 2015.
Regulators face a growing to-do list in the internet of things

Global growth of connected devices and the rise of the internet of things is a hot topic across all industry sectors. The sheer scale of the opportunity itself is astounding; forecasts vary but, by the next decade, the digitized economy is expected to be worth trillions of dollars annually. In connectivity terms, the pace of growth is similarly astounding, with the number of connected devices worldwide expected to grow from 4.9 billion this year to 25 billion by 2020.43 Yet while this paradigm shift is clear enough, the relentless sophistication of devices, industries and societies creates a vast array of regulatory challenges. Standardization and interoperability growth, but the sheer range of data created by IoT poses various challenges to accepted and evolving notions of data security, privacy and integrity.

At the same time, the socioeconomic benefits of IoT are a growing focus area for private and public sector stakeholders. Early-adopting industries include transportation and manufacturing but, by 2020, government is expected to become a leading deployer of IoT solutions as smart cities take shape while an uptick in smart metering initiatives will also signal a transformation of the utilities sector. In this light, both national policies and sector-specific rules and obligations have a vital enabling role to play if IoT is to deliver on its many promises.

Figure 10: Key regulatory and policy focus areas in IoT

Roaming is a key issue for machine-to-machine (M2M) markets. The international use of e.164 numbering, often called “permanent roaming,” overcomes the need to provide local SIMs in all territories and thus simplifies the supply chain for international connectivity (vital for IoT use cases in the automotive and consumer electronics industries, for example). It also enables mobile operators to use foreign SIMs in any given market in order to take advantage of national roaming. Thus far, many regulators have not provided guidance for permanent roaming and, while many may implicitly accept it, levels of regulatory certainty are still lacking.

In a study conducted last year by Machina Research, 55 of 68 countries reviewed had no rules in place, with 11 expressly permitting permanent roaming and 2 prohibiting it. Looking ahead, greater regulatory certainty in favor of permanent roaming would strengthen M2M business models, given the high costs associated with swapping out M2M SIMs, and pave the way for remotely localized SIMs.

Efforts are under way to create roaming-free “global” SIMs via the GSMA, which has submitted recommendations to the European Telecommunications Standard Institute (ETSI).

Finally, data protection may prove an increasingly contentious area. For one, IoT use cases such as connected car or home automation will drive the collection of personal data, which may be aggregated or shared without the knowledge of the end user of the service. In addition, IoT security flaws could enable attacks on information systems that may threaten business continuity or indeed personal safety. Finally, government attitudes to the access and storage of data vary from country to country; contrasting views on “data sovereignty” may affect the business case for cross-border IoT.

As such, there is a challenge for telecoms regulators to work with other policy and regulatory stakeholders to ensure that cross-sector policy frameworks at the national or international level are aligned with IoT environments. In its report summarizing its consultation on IoT, Ofcom has highlighted the need to work with the UK Information Commissioner’s Office (ICO) and others to achieve greater regulatory clarity.

Meanwhile, the EU Data Protection Regulation – agreed upon by ministers in June following three years of wrangling but yet to be negotiated into final law – will usher in stricter stipulations regarding data privacy, given that previous rules were directives open to interpretation at a national level. Here it remains to be seen how distinctions will be made between what constitutes personal and non-personal data and how these might impact IoT business models.

Improving levels of business and consumer awareness of IoT data security is another area where policymakers have an important role to play. Regulators are also conscious of the need to increase levels of self-regulation, where companies are encouraged to act as ideal data custodians. In its report on the privacy and security considerations of IoT, the US Federal Trade Commission (FTC) offers a number of recommendations to those building IoT solutions or deploying IoT devices with security in mind.

In summary, the world of IoT presents a number of challenges to current regulatory frameworks. A holistic regulatory view of these issues is lacking in most countries – only two, Singapore and UK, have developed a view of IoT policy needs and how this relates to investment and innovation.

Looking ahead, national digital policies must explicitly cater to the changing world of IoT while some policy areas, such as spectrum allocation and data protection, will require higher levels of international coordination. Although a wait-and-see approach may help contain existing regulatory burdens, IoT business models will require greater levels of regulatory certainty in years to come.

Source: Machina Research

The issue of number allocation is an area where regulatory progress has been more marked. Regulators in a number of countries are allocating non-geographic numbers for M2M although there are differences in terms of block sizes and conditions. Meanwhile, the development on IPv6 represents another solution to the problem, given that M2M and IoT services do not necessarily require numbers in principle.

Spectrum legislation will also play an important role in the growth of M2M services. Many current M2M services rely on 2G network connectivity and associated spectrum, yet some operators plan to switch off these networks in years to come – witness the announcement earlier this year from Singapore’s main mobile operators.

In such scenarios, new spectrum for M2M is vital. Some regulators are exploring the repurposing of TV white-space spectrum for IoT services, with regulators in the UK and Singapore overseeing trials of M2M in this band. In September, Ofcom opened a consultation on plans to reuse 10MHz of VHF spectrum at frequencies below 100MHz, highlighting its potential to reach distant locations and thus spur IoT use cases in smart farming and environmental sensing.

However, such moves are isolated developments at present: only the UK has allocated spectrum for M2M devices, and IoT is conspicuous in its absence from long-term spectrum release road maps in most countries. In years to come, regulators may need to take a more proactive role in identifying spectrum for IoT use cases as part of moves to free up higher-bandwidth frequency bands.

Network resilience is another issue where regulators may have to adapt traditional requirements. IoT services will depend on low-cost devices able to transmit high volumes of data, which will present new challenges in terms of guaranteeing service continuity.

For more information on use of TV white-space spectrum for M2M services, please see Inside Telecommunications Issue 16: ey.com/Publication/vwLUAssets/Inside-telecommunications/assets/Inside-telecommunications-issue-16.pdf.

“More Radio Spectrum for the Internet of Things,” Ofcom, 10 September 2015.

4. M&A

Introduction

Global telecommunications M&A activity thus far in 2015 has maintained the high levels of activity seen in 2014. Deal volume picked up in the second quarter, reaching 143 announced transactions, compared with 89 in Q1 2015. Meanwhile, deal value stood at US$49b in Q2 2015, up from US$43b in Q1 2015. We continue to see a number of multibillion-dollar deals: 80% of M&A announced in the first six months of 2015 exceeded US$1b.

Western Europe has proved very much at the forefront of deal-making during the year to date. In Q2 2015, the region accounted for 46% of deal value, driven by in-market consolidation activity in France, Belgium and the UK as established players seek additional scale economies. North America has also been the scene of significant M&A, with mergers, footprint growth and adjacent market moves all signaling a dynamic deal-making environment.

Although deal activity in Asia-Pacific lags Western regions, local operators remain focused on moves into information and communication technology (ICT) segments alongside core segment mergers. The three months to June saw consolidation activity continue in Oceania, with Australia’s M2 Group acquiring number three New Zealand ISP CallPlus Group in April while also bidding for Australian ISP iiNet, which ultimately accepted a US$1.24b offer from TPG Telecom in May.47

For Northeast Asian operators, exposure to high-growth technology segments remains important. In Q2 2015, operators based in Japan and South Korea acquired e-commerce businesses, underlining an area of increasing interest to operators. In EY’s recent survey of telecommunications industry leaders, we found that 39% of global operators saw e-commerce, marketing and advertising services as a top-three driver of digital revenue growth going forward.48

Figure 12: Telecoms M&A deal value by target area, Q1-Q2 2015

<table>
<thead>
<tr>
<th>Region</th>
<th>Q2 2015</th>
<th>Q1 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMEA</td>
<td>$26,962</td>
<td>$24,749</td>
</tr>
<tr>
<td>Americas</td>
<td>$16,492</td>
<td>$16,225</td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>$5,168</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>$425</td>
<td>$16</td>
</tr>
</tbody>
</table>

Sources: ThomsonOne, Capital IQ, Mergermarket

47. “iiNet Board Backs TPG Telecom Bid Over Rival Offer From M2,” Bloomberg, 5 May 2014.
Core market consolidation underway in UK and Belgium

The first six months of 2015 saw mergers announced in a number of European markets as transformational M&A in the region continues. In March, Hong Kong-based Hutchison Whampoa Limited (HWL), parent company of UK mobile operator Three, announced a £10.25b (US$15.3b) deal to buy fellow mobile player O2 UK from Spain’s Telefonica.49

The deal combines the number four and number two British mobile operators and is set to create a new mobile market leader, with 33 million subscribers. The announcement came one month after UK incumbent BT Group announced that it had agreed to definitive terms to acquire leading operator EE for £12.5b (US$19.1b).

For Telefonica, the deal is the latest step in its strategy to shed non-core assets, in which it has exited the Czech Republic and Ireland in order to focus on Brazil, Germany and Spain. Cash from the prospective sale would support one of the highest dividend yields in the sector and also help to cut debt to around €36b.50 For HWL, the deal is its most ambitious yet in its strategy to scale up its European operations, in which it has acted as a consolidator in the Austrian mobile market while also acquiring Telefonica’s Irish business last year.

However, the deal faces significant regulatory scrutiny. In October, Ofcom’s chief executive cast doubts on the proposed merger obtaining approval by suggesting that four mobile operators in the UK was a competitive number. Earlier, the UK’s Competition and Markets Authority (CMA) had warned that the merger would significantly affect competition levels.51

Belgium is another market undergoing consolidation. In April, multinational cable operator Liberty Global announced that its Belgian subsidiary, Telenet Group Holding, had entered a definitive agreement to acquire number three Belgian operator BASE from Dutch incumbent KPN for €1.33b (US$1.43b) in an all-cash transaction.52

Highlighting the rationale for the acquisition of BASE, Liberty Global underlined the importance of an asset-based presence in a growing mobile market and the importance of a wider convergence proposition. Belgium is one of Europe’s more advanced multi-play markets, with triple- or quad-play packages constituting over one-quarter of residential bundle offers on the market.53

Mobility forms a component in three-quarters of bundles on the market, and the acquisition of BASE and its 3.3 million customers mobility virtual network operator (MVNO) presence it has had in the country since 2006.

### Figure 13: Belgium residential bundle market overview

Percentage breakdown of bundle offers by type, YE 2014

<table>
<thead>
<tr>
<th>Double play</th>
<th>Triple play</th>
<th>Quadruple play</th>
<th>Quintuple play</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>6</td>
<td>3</td>
<td>72</td>
</tr>
</tbody>
</table>

Source: Belgian Institute for Postal Services and Telecommunications (BIPT)

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Telcos take aim at digital advertising, e-commerce

Operators continue to look beyond consolidation opportunities in core market segments and toward fast-growing adjacent markets. While IT services and data centers have long been the scene of operator moves into new growth segments, other technology subsectors are also entering the mix as target domains.

One of the largest deals of Q2 2015 was Verizon Communications’ acquisition of AOL Inc. for US$4.4b. The all-cash deal marks a significant new phase in Verizon’s stated strategy to build digital and video platforms to drive future growth, with the US operator signaling that AOL’s acquisition would drive its LTE video and OTT video strategy while also supporting the company’s agenda in IoT.56

AOL itself has a substantial content portfolio, including online portals Huffington Post and TechCrunch, as well as an advertising platform that it launched early in 2015 and which Verizon believes can help drive incremental revenue growth.59 In recent years, Verizon has made a number of moves to bolster its media services business, acquiring the likes of upLynk, a video-encoding provider, and Edgecast, a content delivery network (CDN).

Figure 14: Mobile internet ad spending worldwide

For its part, the number three operator’s owner, Bouygues Group, rejected the offer in the same month. More recently, Altice’s CEO has suggested that his company, which has been on an acquisition spree since a 2014 IPO, would turn its attention to cutting costs and integrating its cable systems, having acquired US-based Cablevision Systems Corp. for US$17.7b in September.56

Elsewhere in Europe, operators are pursuing pay-TV assets as part of cross-border plays. In February, Swedish digital entertainment company MTG sold its 50% stake in Swedish cable TV company Sappa to Finnish telco Anvia, which offers quadruple-play services in its home market.57 In another cross-border move, Bosnian mobile operator Telekom Srpske acquired Cabling doo, a Montenegrin cable TV provider.58

For KPN, the exit from the Belgian market follows its departure from the German mobile market and underlines the Dutch incumbent’s focus on its domestic business. In October, European antitrust regulators launched an investigation into the deal, commenting in a statement that they would explore the impact of the proposed tie-up on competition in the mobile sector with regard to prices and choices for Belgian consumers. A decision is expected in February 2016.54

Meanwhile, consolidation remains a talking point in the French market. In June, Luxembourg-based cable company Altice announced it had made a US$11.3b offer for number three French fixed and mobile player Bouygues Telecom. News of the bid came little over a year after Bouygues Telecom had lost out to Altice in a bidding war to acquire SFR from France’s Vivendi. However, the approach faced political opposition, with the French economy minister criticizing the deal.55

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59. Ibid.
E-commerce is another technology domain that is posting stellar growth rates, with eMarketer predicting that the global market will grow 25% this year. Much of this growth is being fueled by the smartphone revolution under way in Asia-Pacific, and operators in the region are keen to take advantage of growth that is forecast to remain high for some years to come.

In May, Japan’s SoftBank acquired 20% of South Korean mobile retail e-commerce start-up Coupang in the country’s largest-ever internet investment, which valued the company at US$5b. In Japan, KDDI acquired a majority stake in LUXA in April for an undisclosed amount. LUXA is an e-commerce site that offers flash sales on expensive retail items, ranging from clothes to weekend holidays, and reportedly passed one million registered users in November 2014.62

Mobile tower transactions remain in vogue

Mobile tower transactions are a key theme in the sector M&A landscape, both as a means for operators to monetize non-core assets and for tower companies to expand and fortify their tower portfolios in order to handle growing leasing demand.

Valued at US$5b, Verizon’s tower divestiture in February was one of the top deals of the first quarter. The US carrier is leasing the rights to more than 11,300 of its company-owned wireless towers to American Tower Corporation (ATC) while ATC will also have fixed-price purchase options to acquire an additional 165 towers on the basis of their anticipated fair market values at the end of the lease terms.63

Meanwhile, Italian operator WIND Telecomunicazioni sold a 90% stake in its Galata tower subsidiary to Abertis subsidiary Cellnex Telecom during Q1 2015. The US$775m deal includes the transfer of 7,377 towers and makes Cellnex the largest European operator of mobile and audiovisual broadcasting infrastructure. 64

Emerging markets also remain the scene of a number of tower-related transactions. In April, Egyptian mobile operator Mobinil sold 2,000 towers to regional tower firm Eaton Towers in a deal valued at US$131m. At the same time, Eaton Towers announced that it had raised US$350m in new equity resources from new and existing shareholders to fund expansion and acquisitions across Africa.65

In June, Blackstone-owned Phoenix Tower International announced the acquisition of T4U Holding Brasil, which operates more than 500 towers in Brazil. The newly named Phoenix Tower do Brasil will own and operate 529 wireless infrastructure assets with a pipeline of over 250 wireless towers under construction for the country’s major mobile operators.66

Figure 15: Top 20 telecoms M&A worldwide by deal value, H1 2015

<table>
<thead>
<tr>
<th>Transaction Description</th>
<th>Deal Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hutchison Whampoa/Telefonica</td>
<td>$15,400</td>
</tr>
<tr>
<td>Numericable SFR/Bouyques Telecom</td>
<td>$11,202</td>
</tr>
<tr>
<td>Frontier Communications/Verizon’s local assets in three US states</td>
<td>$10,540</td>
</tr>
<tr>
<td>Altice/Suddenlink Communications</td>
<td>$7,858</td>
</tr>
<tr>
<td>American Tower Corporation/Verizon wireless towers (11,489)</td>
<td>$5,053</td>
</tr>
<tr>
<td>Investor Group/Hutchison 3G UK (32.98%)</td>
<td>$4,787</td>
</tr>
<tr>
<td>Altice/Vivendi’s remaining 20% stake in Numericable-SFR</td>
<td>$4,432</td>
</tr>
<tr>
<td>Verizon Communications/AOL Inc.</td>
<td>$4,400</td>
</tr>
<tr>
<td>Alfa Telecom Turkey/Turkcell (13.76% indirect holdings)</td>
<td>$2,800</td>
</tr>
<tr>
<td>PPF AA/Ceska Telecomunikaci Infrastruktura</td>
<td>$2,249</td>
</tr>
<tr>
<td>Lightower Fiber Networks/Fibertech Networks</td>
<td>$1,900</td>
</tr>
<tr>
<td>Investor Group/Crown Castle Australia</td>
<td>$1,619</td>
</tr>
<tr>
<td>M2 Group/iiNet</td>
<td>$1,587</td>
</tr>
<tr>
<td>Telenet/Base Company</td>
<td>$1,423</td>
</tr>
<tr>
<td>TPG Telecom/iiNet</td>
<td>$1,240</td>
</tr>
<tr>
<td>Vivendi/Telecom Italia (4.76%)</td>
<td>$1,135</td>
</tr>
<tr>
<td>NTT Communications/e-shelter</td>
<td>$835</td>
</tr>
<tr>
<td>Abertis Telecom Terrestre/Galata</td>
<td>$775</td>
</tr>
<tr>
<td>SK Telecom/SK Broadband</td>
<td>$646</td>
</tr>
<tr>
<td>Orange/Egyptian Co for Mobile Services</td>
<td>$238</td>
</tr>
</tbody>
</table>

62. “KDDI’s ‘Syn Alliance’ grows stronger as telco acquires ecommerce site Luxa,” Technasia, 14 April 2015.
64. “Cellnex Telecom closes the acquisition of 7,377 mobile phone towers from operator WIND in Italy,” Abertis press release, 26 March 2015.
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