

Towards a Profitable Mobile Data Business Model:

- ▶ Scenarios for cost reduction
and innovative service plans



THE MOBILE PERSONALIZATION COMPANY

Executive Summary

The mobile data industry has evolved rapidly over the past two years, with the impact of growing 3G penetration, lower cost smartphones and USB laptop dongles, the popularity of mobile applications, and flat-rate data plans. This has resulted in huge growth in data traversing operators' networks. The market has now reached a critical point with network congestion being felt by operators and consumers alike.

Operators, faced with rising mobile data costs and the potential for consumer churn, are now introducing network congestion management strategies that will reduce costs by balancing traffic requirements across networks and implementing usage controls. Policy control, data traffic offload, evolution to 3G and 4G, and network optimisation will incrementally reduce mobile data delivery costs by more than 60 per cent over the next three years. A holistic approach to the network resource management conundrum in an era of huge mobile data growth is vital to long-term success and profitability.

Policy control – how, when and under which circumstances subscribers can access networks, applications and services – will contribute annual cost savings of over 10 per cent, equating to over \$15 billion in annual cost reduction by 2013 in the US market alone.

Meanwhile, operators deploying a data traffic offload strategy to Wi-Fi or femtocells, using service control to ensure transparent and secure subscriber access, can expect savings of between 20 and 25 per cent per annum by 2013. The evolution to HSPA and LTE will save just under 20 per cent in costs in the same timeframe, according to Chetan Sharma Consulting.

Cost reduction is only one side of the equation – operators are now creating new business models that move away from unsustainable flat-rate plans, towards tiered and usage-based pricing underpinned by subscriber, service, and policy control.

Flexible, dynamic, and personalised pricing models that reflect subscribers' preferences and context, bandwidth and application usage, and network conditions are the wave of the future. These new pricing models will better align data revenues with network costs for the first time including:

- ▶ Usage-based models that take a smarter approach to fair usage;
- ▶ Application-specific charging, to generate appropriate revenues from high-bandwidth services;
- ▶ Time-based models that charge for time spent on the network; and
- ▶ Mobile advertising and mobile commerce funded approaches.

The paper concludes with a range of new business model scenarios, supported by real-world case-studies from several countries, for both the management of rising costs and the delivery of new consumer service plans.

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1. The rise and rise of mobile data

The evolution of the mobile Internet has undoubtedly accelerated over the past 18 months, and with it has come a fundamental change in the economics of delivering data. In mature markets, flat-rate service plans, affordable smartphones, and the growth in use of USB laptop data sticks – or ‘dongles’ – has led to a rapid increase in the amount of data traversing operators’ networks.

The implications of this data growth are dramatic for operators and consumers alike. Increases in the cost of delivering data threatens to out-strip comparative growth in data revenues; a ‘revenue gap’ that no commercial operator can ignore.

Meanwhile, the risk to user experience from congested networks is significant and very real – dropped data sessions, slow network speeds, and pent up frustration. After all, consumer churn is one of the largest costs operators face, especially in mature markets.

While network infrastructure evolution, data traffic offload, and policy control will undoubtedly reduce the costs associated with the growth in mobile data traffic, operators are increasingly likely to evolve their service plans too – reflecting the new business models that will enable sustainable growth in mobile data over the coming years.

GROWTH OF THIRD GENERATION MOBILE SERVICES

The ubiquity of second generation mobile coverage worldwide – at more than 90 per cent¹ – is now supplemented by 3G Internet connectivity in an increasing number of countries.

But this changing data landscape is a relatively new phenomenon, with the global ‘inflection point’ for 3G penetration only set to be passed in 2010, according to Morgan Stanley (see Figure 1). This relatively recent growth in 3G penetration – connections doubling globally over the past two years – has fueled unprecedented mobile data expansion.

In the US and Western Europe, 3G penetration passed the 20 per cent inflection in 2007 and in key developing Asian economies it will be passed by the second half of 2011. In more mature markets such as Japan, 3G penetration is at more than 90 per cent.

Indeed, Morgan Stanley predicts that 3G penetration could surpass 100 per cent in certain developed markets, driven by data only devices. Verizon Wireless in the US, for example, sees potential for 400 per cent data device penetration on 3G and 4G networks.²

Global 3G Subscribers = 2010E ‘Mainstream’ Inflection Point, Penetration >20%

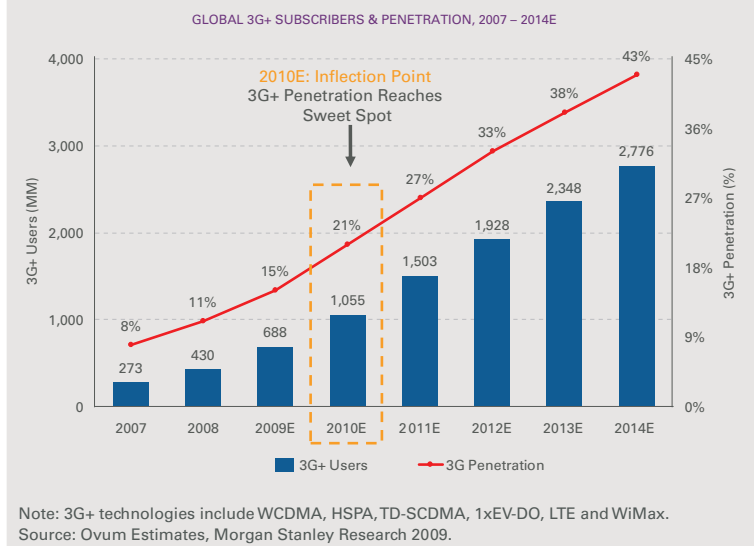


Figure 1: Global 3G Subscribers.

¹ Morgan Stanley, 2009

² Morgan Stanley, 2009

SERVICE-DRIVEN MODELS

Connectivity is not the only factor in the growth of mobile data. Perhaps even more telling is the diversification of mobile devices. Smartphones now account for 20 per cent of global handset sales.³

At the high end, the iPhone has changed the dynamics of the smartphone sector. Owners use more data, spend more time online, and offer higher average revenue per user (ARPU) than comparable smartphone users (see Figure 2).⁴

Crucially, the iPhone has also educated a generation of mobile users on how to stream video and music, and surf the mobile Internet. And the App Store has paved the way for a myriad of 'me too' connected services, available to the mass market.

But it is video and peer-to-peer (p2p) applications that are driving most mobile data traffic. Video, for example, now accounts for at least 40 per cent of data traffic in mature markets, growing to 64 per cent within three years.⁵

However, the largest single concern for operators is the deluge of data being used by laptop dongle-owners. In 2008, over 70 per cent of data on mobile networks was via laptop users.⁶

Underpinning these services is the mobile service plan price war in mature markets that has driven the uptake of flat-rate data plans. This all-you-can-eat model has encouraged unconstrained data usage. Just three per cent of AT&T's subscribers, reports the US operator, account for 40 per cent of all data traffic on the operator's network. This is akin to opening the water tap and then leaving it on.

iPhone Users Use Data / Internet Far More than Average Mobile Users

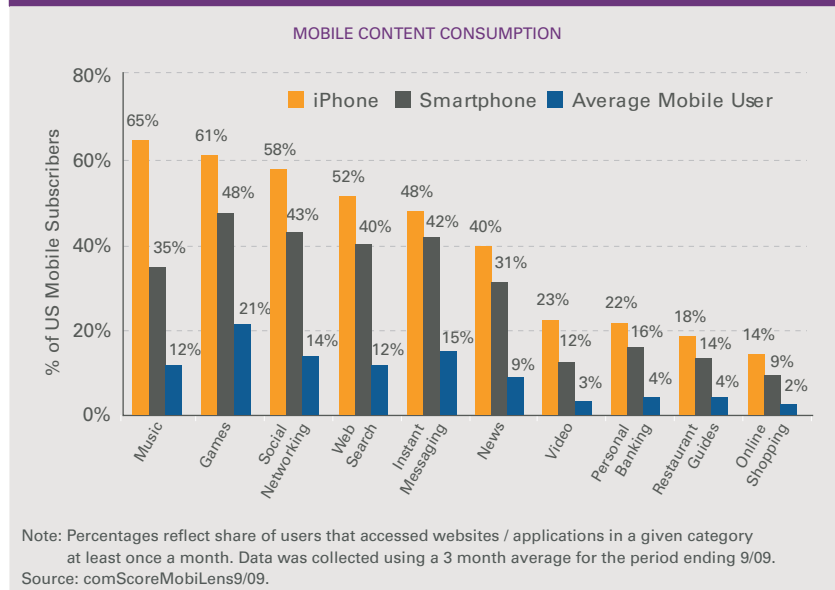


Figure 2: iPhone Users Use Data. Source: Morgan Stanley, 2009

3 Informa Telecoms & Media, 2009

4 Morgan Stanley, 2009

5 Cisco, 2009

6 Chetan Sharma Consulting, 2009.

2. Consequences of mobile data growth – evolving the ‘scissor diagram’

The huge growth in mobile data usage has been a boon to many operators, with revenues from these services increasing as a percentage of operator turnover.⁷

The percentage of revenues that come from data services at Japanese operator NTT DoCoMo, for example, is now in excess of 45 per cent.⁸

This is mirrored in Western Europe and the US with data accounting for 25 per cent of revenues in 2008.

But this windfall has a cost: necessary management of mobile data growth.

Indeed, the capital and operating expenditures associated with this increase in data usage can be significantly destructive to an operator’s profitability – and therefore the industry’s ability to meet the demand for mobile data services sustainably.

Chetan Sharma Consulting forecasts that if left unchecked, the costs of delivering mobile data will likely outstrip incremental revenues by the second half of 2011 in the US market and become unsustainable by 2013. This pattern is mirrored in other mature markets such as Western Europe (see Figure 3).

The consequence is clear: operators must put into place a sophisticated strategy when it comes to network congestion management, bringing costs into line with data revenues.

THE CONSUMER PERSPECTIVE

Consumers in certain markets such as the US and the UK are already feeling the effects of increasing traffic on mobile networks.

In 3G networks, cell size is very much dependent on cell capacity – and a network shrinking effect is apparent when a cell reaches its data load. The result: slower network speeds and dropped sessions, especially at the edge of the network or in urban centres with a high concentration of smartphone and dongle users.

The risk to operators from consumer disquiet is churn – subscribers voting with their wallets and switching to another service provider. In mature markets such as the US and Western Europe, each churned consumer costs between \$200 and \$400.⁹

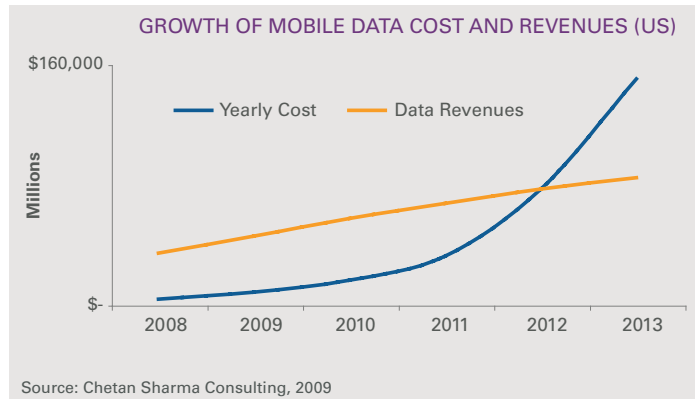


Figure 3: Growth of Mobile Data Costs and Revenues

O2 and AT&T suffer the iPhone effect

According to a public statement by the CEO of AT&T, surging iPhone traffic has resulted in a network experience that is not of a “sufficient standard” to meet consumer demands for data in urban centres such as New York.

Yet this view is at odds with independent network testing, as reported by The New York Times in December 2009, which ranked AT&T’s network as consistently the fastest for download speeds in the US.

The apparent dichotomy, reports Chetan Sharma Consulting, is explained by an increase of over 6,500 per cent in mobile data traffic on the network with the introduction of iPhone 3G in 2008.

Meanwhile in the UK, iPhone operator O2 apologised to its customers for poor network performance, before CEO Ronan Dunne committed the Company to a £100 million network infrastructure spend in the coming months

7 Morgan Stanley, 2009

8 Chetan Sharma Consulting, 2009

9 Ovum, 2009

Increasing consumer reliance on smartphones, laptop dongles, and applications will reduce end-user tolerance for the kind of service interruptions experienced by some operators in the past year, despite lengthy binding contracts. The absence of service level agreements (SLAs) within the mobile industry is part of the reason regulators globally are interested in reducing contract durations.

3. Data growth management

The rapid growth in mobile data costs has prompted operators to look at more sophisticated network congestion management strategies that fall into four categories: policy control, data traffic offload, infrastructure investment, and network optimisation (see Figure 4).

These strategies provide operators with a 'toolkit' of solutions to the network congestion problem.

But in planning an approach that takes into consideration traffic growth, subscriber behaviour, and application trends, operators' principle expense lies in managing the peaks of data usage. This is the scenario facing operators globally – with a small percentage of users typically consuming the majority of data.

Moreover, operators must account not only for the volume of mobile data but the pattern of usage too. Data traffic concentration in urban centres and during early morning/evening travel peaks is now a common model for many operators, leading to localised network congestion challenges. Anecdotally, operators have reported that 80 per cent of the traffic in urban centres is being handled by 10 per cent of the cell sites. As such, management of the way subscribers use their data connection can have a meaningful impact on costs.

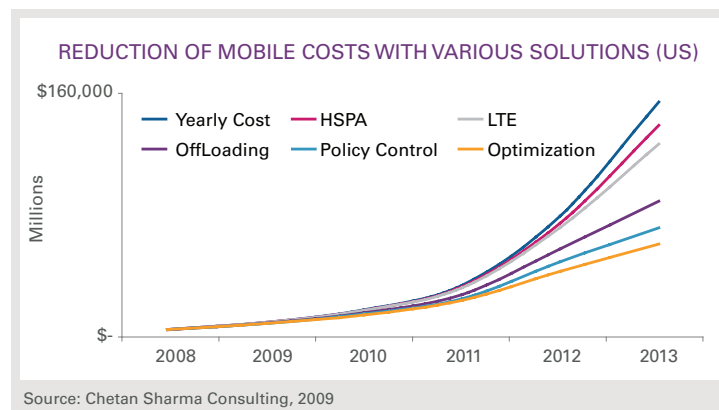


Figure 4: Reduction of Mobile Costs Under Various Scenarios

POLICY CONTROL

Policy control provides real-time network, application, and subscriber policies that allow operators to manage mobile data growth and deliver personalised services on a far more refined level than was possible in the past.

Network policies, performed by the Policy and Charging Rules Function (PCRF), enable operators to manage mobile data traffic by applying real-time bandwidth controls that adapt to changing network conditions and subscriber context. Application policies help operators provision new services and determine how, where, and under which circumstances subscribers can access applications. While subscriber policies give users direct control over their data.

Capex and opex spending, linked to management of traffic peaks, can be limited through effective policy control. As discussed, with only a small percentage of 'heavy' users typically consuming the majority of data and exceeding their monthly limits, management of this user segment by prioritising traffic based on individual subscriptions is critical. So effective is policy control in reducing peaks that data throughput in the busiest times can be reduced by 15 to 20 per cent.¹⁰ Furthermore, it is estimated that policy control will contribute annual cost savings of over 10 per cent in the US market by 2013, equating to over \$15 billion in annual cost reduction.¹¹

¹⁰ Chetan Sharma Consulting, 2009

¹¹ Chetan Sharma Consulting, 2009

Policy control also offers operators the opportunity to educate users about ‘Quality of Service’, offer personalised service options, and empower subscribers to manage their own mobile data usage. Operators can, for example, effectively manage fair usage clauses on an individual basis, introduce tiered, casual usage, and application-based pricing models, and allow subscribers to view their mobile data usage real time, set limits and notifications, and receive promotional offers. These new service models will enable sustainable mobile data growth in the coming years.

MULTI-ACCESS DATA OFFLOAD

Shifting data traffic off a congested mobile network and onto another access technology fundamentally changes the economics of delivering that data. Offload is being implemented by operators globally to manage the total data throughput with, typically, two flavours: offload to Wi-Fi and offload to femtocells. In some regions, WiMAX deployments are also crucial to an offload strategy.

Offload to Wi-Fi is especially relevant in urban centres where smartphones and data cards, or dongles, are concentrated and Wi-Fi hotspots plentiful. Indeed, penetration of Wi-Fi enabled handsets is increasing rapidly, with more than 300 million dual mode devices in the global market by 2011.¹²

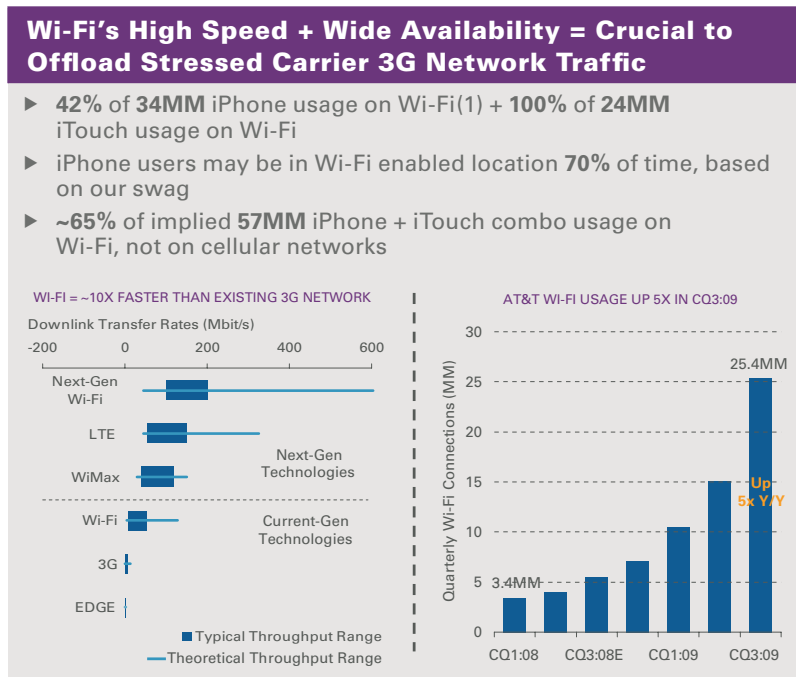


Figure 5: Wi-Fi Crucial to Offload Scenarios. Source: Morgan Stanley, 2009

This is a development that operators are keen to exploit. They are encouraging users to offload to Wi-Fi through free subscription minutes, while forging alliances with hotspot service providers. Hotspot operators, such as BTopenzone in the UK, have reported a large increase in data throughput on their networks from smartphones, which account for the majority of access sessions in some locations.¹³ With USB dongles increasingly prevalent in the market, many operators such as Verizon Wireless in the US, are giving mobile broadband customers access to Wi-Fi hotspots as part of a multi-access strategy.

Data offload strategies have the added benefit of enabling Wi-Fi revenue streams for mobile operators who own hotspots and new revenue-sharing partnerships for operators who don't own their own Wi-Fi network.¹⁴

Femtocells, which offer users better indoor coverage and offload the backhaul to a wireline broadband connection, have yet to reach a mass-market penetration. But with 60 to 80 per cent of mobile data usage taking place indoors,¹⁵ operators can benefit significantly from this offload strategy. Service control technology can provide device and femtocell security, provisioning, and quality of service management.

Finally, offload via bypass allows for even greater efficiency as Internet traffic does not need to be routed through all mobile network elements.

¹² ABI Research, 2009

¹³ Fierce Wireless, 6 January 2010

¹⁴ Fierce Wireless, 15 December 2009

¹⁵ Informa Telecoms & Media, 2009

The cost savings associated with offload are significant according to exclusive data provided by Chetan Sharma Consulting. Operators deploying a mixed multi-access offload strategy can expect savings in the range of 20 to 25 per cent per annum. In the US market, operators will save between \$30 and \$40 billion per annum by 2013 through an offload strategy alone.

Ensuring a seamless service experience for consumers is an important consideration in any data offload strategy. Four major operators in Europe, North America, and Asia Pacific are working with Bridgewater Systems, for example, on offload strategies that transparently re-authorize and re-authenticate subscribers as they move from one access technology to another. Service control manages the attachment to a network, providing a single sign on experience for the consumer.

Moreover, data offload can be combined with policy control to fine tune strategies. For example, operators can surgically offload certain high-bandwidth applications or traffic at specific times based on network conditions.

EVOLUTION TO FOURTH GENERATION MOBILE ACCESS

Infrastructure evolution to 3.5G (HSPA) and 4G (LTE) lowers the cost-per-bit for data throughput on the network, thereby reducing overall costs. However, significant investment in new infrastructure is required for the move to LTE.

The capital intensive nature of LTE, which offers around 40-50 per cent cost-per-bit benefit,¹⁶ means that some operators will choose a strategy of sweating current infrastructure assets with a longer term plan to evolve to LTE as relevant spectrum becomes available.

Network cost is lowered dramatically with HSPA and LTE deployments. Chetan Sharma Consulting reports that evolving to HSPA and LTE will result in cost savings of just under 20 per cent or almost \$25 billion per annum across all US operators by 2013.

Those operators aggressively moving to LTE, such as Verizon Wireless in the US, will initially make laptop data dongles available, with LTE-enabled smartphones still some months away. This reality means that infrastructure upgrades need to be complemented by other strategies to solve data congestion and optimally reduce operators' costs.

NETWORK OPTIMISATION

Network optimisation, through techniques such as compression and caching also adds incremental savings by reducing the total number of bits traversing the network. Typically, Sharma reports, operators can generate savings of five to 10 per cent by 2013 through this strategy.

Verizon Wireless, AT&T, and FT Orange look to Wi-Fi offload

Verizon Wireless launched a new service in December 2009 that allows mobile broadband customers to access thousands of Wi-Fi hotspots at no additional charge and to move easily from the 3G wireless network to those hotspots. When customers are on Wi-Fi and are ready to move, but want to remain connected, or if they want the added security of the 3G network, they can simply switch back to the 3G network.

AT&T's policy to offload traffic to Wi-Fi has brought a 70 per cent cost advantage, reports Morgan Stanley, owing to lower congestion, lower equipment costs, and zero licensing costs for Wi-Fi spectrum (see Figure 5).

In France, FT Orange, which owns a significant Wi-Fi network in the region, is looking at ways to deliver a superior smartphone user experience across 3G and Wi-Fi hotspots.

The success of Wi-Fi lies in its comparatively low capital and ongoing costs. Incremental costs for Wi-Fi hotspots are \$50-100, as opposed to \$2,000 leasing fees on a cell site plus the cost of backhaul, according to Morgan Stanley's data.

4. New service models for a sustainable future

The sustainability of exponential mobile broadband growth will be underpinned not solely by cost savings associated with the strategies discussed but also new service models. The old calculations of operator success predicated on growing ARPU will evolve into a focus on Average Margin per Subscription (AMPS) and increasingly, in a massively connected world, Average Connections per User (ACPU).

In fact as the cost of managing mobile data exceeds that of voice, operators will increasingly pay close attention to the design of service plans.

The changing dynamics of the mobile industry must also be considered. Despite the growth in mobile data traffic, operators continue to rely on voice to uphold their business models. But by 2013, 95 per cent of all network traffic will be data (see Figure 6). The potential for disruptive business models is therefore high in the coming years.

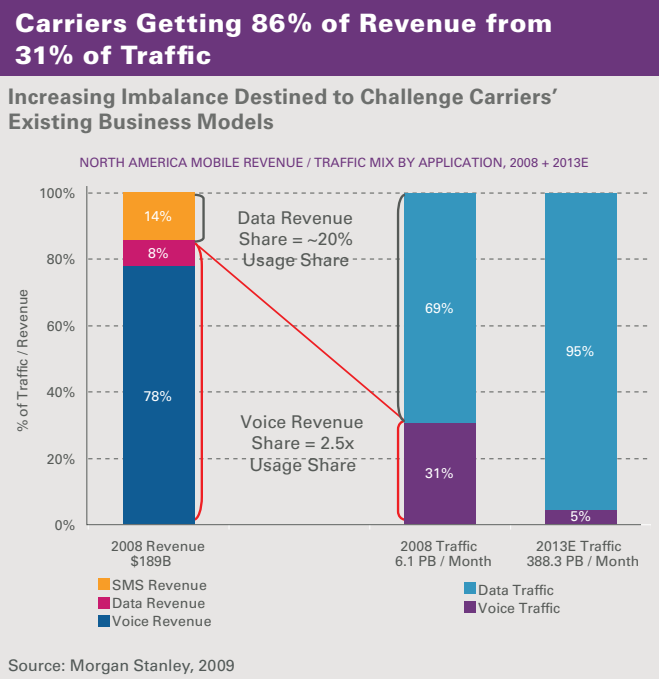


Figure 6: Operators Getting 86% of Revenue from 31% of Traffic.

IS FLAT-RATE SUSTAINABLE?

Flat-rate data plans are undoubtedly essential to driving consumer demand and breaking down price barriers. But the difference between flat-rate in a voice world versus a data world is central to the sustainability of such plans. In voice there is – quite literally – a physical limit to the amount a consumer can talk.

The experience of flat-rate data plans has been very different, with the top five per cent of users dominating network traffic through p2p and video services.

| Verizon Tiered Mobile Broadband Data Card Packages | | |
|--|---|--|
| 5 GB Package | 250 MB Package | Prepaid 75 MB/day 250 MB/week 500 MB/month |
| \$59.99 / Month | \$39.99 / Month | \$15, \$30, \$50, respectively |
| Best for heavy users that <ul style="list-style-type: none"> ▶ Need frequent mobile connection ▶ Send or receive emails with large attachments ▶ Download or upload large files such as photos ▶ Download music occasionally | Best for heavy users that <ul style="list-style-type: none"> ▶ Need mobile connection 7-8 hours a month ▶ Send or receive emails with small or no attachments ▶ Light web browsing ▶ Download a song or two once in a while | Best if you <ul style="list-style-type: none"> ▶ Want the flexibility of using Mobile Broadband with out long-term commitment ▶ Only use broadband data access once in a while |

Source: Morgan Stanley, 2009

Figure 7: Verizon Tiered Mobile Broadband Data Card Packages.

In its report 'Value Added Services for Big-Screen Mobile Broadband,' Ovum concludes that revenue from flat-rate tariffs for handsets like the iPhone will not markedly increase in the medium term. As such, for mature operators, flat-rate data becomes unsustainable unless network upgrades and traffic management strategies are deployed. Indeed, Verizon Wireless recently hinted that it is considering volume-based pricing for its LTE deployment in the US and is already implementing tiered mobile broadband data card packages (see Figure 7).¹⁷

CHANGING SERVICE MODELS

While the attractiveness of flat-rate data plans is understandable both to consumers and operators alike, they are unsustainable for the heaviest users and are expected to become less sustainable with continued exponential data traffic growth. Other tariff solutions must be investigated. Below are examples of innovative and personalised service plans that operators are introducing:

- ▶ **Speed-rated:** These plans offer operators the ability to increase revenue from the heaviest users by placing these subscribers on more expensive tariffs. This can be implemented through effective policy control on the consumer side. Operators Tele2 (Sweden) and Elisa (Finland) effectively use this method of tiered pricing by offering a faster service for a larger monthly fee.¹⁸ The drawback is that mobile networks, as a shared resource, are often unable to guarantee the kind of quality of service required to sustain advertised maximum speeds.
- ▶ **Time-based:** Telecom Italia Mobile, reports Ovum, has successfully implemented time-based mobile data plans. The model uses tiered pricing based on the number of minutes a user spends on the data network. The obvious drawback to the model is that the user is penalised for slow network speeds. Guaranteed quality of service is therefore essential (see Figure 8).
- ▶ **Bandwidth usage and application specific:** Next generation policy control solutions enable operators to implement controls and pricing based on bandwidth usage or specific traffic types. Operators can flexibly charge for heavy bandwidth services such as video or p2p in real time. The heavy mobile video user, for example, can be guaranteed quality of service for a monthly fee, ensuring that revenues match costs for the operator. SmarTone-Vodafone, for example, is delivering tiered services in Hong Kong based on bandwidth usage and time, as well as applications on-demand using Bridgewater Systems' policy control and subscriber data management capabilities.
- ▶ **Time of day:** Operators in mature markets have seen a clear time-of-day usage pattern emerge for mobile data. The question is, as with other utilities, why shouldn't the operators charge more at peak times, according to their network capacity? Or to put it another way, could mobile broadband users be offered incentives to download during the quietest network times? Underpinned by policy control, dynamic and transparent pricing such

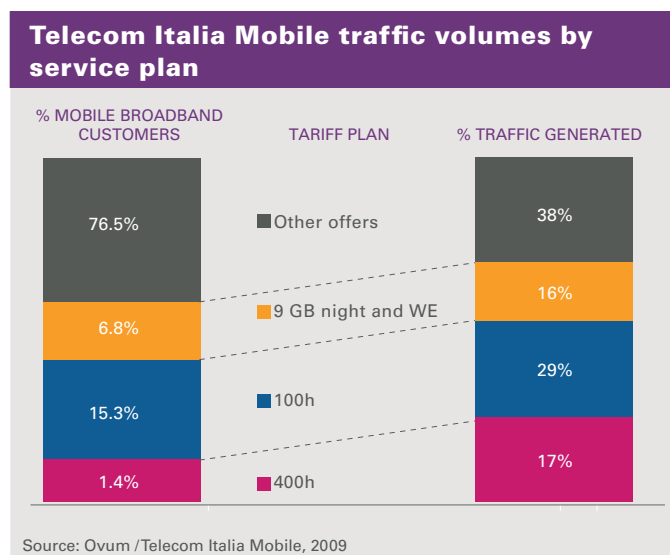


Figure 8: Telecom Italia Mobile Traffic Volumes by Service Plan

¹⁷ Washington Post, 8 January 2010

¹⁸ Ovum, 2009

as that deployed at Telenor Norway¹⁹ during evenings and weekends, enables operators to effectively manage peak loads. For the consumer, more bandwidth at off-peak hours or a cheaper tariff is the incentive.

- ▶ **Location-based service models:** Traffic patterns over the past two years demonstrate that the most congested cell sites are in urban centres. The question for operators is how to best match service pricing models to capital investment and ongoing data opex. Indeed, implementing charging models based on congestion is commonplace – central London’s congestion charge zone levies a fee on all vehicle traffic in the most jammed parts of the city. Could operators implement a similar model if guaranteed quality of service is the outcome?
- ▶ **Quality of service models:** Guaranteed QoS comes at a cost to operators, especially in mobile networks where bandwidth is necessarily a shared resource. But the emergence of ‘bandwidth boost’ models– whereby a user is offered a short-term increase in bandwidth for a set fee for example – provide the opportunity to implement service level agreements.
- ▶ **Ad-funded solutions:** Mobile advertising is beginning to emerge as a viable revenue source for operators. With subscriber privacy concerns now being addressed through governance rules and opt-in policies that protect personally identifiable data, mobile advertising could create shared revenue streams for the operator, personalised offers for the consumer, and brand awareness for the advertiser.
- ▶ **Mobile commerce driven:** Japan’s NTT DoCoMo offers insight into a commerce-driven approach, with an open ecosystem driving adoption and consumer spending on services. Leading mobile Internet players including Yahoo! Japan have developed a viable market for content, services, and mobile advertising in partnership with mobile operators.²⁰

POLICY CONTROL & QUALITY OF SERVICE

Tiered pricing and guaranteed quality of service are ultimately underpinned by network, application, and subscriber policy control. They cannot be done through a charging and billing mechanism alone.

However, operators have educated an increasing majority of smartphone and dongle users that all-you-can-eat plans are the normal pricing model. The lack of sustainability in this model means that operators face tough decisions about future pricing and service models. Wireless spectrum is a finite resource but ‘leaving the tap open’ does not treat it as such.

Policy control and quality of service go hand-in-hand in educating consumers about their mobile data usage and the network effects of their behaviours. The introduction of policy clients for smartphones, such as Bridgewater Systems’ ‘myPolicy™’ application, gives consumers real-time control over their data usage for the first time. ‘Capping’ as a network congestion management strategy is still important but a blunt tool – myPolicy enables a fine-tuned response, both educating users about their behaviour and enabling self-regulation.

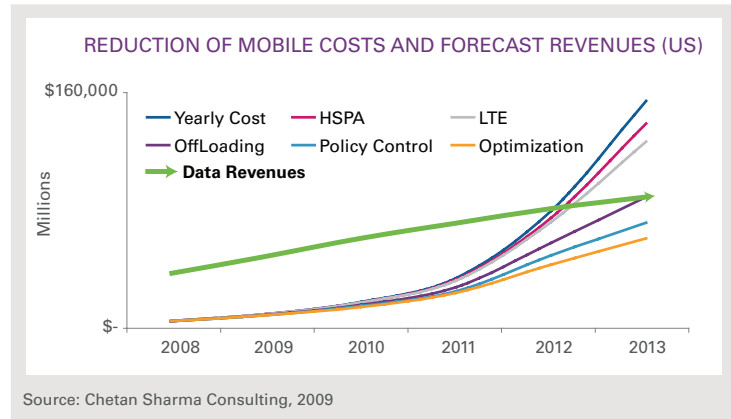
¹⁹ Ovum, 2009

²⁰ Morgan Stanley, 2009

COMPARATIVE BUSINESS MODEL SCENARIOS

Comparative cost reduction strategies, when placed alongside the new service models now being introduced, aid the development of sustainable business models for the mobile industry (see Figure 9). But pricing models will ultimately determine future success and growth in the sector. Unsustainable all-you-can-eat data plans will evolve to include flexible and innovative pricing models as described above.

Operators now have the power to implement service models based on their network maturity and market situation:



Source: Chetan Sharma Consulting, 2009

Figure 9: Reduction of Mobile Costs Under Various Scenarios

- ▶ **Mature, saturated markets with LTE deployment:** Operators deploying LTE in mature markets will achieve cost reduction through network evolution that lowers the cost-per-bit for mobile data. Founded on policy control and subscriber data management, tiered and personalised pricing coupled with usage transparency will hand the control to users to self-regulate their behaviour and ensure long term mobile data sustainability.
- ▶ **Mature, saturated markets without LTE:** European operators seeking to sweat HSPA infrastructure investment will invest in network capacity while deploying policy control and data offload to manage traffic. Consumer pressure is likely to ensure that tiered service plans are deployed for only the heaviest users.
- ▶ **Developing markets:** Operators in China, India and other countries now deploying a 3G architecture are rolling out real-time pre-paid and casual usage plans, as well as promotional offers to encourage data use while managing huge subscriber growth.
- ▶ **Hybrid 3G WiMAX operators:** In emerging markets such as the Middle East and Eastern Europe, operators are offloading both consumers and backhaul to the WiMAX network, which has a far lower cost-per-bit for data delivery. With even greenfield mobile operators reaching capacity, WiMAX offers an important vent in the system and fast data rates.
- ▶ **Operators with Wi-Fi entities:** Wi-Fi growth of multiple hundreds of per cent is forecast in urban centres with a high penetration of smartphone users. Those multi-play operators with a Wi-Fi network or Wi-Fi partnerships will realise large cost savings by offloading data traffic to a hotspot when consumers are in range. Moreover, revenue-sharing opportunities exist for mobile operators.

5. Conclusion

The rapid growth in data traversing mobile networks over the past two years has been a boon to the industry. The breakdown in cost barriers driven by flat-rate data plans, the introduction of next generation smartphones, and easy-to-use laptop dongles have fundamentally changed the industry for the better.

Service revenues are up and an ever increasing proportion of mobile operator profits now come from data, especially in mature markets such as the US, Western Europe, and Japan.

However, the cost of this rapid growth cannot be ignored. User experience has suffered on congested networks, with operators forced into significant upgrade expenditure in recent months. Consumers, who are now more reliant on their handheld devices and connected laptops than ever before, have complained of slower network speeds and dropped sessions. It is an unacceptable scenario for end-users and operators alike.

Network congestion management strategies including infrastructure evolution, data traffic offload to Wi-Fi, femtocells, and WiMAX, and especially policy control offer a more sustainable model for the future. But this must be complemented by an exceptional user experience.

The key to long term viability, however, is not just in the cost side of the equation – operators have the opportunity to evolve flat-rate data plans into new service models that take into account both network resources and consumer usage models. Tiered and usage-based service approaches are inevitable, even if short-term consumer reaction makes the headlines.

Education lies at the heart of this process – the industry now enables flexible, dynamic, and personalised pricing models that are based on real sustainability. It is now operators' responsibility to introduce these models with quality of service guarantees that are based on users modifying their behaviour.

Japan offers a window into the future, with operators having deployed fast mobile broadband to the vast majority of the country both profitably and with high quality of service levels. The operators have done this by underpinning their open ecosystem with tiered flat-rate pricing and policy control.

Japanese operators offer a sustainable model

Japanese operators have led the world in development of 3G and mobile broadband services. Rich content, including video, applications and location-based services are often said to be five years ahead of the US market. Advanced 3G networks and tiered flat-rate pricing drive huge adoption of Internet-enabled handsets in the country. Over 90 per cent of Japanese mobile consumers, including those on NTT DoCoMo and KDDI, have a 3G connection.

The economics stack up too, with a total market value for mobile Internet estimated at \$43 billion by Morgan Stanley and a 14 per cent year-on-year growth in 2008. An average spend per user of \$425 on mobile Internet access and services leads the world.

Incremental revenue from mobile advertising and user-friendly storefronts is a mature market in Japan. Indeed the success of NTT DoCoMo's i-mode storefront and ecosystem has offered a real business model for mobile data. While mobile data access revenues have fallen as a percentage of total spend since 2002 in Japan, the highly developed ecosystem has enabled the provision of profitable mobile commerce solutions, advertising and premium paid-services.

Apple's iPhone and iTunes store leads the way in the rest of the world but Japan is the window into the future.

Bridgewater Systems, the mobile personalization company, enables service providers to efficiently manage and profit from mobile data services, content and commerce. The company's market leading mobile personalization portfolio provides a real-time, unified view of subscribers including entitlements, devices, networks, billing profiles, preferences and context. Anchored by Bridgewater's Subscriber Data Broker™, the portfolio of carrier-grade and standards-based products includes the Bridgewater® Service Controller (AAA), the Bridgewater® Policy Controller (PCRF) and the Bridgewater® Home Subscriber Server (HSS). More than 140 leading service providers including America Movil, Bell Canada, Clearwire, Cox, Hutchison Telecom, Iusacell, Scartel, SmartTone-Vodafone, Sprint, Tata Teleservices, Tatung, Telmex, Telstra, and Verizon Wireless use Bridgewater's solutions to rapidly deliver innovative mobile services to over 150 million subscribers. For more information, visit us at www.bridgewatersystems.com.

Bridgewater Systems

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www.bridgewatersystems.com

Company Headquarters

303 Terry Fox Drive
Suite 500
Ottawa, Ontario
Canada K2K 3J1

P: +1 613 591 6655
F: +1 613 591 6656

European Office

Albany House
324/326 Regent Street,
Suite 404, London,
United Kingdom W1B 3HH

P: 44 (0) 118 925 3298
F: 44 (0) 118 925 3299

Asia Pacific Office

Suite 211/250 Pitt Street
Sydney, NSW,
Australia 2000

P: + 61 2 9283 2313
F: + 61 2 9283 3738

U.S. Office

280 Madison Avenue,
Suite 912
New York, NY
United States 10016

P: +1 866 652 0471
F: +1 613 591 6656