

Evolving Mobile Broadband Business Models

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Abstract

Mass adoption of smartphones and media tablets has fueled the demand for bandwidth intensive services. Consumers expect to be able to use their devices to watch movies, stream music and TV, install applications and make video calls whenever and wherever they choose. While the number of devices and broadband traffic continues to grow, operators still struggle to develop new business models that will fund the deployment of the necessary broadband infrastructure required to support these services. This paper examines current mobile broadband pricing strategies and presents future business models and influencing factors.

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Overview

According to a recent publication by the International Telecommunications Union (ITU)¹, more than 90 per cent of the world's population now has access to a mobile network, with 73 per cent of subscriptions accruing from the developing world in 2010.

In developed countries, growth in mobile subscriptions has slowed considerably during the last five years, with a marginal year-on-year growth of 1.6 per cent from 2009 to 2010. In those countries, the mobile market is reaching saturation levels with on average 116 subscriptions per 100 people, according to ITU's publication entitled *The World in 2010: ICT facts and figures*.

In February 2011, ITU reported that smartphone users consume on average five times more data capacity than users of ordinary mobile phones. Furthermore the number of smartphones is set to rise from today's global estimate of 500 million handsets in use, to almost two billion by 2015. Data volumes are expected to continue on an upward projection, however as network investment costs continue to grow, a key concern for operators is their ability to subsidise this investment with sustained revenue.

Current Global Broadband subscription and pricing models

The OECD² recently published a paper on Broadband Bundling (2011) reporting that 70% of 90 operators surveyed permit users to buy just broadband services (77% of which provide 'stand alone' broadband packages). Statistics published by the OECD present the global distribution between mobile and fixed broadband subscription ratios, outlining quite a variance between countries (see Figure 1). The OECD has also published 'observed broadband subscription spend' per country during 2010 (see Figure 2). Although fixed broadband pricing has falling considerably in the last number of years, countries like Turkey and Mexico, with very high fixed to mobile broadband subscription ratios, have very high overall observed monthly broadband spend, relative to other countries (Figure 3). The US has a higher mobile broadband subscription of 62%, however monthly costs are still relatively higher than most countries.

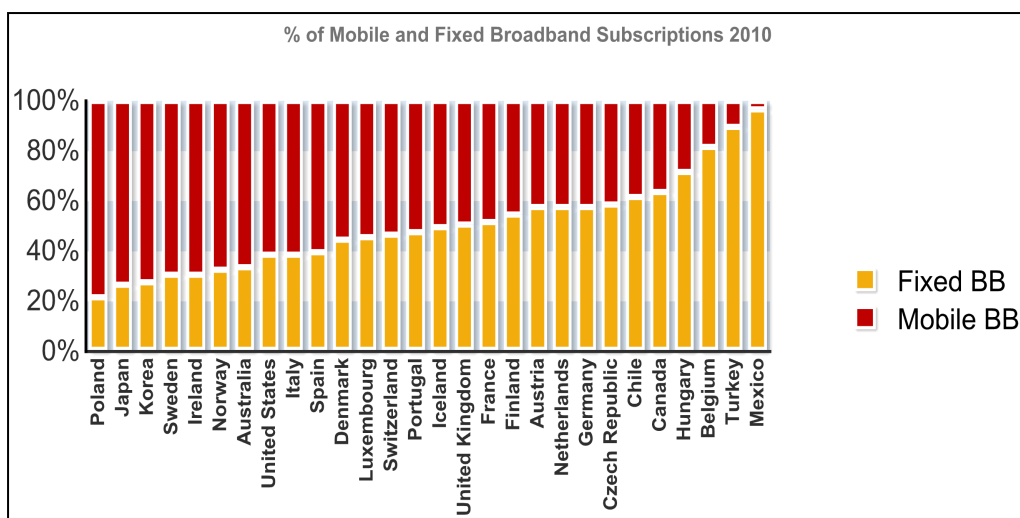


Figure 1: Percentage of Mobile and Fixed Broadband subscriptions, globally 2010
Source: OECD Broadband statistics (June 2010)

¹ The ITU is the leading United Nations agency for Information and Communication of Technology issues.

² The OECD is the Organisation for Economic Co-Operation and Development

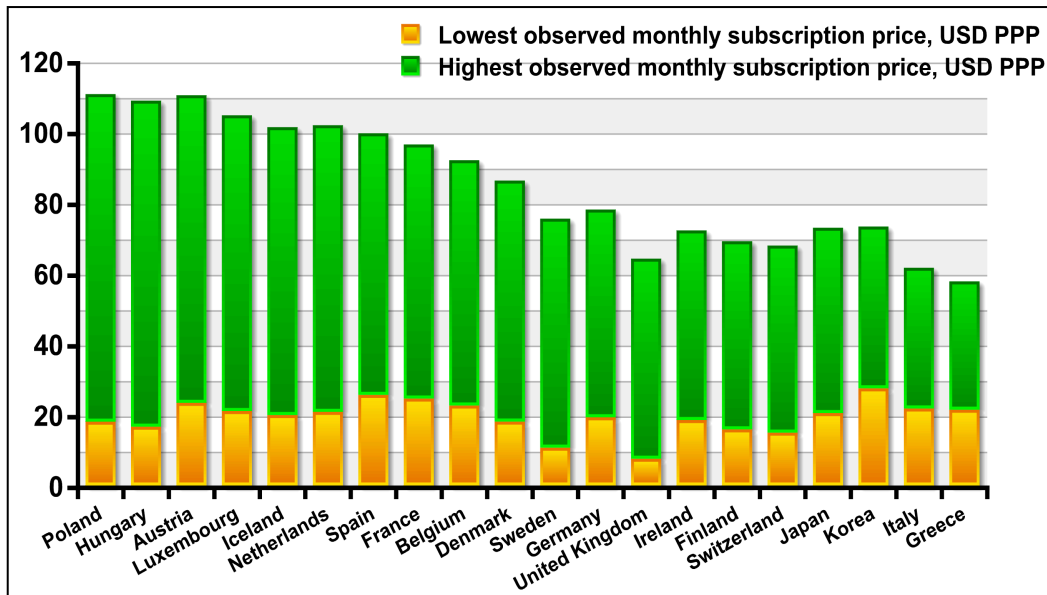


Figure 2: Broadband monthly subscriptions in US Dollars, 2010
Source: OECD Broadband statistics (June 2010)

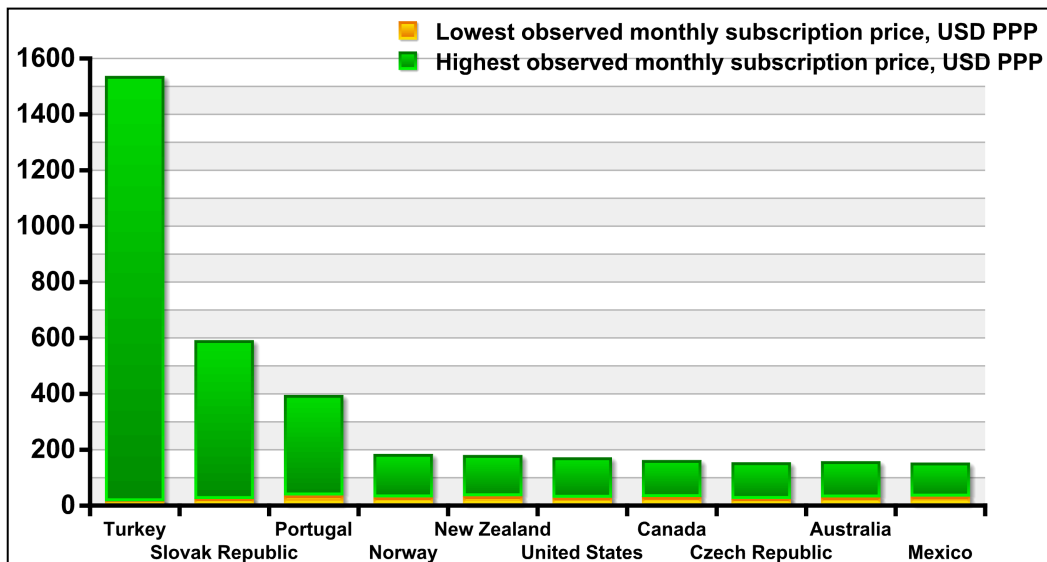


Figure 3: Broadband monthly subscriptions in US Dollars, 2010, high cost countries.
Source: OECD Broadband statistics (June 2010)

Overall, current mobile broadband pricing models are made up of stand alone or bundled broadband products charged at either flat rate or more likely with data download thresholds for prepaid or postpaid subscribers. In the UK, there is quite a variance in pricing between operator’s tiered data rate offers (ranging from 1GB to 15GB offers). Similarly, Ireland offers a range of GB limited download products ranging from 1GB to 15GB per month, however there is little disparity in price ranges between the operators. In France a like for like comparison between operators is made difficult due to the complexity of the bundled offers employed. In the US, data thresholds are considerably lower (5GB on average). As noted by Openet’s paper on “Closing the Mobile Data Revenue Gap”, (2010), current pricing models limit the operator’s scope for innovation and differentiation. New charging models need to be introduced to provide more choice, flexibility and personalisation to customers; and to stimulate new revenue creation.

Tiered Pricing Plans

CSPs have fuelled the uptake of mobile broadband access by offering generous flat-rate plans. As noted by Gartner's November 2010 publication on "*Strategic Alternatives for Pricing Consumer Mobile Broadband*", while flat rate data plans have helped to fuel data traffic growth, they have done little to help grow the operator's revenue. Gartner reports that tiered pricing plans, that include higher levels of customisation, can help lower mobile broadband churn, increase upsell possibilities and offer better opportunities for differentiation against competitors.

A Tariff Consultancy Ltd (TCL) report from 2009 highlighted that mobile broadband is now a 'standard service' in Europe with over 70% of the 97 mobile network operators providing HSDPA download speeds of 3.6MB or 7.2MB. It also noted that the most common thresholds employed is now 1GB, followed by 5GB, 3GB, 10GB. In Europe average mobile pricing is falling around 4% year on year.

Gartner (2010) also reports that prices for data plans dropped over the past few years due to intense competition in the market. At the same time, data thresholds and caps have reduced to some extent in order to counteract the rapidly increasing data volume supported by networks. For example, U.K. carrier O2 moved from unlimited access to a 1GB and a 3GB plan over the past two years. In addition to managing finite capacity, Gartner believes tiered pricing offers the opportunity to upsell mobile broadband – either offering faster network speeds or greater volume at a higher rate.

Global Mobile Broadband Revenues

Cisco have published figures stating mobile data traffic is growing at a rate 3.2 faster than fixed data traffic. It also predicts that mobile video, P2P, gaming and VOIP will drive mobile data growth by a factor of 39 from 2009 to 2014 globally. During 2010, many of the major operators reported revenue growth due to an upsurge in mobile data usage. Verizon Wireless reported an increase of over 23% in data revenue in 2010. A report from the Global mobile Suppliers Association (GSA) states that AT&T enjoyed a 27.2% growth in postpaid data ARPU, increasing from \$17.77 in 2009 to \$21.07 in 2010. During this period, the number of postpaid integrated data devices almost doubled to 29.7 million. AT&T attributed this growth in data ARPU to the introduction of affordable tiered pricing, customer friendly plans and the flexibility to migrate to higher usage plans. AT&T has experienced unprecedented mobile broadband growth, reporting more than 5000% increase since Q4, 2006. Furthermore, AT&T stated the net present value of an iPhone subscriber is more than twice that of a typical postpaid subscriber (Openet, 2010). In order to support this traffic growth, it deployed HSPA+ recently and has plans for LTE deployment during 2011.

Vodafone Group Plc reported that its data revenues reached \$5.8 billion in 2010, with an increase of 19.3% on the previous year. According to Vodafone, the smartphone has been the key driver for this growth in data and the company hopes to increase the proportion of smartphones from 30% to 70% by the end of 2013. CEO Vittorio Colao, reported that 85% of data traffic was supported by data cards and 15% from smartphones but that this mix was shifting to smartphones, noting that smartphone traffic increased by 37% and the dongle traffic by 17% during 2010. It also presented that although data volumes increased by +115%, the average 3G peak utilisation at busy hour remained broadly stable (GSA, 2010). In June 2010, it was announced that Vodafone Spain users, who browsed the internet on their mobile phone, were spending 30 per cent more than the average Spanish mobile user (Openet, 2010).

Meanwhile, Deutsche Telekom CEO Rene Obermann, expects to double revenues by 2015 with €10billion coming from mobile data traffic. Obermann reported that it doubled the number of 3G smartphones in the network to around 8 million by the end of 2010. According to [Wireless Week](#) Deutsche Telekom is rapidly developing its mobile broadband offering as part of a 4G offensive. Deutsche Telekom's customers in Germany, Austria, Poland, Greece, Bulgaria and Montenegro can already surf the mobile Internet at speeds of

up to 21 Mbit/s in most locations. Czech Republic, Croatia, Slovakia and Macedonia will join with 21 Mbit/s later this year. In Germany and Austria, this will double, allowing for speeds of up to 42 Mbit/s this year. Deutsche Telekom's ambition is to provide mobile Internet at DSL speed in any location on any device.

Fixed versus Mobile Broadband

Analysis Mason (Feb 2011) believes that attempts to sell mobile broadband as a substitute to fixed are likely to fail as there is a strong perception among consumers that mobile broadband is not as fast, more unreliable and more pricey than fixed broadband. Recent research from Analysis Mason's '*Connected Consumer*' survey – involving 6000 European and US consumers – indicates that interest in mobile broadband among non-subscribers declined slightly in all markets between 2009 and 2010 and subscriptions to mobile broadband are unlikely to grow at the same high level during the next year as they did in previous years.

Furthermore, Analysis Mason found that about 84% of mobile broadband subscribers also have a fixed broadband connection, and there is little evidence that these subscribers will drop their fixed-line contracts – only 10% of those with both fixed and mobile broadband services stated that they intend drop the fixed service.

Of respondents who said they weren't interested in mobile broadband, 72% said it was because they are happy with the fixed service they were receiving, which is up from 65% last year. Analysis Mason believes that the operators' best strategy to slow the decline in mobile broadband uptake is to emphasise the unique selling point of mobile broadband – its mobility.

Telco 2.0 analysis concurs with the view from Analysis Mason, reporting that in some cases, the revenues from mobile broadband service services are not even covering the costs of delivering data to the users. According to Telco 2.0, the current business models are broken – especially if they also need to provide enough cash flow for further network upgrades and expansion. Despite the wishes of marketing departments, it seems like expensive "mobile" broadband capacity is being wasted at giveaway prices, in an attempt to compete head-on with fixed broadband services.

Analysis Mason (Aug 2010) present that competition from mobile broadband services contributed to the downward pressure on fixed broadband tariffs during the first half of 2010. However, the premium that providers charge for mobile broadband services is also eroding. Prepaid mobile broadband services with usage caps of 3GB or more (sufficient for light users) now undercut entry-level fixed broadband service propositions in most Western European countries. Some broadband markets in Central and Eastern Europe, such as those of Poland and Estonia, are also approaching pricing parity for fixed and mobile broadband services.

Mobile Broadband Bundling and Churn

Recent research from Analysis Mason (Feb 2011) suggests that operators are winning the battle against churn. Based on its '*Connected Consumer*' survey, it found the portion of mobile handset subscribers planning to change operator has fallen from 14% in 2009 to just 9% in 2010. According to Analysis Mason, the reason for this decline is due lack of competitive pricing between operators and longer contracts. Analysis Mason expects that operators will aim to differentiate themselves by providing access to content and applications. Twenty-five per cent of iPhone owners surveyed indicated this would motivating factor for them to changing operator. Furthermore, the same survey revealed that 26% of consumers cited poor user experience as the main reason they were considering switching operator.

A [Telecomspricing](#) article dated September 2010 published findings from the Tariff Consultancy Ltd (TCL) report - called [MNO Trends in Europe 2010](#) – revealing that network operators are becoming more efficient in

managing both churn and ARPU. This report indicated that the average blended monthly ARPU levels rose sharply to Euro 25.40 across the 30 key operators in France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland and the UK in the six month period to the end of June 2010 compared with a year ago. In addition, the average blended annualised churn levels have decreased slightly from 27% to 26.1% within this time period. T-Mobile (Germany) reported the largest year on year fall of 2.1 million customers (caused mainly by a decline of 2.2 million Pre Pay accounts) followed by TIM (Italy) with a decline of over 2 million customers and T-Mobile (Netherlands) with a decline of over 1 million customers. These operators stated that this fall in pre-pay customers was part of a deliberate strategy to focus on higher value post pay accounts. Furthermore, some operators reported a dramatic uplift in monthly ARPU as a result of moving their focus away from Pre Pay accounts. T-Mobile Netherlands saw its monthly blended ARPU improve by 6 Euro at the end of June 2010 highlighting the benefits for operators of focussing on adding value rather than chasing higher subscriber numbers.

The key benefit of bundling is to create customer stickiness, and subscribers can benefit from substantial discounts. According to OECD's recent publication on Broadband Bundling (Feb 2011), bundles are typically sold with a significant price discount over stand alone prices. Bundling plays a key role in extending broadband service reach, according to this report. An article from [Total Telecom](#), dated October 2010, states that operators can increase market penetration and revenues by raising tariffs and including smartphone devices in their bundles, clearing out low-revenue users rather than just chasing subscriber numbers. This article examines increases and decreases in service pricing together with various bundles of devices and data plans across a number of countries. The biggest market penetration gains in France, Germany and the UK during 2010, were realised when price packages were offered with a service bundle at current prices that included a dongle/usb device, a smartphone and unlimited data. But in Italy, Spain and the US the greatest penetration gains came when the package offer was discounted by 20% below the baseline tariff and bundled with a mobile broadband dongle. The most significant revenue gains in all countries, other than Spain and the US, came when higher tariffs and bundled data devices and smartphones were applied. In conclusion, Total Telecom Plus observed that northern Europeans welcome bundled packages with smartphones at premium prices while southern Europe and the US are just looking for discounts. This underlines the importance of carefully targeted pricing and market segmentation, proving that selective bundling of offers can be more effective than service discounting.

Off Peak Unlimited Data Trends

With the exception of 3UK, with its announcement of an unlimited data plan in December 2010, most operators are moving towards limited data usage plans in place of "all you can eat" plans in order to manage finite capacity. Throughout 2010, European operators like Telefónica of Spain, Vodafone, Deutsche Telekom and France Télécom's Orange unit have moved from unlimited data plans to tiered plans linking speed and downloads to higher costs. However, in order to maximise deployed network capacity, many operators are using pricing incentives to generate revenue at off peak times.

The "off-peak unlimited data" trend in Europe is growing as highlighted in the article by [RC Wireless](#), noting that several European carriers offer services allowing users an additional quota of data usage – or even "unlimited" usage – during the night, off-peak weekday hours, weekends and public holidays, although there is still a great degree of variety in the structure of such propositions.

France provides a number of "off-peak" usage incentives. In Q3 2010, all three French mobile network operators marketed services offering off-peak unlimited usage of some description – either over the weekend (Orange, SFR and Bouygues Telecom) and/or off-peak weekday – essentially evenings to early morning. Other examples of off-peak incentives can be found in Greece (Wind Hellas' "Student Data" plan), in the United Kingdom (Orange UK's "Happy Hour" surfing options), in Romania (Orange Romania's inclusive

“Happy Hour” from midnight to 7 a.m. on key Colibri Internet plans) and in Portugal (Optimus’ bolt-on “Happy Hour” from 2 a.m. to 9 a.m.).

Key Influencing Factors for Mobile Broadband Models

As suggested by IBM’s Institute of Business Value (IBV) ‘*Telco 2015*’ paper (2010), the industry appears to be ebbing its way towards what it describes as the ‘generative bazaar’ scenario. In this scenario, barriers between OTT and network providers blur as regulation, technology and competition drive open access. Infrastructure providers integrate horizontally to form a limited number of network co-operatives that provide pervasive, affordable and unrestricted open connectivity to any person, device or object, including a rapidly expanding class of innovative, asset-light service providers. A number of factors are shaping the future of mobile broadband pricing models because they are forcing operators to rethink their traditional business models. Operators need to stop thinking like traditional telecommunication operators and acknowledge how these factors are influencing the future of the communications industry.

1. Customer Expectations

Customer expectations are shaping the evolution of operators pricing models. Consumers expect to be able to use and access services with their devices anywhere and any time. They expect to have flexibility in how they pay for such services and to be able to control that spend. They also want choice, pricing transparency, and service customisation based on individual lifestyle motivations and personal interests. The one price fits all model is no longer appropriate in this mobile digital age.

2. The Cost of Infrastructure

While the debate on ‘new’ spectrum provision continues, operators are struggling to maintain service quality with finite radio bandwidth. The net neutrality debate in the US, brought the contentious issue of cost of infrastructure into focus during 2010. Mobile operators claimed that they were discouraged from investing substantially in broadband if unable to recoup investment costs by offering tiered pricing or a premium for data QoS. John Thorne, senior vice president and deputy general counsel of Verizon, argued that they had little incentive to make large investments to develop advanced fibre-optic networks if they are prohibited from charging higher preferred access fees to companies that wish to take advantage of the expanded capabilities of such networks. Thorne and other ISPs have accused Google and Skype of freeloading or free riding on a network of lines and cables the phone company spent billions of dollars to build. Bret Swanson from the [Wall Street Journal](#) said that YouTube, MySpace and blogs are put at risk by net neutrality. Swanson stated that YouTube streams as much data in three months as the world’s radio, cable and broadcast television channels stream in one year, 75 petabytes. He argued that net neutrality would prevent broadband networks from being built, which would limit available bandwidth and thus endanger innovation.

The US regulatory body, the FCC, voted in December 2010 to approve net neutrality rules for wireless and wired networks. As expected, reports [Fierce Wireless](#), the rules largely ‘go easy’ on mobile broadband providers. The rules, state [RapidTV News](#), prevent broadband providers from throttling P2P and OTT video traffic—a practice that many operators say is necessary to gain a handle on network congestion, maintain QoS and QoE, and meet SLAs. Verizon, AT&T, Sprint, T-Mobile and other wireless carriers will be barred from blocking services like Google Voice and Skype that compete with their own voice and video offerings.

Wireless carriers also will face transparency requirements on network management policies and a basic “no-blocking” rule on lawful content and applications. The rules will allow for reasonable network management according to [Fierce Wireless](#) -which is defined as actions that are “appropriate and tailored to a legitimate network management purpose, taking into account network architecture.”

Most of the main operators are moving towards 4G or Long Term Evolution (LTE) network technology in an effort to reduce costs and provide much needed bandwidth, however, it is likely that many will continue to support multiple access technologies for some time to come. As described in the Acatel Lucent (ALU) article “*Wireless Broadband Evolution and Wireless Business Model Revolution*”, LTE combines end-to-end, flat-IP architecture with next-generation radio frequency technologies to unleash unprecedented performance in terms of per-user and overall network bandwidth. Furthermore, LTE provides very low latency required for real-time services and unrivaled cost efficiency in terms of cost per megabit of data. In short ALU claims that LTE is ideally suited to delivering high-bandwidth, rich multimedia applications to the mass market.

However, ALU admit that LTE on its own will be insufficient to ensure future operator profitability for data services. End-users have the same expectations from mobile broadband as they enjoy from fixed broadband such as high bitrates, flat-fee tariffs and free services and content (particularly user-generated content). Also, even though the cost per megabit is expected to fall dramatically with LTE, the consumption of data volumes by consumers (for video-centric services, across more and more devices) will lead to an overall -but finite- decline in the total cost of ownership of the network.

The path to a profitable wireless broadband business ALU asserts, is linked to the network evolution to LTE, however of equal importance is the operators ability to transform its service delivery, its supporting processes and organisation. This view is echoed by Telco 2.0, stating that the ability to develop new wireless business models will be necessary to help justify extra infrastructure investment as end-user spending on broadband access reaches market saturation.

3. The Over The Top (OTT) Effect

With diminishing returns, and growing costs to provide network capacity, operators must rethink their basic business models in an effort to monetize data. Over The Top (OTT) providers are already finding ways of bypassing the operators, creating revenue without the need for operator billing systems or quality of service guarantees. The availability of stand-alone services will also play a key role in the competitive potential of OTT services, which allow consumers to watch video or make voice calls “over-the-top” of an existing broadband connection (OECD, 2011). According to [IPTV news](#), video, once considered an entertainment service, has now become a means of communication with the advent of over-the-top video and mobile applications. Just as texting and email have displaced voice as the primary means of communication, OTT video has become another way in which people communicate, it states. However, as OTT video communications begin to make an impact within the market, the network remains however the real asset within the value chain, with bandwidth providing the biggest value. OTT services can be provided via applications on mobile devices and provide a lower-cost solution for subscribers wanting video or voice services, but who do not value the services enough to buy them as part of a bundled service from the operator.

Some market analyses point towards video being the fastest growing segment of all internet traffic. In May 2010, YouTube announced that it now served 2 billion videos per day. Another study from comScore estimates that nearly 178 million Internet users in the US watched 33.2 billion online videos in December 2009. The percentage of online population who streamed video in 2008 is significant in countries such as the US (80%), the UK (84%), France (79%) and Germany (66%), according to the OECD report published 2011. It also presents that Voice as an OTT service is eroding operator revenue. In January 2010, TeleGeography calculated that international Skype traffic accounted for 12% of the world’s international long distance traffic during 2009. In other cases, incumbent operators have begun offering their own OTT voice services, like the Finnish company, Elisa, providing OTT voice service over other network’s broadband infrastructure (OECD, 2011). The OECD stress the point that the availability of stand-alone broadband - not tied to voice - will be a key factor in the “*eventual success of competitive OTT providers*”.

Openet (2010) believes the gap between revenue and demand is significant and is expected to widen with time if operators don't take action now. For a long time, operators have considered third parties, in particular Over-The-Top service providers (OTT), a threat, its states. However these newcomers bring a wealth of innovative services and applications. With the growing adoption and interest of consumers, operators cannot afford to ignore the appeal these new applications have to their customers. Therefore, the question is how can operators make the most of this situation and turn it into an opportunity. Operators can actually make money from third party service and application providers, including OTT, by developing business models that integrate them, say Openet. For example, they can monetize OTT with service passes: a monthly VoIP pass or an application-specific pass to access Facebook for 24h. Openet suggests that operators could integrate a partner's offering into their package, and generate an additional revenue stream as the partner pays a fee to the operator for promoting and selling its service. Raconteur and Informa's ['Financing the Future'](#) (2011) presents the view that the future of mobile broadband investment depends on whether "*staid telecom companies and disruptive newcomers*" can team up in a way that would benefit both financially.

According to Raconteur and Informa, Citibank is projecting Apple's App Store will deliver \$2 billion in revenue in 2011, billing consumers directly and making significant revenue on the apps it sells. Another company bypassing the operators is eBay mobile. The company uses PayPal to bill its 30 million customers and reported upto \$2 billion in transactions over mobile phones last year, without involving the mobile operators in their business model. Google and Apple are making serious investments and nurturing revenues from mobile advertising, an area in which operators have had only limited success to date. Meanwhile, companies like Skype and Google are eating away at voice traffic and causing revenues from that stream of core business to further plummet. "Mobile operators used to be at the centre of the ecosystem," says Thomas Husson, a Paris-based analyst at Forrester Research. "They were controlling the user experience and haven't necessarily anticipated the tectonic shift." The whole concept of who supplies telecoms and communications is changing state Raconteur and Informa. Telephony and other communication services will increasingly be just another software application with no special relationship to device, platform or location, making it possible for a player like Facebook to offer mobile services. This report predicts that Skype and Facebook will combine and will impact operator roaming revenues.

Consequently, the key message for operator's survival is to unite and collaborate with these newcomers, which leads to the problem of ease of integration and open access. In order to partner with third parties, operators must offer a standard and open API (application programming interface). Such wholesale services create an entirely new revenue stream for operators, "without the headache and expense of having to dream up, create and market new services" state Raconteur and Informa. The first commercial OneAPI multinet network service is already operational in Canada, linking mobile networks run by TELUS, Bell Canada and Rogers Communications. Rene Schuster, CEO of Telefónica O2 Germany, says it is crucial that mobile operators work more closely with other types of internet players. "We have to find a way to get together from a transaction or quality of service point of view." An open API platform seems to be the foundation for any new business model approach for operators looking to obtain revenue from 'upstream' third parties.

4. Mobile Advertising

Google and Apple have invested more than \$1 billion in acquiring mobile advertising networks and finally the nascent mobile marketing value chain is beginning to show signs of maturing and evolving, according to Raconteur and Informa's article "*Change of Channel: Smartphone Become The New Ad Platform*", Feb 2011.

Content providers as well as advertisers need to be aware that mobile now accounts for between 5 per cent and 10 per cent of all web traffic, says mobileSquared's Nick Lane. "*If their website isn't optimised for a mobile experience, then potentially they could be alienating new customers. No company can afford to do that. They've really got to think about not just the PC experience but the mobile experience.*" Experts believe the

future in mobile advertising will be in location based services, which takes advantage of the mobile's unique ability to use GPS to put a consumer near a point of sale.

Again the onus is on mobile operators to close the 'cultural gap' with agencies and advertisers. Operators need to form partnerships that make the most of their consumer data with advertising networks. Information such as device ownership, average revenue per user (ARPU), past behaviour, service usage, roaming information, and call history, on top of consumer profiles are extremely valuable to marketers who wish to ensure a higher return on their budgets. The challenge, points out Raconteur and Informa, in moving to this business model will be for operators to become the trusted party both for advertisers and consumers, who want their privacy and identity to be respected.

Windsor Holden, chief analyst for Juniper Research, says it's mobile's potential for "*very detailed analytics*," that helps make it most attractive as an advertising medium. "*It's a quantifiable distribution channel and it's relatively successful both in terms both of engaging more users and offering opportunity to click through to respond to messages*," Holden says. "*As the use of mobile Internet increases, I think you will see a significant proportion of digital advertisement spending moving across specifically to mobile channels.*"

5. Devices and embedded applications

Google's strategy to populate the world with an affordable device is beginning to pay off. At the Mobile World Congress (MWC) in February 2011, Eric Schmidt (Google's CEO) announced "*350,000 activations a day. 170 compatible devices, 27 OEMs, 169 carriers, 69 countries, over 150,000 applications in app store — that number has tripled in nine months*". The growing dispersion of smartphone and media devices was also evident at MWC with Samsung introducing its new Galaxy S smartphone and tablet, HTC presenting its first tablet along with five new smartphones, LG demonstrating its G-Slate tablet and the first 3D phone and Sony Ericsson promoting its Xperia Play. Interestingly, all these devices run on Android, underlying the importance of software in a mobile industry where smartphones and data use are creating most of the value. As observed by Openet (2010), it is important to note that whilst increasingly sophisticated smartphones supporting advanced applications are being launched, there is also a growing market for less expensive, less advanced devices, especially in developed countries. Operators need to be able to support both markets in order to maximise their revenue potential. Apple, in recognition of this and of Google's growing dominance in the mobile app industry, is developing a more affordable smartphone to widen its market reach.

Correspondingly, the number of smartphones, media tablets, M2M devices and embedded mobile applications are set to grow substantially. IDC (2010) predict that Operator Equipment Manufacturers (OEMs), like Qualcomm and Intel, will continue to develop chipsets for embedded cellular connectivity accessible to multiple network providers. Consumers expect and will find appeal in the ease of use and transferability between networks brought about by these embedded applications both domestically or internationally. Furthermore, these devices will be able to connect seamlessly using multiple technologies like 3G, WiMax and LTE. Increasing availability of new connected computing devices, states IDC, will help spur growth of mobile broadband consumption. Businesses will increasingly adopt wireless communications to improve efficiencies and productivity and as reliance grows, ubiquitous mobile broadband connectivity will drive data revenue.

New Partnership Models

Operators need to sustain revenue margins to fuel the cost of maintaining and expanding network infrastructure. New contracts need to be formed 'upstream', with all the key players and influential new-comers to this market space to generate an influx of revenue (see Figure 4).

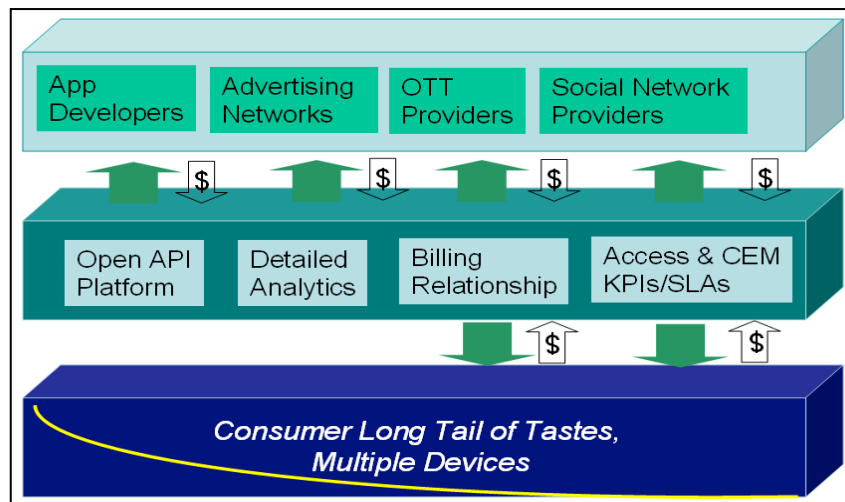


Figure 4: New 'Upstream' Revenue Streams
Source: IBM Research, 2011

- **App Developers:** Operators should provide an easy integration to their backend systems through standard API platforms. This will open up innovation to feed the long tail of tastes of the subscriber base, and by helping to distribute and promote applications, as well as providing the billing capability; operators can obtain a certain percentage of revenue from this relationship.
- **Advertising Networks:** A growing number of advertising networks sell customer information to marketers searching for key information regarding potential consumers. Operators have a wealth of detail regarding the habits, behaviours and tastes of subscribers and can provide this information for a price or obtain revenue for corresponding upsell based on targeted advertising to willing subscribers. Furthermore, the ability to track location of target customers provides a significant valuable dimension to this attractive distribution channel.
- **OTT Providers:** Media and content providers, Broadcast TV and video streaming can all benefit from a collaborative relationship with mobile operators. By developing contracts based on service quality, bound by service level agreements, these third parties can nurture a satisfied customer base, while the operators are part funded for the network investment required to support these services. Operators can also provide the billing platform should content providers require payment from end users. According to the OECD (Feb 2011), OTT services require a certain level of network quality to function correctly and should be considered in any debates surrounding traffic prioritisation/network neutrality. It also believes that competitive broadband markets should be able to deliver OTT services in an efficient way to enable users to select their preferred OTT provider.
- **Social Network Providers:** Social community hosts like Foursquare depend on mobile operators to "widen their distribution platform". Operators can share customer location information as well as behaviour information to facilitate these types of "web players" strength and establish their own business models with retailers and advertising networks. Operators can negotiate a share in the value chain created.

Another key factor, influencing the make up of the evolving Mobile Broadband models is the growth of data embedded devices and the flexibility consumers expect when connecting to services. Operators may detach

themselves from subsidising devices and will begin to provide session based services rather than long term contracts to consumers of content (See Figure 5).

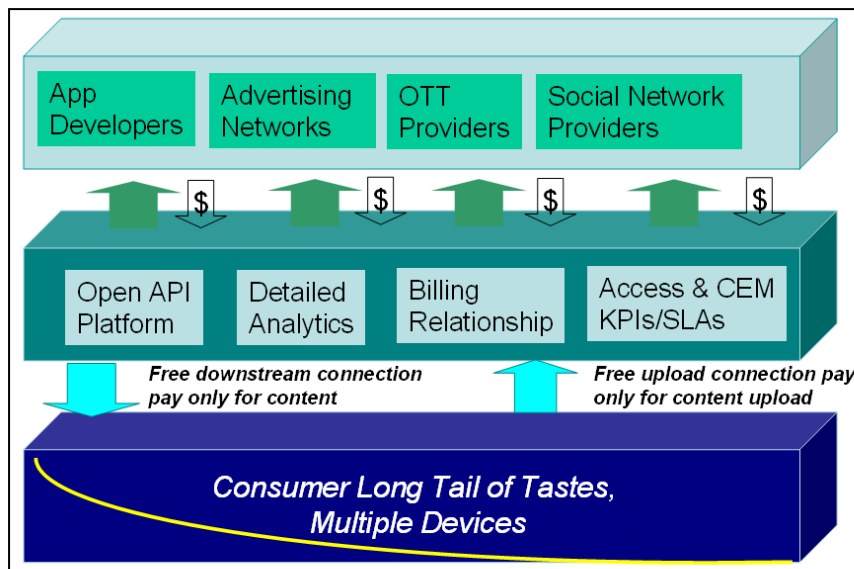


Figure 5: New Revenue Streams
Source: IBM Research, 2011

Future Mobile Broadband Pricing Models

Real time policy management techniques and sophisticated billing based on content consumed or uploaded. will enable operators to develop creative pricing models for their consumers. Some operators, if substantial revenues can be secured from new upstream relationships, may even offer free connectivity to ‘would be’ users and seek revenue from certain transaction types. Other models, as identified by Telco 2.0 may involved ‘sponsored Free, guest or “sponsored” mobile broadband, paid for by venue owners or event organisers. Variations of the two-sided business model might also include, as described by Telco 2.0, subsidised mobile access by “upstream” parties like advertisers or governments, rather than direct end-user payment.

Telco 2.0’s mobile broadband business model report on “*Opportunities, Forecasts and Future Scenarios*” estimates that New ‘upstream’ customers will generate over \$90 billion in broadband revenues globally by 2020. This report also recognises that transition to these models will not be easy, noting that question marks about the convenience of using physical SIM cards, especially for temporary access remain. Furthermore, it expects that terms like ‘ARPU’ and “subscription” will have less relevance as conventional “subscribers” drop to perhaps 40% of the overall mobile broadband user base. It also notes a shift in the operator/subscriber relationship as consumers migrate from ‘ongoing subscription’ type contracts to a more ‘transient’. ad-hoc / per session engagements. Four possible mobile broadband pricing models are presented below. At this stage, data is not available to recommend or promote one model over another, however availability and subsequent consumer adoption of ‘per transaction’ pricing model indicates a growing appetite for flexible usage models proven users freedom to user services without the need for contract tie-in.

1. Application Aware Pricing Model

This model enables the customer to pay per movie, per video conference, per premium TV view, etc. Content based billing allows the operator to charge based on value of content provided and/or amount of bandwidth consumed for that particular service. According to Openet (2010), this type of model permits operators to supply an appropriate, uncompromised quality of service that protects customer satisfaction.

2. Per Transaction Pricing Model

This model is already available from some operators and provides end users the option to purchase one-time use of data services for a limited period of time, volume of data, number of transactions or specific services. When combined with Subscriber Initiated Provisioning, this type of 'service pass' offer provides a highly personalised experience, giving customers access to data services when they need it, wherever they need it, in the amount they need (Openet, 2010). It creates new revenue streams for operators by extension of market reach, attracting customers who are unlikely to opt for long term contracts, for example, roamers, business people and vacationers.

3. Flexible Payment Pricing Model

This model permits consumers the ability to pay for the service using a variety of payment methods ie. credit cards, PayPal, ewallet, loyalty points, sponsored content provider codes or advertisement coupons. This model also provides the ability to open up new revenue streams from consumers as well as supporting upstream revenue from third party suppliers.

4. Flexible Time Period Consumption Pricing Model

This model allows postpay subscribers to pay for services when they initiate the service usage, independent to the operator's billing cycles. As an example, Openet (2010) describes that if a customer activates their iPad on the 10th of the month, they would be charged a full month subscription of \$20 running from 10th of the month until the 10th of the next month, regardless of the normal billing cycle of that operator.

Conclusion

Although network evolution and infrastructure investment is key to the provision of the mobile broadband service, other factors including the seamless ability to connect and the unstoppable tide of new entrants into the mobile space will shape mobile business models of the future. It is anticipated that multiple models will evolve as operators provide the API platform to connect and form partnerships with third parties. Attention will turn to securing revenue from content providers and advertising agencies as well as obtaining new forms of revenue from consumers. The operator's key assets remain their intimate consumer knowledge, the billing relationship and their ability to manage the user experience, however these assets do not secure sustained profitability against increasingly diverse and innovative industry players. Rather than resist the tide of change, operators need to evolve alongside these entrants and change their business models and regard their established relationships with consumers as purely a transient 'first mover advantage'.

It is likely, using a combination advanced policy management, real time charging, content and behaviour analysis and a standard open API platform, that multiple new and innovative pricing models will emerge. A key negotiating asset for operators will be their ability to offer quality of service experience Service Level Agreements (SLAs), and their ability to provide aggregated customer behaviour insight.

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