

Mobile Broadband Profitability

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Business case modelling shows that the Mobile Broadband (MBB) business in the Hungarian market for the market player Pannon has a payback time of seven – eight years and the NPV (Net Present Value) is positive after nine years, excluding initial 3G licence fee. The profitability curve is more or less on the same level as for the 2G/voice business in Pannon, reflecting the CAPEX intensiveness of the MBB business based on 3G/HSPA.

The most important sensitivities for achieving a profitable MBB business are ARPU and customer uptake. Thus, short-term actions should focus on rapid market penetration of MBB access where there is demand with stable price points that ensure product and segment profitability. Further the network costs must be monitored and controlled, both with selected network roll-out & upgrades and traffic management. To reduce risk it is essential to deploy total cost of ownership (TCO) measures to negotiate transparent vendor prices with caps on relevant cost levels to decouple network cost from traffic volume.

Looking at the total mobile business the MBB revenue seems to only offset the decrease in the voice/SMS revenue as this market matures. To ensure revenue growth and profitability for the total mobile business there will be a need to extend the MBB business into personal Internet, probably in a combination of subscriptions across handsets, PCs and other personal devices. This can either be reached by more segmented Internet access offers giving 100% or more population penetration, or by taking a position and get some extra revenue from personal service offering on top of the Internet access.

1 MBB Profitability

The focus for looking at the MBB profitability was initially put on Telenor’s 3G/HSPA business. Telenor’s WiFi (Norway) and WiMax (Norway, Promonte) businesses were considered too low on customer and revenue level to be taken into account. Due to difficulties in extracting the total Nordic costs for 3G and too low customer uptake in the Serbia and Promonte operations, Pannon was used as the main source for calculating the profitability of the MBB business.

Early 2009, Pannon were in the process of deciding on their new business plan for the period 2009-2014,

including actual numbers for the 3G/HSPA business in 2007-2008. Based on this a generic business case model reflecting the Pannon business plan input/output was established.

This business case modelling showed that the MBB business in Pannon had negative cash flow until 2010 and the payback time was seven – eight years. The NPV (Net Present Value) was positive after nine years. This profitability curve was more or less on the same level as for the 2G/voice business in Pannon, reflecting the CAPEX intensiveness of the MBB business based on 3G/HSPA.

The market assumptions for the Pannon business plan in early 2009 were mainly based on market analysis and customer uptake for Internet access on PC. In the autumn 2009 Pannon updated their business plan especially when it came to Internet access on handsets. Further, together with Ericsson, the network traffic was analysed and the network dimensioning and upgrade needs were adjusted. This resulted in a slightly better business case, but the negative cash-flow period, payback time and NPV were all in the same range.

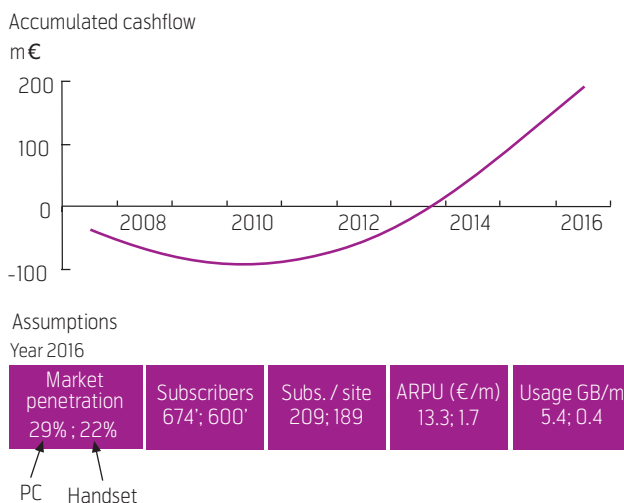


Figure 1 MBB profitability based on Pannon business plan input/output

2 Sensitivity Analysis on KPIs

The generic business case modelling of the Pannon business plan made it possible to establish a set of KPIs and do sensitivity analysis on the main drivers for these KPIs.

2.1 KPIs

The following KPIs for MBB profitability are suggested to be benchmarked:

- Data revenue / site
- Data CAPEX / revenue
- Profit / GB

These suggested KPIs can be analysed and benchmarked based on a set of input and intermediate KPIs:

Data revenue / site

The business case modelling shows that with the assumptions of only upgrading and adding more 3G/HSPA sites for capacity (no HSPA+/LTE), this KPI will reach a max yearly revenue level of € 37,000 – 38,000 / site in 2014 with the given segmented customer uptake, ARPU and traffic volumes. The PC subscriptions will by that point contribute with 85% of the revenue and consume 96% of the traffic.

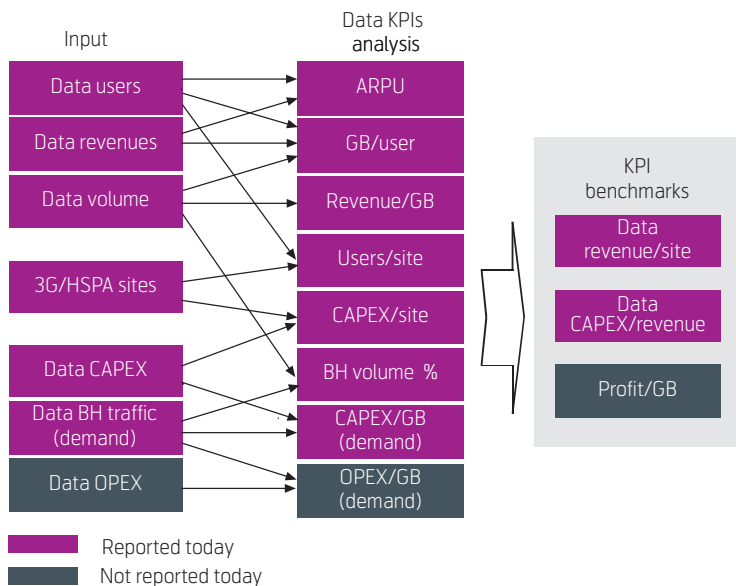


Figure 2 MBB profitability KPIs

Data CAPEX / Revenue

The business case modelling shows a decrease in this KPI down to about 20% in 2014 with the given assumptions around vendor price erosion and revenue/site. Further development/enhancement of this KPI will be dependent on a smart introduction of new technologies (HSPA+/LTE) giving higher capacity per site and thereby better CAPEX/revenue performance over time. IS/IT CAPEX is only estimated as a proportion of the core network CAPEX. Due to close links with 2G/voice capabilities for this CAPEX element there might be a better solution in the long run to consider the CAPEX/revenue for the total business when benchmarking this KPI. Another solution is to use the percentage of data revenue / total revenue as the splitting factor for IS/IT CAPEX.

Profit / GB

The business case modelling shows a Profit/GB a little bit over € 1/GB in 2014, the year of payback. As for data CAPEX / Revenue there is a need to single out the data related OPEX from the total OPEX. Due to difficulties in reporting around this, the percentage of data revenue / total revenue might again be used as a splitting factor. This probably gives some underestimation in the first years. In the model the data OPEX / Revenue reaches around 30% at the end of the calculation period.

2.2 Sensitivity Analysis

Based on the generic business case modelling the following sensitivity analysis was done:

ARPU

The price erosion in the base case was set to 3%, giving a weighted ARPU of € 12 in 2011 and € 9 in 2016. Increasing the price erosion to 5% and the customer uptake on low-ARPU price plans, reaching 20% lower weighted ARPU, the NPV decreases by € 44m. Higher uptake of high-ARPU price plans (same price erosion), reaching 20% higher weighted ARPU, gives the same increase in NPV.

Subscribers per Site (Uptake)

The base case figure for subscribers per site is 170 PC subscribers in year 2011 and 209 in year 2016. This indicates a very high initial pick-up rate per site based on selective roll-out of sites. For handset customers the figures are 60 and 189 respectively. 20% increase/decrease in customer uptake per node gives an effect on the NPV of +/- € 30m.

Subscribers per site and the ARPU level are the two main drivers for the data revenue / site KPI.

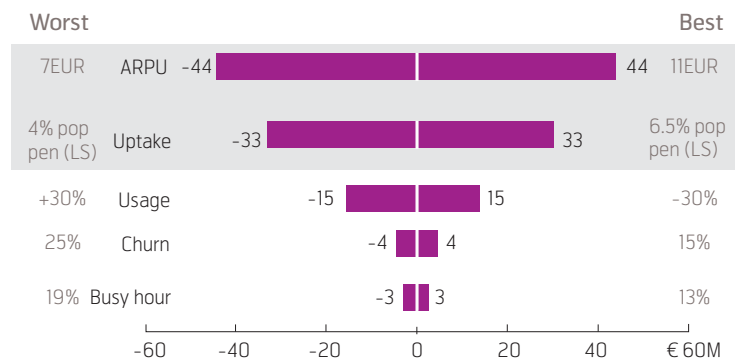


Figure 3 Key sensitivities of MBB based on Pannon business plan input/output

Traffic per Subscriber (Usage)

The traffic per subscriber has been seen as one of the key challenges for the long-term profitability of MBB, especially the high share of the total volume consumed by some 1-2% extreme large screen users.

Since most of the mobile operators that have launched MBB are looking at some way to control the extreme usage, we have included throttling of 1% of the PC subscribers as the base case. The average traffic per PC subscriber per month is then continuously decreased by approximately 20% (from 6.5 GB to 5.4 GB in 2016). Throttling of 5% gives an extra 20% less traffic volume. The effect on the NPV with no throttling is a €15m decrease, whereas the 5% throttling gives a €14m increase.

Busy Hour Peak Rate

Another important discussion around MBB profitability is the busy hour peak rate that, together with traffic per subscriber, drives the data capacity need. Since the data traffic peak rate increases well over the voice traffic peak rate when launching MBB, the cost of the total network is driven by the data busy hour peak rate.

Close monitoring of the most crowded part of the radio network sets the dimensioning rules. Due to the bursty nature of Internet, traffic utilization of the total capacity in the peak hour, and not the instant peak rate, should be used. The base case assumption is that 16% of the total traffic volume per site per day is produced in busy hour for sites that reach their limits. However a decrease/increase of this ratio by 20% only gives an effect on the NPV of +/- €3m.

Traffic per subscriber and busy hour peak rate together with the revenue/site KPI are the main drivers for the CAPEX/revenue KPI.

Churn

The acquisition and retention cost is estimated for both per PC and handset subscribers. The total non-network OPEX is highly driven by this multiplied by the churn factor. The churn for MBB has so far been a little bit higher than for fixed broadband and is well over 20% in some markets. The sensitivity for churn is however quite small, about €4m on the NPV per 5% points increase/decrease.

3 Recommend on Levers to Optimise MBB Profitability

The following key short-term actions to ensure MBB profitability were established:

- Address key segments and market clear Internet value propositions;
- Include fair usage policies and deploy traffic management mechanisms;
- Build coverage according to demand and upgrade capacity based on fill-rate;
- Seek to decouple vendor costs from traffic development.

3.1 Segmentation and Market Offering

MBB is mainly sold as Internet access, addressing customers with PC without any special focus on Internet applications and services. Further the product in most markets is positioned more as a household/business subscription (primary access) than personal/employee subscription (secondary access). This means the product will compete in a total broadband market together with fixed broadband offerings.

The price/value perception in this market is mainly related to bandwidth. MBB as a product has low quality assurance when it comes to bandwidth (shared resource) and the operators try to align their network capacity to a customer expectation of around 1 Mb/s. Since bandwidth is a relative measure, price per volume or flat rate prices with volume limitations has become the standard differentiation and segmentation for the MBB offerings in the market.

The customer expectations for MBB price plans are

- Monthly price level on par with fixed broadband;
- Predictable and transparent pricing.

Unlimited volume is of course the ideal offer from the customer point of view, but there is a clear trend in the market to accept a fair-usage policy restricting the 1-2% extreme users (media buffers) that try to push the MBB product to their limits. The large screen product offering should therefore have at least three price plans addressing the entry, mass market and extreme users with low, medium and high price level and fair-usage policy for volume usage respec-

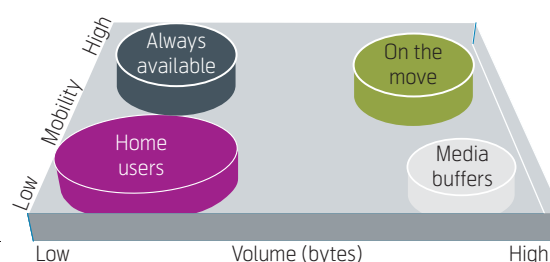


Figure 4 Internet access segmentation for the consumer market

tively. The pricing should be time based (eg. fixed price per month, week, day, hour, minute) to avoid bill shock for the customers.

In general the business market can be addressed with more or less the same MBB product portfolio. Packaging with security and communication services and higher service level agreement (SLA) when it comes to customer support can however give much higher average ARPU for the business segment. The business segment also tends to buy products with more volume included as long as the price is predictable, even though they use less than the consumer segment on average.

The introduction of prepaid will make it more reasonable to offer shorter time periods than one month which is more or less standard for the fixed broadband offerings. The Pay-as-you-go (PAYG) model setting a price per minute/hour should then be extended with daily and monthly caps.

With 3G/HSPA capabilities in the network, there will also be a possibility to extend the Internet offering for handheld devices in line with the uptake of 3G/HSPA capable handsets. Together with the PAYG price model with daily/monthly cap, handset customers should also have the possibility to subscribe to the MBB price plans.

The goal for the MBB product offering and price plans is to attract and ensure the needed customer uptake per node and ARPU (base case), giving away more network capacity/volume in a managed way to increase the Internet experience.

3.1 Summary

The MBB product offering and price plans must attract the customers to ensure the needed customer uptake per node and ARPU:

- Offer at least three PC price plans with price levels addressing the entry, mass market and high-end users with fair-usage policies for volume respectively;
- Increase ARPU in the business segment with service bundling and higher SLA;
- Use time based pricing to avoid bill shock for the customers;
- Offer both postpaid and prepaid;
- Introduce handset price plans that combine pay-as-you-go (price per minute/hour) with daily and monthly caps.

3.2 Traffic Management

Handling of high traffic volumes has become a topic that needs attention. In periods with high traffic load, if left unattended, there are no mechanisms in the network that guarantee that all users get their fair share of the available capacity.

The current approach is to restrict users upon reaching their allowed traffic volume quotas (fair-usage policy) by manual throttling. This is a resource intensive approach, and more effective solutions are being evaluated.

A starting point will be to introduce Deep Packet Inspection (DPI) to do proper monitoring of network traffic and application usage. Measures from the Pannon network shows that all PC customers have nearly equal volume of web traffic whereas peer-to-peer (P2P) traffic (file sharing) only dominates the two upper segments of customers (about 2.5% of PC subscribers).

Further the web traffic is now starting to be dominated by video, 41% of web traffic and 28% of total traffic. Even though there seems to be an opportunity to throttle only the P2P traffic, this will only have limited effect as more and more normal users with the same web/video characteristics of their traffic get onboard.

The target solution within the foreseeable future appears to be a Policy Control Resource Function (PCRF) solution, with a Deep Packet Inspection (DPI) and network support for Quality of Service (QoS). This will make it possible to distinguish and

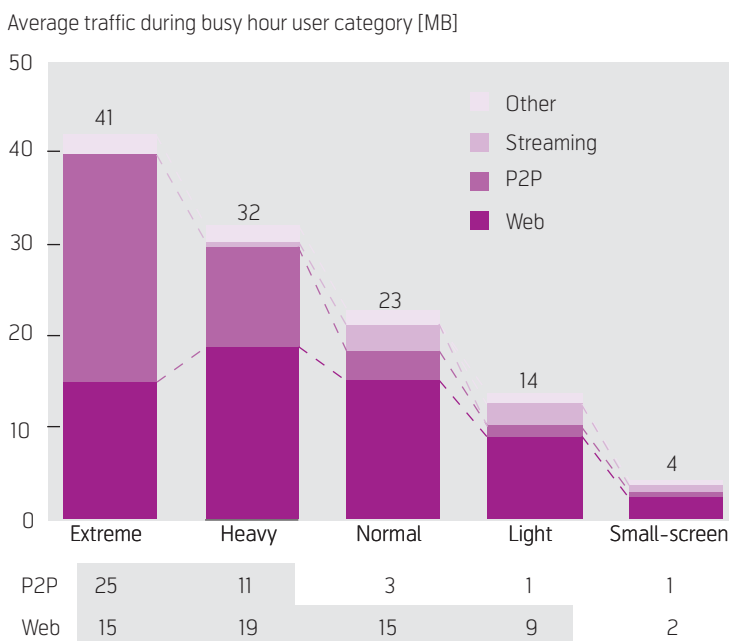


Figure 5 Average traffic in busy hour in the Pannon network

prioritize between traffic with low willingness to pay per GB (video) and traffic with high value (real-time, business critical). However, the cost of such a complete solution is high, and the maturity of the total solution is not yet fully proven.

Further to get the real benefits from such a solution the QoS mechanisms need to be implemented in the radio network as well. This needs to be taken into consideration when negotiating with the radio network vendor.

Summary

Traffic management is needed to let all the customers get their fair share of the available capacity in peak hours:

- Manual volume throttling might be a short-term intermediate step to ensure a simple traffic management solution while investigating a long-term solution.
- DPI gives monitoring capabilities to investigate the traffic development in the network to decide on implementing further throttling mechanisms.
- PCRF is the target solution within the foreseeable future together with QoS support in the radio network.

3.3 On-Demand Network Coverage and Capacity Upgrades

Both MBB demand in the market and competition from other (fixed) broadband players are considered to be focused around some key coverage areas in the start-up phase (cities, parts of cities, urban areas). The Internet as a service does not rely on coverage for the receiving party as for voice and it is therefore possible to do a more selective roll-out than what was considered when rolling out the 2G/voice network.

The selection of the start-up coverage area should be a joint effort between market and technical departments. The demand attributes such as affordability, PC penetration and customer needs should be coupled with supply attributes like existing site / backhaul capabilities, 3G/HSPA upgrade prices and possibly any 2G/EDGE data traffic measures to form the strategic roll-out plan. The final decision should be made based on a tactical review considering competition, time-to-market and other internal issues like CAPEX constraints, etc. The goal for the selective roll-out is to ensure high customer uptake per node since this is one of the main drivers for the MBB profitability.

The existing 2G network with GPRS/EDGE capabilities might help to supplement the MBB product offering and set the limits for the needed 3G/HSPA node upgrades. Measurements show that 5% of the nodes carry 15-20% of the traffic, and the next 20% of the nodes carry 30-35%, meaning the needs for network upgrades will rather be in the dense part of the network to ensure needed capacity, than to enlarge the 3G/HSPA coverage into areas with less demand. The business case modelling takes into account upgrades to 14.4 HSPA and up to three carriers (5 MHz slots) per node. When the capacity limits for this configuration are reached, the assumption is to build a new site in the area to increase capacity. In the dense part of the network (5% of nodes), the number of new sites will reach its limits (more than doubling of sites) six – seven years after launch. This implies a need for further network upgrades and can be solved either with HSPA+/LTE solutions or by unloading the capacity needs with WiFi or other fixed broadband solutions.

All the needed network upgrades on the radio access nodes (NodeB) must correspond with a backhaul and backbone upgrade. The increase in backhaul capacity can be solved with microwave upgrades, even though fibre is preferred in the long run, whereas the backbone must be upgraded to fibre to be capable of handling the MBB product offering. Further the data traffic should be handed over to an all-IP network as fast as possible in the backbone to optimise traffic routing and enable content & service servers in the network (on-net). This will lower the off-net traffic needs and thereby lower IP transit costs.

Summary

The MBB network roll-out and capacity upgrades must ensure high customer uptake and utilisation per node since this is one of the main drivers for the MBB profitability:

- Target coverage areas with high market demand for initial roll-out;
- Upgrade nodes to 14.4 HSPA and available carriers (5 MHz slots) when there are capacity needs (HSPA+ / LTE might be needed six – seven years after launch);
- Increase backhaul capacity with microwave upgrades and seek fibre solutions in the backbone/core;
- Deploy an all-IP network as fast as possible in the backbone/core to optimise traffic routing and enable content & service servers in the network (on-net).

3.4 Procurement and Vendor Management

The business case model was populated with cost figures from the recent negotiated contract for Pannon. We expected busy hour demand (Mb/s and concurrent users) to be a major cost driver, but with utilisation of all available upgrade possibilities and strong focus on the cost related to these upgrades, the sensitivity was quite low. To further increase the MBB profitability the initial roll-out cost must be lowered. New contracts in both the Nordic and Asian operations show a clear trend towards having more transparent and better prices, both when it comes to initial cost and cost of upgrades.

It is strongly recommended to deploy a holistic TCO measure with well defined HW configurations to understand and compare cost structures in relevant contracts. Simplicity and transparency should be targeted at all levels. Software upgrade and feature costs should be well reasoned – avoid yearly software upgrade fees, and decoupled from HW upgrades to avoid that network capacity increase is a major price driver.

The cost structure should be constantly monitored and it is essential to cap the cost levels at the right places to decouple the cost from network capacity (Mb/s and concurrent users). Relevant cost drivers should if possible be linked to revenue drivers.

Relevant KPIs to deploy over time include:

- CAPEX per Mb/s (should follow a descending slope, constantly targeted lower);
- OPEX per year based on number of network elements.

Summary

Tight vendor management is a key to reducing Total Cost of Ownership (TCO) for MBB:

- Target simplicity at all levels, ensure transparency and good understanding of the cost structure, deploy the Telenor TCO with well defined HW configurations;
- Avoid capacity as a (major) price driver; decouple SW costs from HW capacity and target caps on different levels or on total cost;
- Ensure well reasoned software upgrade and feature costs – avoid yearly software upgrade fees.

4 Conclusion

Our investigations and calculations have shown that the MBB product offering can be profitable for 3G investments given certain preconditions and actions.

First of all there needs to be a demand in the market and the network investments should be clearly linked to that through selective roll-out. When the investments are done, customer uptake in segmented price plans with stable ARPU is key to profitability. Traffic load is manageable both short and long term if fair-usage policy is included and enforced.

Further, the MBB profitability is dependent on decoupling of vendor cost from traffic increase with introduction of caps on total cost. The modelling also indicates that HSPA will be insufficient to cover the needed capacity in the most dense part of the network in the calculation period. Negotiating prices for HSPA+ and LTE upgrades with focus on Total cost of Ownership is therefore of high importance to have a sustainable business.

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