

# Mobile Broadband in Europe:

## **Profitability Challenge or Next Growth Engine?**

Telecom & Media Insights  
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# 1 Abstract

Mobile broadband is emerging as a growth driver for European Telcos, who have seen limited uptake of 3G. Access speeds comparable to entry level DSL connections, affordable flat-rate pricing plans, and availability of low cost terminal devices have resulted in a strong uptake of mobile broadband services, especially the uptake of data cards and USB dongles. In certain geographies, mobile broadband has already started to make a significant impact on fixed broadband services with substitution setting in. However, this uptake is exerting pressure on installed mobile data capacities, even as price erosion threatens to affect profitability of mobile broadband. Operators will need to focus their attention on three broad areas: managing profitability, investing in backhaul and access capacity, and maintaining high quality services. Our analysis reveals that operators will see their margins erode, as prices of flat-rate data packages decline. Moreover, incremental CAPEX<sup>1</sup> on capacity upgrades necessary to keep pace with increased demand for bandwidth is likely to further affect profitability of mobile broadband. In the short term, differential pricing of services and implementing traffic shaping measures can help operators optimize use of capacity by limiting the usage of high-bandwidth applications. For the long-term, operators will need to look at means to reduce backhaul capacity OPEX<sup>2</sup>, through investments in scalable and cost-effective backhaul based on fiber. In order to cater to the demand for increasing access speeds, operators will need to draw up a clear roadmap of migration to next-generation technologies such as LTE<sup>3</sup>. Mobile operators will also need to consider investments in improving in-building coverage through femtocells, in order to provide high quality of services for home users and accelerate fixed-mobile substitution.

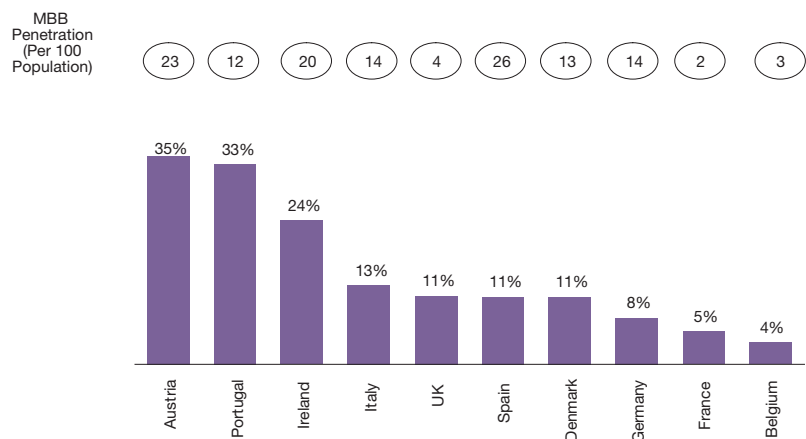
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<sup>1</sup> Capital Expenditure.  
<sup>2</sup> Operating Expenditure.  
<sup>3</sup> Long Term Evolution.

## 2 Emergence of Mobile Broadband

Mobile broadband (MBB) comes as a shot-in-the-arm for European operators, who have so far seen limited uptake for 3G services. Affordable flat-rate pricing, better access speeds resulting from technology upgrades and the proliferation of PC cards, and USB dongles and smart phones have made mobile broadband an attractive proposition for users. Most countries in Europe have seen a significant uptake of mobile broadband services, especially of PC-based Internet access services through mobile USB modems and PC cards (see Figure 1).

**Figure 1: Mobile Broadband Subscribers as % of Total Broadband Connections, January 2009**

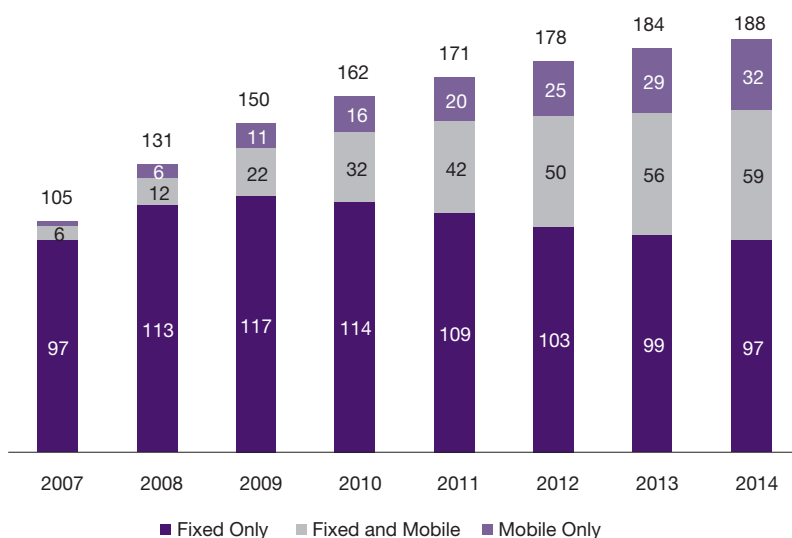


Source: European Commission, *Progress Report on the Single European Electronic Communications Market 2008*, March 2009; Enders Analysis, *European Mobile Market Analysis*, March 2009<sup>4</sup>

In most European geographies, the uptake of mobile broadband is growing at a faster pace compared to fixed broadband driven by the uptake of PC cards and dongles. In countries such as Austria and Ireland, where penetration of mobile broadband is high, fixed mobile broadband substitution appears to be setting in. In a recent survey, as much as 32% of people polled were using mobile broadband as a substitute for fixed broadband<sup>5</sup>. Across Europe, it is estimated that mobile broadband will increasingly start eating into the fixed broadband market, both substituting as well as complementing fixed broadband usage (see Figure 2).

<sup>4</sup> Note: UK data is for December 2008.

<sup>5</sup> GfK Consumer Tracking Panel, *Is your mobile broadband in addition to, or instead of, a fixed connection?* November 2008.

**Figure 2: Broadband Households by Platform (millions), Europe, 2007-2014E**

Source: Analysys Mason, *Does fixed broadband have a future without mobile?* April 2009

However, this growth is not without its share of challenges. As operators continue to aggressively acquire subscribers, and encourage usage of the service, the profitability of mobile broadband services is likely to be at risk. Moreover, the rise in usage can lead to demand outstripping supply, thereby putting significant strain on operator investments in network infrastructure.

In this paper, we analyze the growth of mobile broadband, and the key challenges that this growth brings for operators. We also evaluate solutions to these challenges and conclude with a set of actionable recommendations on the road ahead for mobile operators.

## Current mobile broadband pricing models are unsustainable in the long-term

### Drivers of Mobile Broadband

Growth in mobile broadband has been largely led by three broad factors: increase in access speeds, attractive pricing plans, and rapid growth of terminal devices.

#### *Increase in Access Speeds*

Early successes seen in countries such as Austria, where mobile broadband has now crossed the 20% population penetration levels, have spurred operators across Europe to rapidly upgrade their networks to deliver faster access speeds. For instance, EVDO Rev A<sup>6</sup> deployments have grown by over 470% in 2008 while HSDPA<sup>7</sup> deployments have grown over 95%<sup>8</sup>. In the UK, mobile broadband headline speeds average 1.9Mbps while fixed broadband speeds average 2.9Mbps<sup>9</sup>. The differential in speed is more than made up by the convenience of mobility that mobile broadband offers consumers.

#### *Attractive Pricing Schemes*

Mobile operators have innovated in pricing mobile broadband services. Operators have introduced flat rate tariffs which have encouraged consumers to take up mobile broadband services. At the end of 2008, over 20 mobile operators across Europe are estimated to have launched flat rate unlimited packages. Moreover, in the past year, the average data caps have almost doubled<sup>10</sup>.

<sup>6</sup> Evolution Data Optimized.

<sup>7</sup> High Speed Data Packet Access.

<sup>8</sup> Various analyst reports.

<sup>9</sup> Guardian, *Average UK broadband speed is less than 3Mbps, says Broadband Expert*, February 2008.

<sup>10</sup> TCL, *Mobile Broadband Pricing 2009*, December 2008.

## **Operators will soon need to consider reducing backhaul OPEX through investments in fiber backhaul**

Competition has also forced operators to aggressively drive down prices of mobile Internet access packages. For instance, in the Netherlands, the average price/MB of data has fallen down from over €0.84 in 2005 to €0.13 in 2008<sup>11</sup>, due to the significant increases in data allowance coupled with aggressive price cuts. The price drop has been steeper in locations such as Germany with the unit price decreasing from €0.33 in 2005 to as low as €0.001 in 2008<sup>12</sup>. Moreover, the mobility premium for mobile broadband services is rapidly declining, making it a competitive alternative to fixed broadband. For instance, in the UK, the entry level mobile broadband plan from Vodafone costs £15 comparing favorably with BT retail's 'Option 1' which is priced at £15.65<sup>13</sup>.

### ***Availability of Devices***

Rapid development of terminal devices, coupled with the downward trend in their prices, has played a significant role in the growth of mobile broadband operators, who have also initiated bundled contracts where “netbooks” - stripped down laptops built for wireless Internet access - are bundled along with a service plan. Across Europe, it is estimated that mobile operators account for 20 to 25% of total small laptops sold<sup>14</sup>. Operators such as T-Mobile have experienced strong growth in uptake of their mobile broadband services after they started to bundle netbooks. For instance, T-Mobile is estimated to have signed up over 600,000 subscribers in the six months since its September 2008 launch of netbooks<sup>15</sup>.

Rapidly declining prices of USB dongles are playing a significant role in driving up adoption of mobile broadband services. In the UK, the price of Vodafone's dongle decreased from £99 in 2007 to £49 by 2008 for a 30-day contract price plan<sup>16</sup>.

In the next section, we discuss the key challenges that operators are facing in deploying and running profitable mobile broadband services.

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11 Tarifica Analysis.

12 Tarifica Analysis, Enders Analysis, *Vodafone UK data pricing: free for £5 a month*, May 2008. Company Websites, 3G Website, *T-Mobile Launches Open Mobile Internet*, July 2005.

13 Company websites.

14 & 15 BusinessWeek, *Wireless Carriers: Your New PC Retailer?* April 2009.

16 Phonesreview.co.uk, *USB dongle price slashed in half by Vodafone*, June 2008.

### 3 Key Operator Challenges Going Forward

Mobile broadband's strong growth has also brought with it a set of challenges that operators need to overcome. The rapid uptake of mobile broadband services coupled with a sharp decline in prices is leading operators into a monetization conundrum for mobile broadband services. Moreover, with rising access speeds and increased usage of USB<sup>17</sup> dongles, challenges arise around ensuring adequate in-building coverage.

In this section we identify some key challenges that mobile operators will face with regard to their mobile broadband offerings. We have modeled the expected increase in traffic and effect of pricing and usage on profitability<sup>18</sup> for a typical Western European operator and used it as the basis of our analysis.

#### Upgrading Access and Backhaul Capacities

Rapid uptake of mobile broadband services in Europe is putting a strain on operator network infrastructure. Flat rate data plans offered by operators have encouraged consumers to increase their usage of the service, consequently significantly impacting operator projections on bandwidth consumption. For instance, T-Mobile's mobile traffic tripled in the first month after its introduction of a flat rate data plan<sup>19</sup>. Driven by the increased usage, it is estimated that backhaul demand is likely to see a ten-fold increase between now and 2015<sup>20</sup>. Consequently, operators are being forced to upgrade their network infrastructure investments spanning carriers, spectrum, backhaul, and network technologies. Operators such as Vodafone, TeliaSonera, Swisscom Mobile and Telecom Italia have initiated migration of their microwave backhaul to carrier Ethernet that offers higher capacities<sup>21</sup>.

Our analysis indicates a significant spike in capacity requirements based on different consumer usage patterns. However, in a market such as the UK, even in the most optimistic usage scenario, installed capacity is likely to fall short of usage demands by early 2010 (see Figure 3).

<sup>17</sup> Universal Serial Bus.

<sup>18</sup> Key Assumptions: estimates are for a hypothetical European operator which has around 40,000 3G BTS; estimates include mobile broadband usage on datacards, USB dongles and embedded laptops. Usage of mobile broadband on the handset is not considered. Total 3G base stations assumed at 40,000 and all operators assumed to have equal market shares.

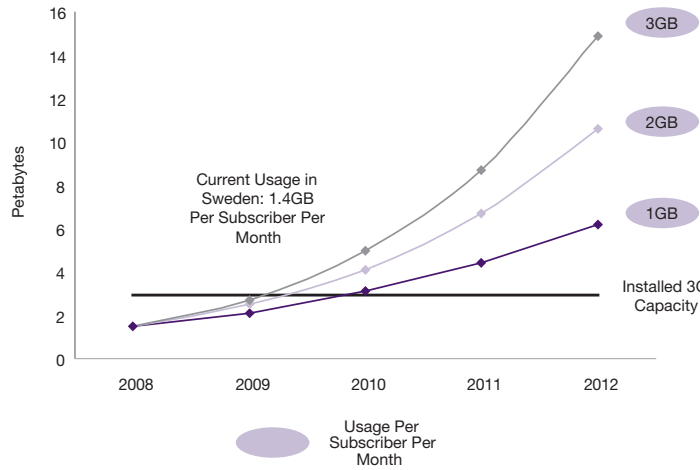
<sup>19</sup> 3G Wireless Broadband, *Increase in Mobile Data Traffic Prompts Operators to Focus More on Backhaul*, June 2008.

<sup>20</sup> Analysys Mason, *Mobile network operators prepare for a ten-fold increase in wireless traffic*, November 2008.

<sup>21</sup> 3G Wireless Broadband, *Increase in Mobile Data Traffic Prompts Operators to Focus More on Backhaul*, June 2008.

**Congestion-based or time-based pricing could offer relief to mobile operators in the medium-term by optimizing capacity usage**

**Figure 3: Usage Evolution for Mobile Broadband (Petabytes) for Varying Data Usage Scenarios, UK, 2008-2012E**

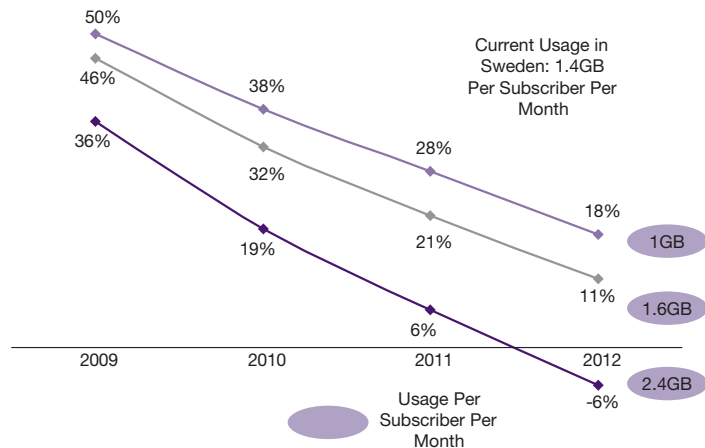


Source: Capgemini TME Lab Analysis based on analyst reports; Regulatory websites (Ofcom); Company websites

**Improving Profitability of Mobile Broadband**

Operators are fast realizing that their business models for pricing mobile broadband services are unsustainable in the long term, due to their inability to tie pricing and consumption. For instance, in Sweden, revenues from mobile data traffic increased by 60% in 2007, compared to a 1000% growth in mobile data traffic<sup>22</sup>. Our analysis of profitability for the hypothetical European mobile operator reveals the significant impact that rapidly increasing usage of mobile data can have on the profitability of mobile broadband services (see Figure 4). While operators can continue to enjoy high margins if data usage is capped at 1GB per subscriber per month, in many European locations usage per user has breached this limit. For instance, average traffic per active subscriber per month in Sweden increased from 457MB in H1 2007 to over 1,398MB by H2 2008<sup>23</sup>. If usage continues to spiral upwards, operators can see their margins (EBIT) declining to levels below 10%.

**Figure 4: Impact of Increased Usage on MBB EBIT (%), Sample European Operator, 2009-2012E**



Source: Capgemini TME Lab Analysis based on analyst reports; Regulatory websites (Ofcom); Company websites

<sup>22</sup> Swedish Post and Telecom Agency (PTS), December 2008; PTS, *The Swedish Telecommunications Market 2007*, June 2008.

<sup>23</sup> 3G Wireless Broadband, *Increase in Mobile Data Traffic Prompts Operators to Focus More on Backhaul*, June 2008.



### Offering Optimum Quality of Service

Operators are faced with a problem of offering acceptable levels of quality of service (QoS) across all usage locations. Consumer usage of mobile voice and data at home now constitutes almost 40% of all usage<sup>24</sup>. It is estimated that between 12 to 22% of all mobile customers have faced indoor coverage issues, with the percentages rising significantly for 3G networks<sup>25</sup>. Fixed operators, who offer wired/wireless Local Area Network (LAN), inside customer premises have a significant advantage when it comes to quality of service. Mobile operators, on the other hand, face losses in signal transmission and limited in-building coverage. However, for mobile operators to ensure that a significant proportion of fixed broadband consumers migrate to mobile broadband services, adequate in-building coverage becomes an imperative. Moreover, the increasing use of high-bandwidth data services implies that operators need to continue upgrading their backhaul and access capacities to keep pace with demand. For instance, the rise in popularity of rich-media applications such as streaming HD (High Definition) videos is causing operators to see strong rises in data usage. In Hong Kong, mobile data usage increased over fourteen-fold in the two year period between 2006 and 2008<sup>26</sup>. Such rapid increase in usage of data will require operators to secure backhaul in line with rising demand to ensure high QoS.

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<sup>24</sup> & <sup>25</sup> Orange, *Coverage Propositions for Orange Customers*, February 2009.

<sup>26</sup> GoMo News, *Mobile data use in Hong Kong increases 14 fold in two years*, April 2009.

## 4 Recommendations

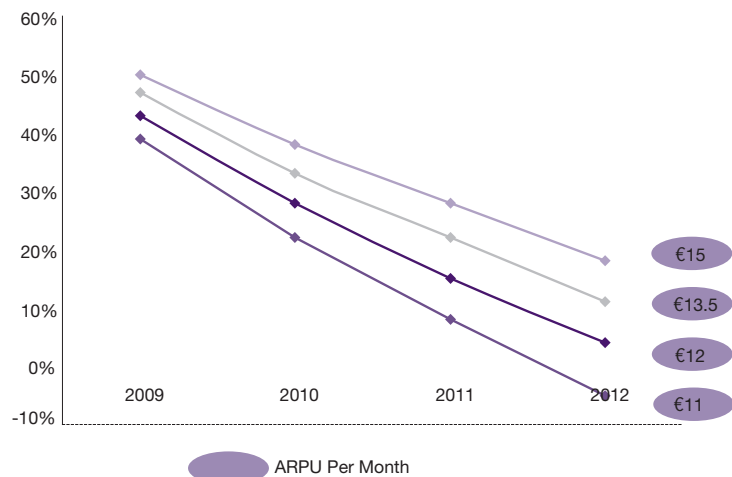
**CAPEX requirements more than triple for a rise in average data usage from 1.6GB to 2.4GB per month per subscriber**

While operators need to continue investing in networks and competitively price their services, at the same time they will also need to ensure that they are making margins. For mobile broadband to remain a stable long-term growth engine, measures aimed at offering high-quality profitable services become essential. We believe operators need to focus on increasing capacity, improving profitability, ensuring high quality of service even within closed buildings, and developing targeted pricing plans for various usage patterns. In this section, we suggest definite measures for each of these concern areas and analyze their timelines and impact.

### Boost Profitability through Differential Pricing and Traffic Shaping

With data usage on mobile broadband surging ahead, operators will need to reconsider their pricing strategies to make up for the shortfall between network usage and revenues. Our analysis reveals that profitability levels vary significantly with changes in pricing of the mobile broadband service (see Figure 5).

**Figure 5: Impact of Pricing on Net Profits (%) for 1GB usage per month, Sample European Operator, 2009-2012E<sup>27</sup>**



Source: Capgemini TME Lab Analysis based on broker reports; Regulatory websites (Ofcom); Company websites

Congestion-based or time-based pricing could offer relief to mobile operators in the medium-term by optimizing capacity usage. For instance, Vodacom Tanzania has installed systems that help it to implement dynamic tariffing, by identifying under utilized areas of the network in real-time<sup>28</sup>. Such visibility on network usage allowed Vodacom to offer discounts to users in off-peak periods and in uncongested areas.

<sup>27</sup> Prices pre-Value Added Tax.

<sup>28</sup> Telephony Online, *Uncapping data: Vendors explore alternatives to mobile Internet quotas*, April 2009.

Operators will also need to actively consider traffic shaping as a viable solution towards managing network traffic. In the US, it is estimated that 2% of mobile broadband users account for over 50% of data consumption<sup>29</sup>. Operators, are hence looking for solutions to work around this challenge. For instance, T-Mobile's web'n'walk package offers mobile broadband services on best-effort basis and reserves the right to slow down speeds of the consumer in case they are using data-intensive applications such as VoIP (Voice Over Internet Protocol)<sup>30</sup>. Similarly, mobile operator Maxis in Malaysia discourages use of bandwidth-intensive applications by retaining the right to terminate the connection on identifying usage of applications such as peer-to-peer file transfer<sup>31</sup>.

By reducing the priority assigned by the network to non-delay sensitive, albeit bandwidth-intensive applications such as peer-to-peer transfers, bulk file transfers and network storage-related transfers, mobile operators can ensure that they offer a higher quality of service for users of delay-sensitive applications such as email, IM and office applications, and for regular browsing.

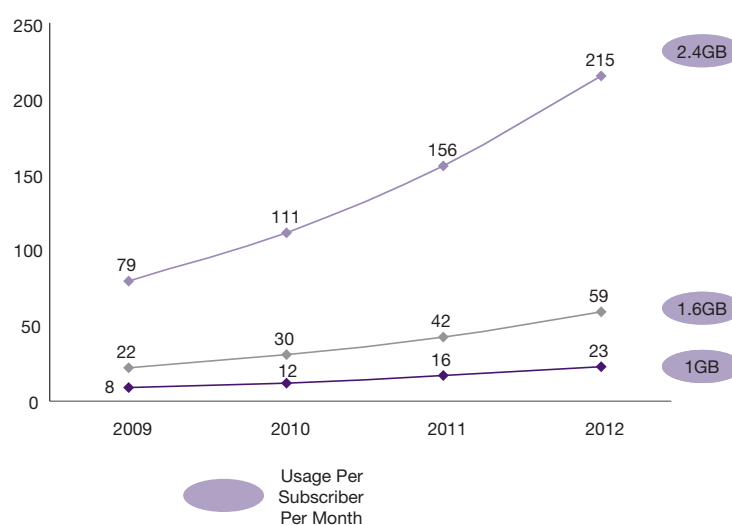
The biggest challenge to implementation of traffic shaping measures is the potential negative backlash from consumers who have thus far been used to unlimited and unrestricted data. In this context, operators are looking to implement measures that achieve their objective of curbing excess usage without antagonizing the customers. For instance, Vodafone Hungary is attempting to build a system that will reduce throughputs of heavy users to 2G speeds at peak periods, whilst continuing to offer 3G speeds during off-peak hours<sup>32</sup>.

### Invest in Enhancing Quality of Services

#### *Invest in Cost-Effective Backhaul Capacity*

Our analysis of likely CAPEX to be incurred indicates a significant need for investment in upgrading infrastructure, to cope with the corresponding rise in data usage. Our analysis shows that CAPEX requirements could more than triple for a rise in data usage from 1.6GB to 2.4GB per month per subscriber (see Figure 6).

**Figure 6: Impact on Incremental CAPEX for Varying Data Usage (€m), Sample European Operator, 2009-2012E**



Note: CAPEX does not take into account sunk costs in setting up a 3G network and spectrum costs

<sup>29</sup> Tech Radar, *Traffic shaping comes to mobile networks*, February 2009.

<sup>30</sup> T-Mobile website.

<sup>31</sup> Maxis website.

<sup>32</sup> Telephony Online, *Vodafone tries "soft caps" on mobile broadband usage*, January 2009.

Currently, across Europe, most operators typically lease a significant amount of their backhaul requirements from third-party providers. It is estimated that while microwave backhaul, which usually comprises 65% of overall backhaul, is self-owned, the remaining 35% of leased capacity contributes to over 65% of the transmission OPEX<sup>33</sup>. With rapid increase in backhaul capacity driven by network upgrades, most operators are caught in a situation where their increasing share of payouts to backhaul owners are driving down their current margins. Moreover, the majority of leased lines currently are T1/E1<sup>34</sup> lines that are not future proof. With a rapid rise in data usage in mobile broadband services, mobile operators will need to upgrade their backhaul capacities, and invest in a judicious mix of solutions built around fiber, microwave and leased lines.

Network sharing also offers a compelling proposition for mobile operators, as evidenced by the recent announcements from major UK operators. Operators see scope for significant savings by pooling assets and sharing backhaul. For instance, T-Mobile and 3 UK, through their joint venture company MBNL (Mobile Broadband Networks Limited), have recently signed a five-year agreement with BT Wholesale for sharing backhaul jointly<sup>35</sup>.

### ***Improvement of In-building Coverage***

Mobile broadband faces a key challenge in competing with fixed broadband services inside the home. For instance, in the UK, over 75% of mobile broadband users access the service using their dongle while at home<sup>36</sup>. Similarly, in a trial conducted by Telecom Italia Mobile, over 48% of the participants used data services at home<sup>37</sup>. Such usage patterns strengthen the case for deployment of femtocells<sup>38</sup>, a technological alternative to investing in expensive base stations. Moreover, the economics of deploying femtocells makes for a compelling proposition. It is estimated that marginal cost per GB of data on a femtocell is only US\$2.4 as opposed to US\$9.5 for expanding a HSPA network in a capacity-constrained area<sup>39</sup>.

Femtocells also allow mobile traffic at home to be off-loaded from the macro network. This helps mobile operators to not only enhance in-building coverage, but also reduce the load on their network. Analyst and industry estimates indicate that femtocells can help operators gain significant savings on external radio access network upgrades (see Figure 7).

Given this backdrop, multiple operators around the world have begun to offer femtocells to consumers looking for enhanced coverage. In the US, Sprint has already made commercially available its femtocell offering, Airave<sup>40</sup>, while rival AT&T is likely to introduce its competing offer in 2009. Sprint's offer includes a standalone femtocell priced at US\$100, and fixed monthly fees of US\$5 as enhanced coverage charges. Sprint also offers optional add-ons where unlimited calling can be activated for single (US\$10) or multiple lines(US\$20)<sup>41</sup>. In Europe, operators such as Vodafone and Telefónica are trialing the product ahead of commercial launches<sup>42</sup>.

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33 Analysys Mason, *Outsourcing and network sharing: Key considerations to solve the backhaul challenge*.

34 T1 and E1 are protocols used in transmission lines that enables channel capacities of 1.5Mbps/2Mbps per line.

35 Fierce Wireless, *T-Mobile and 3UK sign joint backhaul deal*, October 2008.

36 Ofcom, *Communications Market Review*, August 2008.

37 Telecom Italia Mobile Presentation at Mobile World Congress, 2009.

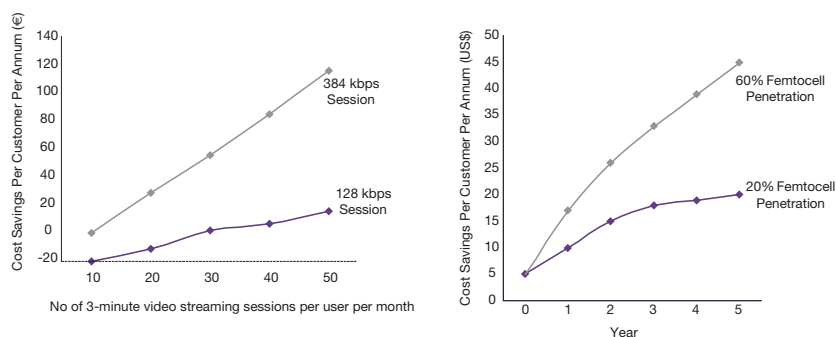
38 A femtocell is a small cellular base station, typically designed for use in residential or small business environments.

39 Femto Forum, *Femto Cell Business Case*, April 2009.

40 Fierce Wireless, *Sprint goes nationwide with Airave femtocell*, July 2008.

41 Sprint website.

42 Wall Street Journal, *House Calls*, February 2009.

**Figure 7: Impact of Increased Usage on MBB EBIT (%), Sample European Operator, 2009-2012E**

Source: Capgemini TME Lab Analysis based on analyst reports; Regulatory websites (Ofcom); Company websites

### Target Customers through Focused Pricing Plans

Operators will need to create and position mobile broadband offerings targeted at various user segments so as to optimize network utilization, while improving uptake.

High usage consumers are attracted towards plans that incorporate larger data limits, and limited overuse charges. Such consumers are likely to pay a premium price for the enhanced data limits. Estimates indicate that high usage consumers typically generate up to 100% more ARPU than light users<sup>43</sup>. Given this usage-based-pricing scenario, operators will need to ensure that they build plans customized for monetizing the bandwidth requirements of such consumers. Some operators have recognized these inherent characteristics of high data users and have accordingly launched plans that cater to them. For instance, in the UK, 3 has plans that offer up to 15GB for high usage consumers, while its lower end plans for light users typically offer 1-3GB. Similarly, in Poland, Orange offers a premium service allowing 14GB priced at €33 while its lowest offer is priced at €13 for 1GB of usage<sup>44</sup>. Operators will need to continuously monitor the needs of high bandwidth users based on emerging applications, and accordingly price the service thereby attracting such users.

Low usage consumers typically approach mobile broadband from a utilitarian use case. These consumers are concerned with connectivity whilst being mobile. Consequently, their requirements are for plans which are not expensive, yet offer them the required bandwidth. Operators need to approach these consumers with pay-as-you-go plans or low-priced contracts. In the UK, for instance, most entry-level plans are priced at £10-£20 and offer 1-3GB of data downloads. Similarly, pay-as-you-go plans will need to be priced at a level where fixed broadband users are encouraged to try mobile broadband services. In the UK, O2 offers prepaid plans priced at £2 for 0.5GB of usage for one day<sup>45</sup>.

43 Ecommerce Times, *What's Lighting the Fire Under Mobile Broadband?* January 2009.  
44 & 45 Company websites.

Operators will need to ensure that they create a compelling value proposition aimed at light users in order to encourage uptake. They should strive to encourage light users to migrate to heavier tiers. This can be achieved by bundling attractive netbooks, thereby retaining the customer for extended contracts and with higher ARPUs. Such consumers can also be targeted through bundled services that offer both fixed and mobile broadband access. In the UK, fixed-line operator, BT, launched its mobile broadband service (as an MVNO<sup>46</sup>) targeting these very consumers. The operator has started to bundle 1GB of free mobile broadband usage for its fixed-line broadband consumers who sign-up for the offer, after paying a one-off charge for the dongle<sup>47</sup>. Initiatives such as bundling and up-selling will help in encouraging light users to upgrade to higher price-tiers.

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<sup>46</sup> Mobile Network Virtual Operator.

<sup>47</sup> Mobile Today, *BT launches 'cheapest mobile broadband' package*, April 2009.

## 5 Conclusion

### **Femtocells offer a compelling case for enhancing in-building coverage and off-loading data traffic from the wireless network**

In conclusion, both incumbent mobile operators and challengers will need to have a clear roadmap for improving profitability and quality of mobile broadband services.

Market leaders will need to prioritize their initiatives around traffic shaping and managing capacity. Having gained a lead in the market, these players will now need to ensure that the rising usage of the data services does not lead to a capacity crunch thereby impacting the quality of their services. In this context, market leaders will need to ensure that they take effective actions at securing backhaul and enhancing in-building coverage.

Market challengers, on the other hand, need to rapidly scale up, or they could be left behind by the market leader. Consequently, they are under significant pressure to increase market share through price discounts. However, rapid price cuts, coupled with rising usage, are creating a profitability barrier for these operators. Challengers will need to make sure they deploy differential pricing tactics so as to sign-on customers of all usage patterns and simultaneously ensure that their pricing builds on profitability.

Network operators will need to look at enhancing the value proposition out of their fixed-line services by considering bundled mobile broadband services. They will need to leverage on the strength of their network inside the home, however they will also need to build services that allow consumers the freedom of accessing broadband in all use cases. Consequently, fixed operators can consider becoming an MVNO or collaborate with challengers in the mobile broadband market to deliver a bundled offering.

## About the Authors

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