# Shifting the supply axis: The road to 4G

Revenues from mobile broadband services are expected to double over the next five years, but operators face challenges in capturing this value. They need to resolve the substantial capacity constraints, while overcoming profitability issues in their current pricing structures.

Although the telecommunications market in Western Europe has begun to stagnate after decades of growth, mobile data (including mobile broadband and smartphones), is seeing huge expansion. Research reveals staggering but realistic growth expectations in mobile data with revenues doubling between now and 2014, even in the most mature markets (Exhibit 1).

Even though mobile broadband, smartphone penetration, and data usage vary across countries, a common conundrum remains: no operator has yet managed to shift business models to monetize mobile data consistently across their customer base. On the contrary, many already face profitability challenges, particularly in covering network costs. What is the key to mastering this new mobile data wave of huge proportions?

## The challenge in monetizing mobile data

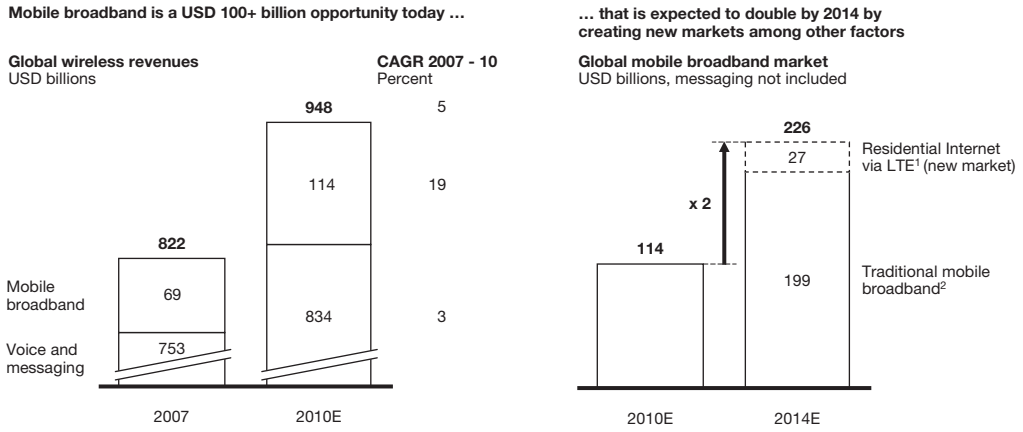
While most operators are managing to grow their top line with mobile data, there is a treacherous undercurrent. Mobile data ARPUs are not delivering the same EBITDA margins as voice: a significant share of customers are unprofitable. This is because mobile data offers are mainly structured around bundled plans – and the prices of these are decreasing at a rate of 60 percent p.a. on average. Plus, individual users can put a huge strain on the network. Sometimes 10 percent are responsible for 50 percent of the network data traffic – without contributing one cent more in revenues. As a result, actual revenues per megabyte are decreasing at around 50 percent p.a. – a trend expected to continue over the next few years if radical action is not taken soon.

This revenue decline is partially compensated by a decrease in the average cost per megabyte of around 32 percent p.a. But this is not enough. Calculations based on network costs show that margins are under great pressure, with some 20 to 30 percent of customers already generating losses.

The first step for mobile network operators (MNOs) is to ensure that their sales and marketing teams understand the actual cost of handling their mobile data traffic. They then need to run simulations to assess current and future costs with a full and incremental costing approach to go beyond average cost per gigabyte and understand the cost difference between regions and times of day in order to manage these proactively. Using this as the cornerstone for their decisions, they should then – as a stop-gap – put in place all possible levers to monetize their scarce 3G network resources.

This implies a new mindset, linking the price paid by customers to the costs operators actually incur, including increasing the price per megabyte or subscriber where this is justified. Such demand realignment is a natural development that every operator will be forced to make to profitably capture this opportunity. The speed at which these price adjustments can be imple-

## 01 Already a pivotal growth engine, mobile broadband will double in size by 2014 to generate almost 20% of operator revenues




1 Servicing residential Internet needs by mobile broadband via LTE
2 Smartphones and datacards

SOURCE: Yankee Group; Merrill Lynch Wireless Matrix, Q1 2010; Morgan Stanley, December 2009; Credit Suisse; McKinsey

mented depends on the local competitive dynamics. On top of this profitability challenge, a more fundamental issue for operators will be to restructure their supply axis.

### The challenge in keeping up with demand

For twenty years, telcos have been driven by the need to fill their vast capacity – price was not the major issue. Market mechanics have now changed. The shift to a supply-constrained market means operators need to adapt their business models. They have no choice but to rethink their DNA to maximize the value of their mobile data operations.

Capacity is rapidly becoming a scare resource. The total number of users coupled with a rise in the average traffic per user is driving this trend. Data applications are far heavier to carry on the network than voice or SMS: five minutes of video require 40 MB of capacity versus five minutes of voice at only 0.5 MB. Bundle usage in megabyte per month is increasing at a rate of 35 percent p.a. – and mobile data can also be peakier than voice traffic, creating the potential for poor voice quality, disconnections, and even network crashes.

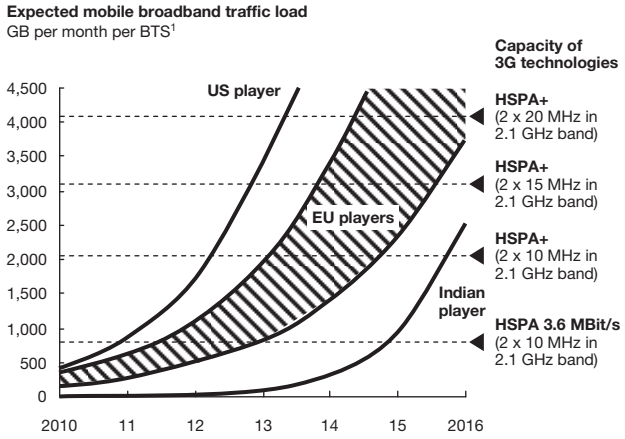
Compounding the situation, growing mobile datacard and smartphone usage and penetration are driving data traffic on mobile networks to almost double every year. This means substantial network congestion in hotspots will emerge on the current network in the next one to three years, with potential to dramatically impact the customer experience. Network technologies currently deployed cannot keep up with this demand growth; MNOs will need to significantly upgrade their networks very soon, though exact timing will be very different in each market and for each operator (Exhibit 2).

### Short term: Ease congestion; delay investment

Operators first need to develop deep insights into the changing supply constraints and the drivers behind them. This includes investigating their network's total maximum capacity over the next few years to foresee where saturation could occur. They should then increase capacity in saturated areas in the near term wherever they can. How they do so will vary by operator, their region, and the spectrum they already have. What operators do have in common, however, is that they should do their utmost to increase capacity and reduce average cost per megabyte along the following two levers.

Offload traffic. Operators need to see their network globally, as one made up of multiple technologies that can be intelligently leveraged together: mobile, fixed,

## 02 Operators will need to counter capacity constraints with LTE rollouts, albeit at different points in time




**Key drivers for mobile traffic growth and urgency of LTE migration**

- Current mobile broadband and smartphone penetration
- Average usage per user and application of fair use policies
- 3G network technology footprint and spectrum allocation
- Network topography and population density
- Local content and service proliferation on mobile broadband

1 Base transceiver stations within existing 3G network footprint

SOURCE: McKinsey

OUTSIDE-IN ESTIMATES

Wi-Fi, and potentially femtocells. Wherever there is a capacity issue, they should urgently develop workarounds to offload mobile traffic to other network components – whether fixed (onto DSL) or Wi-Fi. Estimates based on the experience of several operators suggest that between 5 and 20 percent of total radio-access network traffic can be offloaded to Wi-Fi hotspots.

Improve the technology mix. Another partial solution is to roll out the latest 3G/HSPA technology. By doing so, operators can rapidly accommodate more traffic. This needs to be implemented both at the network layer level (base transceiver station upgrades), but even more importantly at the customer device level by upgrading handsets or dongles – which will require more time.

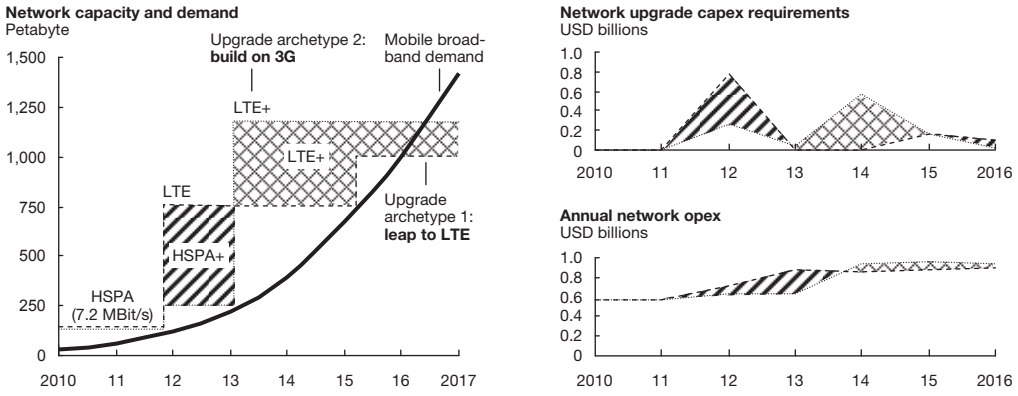
### Medium term: Traversing the hard but crucial road to 4G

The medium-term solution entails a major network upgrade with additional spectrum and LTE deployment. New network technology generations such as HSPA+ or LTE could more than halve the cost per gigabyte with their increased capacity per site, relieving network capacity constraints. HSPA+ and LTE are expected to support three to five times as much traffic as HSPA (7.2 MBit/s) with the same spectrum, reducing cost per gigabyte by 40 to 70 percent compared with the currently implemented network.

LTE rollout costs could be much lower than UMTS since major network elements already in place can be leveraged. In the long run, network operations will also become simpler thanks to the full-IP network architecture. LTE can even enhance the customer's mobile broadband experience, creating new revenue opportunities from upgrading the existing service promise. This could have clear upsides for mobile data ARPUs from existing customers, but both the promise and customer willingness to pay for it will need to be proven in concrete terms.

LTE provides higher broadband speeds (both download and upload) at a level comparable to ADSL2+. It can go even further to improve broadband connection stability and security, while reducing latency and connection times to enhance the user experience for applications like video telephony, online gaming, and video on demand. LTE is expected to become the most relevant official 4G standard. Over 126 carriers worldwide already endorse LTE. Six deployments are currently underway. Still, short-term challenges for LTE do remain. For example, handsets are not widely available, voice protocols are only now being standardized, and LTE dongles are still rather expensive.

# 03 Upgrade paths have very different cash profiles and offer operators a key strategic choice




SOURCE: McKinsey

ILLUSTRATIVE

For these reasons, the migration path to LTE requires MNOs to make complex trade-offs, e.g., between costly spectrum acquisition and substantial investments in network infrastructure with no proven case of revenue upside. MNOs should decide on the strategic network upgrade path (including HSPA+, LTE, and LTE+) that will most favorably impact both their long-term mobile broadband strategy and their cash profile. Progressing along the network upgrade path will require additional capex of up to twice that of the current 3G network's opex level and could drive up network opex by 30 to 40 percent for some players by 2015.

With spectrum auctions taking place in most European countries over the next two years, MNOs need to make firm decisions on their long-term mobile broadband strategy. They must specify their spectrum needs and reservation prices for the different spectrum bands available, given the different competitive strategy options they could pursue.

Deciding between a range of strategy archetypes. To optimize their mobile broadband business, MNOs should design their own tailored strategy somewhere between two extreme strategy archetypes (Exhibit 3). The first is a "leap to LTE" rollout strategy – where operators aggressively pursue LTE now. Players who will be drawn toward this strategy will likely include large operators with significant mobile broadband and smartphone market share, players aspiring to technology leadership positioning, or operators with inadequate 3G spectrum allocation. A more gradual rollout building on 3G – where operators maximize their HSPA capacity and delay LTE investments in the short to medium term – will be more relevant for smaller operators with attacker or a value-for-money positioning. The right choice depends on multiple parameters that MNOs need to explore immediately, such as spectrum and current footprint.

Detailing two key areas to drive the right choices. Every MNO should flesh out key phases along the upgrade path to help them reach decisions on their optimal long-term mobile broadband technology strategy.

- Spectrum and technology upgrade path. Operators need to decide on the succession of technology upgrades that will fit their current data strategy and market characteristics. What is the expected demand growth in their market? What will customers be willing to pay for mobile broadband services in the future? What is the operator's strategic positioning? Does the company already have a dominant technology and service position, or is it a value-for-money price leader? What is the spectrum applica-

tion plan and spectrum auction positioning in their arena, including reservation prices? And what technology succession in spectrum bands will align best with the expected demand development?

- Tactical implementation and timing. Only optimal tactical pacing within the overall mobile broadband strategy will ensure success and optimize the road to 4G business case. MNOs need to focus on topics such as regional rollout priorities, fixed substitution propositions, and further capacity extension strategies. For instance, refarming 1,800 MHz 2G spectrum could be a viable strategy to build additional LTE capacity networks, but this requires advance planning. Partnering opportunities could offer operators great value creation potential as well. Those operators that pool spectrum based on network-sharing agreements will reap a significant cost-to-serve advantage.

Both of these levers are highly dependent on the regulatory environment (auction timing and rules, coverage obligations, and refarming stipulations). Shaping the optimal upgrade strategy therefore requires cross-disciplinary collaboration with marketing, network, and regulation departments working closely together.

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The new mobile landscape calls for a radical mindset shift: no longer is the issue inadequate demand, supply has now become the stumbling block. As simple, flat-rate mobile broadband propositions challenge operator profitability, severe supply congestion looms on the horizon with no silver-bullet solution in sight. As each telco tailors its network upgrade strategy to the many facets of its market situation, getting the timing right for both decisions and investments will prove crucial. Operators who will prosper in this new data-centric world will be those who act simultaneously on marketing and network levers as they traverse the financially difficult but inevitable road to 4G.


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