

Mobile Broadband

Ensuring sustainable profitability

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The year 2007 represented a breakthrough for the mobile broadband industry. For the first time since the advent of mobile broadband technology operators have succeeded in tapping into significant new revenue streams as broadband subscriber growth has been nearly explosive across developed markets. But a number of significant challenges still need to be addressed if operators are to sustain a profitable mobile broadband business. Network capacity upgrades for accommodating the sharp increases in data traffic could cost several hundred Euros per broadband subscriber in CAPEX alone, and expansions of network capacity will depend strongly on usage patterns that are not easily predicted as well as the intended quality of service. Other key cost elements are the traffic-dependent software license fees imposed by equipment vendors, and these may well become dominant as data traffic increases. The most effective way of managing the mobile broadband business and securing sustainable profitability is to identify and control expenditure drivers by developing a comprehensive techno-economic business model.

Facing the new mobile broadband challenge

Mobile broadband traffic is today growing at an almost explosive rate. UMTS with HSPA appears finally on the way to fulfil its long awaited promise, and in the meantime analysts are predicting a bright future for 3GPP LTE as well as other future technologies, such as WiMAX.

With mobile broadband technology becoming increasingly mature, many mobile-only operators are aggressively targeting traditional fixed broadband markets, aiming at increased fixed to mobile substitution.

While 2G technologies are readily understood, mobile broadband and the host of associated technologies require a new business approach and entirely new technical skills. The mobile broadband business differs fundamentally from standard voice and messaging, and this presents a new challenge to many operators.

For example: broadband usage patterns are radically different than those of voice and can be unpredictable. The impact of broadband usage on network infrastructure and quality of service – and vice versa – needs to be mapped out, as do capital and operational expenditures. Short and medium term targets need to be aligned with strategic goals to ensure bottom-line results, and – not least – to sharpen the broadband operator's competitive edge.

So how do you approach the new mobile broadband opportunity and face up to new challenges? Omnitele believes that the only effective solution is to build a comprehensive techno-economic model, which can act as the central management tool for making the right tactical and strategic business decisions.

What pricing scheme should be used? How do potential bottlenecks in the infrastructure affect the quality of experience? How much do I need to invest and when? What are the incremental costs per user of introducing a mobile broadband service? Will broadband degrade the voice service? What's the bottom line?

The interdependence of a broad range of commercial and technical factors is likely to affect your mobile

broadband business in unpredictable ways. This means that answers to these questions are complex and directly linked to the market and technical environments of the given mobile operator.

Omnitele's industry-leading mobile broadband consulting service answers these and many other key questions. It is a critical aid in transforming the challenges of the mobile broadband business opportunity into bottom-line success.

The Omnitele techno-economic modelling approach

Using a complete broadband business model developed by mobile industry experts is tantamount to applying decades of industry-leading mobile management experience to your business opportunity. The model can, with sufficient accuracy, predict the complex interplay of a variety of factors – such as technical bottlenecks versus user quality impact and/or revenue reductions – that are otherwise usually analyzed on the fly or even sometimes omitted. The modelling approach quantifies your business opportunity and reduces your business risks.

Seven steps to a successful mobile broadband business

Step 1 – Market sizing & segmentation is key

Understanding and quantifying a mobile broadband market is key and always the starting point of the business model. There is a great deal of variation between the markets of various countries – for example between countries in emerging and mature markets – and these can be described and predicted through careful research and proven prediction models.

Basic figures include penetration rates, market shares, and effective user segmentation strategies. The latter is a reflection of strategic thinking and can only be done through careful market study coupled with strong local understanding. Other critical factors are the level of fixed broadband penetration, analysis of competitive services, possible new market entrants, and more.

As none of this constitutes an exact science, confidence bands should accompany baseline numbers. This allows for sensitivity analysis, such as plotting changes in the return on investment against changes in market data & forecasts.

Mobile broadband market data is compiled from reputable and reliable industry sources, and can be modified to reflect operator experience as well as real user segmentation data if available.

Step 2 – Defining quality of service targets

Creating a portfolio of end-user services is only the beginning. While these on a high level define the types of services offered, they say little about the service quality experienced by the end user.

While QoS for voice and messaging are readily understood and relatively easy to quantify, mobile broadband requires a new view of what quality of service means. Also, the QoS target for a mobile broadband network has a heavy impact on infrastructure CAPEX, and is one of the few key competitive factors fully under the control of the mobile operator.

Analyzing the techno-economic trade-offs between QoS and infrastructure CAPEX is thus a fundamental issue for mobile operators, and can only be properly analyzed by using relevant tools capable of linking the two.

QoS targets should be adjusted to the market positioning

One step up from QoS – and more user-centric – is the concept of Quality of Experience. This is an estimated measure of the complete user experience and can be derived from a number of user quality parameters.

As an example an operator may want to offer a minimum downlink data rate of 1 Mbps for 95% of active subscribers in the busy hour, or a maximum of 5 second average web page download time for 90% of the sessions. Such a QoS metric and its target value will depend greatly on the positioning of the service and the competitive environment.

If the mobile broadband service offered is for consumers, and if target segments are mainly basic Internet users, the operator may want to relax the throughput requirements and launch a smooth web browsing service. This can be achieved at a bandwidth much lower than nominal data speeds of HSDPA technology, in turn reducing the equipment and operational expenditure per user.

If on the other hand the aim is to attract high-end corporate customers, the operator should be aware that some corporate clients are likely to measure throughput rates during the supplier selection process. In this case the business potential of acquiring the high-value customers may justify the additional cost of more stringent QoS targets.

Step 3 – Developing a detailed model of network costs & drivers

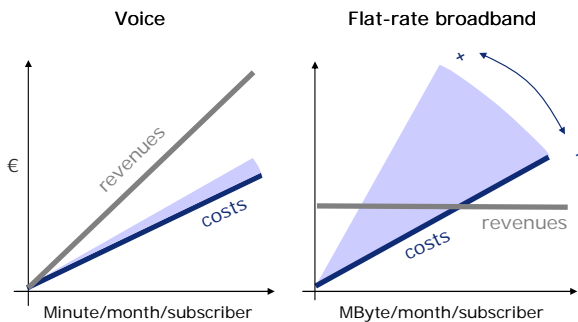
Competing with fixed broadband service providers can be a risky business proposition for mobile broadband operators. The average data volumes of a typical customer with a flat-rate mobile broadband subscription can reach fixed broadband levels – and this can mean

several gigabytes of data traffic per user per month. The end result can be very high levels of CAPEX and OPEX.

While network costs for voice services are relatively simple to estimate, the cost of providing incremental capacity for a mobile broadband subscriber is highly sensitive to the details of the network layers.

Incremental costs will depend on factors such as the structure of the network, the technologies used, the network vendor's software and hardware prices, the daily traffic profile, the geographical distribution of traffic, and the target QoS requirement.

Usage-related network costs



The network costs for flat-rate broadband can easily exceed revenues if not carefully controlled

Omnitele has solid industry experience in analysing cost structures for mobile broadband operators. In many cases the incremental CAPEX required to accommodate a single flat-rate mobile broadband subscriber can reach several hundred Euros.

With typical subscription fees of €20-€30 per month, this means that it may take over a year to pay back the network capacity investments required for the newly acquired customers.

When the fixed CAPEX of coverage deployment is included – as well as fixed and variable OPEX components – the overall payback time for a mobile broadband network could be as much as 5 years. Negotiating the right equipment prices and software license fees is extremely important for the business case, as these will have a direct impact on the bottom line. By employing a business modelling approach and obtaining clear results – such as in the example above –

the operator is in a position to extract the most competitive pricing from the vendors.

CAPEX breakdown as the traffic increases

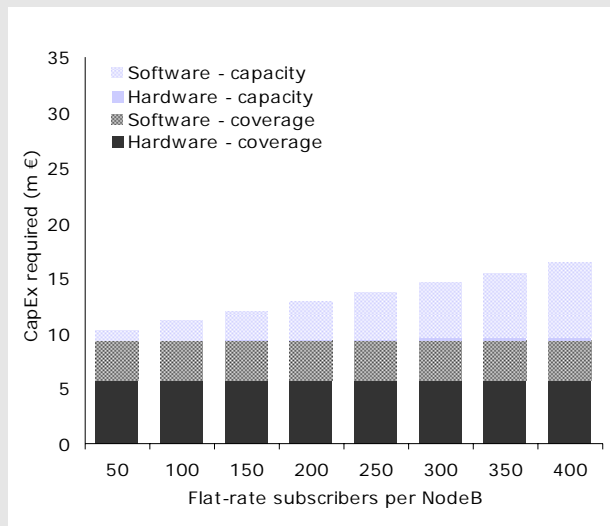
A large part of capacity-related network costs include hardware and software components for the radio access network.

These costs depend on the pricing strategy of the chosen network equipment vendor, since some vendors have chosen to charge capacity-related fees on base station level, while others base prices on total RNC throughput.

The chart below shows the relative radio access network CAPEX requirement for mobile broadband coverage and capacity as a function of the average number of subscribers served by each UMTS base station of a certain size radio access network.

The calculation is based on typical software and hardware vendor list prices. The underlying traffic model uses 1GB/month/subscriber on average.

Results show that the costs of providing the adequate capacity to support additional mobile broadband subscribers are significant. It also shows that software license fees may outweigh hardware costs.



Step 4 – Establishing the loop between commercial and technical departments

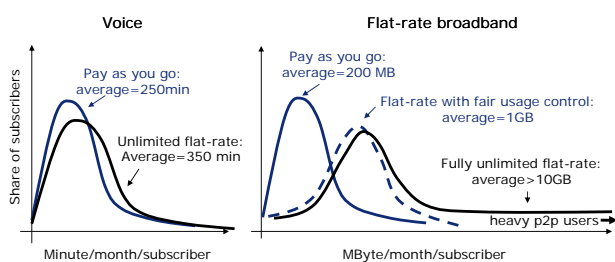
Most mobile operators have solid understanding of the GSM business and a great deal of experience with 2G infrastructure and its associated costs.

2G network costs are relatively straightforward to model and are fairly independent of the service offering. This allows for marketing experts to apply predetermined and constant per minute cost figures when developing the business case for a new service or a promotional campaign. In 2G it is therefore often not necessary to perform a detailed analysis of the impact on network cost.

In contrast, mobile broadband network costs depend greatly on the detailed definition of the broadband service that an operator wishes to market and launch. This makes it critically important to involve network technology experts in the business strategy and planning process.

Another important issue is the great variation in mobile broadband usage patterns. Variations (such as those illustrated in the figure below) are a fundamental characteristic of broadband usage and represent a type of user behaviour not seen for voice services.

Variations in mobile broadband traffic distribution



Voice service requires physical activity, limiting the typical range of monthly usage. In contrast, some broadband applications can generate data traffic without the user being active at all (e.g. a computer running a file sharing program over night). This can have a dramatic effect on usage levels if not carefully controlled by the operator (the figure is an illustration).

Even for flat rate voice services – meaning all-you-can-talk packages for a single monthly fee – only very few

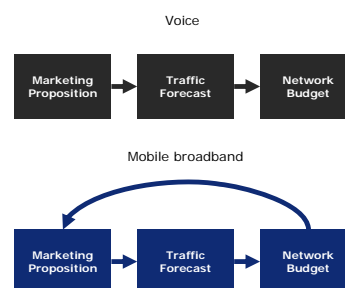
subscribers will generate extreme amounts of traffic. In contrast, an unlimited mobile broadband package is likely to attract many heavy users, loading the network with up to a hundred times more traffic than the average user. The costs of scaling network capacity to meet such extreme demands would likely undermine the business case for the entire service.

To minimise this risk, it is essential to control unprofitable usage levels. Such control may consist of a clearly communicated usage cap on the monthly package or a restriction on allowed application types (e.g. banning bandwidth hungry peer-to-peer file sharing applications).

Some operators have even chosen to introduce active methods of control such as throttling back on data speeds once a certain amount data has been consumed. The most advanced control measures include active traffic shaping and de-prioritisation of data-hungry application types (which typically include peer-to-peer file sharing). Regardless of method chosen a thorough impact assessment is required and the most effective solution can only be found through close cooperation between commercial and technical experts.

Put even more simply: it is important to create a feedback loop between the marketing and technology aspects of the business.

Linking marketing & technology



A voice network can be designed directly from traffic forecasts. On the contrary, effective design of mobile broadband networks requires a feedback loop between the commercial and technical aspects of the new service.

Omnitele's comprehensive techno-economic modelling approach provides exactly this link, and allows operators

to establish this process before making strategic decisions on network investments.

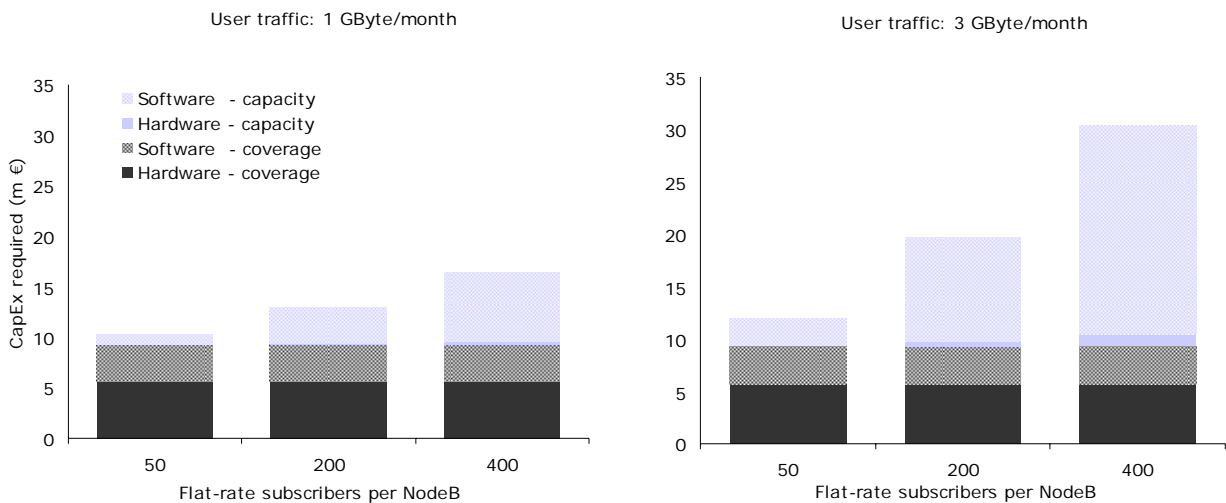
Step 5 – Estimating risks by sensitivity analysis

In GSM the results of a promotional campaign or a new service can be relatively easily predicted. The elasticity of usage versus the retail price can be estimated based on past experience. In contrast mobile broadband is for many an entirely new business opportunity and few operators can rely on previous experience or find accurate research data.

For example: for flat-rate data services it is challenging to predict how the average usage per subscriber will develop. If assumptions and input data are wrong, the business could in the worst case operate at a loss.

The chart below illustrates the effect of increasing the average usage per subscriber by the factor of three. The Omnitele business modelling approach allows operators to analyze “what if” scenarios – like the one exemplified above – nearly on the fly by simply changing basic input parameters. This gives managers and executives the power to fully understand and quantify the mobile broadband opportunity and accurately assess and reduce risks.

Software license fees cause sharp rise in CAPEX



The conceptual example above shows what happens with CAPEX when the usage per subscriber is increased by a factor of three. The dramatic increase in CAPEX demonstrates that it is critical to understand the worst and best case scenarios and their financial implications before making any network investment decision.

Step 6 – Extending the scope of the broadband business case

In practice it may often not be possible to justify mobile broadband network investments on the basis of a single service type, such as a simple “bit-pipe” data connectivity service. New broadband operators should therefore take into account the revenue and cost impact of other services, such as video streaming or full track music download.

Complex scenarios of mobile broadband

Service types	Bit-pipe connectivity	Content (e.g. video on demand)	voice		
Technology	GPRS/EDGE	HSPA	HSPA+	LTE	WiMax
Network operation mode	Own network	Shared network	National roaming	MVNO	
Market sizing	Forecasting number of subscribers per service	Forecasting usage per subscriber per service			
Revenue factors	Direct revenues from mobile broadband services	Indirect revenues due to increased voice customer base	Data roaming revenues (inbound & outbound)	Negative impact on inbound roaming revenues	
Cost saving factors considered	Saving 2G capacity investments due to voice traffic offload	Saving 2G network OpEx by switching off GSM layer			
Network layers considered	UTRAN OpEx & CapEx	Transmission OpEx & CapEx	Core OpEx & CapEx	Internet gateway OpEx & CapEx	Service Platform OpEx & CapEx
Network cost types	Incremental (variable) capacity cost of adding subscribers	Fixed cost of providing/ extending coverage with base capacity			
Non-network costs	Terminal subsidies	Marketing activities (ATL & BTL)	Sales commissions	Headcount impact	
Sensitivities	Changing QoS targets	Changing usage	Changing subscriber base	Changing network pricing	

A mobile broadband operator may face nearly any combination of the above scenarios. The Omnitele techno-economic modelling approach and associated consultancy services give operators the power to effectively address and analyse the matrix of key issues above.

An aid in justifying the mobile broadband business case could also be the potential savings obtained by migrating GSM voice traffic to a 3G network. In Finland, for

example, operators are already considering shutting down GSM networks based on the availability of more cost efficient UMTS 900MHz technology. Such a strategy could save much of the OPEX associated with operating two radio networks.

Another important element – especially in mature markets – is that the lack of adequate 3G coverage and services may discourage potential users and thus limit mobile voice revenues. The trend is already evident in the case of corporate customers, for whom extensive UMTS coverage is a stringent requirement when choosing a preferred telecommunications service provider.

The complexity of the business plan further increases if more than one technology or alternative ways of saving network costs – such as network sharing – need to be considered in the overall analysis.

Depending on the actual situation of the operator and its market, the scope of the exercise can range from some to all elements highlighted in the diagram on the left.

Step 7 – Preparing for a changing landscape

An important learning of the unexpected success of mobile broadband is that operators should prepare for developments in the competitive environment as well as changes in subscriber behaviour.

For example: in the battle for the broadband customers more and more mobile operators have begun adjusting pricing schemes to those of fixed broadband, i.e. flat-rate, or all-you-can-eat packages.

At the same time there is a growing opinion in the industry that even fixed broadband operators may not be able to sustain flat rate pricing schemes in the long run as exponentially growing data usage is becoming a serious risk to profitability.

It is still difficult to predict whether a paradigm shift in fixed broadband pricing will happen giving way to usage-based tariffs. But if it happens, mobile operators will need to revise pricing strategies.

A similar observation can be made regarding rules and regulations employed by operators to restrict bandwidth-hungry peer-to-peer file sharing applications. Operators are today relatively constrained in limiting such extreme usage. Changes in legislation could have an effect on permitted data traffic and in turn affect the profitability of flat-rate broadband services.

Another uncertainty is the future uptake of premium content services such as video streaming or full track music download. Currently the popularity of these services is moderate but changes in the market are not unlikely to occur.

The application of a detailed business model is an effective way of understanding the impact of such changes. Once a techno-economic modelling framework has been developed, it is relatively easy to adapt this to reflect the latest developments in the industry and new market conditions.

About Omnitele

Omnitele bridges the gap between business and technology. With 20 years of telecommunications industry experience our management consulting services are designed to transform new business opportunities into success.

For more about Omnitele, visit our web site at www.omnitele.fi.

For more about our mobile broadband business modelling services, contact the authors of this article:

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