

Bangladesh Telecoms Sector Challenges & Opportunities



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Executive Summary

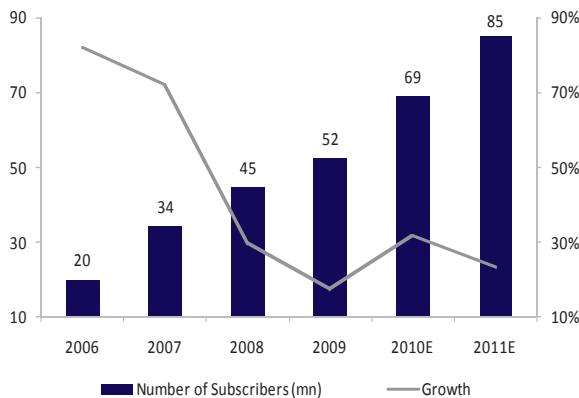
- The Telecoms sector in Bangladesh has seen growth in mobile penetration that has exceeded all expectations with over 65.1 million subscribers as of September 2010 versus only 4 million in 2004. We believe that with a supportive regulatory environment, crossing 100 million subscribers by 2013 is achievable.
- The rapid growth in mobile telephony has undoubtedly had a transformative impact on the economy in terms of aggregate investment, FDI and productivity levels. There have also been substantial benefits from greater connectivity in terms of social cohesion and poverty alleviation.
- However the industry also faces a number of uncertainties, including upcoming Telecom license renewals which expire in 2011 and the prospective auction/issuance of 3G licenses where the cost of the licenses and capex requirements are still unclear.
- A further key challenge is the slowdown in revenue growth, as subscriber growth is netted out by falling voice tariff and the lower spending patterns of new users.
- A potential constraint on the next phase of growing subscribers further is the high level of taxation on the sector. The recent amendments to the Telecoms Act might also increase the risks of arbitrary regulatory interventions.
- Greater internet penetration is of particular relevance to Bangladesh given the priority given to “Digital Bangladesh” by the Government. This initiative offers a number of potential revenue enhancing opportunities to Telco operators.
- Fixed line penetration continues to be low and so the opportunity lies with mobile, for voice and for data. Most people’s first experience of the internet will be mobile.
- With India’s 3G auctions having been completed on 19 May 2010 and service delivery under roll out process, we believe there are a number of valuable lessons for the prospective evolution of 3G markets in Bangladesh.
- 3G networks are expected to significantly enhance user experience of existing data services, with the introduction of video and other high bandwidth services by carriers; to help 3G really gain adoption among consumers, development of a mobile VAS ecosystem is critical.
- One of the key areas where operators, equipment vendors and value added service providers in the industry are focused is the rising importance of convergence and its impact on consumer spending patterns.
- In this report, we provide both an outline of the sector including the major players, data, VAS, regulatory issues and future opportunities. We hope it is a useful tool for current and future prospective investors.



The almost exponential growth in the Telecoms sector in Bangladesh in the last 5-10 years has had the same transformative impact on Bangladesh's economy as the growth of Ready Made Garments and Remittances. As well as being the largest contributor to Foreign Direct Investment and tax revenues, the catalytic effect of rapid mobile penetration on increasing the quality of life of tens of millions of people has been significant.

We would emphasize at the outset that the bulk of this report focuses on the Mobile Phone Operators given that they form the dominant part of the Telecoms sector by revenues, employment and coverage. However we do provide a brief summary of Wimax, Internet Service Providers (ISPs), Fixed Line Companies and other Telecoms players and we intend to provide fuller analysis in a future report.

Exhibit 1 : Mobile Subscribers



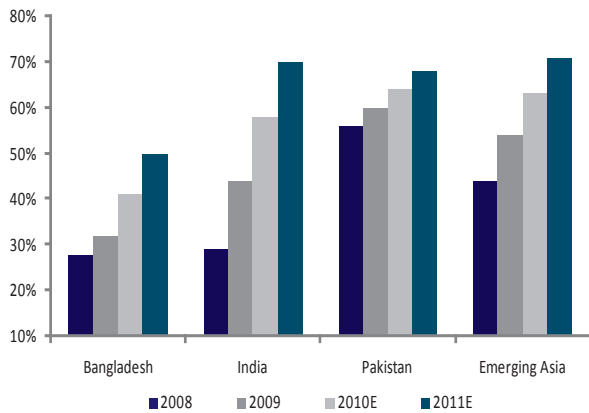
Source: AT Capital Research & BTRC

As at September 2010, the BTRC has reported that there are 65.14 million mobile subscribers in Bangladesh and with competition in the sector intensifying, one would expect the rate of growth to remain strong going forward.

However, Bangladesh still lags a majority of other countries in the region in terms of mobile penetration, most notably Pakistan. The chart below illustrates, the potential to cross 100mn subscribers by 2013 is not unrealistic, particularly if the relatively high level of taxation on SIMs is reduced by the Government.

Grameenphone's IPO is coming up for its first anniversary in which it emerged as the largest listed company by market capitalization. With at least one, and possibly two, further Telecoms companies set to also IPO in the next 12-18 months, the sector is likely to see greater interest from both domestic and international investors. Foreign fund managers also

Exhibit 2 : Wireless Penetration

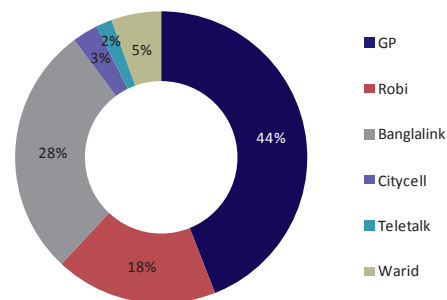


Source: AT Capital Research & BTRC

tend to give greater importance to more effective corporate governance and financial transparency, a feature of the sector in part because of the ownership of the majority of players by international Telecoms companies.

Recent M&A activity has also increased the competitive dynamics in the sector. Bharti Airtel, India's largest Telecoms Company purchased a majority stake in Warid, the number 4 Bangladeshi player, in January 2010. There are strong expectations that Bharti will provide significant competition for the existing Top 3 of Grameenphone, Banglalink and Robi (formerly AKTEL) by leveraging its experience in India in terms of rural penetration and its portfolio of VAS and data products. It also is expected to invest substantially in improving network infrastructure having announced an agreement on 7 October 2010 with Ericsson and Huawei. The fact that Singtel, the 32% shareholder in Bharti, also owns 45% of number 5 operators Citycell, also suggests one prospective route to much anticipated industry consolidation.

Exhibit 3 : Mobile Market Shares as of Sep' 2010



Source: BTRC

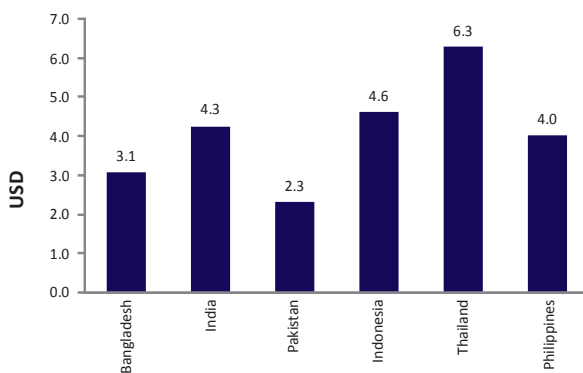


In terms of future industry challenges one of the immediate issues is one of regulatory uncertainty as the Government has not yet announced the renewal process or cost for the licenses of four (GP, Banglalink, Robi and City Cell) of the 6 Telcos that expire in 2011. In addition, there is a lack of clarity about the timing and process of 3G auction licenses. This needs to be resolved reasonably quickly if future investment plans by the existing Telcos are not to be delayed. A particular concern is that with the 3G auction licenses in India generating \$ 14.7 bn in revenues for the Government of India, whether the Bangladesh government sets license renewal fees so high as to reduce the growth of 3G networks in Bangladesh. There is clearly, in our view, a balance between the revenue objectives and the developmental benefits of continued rapid mobile subscriber growth and internet/broadband penetration. This is highlighted in the Chapter on the economic benefits of Telecom and Broadband in this report.

A broader challenge for the industry is one of maintaining revenue growth as Average Revenue Per User (ARPU) continue to decline. The next phase of mobile subscriber additions is likely to be focused on rural subscribers, who are more price sensitive than those in urban sectors. They have with a greater propensity to hold multiple SIMS and engage in carrier switching/arbitrage for the best rates and hence lower marginal spending.

There are four main areas we expect Telcos to look for revenue enhancement. Firstly greater development, promotion and focus on Value Added Services and investment in a broader VAS “ecosystem” perhaps with common applications platforms. In this report we outline VAS opportunities in Agriculture, Financial Services/Mobile Banking, Healthcare and E-Commerce.

Exhibit 4: Regional ARPU (USD)



Source: Source: AT Capital Research & BofAML Global Research Estimates

But entertainment, games and infotainment are also set to develop rapidly given that the median age of Bangladesh’s population is 23.3 years with 65% under the age of 25.

The second area that mobile companies are likely to increasingly focus on for new incremental revenues is in data. It is currently estimated that the 4-4.5 mn internet users in Bangladesh, with 90% accessing the internet via mobile based delivery systems such as GP’s Edge and GPRS. However, we expect two factors to increase internet penetration rapidly. One is the prospect for new 3G networks that yield faster speeds and a better user experience. Secondly, we expect as part of the Digital Bangladesh initiative, the government will substantially reduce the wholesale cost of broadband. This reduction is likely to be largely passed on by Telco companies which will support revenues as volumes increase. Clearly this will also require the development of more Bangladesh relevant/ local language content to stimulate demand. Also the relatively high cost of smartphones might also be a constraint but we also anticipate handset manufacturers, such as Samsung and Nokia, will both reduce the price of such handsets for nascent EM such as Bangladesh and also enhance the data capabilities of less expensive non-smartphone handsets.

A third major opportunity for all the Telecoms companies is to target the rapidly growing business segment by developing more focused Enterprise products. In India, the top 5% of mobile subscribers generate 25% of revenues, and large corporates are a major proportion of that. We expect the greater maturity and sophistication of Bangladeshi companies to offer new opportunities to those Telecoms companies that are able to offer customized products for marketing, distribution as well greater internationalization.

A fourth opportunity is convergence which, as a theme has had a profound effect on Telecoms markets in more developed countries, but has yet to have an impact on Bangladesh. But we believe Telecoms companies have an opportunity to diversify revenues into new areas such as content development for data and VAS and even investment in media companies in Bangladesh. With the arrival of 3G and faster mobile-based data networks IPTV (internet based TV) and “I-Tunes” type music retail services is likely to become a bigger potential source of revenues given the growing significance of the youth market in Bangladesh.



Although it is estimated that for market leader GP non-voice only constitutes 5% of revenue, we expect this to increase rapidly, albeit from a low base, in the next few years. This expectation is echoed by other market players and especially new entrants. Atul Bindal, president of Mobile Services of Bharti Airtel, stated in a press conference on Oct 7 in Dhaka that “Two things are now crucial to strengthen our presence in the Bangladeshi market...One is to ensure better quality of our voice services and the other is to tap the potential demand for non-voice services in the remotest region... For example, there is a huge demand for m-commerce, internet and healthcare services through mobile telephony in the rural areas”.

We believe that at least one merger is likely in the next 12-18 months, namely Bharti Airtel and City Cell. Aggregating spectrum is perhaps the key attraction for Bharti to consider this. We also find it hard to see Teletalk, the government owned Telco company sustainably growing without either a JV with a large foreign Telco (there had been some talk of a Vietnamese Telecoms company being interested), or potentially a merger with either Robi or Banglalink. Overall, an industry where only one player, GP, is making a regular acceptable return on equity and the other 5 are either losing money or are only marginally profitable, is an unsustainable equilibrium.

It seems likely that the market share of the current Top 3 players (GP, Banglalink and Robi) will come under pressure from Warid/Bharti's likely aggressive push for market share in 2011. But we continue to re-iterate that mobile subscriber growth can more than offset declining ARPUs and, combined with growing non-voice income opportunities, see aggregate industry revenues increasing. Despite the rapid growth in recent years, our key message in this report is that the Bangladesh Telecoms is far from a mature industry with substantial new opportunities for all market participants and hence prospective investors. While there are many challenges, we believe that the successful development of the sector will remain a key element in the next phase of growth of the Bangladesh economy towards Middle Income Status.



Chapter - 01

Challenges & Opportunities

- The Bangladesh Telecoms sector's growth has exceeded all expectations and has had a transformative impact on the economy in terms of aggregate investment, FDI and productivity levels.
- A successful implementation of the Digital Bangladesh Initiative is likely to not only play a key role in laying the foundation for 8%+ growth in the economy, but also offer a number of potential revenue enhancing opportunities to Telcos.
- There are likely to be Public Private Partnerships (PPPs) opportunities for Telcos to partner up with the Government of Bangladesh (GoB) in service delivery across the areas of e-education, e-health and e-governance.
- The GoB might enact more Telecoms friendly regulatory or fiscal reforms to encourage faster mobile phone penetration to catalyze access to information. Bangladesh's Telecoms sector already suffers one of the highest tax rates in the world.
- One of the key factors that is impeding Mobile phone penetration in Bangladesh is the BDT 800 SIM tax. This compares with PKR 250 in Pakistan where mobile penetration at 60% is more than 1.5 times that in Bangladesh.
- We believe there is a strong case for GoB to substantially reduce broadband wholesale prices further to also accelerates broadband access and penetration across the population.
- The push to develop Information Technology Enabled Service (ITES) and Outsourcing might present new business opportunities and scope for diversification by the Telcos.
- However, one major challenge is regulatory uncertainty. The BTRC has yet to announce the terms on which the Telecom Licenses of the top 4 players, GP, Banglalink, Robi and Citycell will be renewed when they expire in 2011. This has hindered further capex investment by the Telecoms sector.
- Another area of uncertainty is the terms on which 3G licenses will be issued. The upcoming 3G spectrum allocation is expected to take place in 2011. In the context of delivering a Digital Bangladesh, ensuring a balance in having reasonable 3G license renewal costs to incentivize operators to invest in networks and infrastructure to ensure broader fast 3G data delivery is important.
- We also discuss some of the key drivers of mobile penetration growth. These include: 1) Relative wealth of the market - GNP per capita adjusted for purchasing power parity (PPP), and the distribution of wealth; 2) Quality, availability, and pricing for wire line services; 3) Innovative service offerings ; 4) The intensity of competition; 5) The price of a handset; 6) Acquisition price of a SIM
- With 3G and provision of data services, we expect the Mobile Telecoms sector (being largely foreign owned), to continue to be the highest contributor to FDI.



Overview

The Telecoms sector in Bangladesh, as is the case in many other developing countries, has seen growth in mobile penetration that has exceeded all expectations. It has undoubtedly had a transformative impact on the economy in terms of aggregate investment, FDI and productivity levels. There have also been substantial benefits from greater connectivity in terms of social cohesion and poverty alleviation. There is likely to be a whole new wave of innovations in Value Added Services as well as Data for Telecoms players. The Government of Bangladesh's commitment to a "Digital Bangladesh" is also likely to present major opportunities for the sector.

Additionally, the IPO of Grameenphone, the largest Telecoms player, and indeed the largest corporate by value in the country, in November 2009, has also seen the Telecoms sector take on much greater significance in Bangladesh's capital markets development.

With market expectations growing of further IPOs from other Telecoms players such as Banglalink, Robi and Teletalk, as well as potential industry consolidation, the sector's focus for investors, both locally and internationally is set to grow further.

In this report, we provide both an outline of the sector including the major players, data, VAS, regulatory issues and future opportunities. We hope it is a useful tool for current and future prospective investors.

A Brief History of the Bangladesh Telecoms Sector

The Bangladesh Telegraph and Telephone Board, the state owned Telco company, was formed in 1971, shortly after the emergence of Bangladesh as a sovereign nation after the War of Independence that year. In 1989 three telecoms licenses were issued, including one mobile license. But it was really with the allocation of a further three licenses in 1996, that competition in the Bangladesh Telecoms sector became meaningful. And the explosion of Telecoms penetration in the last decade has been extraordinary. Bangladesh's telecom market is growing at a CAGR of 53.8% in the last four-year period 2005-2009. The year-on-year growth rate has slowed recently, to 17.5% in 2009 as Telco operators were less aggressive in SIM

tax subsidies, but accelerated sharply in the first half of this year and by the end of September 2010 there were a total of 65.14 million cellular customers, up by 29.24% in the preceding twelve months. By that date wireless penetration had crossed 38%.

Exhibit 6 summarizes the timeline for the evolution of Bangladesh's Telecoms sector. Exhibit 7 summarizes the extraordinary growth of the Telecoms sector globally. What is noteworthy is the dramatic shift in mobile penetration growth to developing countries led by China and India.

Key Future Challenges and Opportunities for Telecoms

In the rest of this report, we discuss in more detail some of the major challenges and opportunities for the Bangladesh Telecoms Sector. We would emphasize at the outset that the bulk of this report focuses on the Mobile Phone Operators given that they form the dominant part of the Telecoms sector by revenues, employment and coverage. However we do provide a brief summary of Wimax, Internet Service Providers (ISPs), Fixed Line Companies in Appendix 1 and other Telecoms players in Chapter 8, for which we intend to provide fuller analysis in a future report.

One of the major new initiatives in 2010 has been infrastructure sharing agreements between GP and Banglalink, GP and Robi, and Robi and Banglalink. We expect this trend to continue partly enforced by the regulator but as a matter of practical necessity. In Chapter 9 we summarize some of the recent thinking among Telecoms consultants on the cost-benefit analysis of infrastructure sharing. Operators across the world, particularly so in developing markets, face challenges in sustaining margins with declining ARPU. Population distribution patterns in developing markets complicate the situation since access to telecom services vary significantly between urban and rural areas. Operators in these countries need to balance the cost of operations in congested and saturated urban setups with the costs of new network rollouts in other areas. In this context, tower sharing offers a compelling proposition for savings costs and reducing time-to-market.



Exhibit 5 : Snapshot of Bangladesh Telecom Operators

	GRAMREENPHONE	BANGLALINK	ROBI	WARID	CITYCELL	TELETALK
Start of Operation	1997	1997	1997	2007	1993	2005
Ownership Structure	Telenor 55.8%	Axiata Group 70%	Wairid Telecom 30%	Singtel 45%	Government 100%	
Subscribers in Million (August,10)	Grameen Telecom 34.2%	Orascom 100%	NTT DoCoMo 30%	Bharti Airtel 70%	Far East Telecom 24%	
Market Share % (August,10)	Public & Institutions 10%			Pacific Group 31%		
Net Subscribers Additions in million (2009)	27.9	17.5	11.5	3.4	2.0	1.1
Market Share of Net Addition (%)	44.0%	27.7%	18.1%	5.4%	3.1%	1.8%
Standard/Frequency	2.27	3.54	1.09	0.66	0.14	0.09
Technology	29.14%	45.44%	13.99%	8.47%	1.80%	1.16%
Network Coverage	GSM: 900/1800	GSM: 900	GSM: 900	GSM: 1800	CDMA 800	GSM: 900/1800
No. Cell Sites(December 2007)	22 MHz	17.5MHz	17.8MHz	15MHz	10MHz, 7MHz	15.2MHz
Key Financials (Q2, 2010)	GSM, GPRS,EDGE	GSM, GPRS,EDGE	GSM, GPRS,EDGE	GSM, GPRS,EDGE	CDMA20001x, EVDO	GSM, GPRS,EDGE,EGSM
Revenue (USD mn)	89% Geographical	79% Geographical	n/a	n/a	n/a	n/a
Growth (%)	99% Population (as of June 2010)	90% Population (as of June 2010)	84% Population (as of June 2010)	64 Districts (as of March 2009)	64 Districts -More Than 500 Thanas (2009)	64 Districts-402 Upazilas (2009)
EBITDA (USD mn)	More than 12,700	5,719	4,875	1,700	n/a	n/a
EBITDA Margin (%)						
Key Metrics (Q2, 2010)						
Gross ARPU (USD)	270.1	114.7	90.1	n/a	n/a	n/a
Monthly Churn (%)	10.0%	14.9%	5.0%	n/a	n/a	n/a
	114.7	31.1	31.0	n/a	n/a	n/a
	42.0%	27.1%	34.4%			
	3.47	2.47	2.69(prepaid)	n/a	n/a	n/a
	1.3%	2.1%	n/a	n/a	n/a	n/a

(1) Includes additional spectrum bought in 2008. GP—7.4MHz, Banglalink—5.1MHz, Robi—5.0MHz.

(2) Source: BTRC.

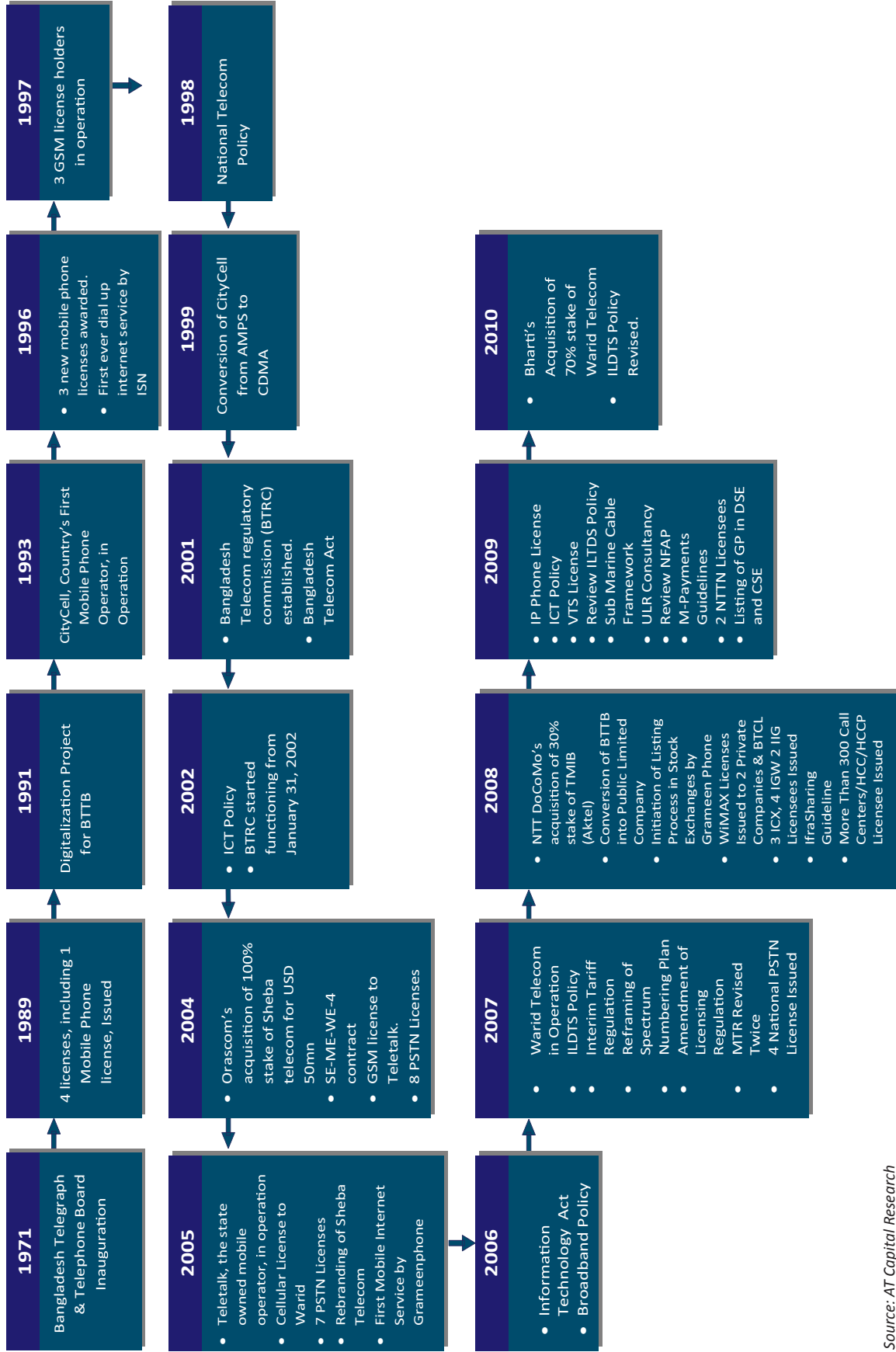
(3) Source: GP from Company, Robi from Axiata presentation Q2'2010, Banglalink from Orascom 1st half 2010 Report.

(4) Source: GP from Company as of Q2 2010, Robi from Axiata Q2 2010, Banglalink from Orascom Q3 2009 reports & Other for respective web sites.

(5) AT Capital Research



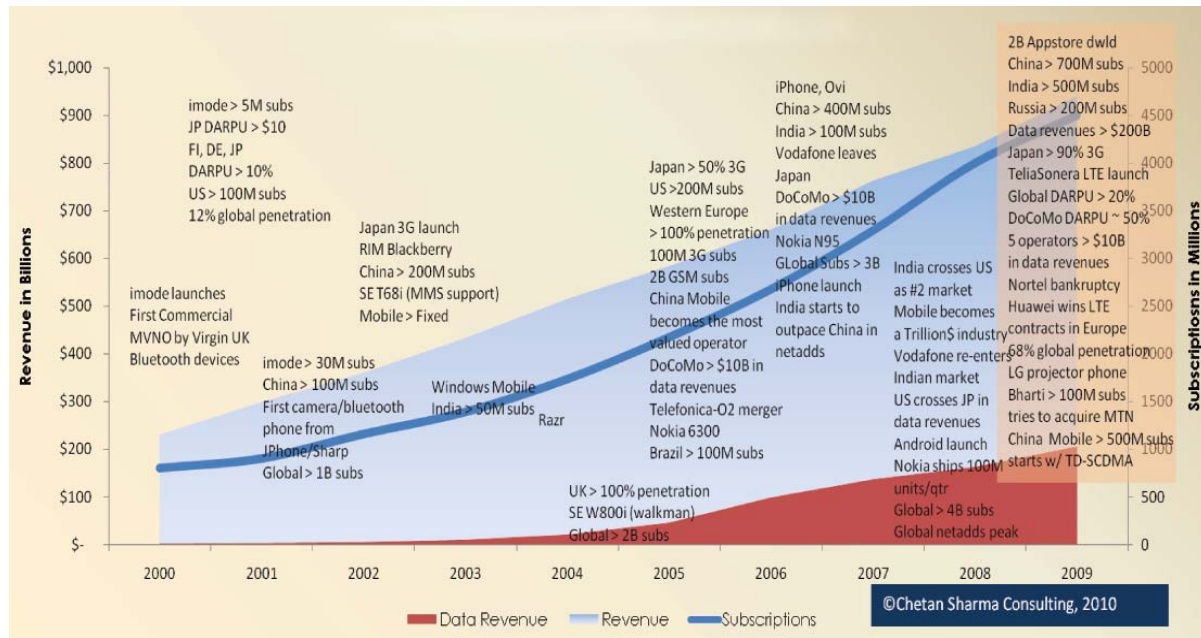
Exhibit 6 : A Timeline of the Evolution of Bangladesh Telecoms



Source: AT Capital Research



Exhibit 7 : Global Mobile Industry : The Last Decade



Source: Chetan Sharma Consulting, 2010

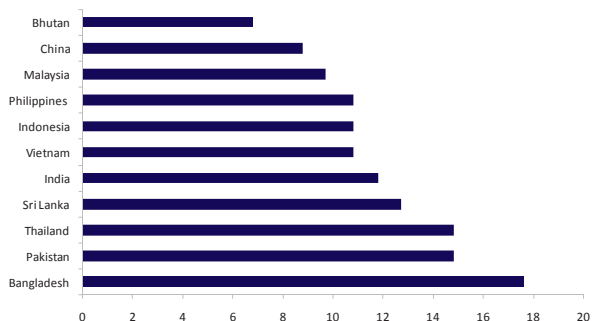
Digital Bangladesh as a catalyst to Broadband/Data

In Chapter 3 the focus on the potential transformative benefits of greater broadband internet penetration is of particular relevance to Bangladesh given the priority given to “Digital Bangladesh” by the present Government. This initiative offers a number of potential revenue enhancing opportunities to Telco operators:

- 1) There are likely to be Public Private Partnerships (PPPs) opportunities for Telcos to partner up with the Government of Bangladesh (GoB) in service delivery across the areas of e-education, e-health and e-governance.
- 2) The GoB might enact more Telecoms friendly regulatory or fiscal reforms such as cuts in the SIM tax to encourage faster mobile phone penetration to catalyze access to information and hence the Digital Bangladesh push. As we highlight in Chapter 6 on taxation, and illustrated in the chart below, Bangladesh’s Telecoms sector already suffers one of the highest effective tax rates in the world.
- 3) We believe there is a strong case for GoB to substantially reduce broadband wholesale prices further to also accelerates broadband access and penetration to a broader range of the population. This might be done in conjunction with the installation of a second submarine broadband

cable link which itself might be done under a PPP. In addition to adding more capacity to accommodate greater demand triggered by lower internet prices, a second cable would critically leave Bangladesh less vulnerable to service disruptions it has faced in recent years when problems arise with one cable. An additional option favoured by some industry experts is a direct line extension line taken from India for additional broadband capacity that has the advantage of being considerably quicker (perhaps only 3-6 months to install) and cheaper.

Exhibit 8: Tax as proportion of Total cost Mobile Ownership (TCMO) (in %)



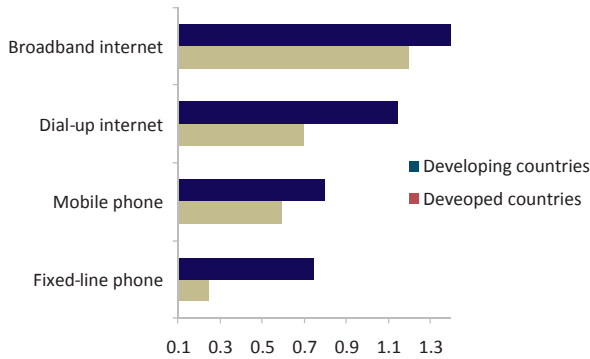
Source: “Global tax review 2006-07 by Deloitte

- 4) The push to develop Information Technology Enabled Service (ITES) and Outsourcing might present new business opportunities and scope for



diversification by the Telecoms companies. It is noteworthy that such a strategy has been adopted by market leader GP who have established GP IT as a separate company and one that is already the largest information technology company in Bangladesh with around 300 employees.

Exhibit 9 : Tax as proportion of Total cost Mobile Ownership (TCMO) (in %)

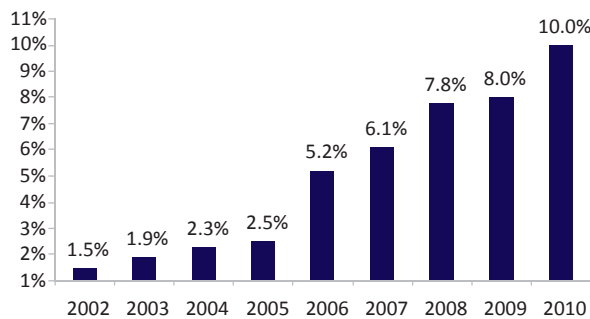


Source: "Global tax review 2006-07 by Deloitte"

License Uncertainty and 3G Opportunity

The BTRC has yet to announce the terms on which the Telecom Licenses of the top 4 players (GP, Banglalink Robi and Citycell) will be renewed when they expire in 2011. This has hindered further capex investment by the Telecoms sector. Telecoms are also a major contributor to National fiscal Revenues and so it is in the interests of the Government to keep the sector expanding. In addition it has been the largest source of FDI for Bangladesh.

Exhibit 10 : Telecom Sector as % of Total Tax Revenue



Source: AMTOB & NBR

Telecoms companies need clarity on process and terms of license renewal. In chapter 7 we discuss both 3G

license and other issues such as number portability.

There is uncertainty on the terms on which 3G licenses will be issued. The upcoming 3G spectrum allocation is expected to take place in 2011. The original deadline by the BTRC was in March 2008. In January 2010, the allocation will be done either by auction or beauty contest. It is understood that telecom regulator BTRC is going to allocate available (45 MHz) spectrums to four prospective operators. It is expected that five operators Grameenphone, Banglalink, Robi, Citycell and Warid will contest for three licenses, unless green field operators are also made eligible. The fourth license is reserved for the state run mobile operator Teletalk.

Another important issue is the cost of 3G licensing. During the launch of a trial 3G network by Ericsson in August 2008, BTRC ex-chairman Maj Gen (retd.) Manzurul Alam put a valuation of USD 200mn on the licenses. The Indian 3G license auctions have just been completed at relatively high valuations. However it might be argued that the Indian 3G license renewal process is less relevant for Bangladesh. As we highlight later in this report, in India much of the 3G spectrum that has been purchased is being utilized to improve service quality for voice given capacity limits rather than increasing data availability and penetration. So in that sense, it has operated as additional 2G frequency rather than 3G service delivery. A theme we come back to several times in this report is that wider broadband internet access has a large potential impact on increasing GDP growth in an economy like Bangladesh. In the context of delivering a Digital Bangladesh, ensuring a balance in having reasonable 3G license renewal costs to incentivize operators to invest in networks and infrastructure to ensure broader fast 3G data delivery is important.

With India's 3G auctions having been completed in 2010 and service delivery under roll out process, we believe there are a number of valuable lessons for the prospective evolution of 3G markets in Bangladesh. The business case for extending a roll-out to densely populated areas, or even for rolling out a network at all, can depend on factors such as spectrum availability. Policy makers need to take into account how regulation can affect business cases for, and hence investment in, wireless broadband networks. Policy that accommodates commercial considerations and regulates accordingly can act as a key enabler of private-sector investment in developing markets. The following areas should be taken into consideration



while outlining the 3G licensing procedure:

- Good competitive practice
- Level playing field
- Rational terms and conditions
- Affordability and commercial viability
- Access to international connectivity and capacity
- Competition, joint volume purchase or both
- Tax/fiscal incentives to build-out networks
- Planning for converged services
- IP transition and NGN
- VOIP and multi-media
- Enabling and Predictable License renewal framework

We summarize some of the key findings from a FICCI BDA paper (3G & BWA: The Next Frontier: Business Models, Projections and Imperatives).

They note that: '3G networks are expected to significantly enhance the user experience of existing data services, with limited introduction of video and other high bandwidth services by carriers; data ARPU of 3G subscribers is expected to be initially dominated by data connectivity charges....to help 3G really gain adoption among consumers; development of a mobile VAS ecosystem is critical.'

While the mobile VAS market has evolved from the earlier on-deck only versions to open access portals, a number of initiatives still need to be undertaken for fully developing this market. The VAS contribution to revenue is upwards of 20% in emerging markets such as China, even without introduction of 3G, as compared to sub 10% in India. Some of the enablers need to come from the regulator and the government for development of a robust VAS ecosystem.

In Chapter 4 we also discuss Convergence and implications for Telecoms players. One of the key areas where operators, equipment vendors and value added service providers in the industry are focused is the rising importance of convergence and its impact on consumer spending patterns.

If service providers build service-converged networks, then financial services, public services, and entertainment applications will be able to reach a far larger portion of the population. This is likely to have major implications for BD Telecoms companies and may lead them to invest in ISPs and also in IPTV, Video and media and also game development as well as domestic web content. This is another potentially

significant revenue opportunity for Telecoms but it has been a major threat to competitive positions in developed economy Telecoms markets as content providers and handset manufacturers, most notably Apple with the I-phone, have leveraged their effective positioning in convergence to gain competitive advantage.

A key strategic consideration for governments is the implication of convergence for competition/market structure in the ICT sector. If developing countries seek to maximize the benefits of convergence, they could consider policies that increase access to advanced technologies and innovative, high-quality services by opening markets and removing regulatory barriers to new technologies and business models

In Chapter 5 we discuss the broad range of VAS opportunities in Bangladesh and discuss in greater detail Agricultural VAS, Mobile Banking, M-Health and M/E-Commerce. As well as driving revenues directly, value added services can enhance performance in other ways. Critically, in a competitive market, they help to build stronger relationships with customers, as customer data can be mined to create customized services that increase loyalty and enhance stickiness.

One of the major new initiatives in 2010 has been infrastructure sharing agreements between GP and Banglalink, GP and Robi, and Robi and Banglalink. We expect this trend to continue partly enforced by the regulator but as a matter of practical necessity. In Chapter 9 we summarize some of the recent thinking among Telecoms consultants on the cost-benefit analysis of infrastructure sharing. Operators across the world, particularly so in developing markets, face challenges in sustaining margins with declining ARPU. Population distribution patterns in developing markets complicate the situation since access to telecom services vary significantly between urban and rural areas. Operators in these countries need to balance the cost of operations in congested and saturated urban setups with the costs of new network rollouts in other areas. In this context, tower sharing offers a compelling proposition for savings costs and reducing time-to market.



Telecoms Fundamentals 101 : Industry Growth and Revenue Prospects Key

As GP only came to the stock market last year, and no other Telecoms companies have yet listed, we believe it is useful to go back to first principals of what drives valuations in Telecoms. The primary revenue drivers for wireless operators are: the potential market for Telecoms subscribers, the competitive environment, which determines an operator’s market share, and the profitability of the subscribers, which is reflected in the average revenue per subscriber (commonly referred to as “ARPU”). Telecoms is inherently a more capital intensive business than many other sectors given the large investment needed for building infrastructure/networks. Thus effective use of capital is another major determinant of valuations in the Telecoms sector.

Annual incremental penetration has been accelerating, with the most meaningful gains in Europe and parts of Asia. In 1998, Italy, Portugal, and the United Kingdom, among others, saw strong incremental penetration rates, which hovered around 10%. In the U.S., incremental penetration in 1998 was roughly 5%; in Canada, roughly 3.5%. The incremental penetration rate represents the growth in the overall wireless subscriber base and is therefore a large determinant of wireless valuations. However as the previous section highlighted, the last 5-10 years has been dominated by mobile subscriber growth in developing countries.

What drives Mobile Penetration Rates?

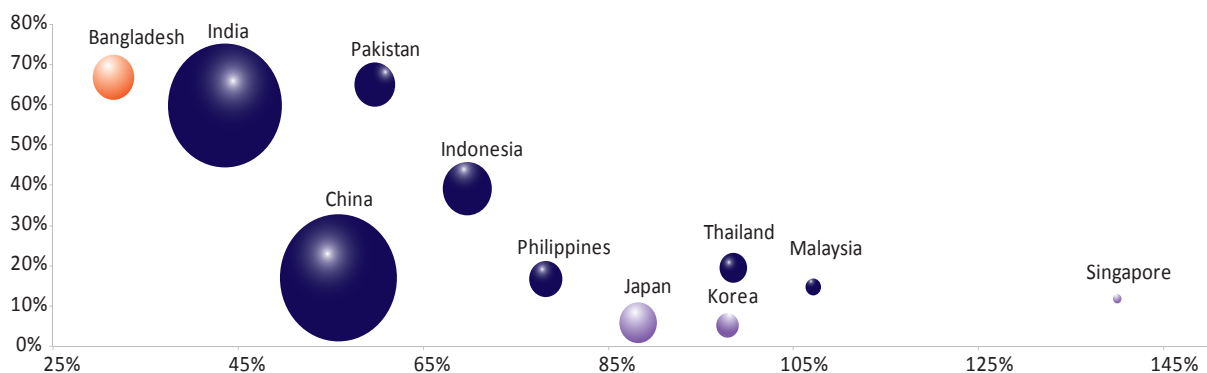
In valuing a wireless company, its potential for subscriber growth is a key element. We believe that the following factors are likely to be the principal drivers of wireless penetration rates:

1. Relative wealth of a market, which we define as GNP per capita adjusted for purchasing power parity (PPP), and the distribution of wealth.
2. Quality, availability, and pricing for wire line services.
3. Innovative service offerings such as prepaid calling, along with calling-party-pays.
4. The intensity of competition
5. Variations between national markets
6. The price of a handset
7. Acquisition price of a SIM

Clearly, additional variables are at work. Some – such as mobility pricing, network quality, network coverage, and customer service – are associated with the operator. Others, of less concern to the average consumer, are set by the regulator: the number of wireless operators allowed, retail price regulation, and the taxation and interconnection regimes, for example. Others depend on aspects of the country’s economy, including GDP growth, the investment environment, geographic distribution of population, cultural issues, and so on.

In landline (wire line) penetration, PPP-adjusted GNP per capita helps to define the addressable market for wireless services, which seems logical, as the wealthier a country, the greater the number of people who could afford wireless (or even wire line) services. We have found a very strong correlation between wireless (and wire line) penetration rates and PPP adjusted GNP per capita. Exhibit 12 for lower and middle income countries with per capita income below USD 10,000 shows a positive relationship between mobile penetration and per capita with an R Sq coefficient of 0.56. However there is considerable variation between countries. Bangladesh appears to have a relatively low level of mobile penetration relative to

Exhibit 11: Mobile Penetration vs. Mobile Subscribers CAGR



Source: AT Capital Research
 Note: Size of bubble denotes relative population of country.



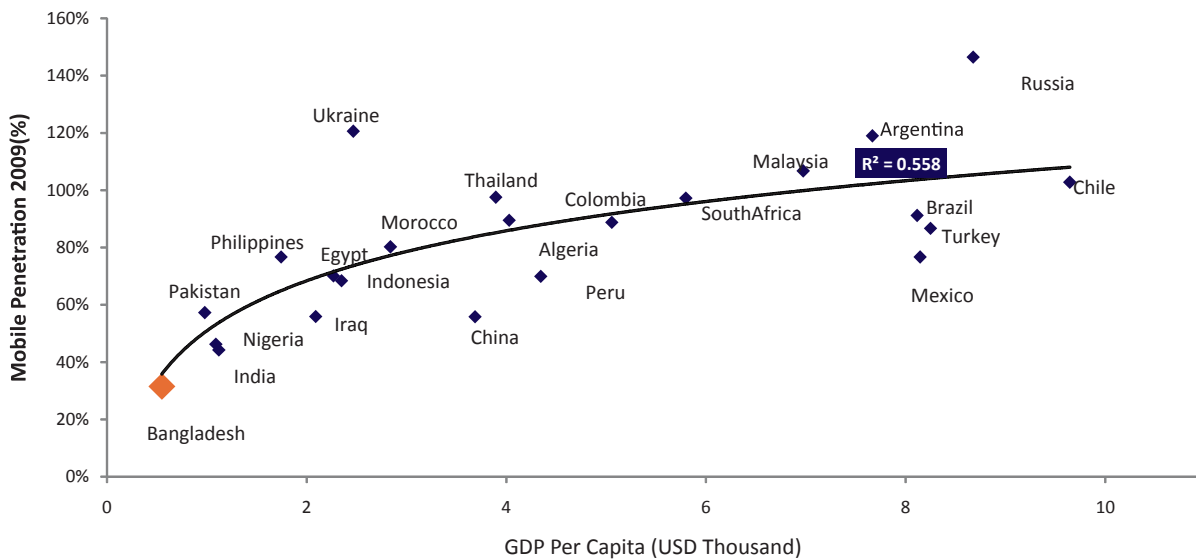
income. However Pakistan, Philippines, Ukraine, and Russia appear to have relatively high penetration rates relative to per capita. This might be explained by cultural factors and a willingness to accept technology more readily. This in part explains the much more rapid mobile penetration growth in the Scandinavian countries in the late 1990s and early 2000 period. However more likely there are other factors such as relative taxation and possibly the levels of taxation. Of course it may also be the case that countries reach “tipping points” where their mobile penetration accelerates. Bangladesh may already be entering such a phase.

pricing for consumers, which in turn should stimulate market demand. On this basis, with 6 competitors and aggressive battles over price, Bangladesh should be well positioned for further strong mobile phone growth.

Quality, availability, and pricing of wire line services affect penetration. In developing countries, for example, a low teledensity of wire line service (normally quoted as the number of residential wire line phones per 100 people) may drive wireless penetration. Long waiting lists for wire line service and/or high connection fees could also increase demand for wireless service as an alternative to wire line. The chart below illustrates that Bangladesh has seen mobile penetration significantly grow rapidly as has been the case in a number of other Asian EM countries.

The intensity of competition has an impact on wireless penetration rates. Typically, the greater the competition (as determined by either the number of competitors or the intensity of competition among the players), the higher the penetration rate (all other variables being equal). The rationale for this is obvious. Greater competition should lead to more attractive

Exhibit 12: Mobile Penetration vs GDP Per Capita (Less than USD 10 Thousand)



Source: AT Capital Research



Exhibit 13: Wireless Penetration of Emerging Asia (%)

	2002	2003	2004	2005	2006	2007	2008	2009	2010E	2011E
Bangladesh			3	7	13	22	28	32	41	50
India	1	3	5	7	13	20	29	44	58	70
Pakistan			5	14	31	49	56	60	64	68
Indonesia	5	9	14	23	30	42	62	70	76	82
Thailand	28	35	42	47	62	81	93	99	102	103
Malaysia	26	44	57	75	74	87	99	106	118	124
Phillippines	19	28	39	41	49	61	73	78	81	83
Emerging Asia	10	13	17	21	27	36	44	54	63	71

Source: BofAML Global Research estimates & AT Capital Research

If an operator has better network coverage and/or a higher quality network, it should (all other things equal) have greater market share. In network coverage, customers want to be able to use their phones everywhere, and the operator that has the best coverage should have a competitive advantage. This has appeared to have helped the largest player in Bangladesh Telecoms, Grameenphone, as they have invested most aggressively with the largest number of base stations. However infrastructure sharing pressures from regulators may also reduce this advantage somewhat although sharing provides a new source of revenue.

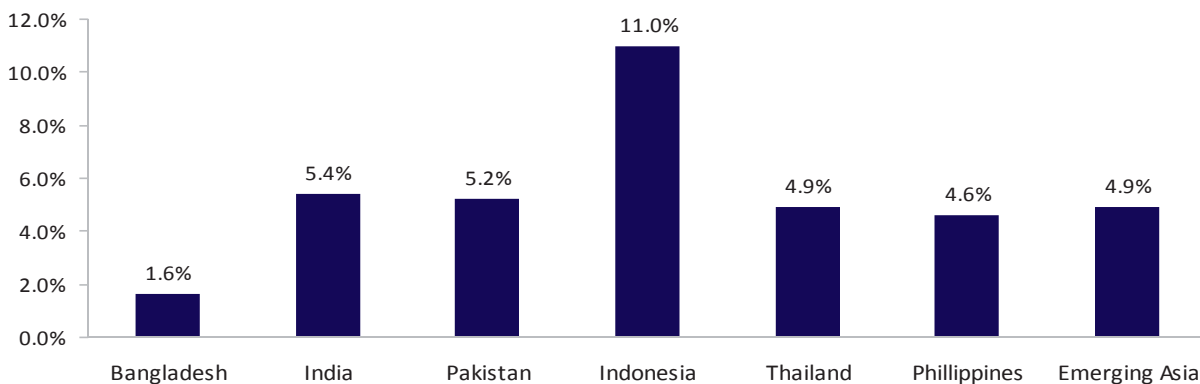
Marketing and the introduction of innovative service offerings are often a major determinant of market share. Examples of innovative offerings include prepaid service, “bucket” minute plans (where customers pay one price for a set number of minutes), and the recently introduced one-rate pricing plans (where roaming and long distance rates are included) in the U.S. Finally, distribution channels will also have a large impact

on market share. The primary distribution channels include direct sales forces, company-owned retail stores, and third-party retailers. Generally speaking, a company with broad distribution capabilities should garner a larger market share.

While many factors influence the value of an operator, the number of subscribers it has is a large determinant of its value. Clearly, the quality of these subscribers — the amount of revenues they generate and the costs necessary to support them — will also have a large impact on value.

Churn also has a large impact on wireless valuations. Churn refers to the percentage of subscribers that discontinue service (either voluntarily or involuntarily). Churn can have a very large impact on valuation because the more subscribers you lose (or churn) the more new (or “gross”) subscribers you have to add to increase or maintain the subscriber base. A company uses marketing dollars and commissions to add new subscribers, and it could be expensive.

Exhibit 14 Monthly churn-Emerging Market 4Q 2009



Source: BofAML Global Research estimates & AT Capital Research

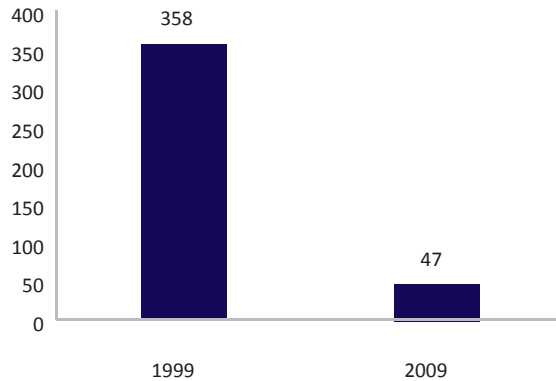
Note: Bangladesh churn rate is calculated by taking market share weighted churn rate of GP and Banglalink as of 2Q 10. Others as of 4Q 09



As a result, assuming it costs all companies the same amount of money to add a new customer, the operator with the higher churn rate would have a lower operating margin, all other things being equal. The average monthly churn rate in the U.S. is 2%–2.5%, and therefore an operator “churns” roughly 25%–30% of its customers each year. The intensity of competition tends to have an impact on churn rates as customers switch from one operator to another due to either price or service.

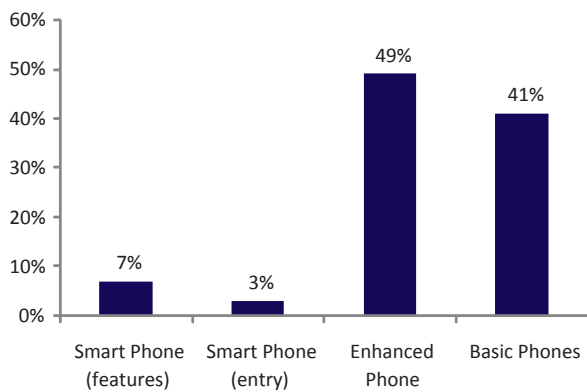
Churn is equal to the number of subscribers that are disconnected divided by the average subscribers during a particular time period. Although operators calculate churn in several ways, they primarily use this industry definition.

Exhibit 15: Real Cost of Phone (USD)



Source: Gartner

Exhibit 16: Handset Sales in Developing Markets 2009



Source: Gartner

SIM Tax Limiting Subscriber Growth

One of the factors that is impeding Mobile phone penetration in Bangladesh is the BDT 800 SIM tax. This compares with PKR 250 in Pakistan where mobile penetration at 60% is more than 1.5 times that in Bangladesh. The Association of Mobile Telecom Operators in Bangladesh (AMTOB) has prepared detailed projections of the prospective growth in Mobile phone penetration as a result of the abolition of SIM Tax. This is outlined below. Another aspect of the AMTOB forecast that more rapid industry growth would more than offset the lost SIM tax to increase the total revenue to the Government as illustrated in the charts below. It seems likely, in our view that SIM tax will be reduced by the current government given their commitment to Digital Bangladesh and an information-enriched society.

Exhibit 17: Revenue contribution under different scenario (SIM Tax/No SIM Tax)

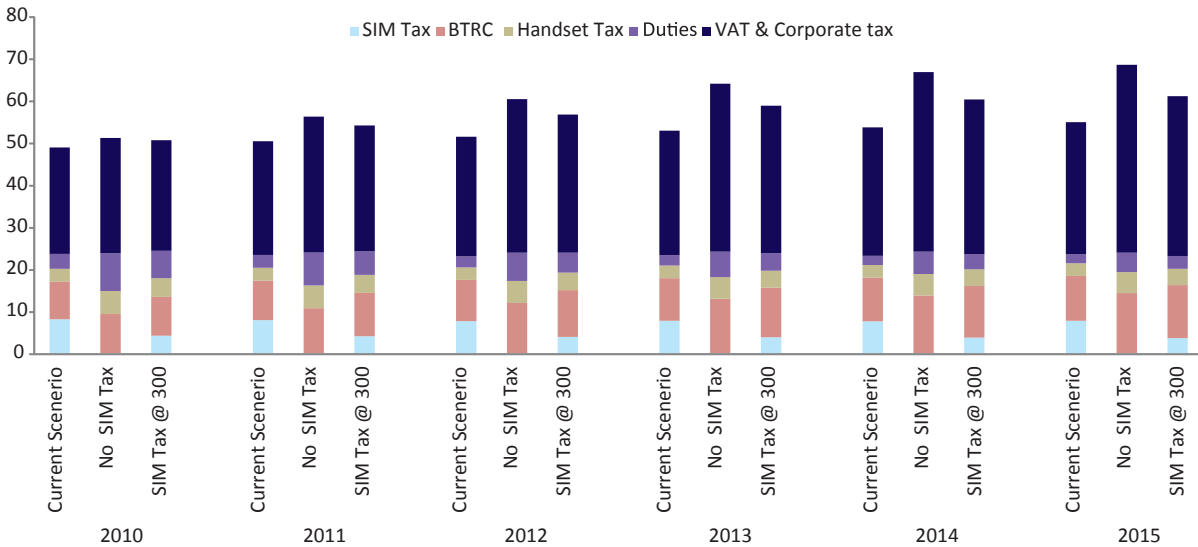
Figures in BDT Bn

	2010			2011			2012			2013			2014			2015		
	Current Scenario	No SIM tax @ 300	SIM tax @ 300	Current Scenario	No SIM tax @ 300	SIM tax @ 300	Current Scenario	No SIM tax @ 300	SIM tax @ 300	Current Scenario	No SIM tax @ 300	SIM tax @ 300	Current Scenario	No SIM tax @ 300	SIM tax @ 300	Current Scenario	No SIM tax @ 300	SIM tax @ 300
SIM Tax	8.3	-	4.4	8.1	-	4.3	7.9	-	4.1	7.9	-	4.0	7.8	-	4.0	7.9	-	3.8
BTRC	8.9	9.5	9.2	9.4	11.0	10.3	9.8	12.2	11.1	10.1	13.2	11.8	10.4	14.0	12.2	10.7	14.5	12.6
Handset Tax	3.1	5.5	4.4	3.0	5.4	4.3	3.0	5.2	4.1	3.0	5.2	4.0	2.9	5.1	4.0	3.0	5.0	3.8
Duties	3.5	8.9	6.5	3.0	7.8	5.6	2.6	6.7	4.7	2.5	6.0	4.1	2.2	5.3	3.6	2.2	4.6	3.1
VAT & Corporate tax	25.3	27.4	26.3	27.0	32.3	29.9	28.4	36.4	32.8	29.6	39.9	35.0	30.5	42.6	36.7	31.3	44.6	37.9
Total	49.1	51.3	50.8	50.6	56.4	54.3	51.6	60.5	56.9	3.1	64.2	59.0	53.8	67.0	60.5	55.1	68.7	61.3

Source : AMTOB

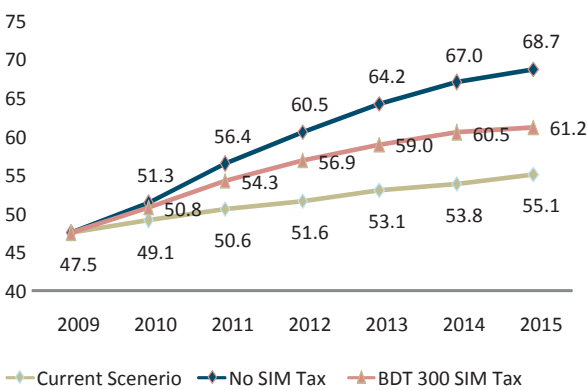


Exhibit 18 : Revenue contribution under different scenario (SIM Tax/No SIM Tax) (BDT Bn)



Source : AMTOB

Exhibit 19 : Government Revenue Projection (BDT bn) under different SIM tax scenarios



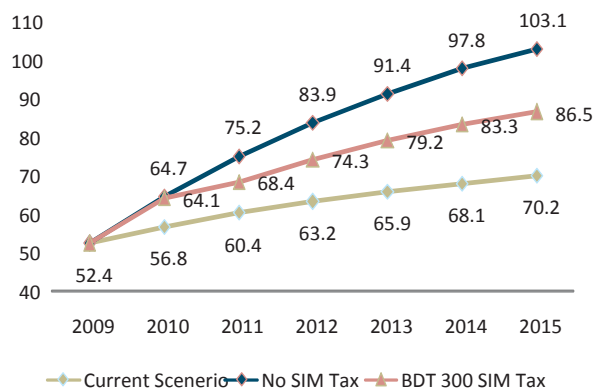
Source : AMTOB

Profitability of Subscribers

After determining an operator’s customer base, the next step in valuation is to assess the profitability of the subscribers. The following discussion walks through the key revenues and expenses that measure wireless companies’ profitability.

Service revenues normally refer to the recurring revenue stream from the customer base. A major revenue stream that is excluded from service revenues is equipment revenues (the cost of the handset), which tends to be nonrecurring. Service revenues primarily include the monthly access charges for wireless service and the usage-related revenue streams (for both local and long distance calls). Other service

Exhibit 20 : Market Growth Potential (mn) under different SIM tax scenarios



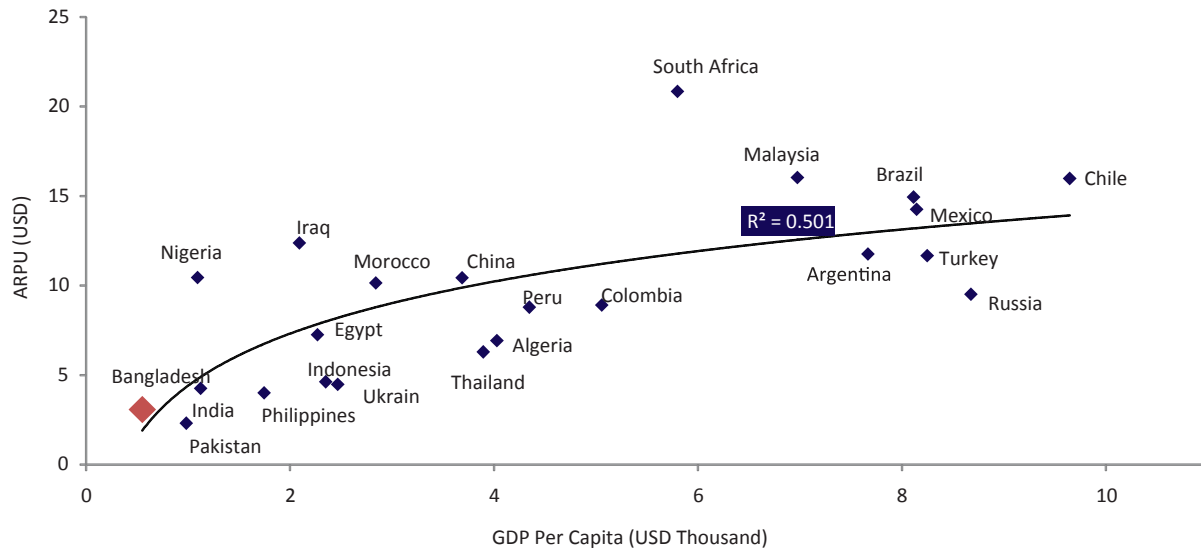
Source : AMTOB

revenue streams include value-added services such as voice mail and messaging, and in the future they should include a much higher portion of wireless data revenue streams (in contrast to today, where voice is the primary application).

Wireless operators break down service revenues to calculate average revenue per unit (ARPU). A customer with a higher ARPU generates more revenue and obviously is more valuable, all other things (churn, acquisition costs to get them, and costs to support them) being equal. **ARPU is calculated by taking total service revenues and dividing by the average number of subscribers.**



Exhibit 21 : ARPU (USD) vs GDP Per Capita (Less Than USD 10,000)



Source : AT Capital Research

The next phase of mobile subscriber addition will need carriers to sustain a low cost operating model across all markets, with rural areas witnessing a higher opex per minute and urban areas expected to see declining revenue per minute. Unlike urban areas, lower ARPU and revenue per minute is not the biggest challenge to profitable expansion in rural areas. It is however, the logistical challenge of managing network operations, and also the higher cost of power due to lower availability of electricity and thus higher dependence on diesel, with some cell sites operating for up to 18 hours on diesel generators in category C circles and rural areas.

In urban areas, the challenge has become maintaining revenue per minute at profitable levels due to subscriber additions from the low end segments and high level of rotational churn in prepaid. The traffic pattern of low end incremental customers remains dominated by incoming MoU and higher on-net share of outgoing MoU.

Correlation between EBITDA margins and market share at a global level

It has been noteworthy that in Bangladesh, the market leader, GP, with the largest market share of around 44% also has the highest EBITDA margins.

An interesting analysis that suggests there are benefits in terms of profitability of crossing a certain “critical mass” of market share comes from another ME Telco operator, Millicom, which acquired 13 mobile licenses

around the world in the 80’s, mainly in Latin America, Asia, and Africa. Millicom is a mobile operator exclusively focused on offering mobile services in emerging countries. Many of the countries where Millicom operates have very low GDP per capita levels: from USD 300 in DRC to USD 9,000 in Colombia.

In Europe or in the USA, most customers subscribe to post-paid users: they have accounts with their operators and get billed for calls per month (“postpaid” customers), or they subscribe to fixed packages with a predetermined amount of airtime.

These packages usually include a handset, a system that carries a huge cost to the operator. Millicom’s model is totally different: like most operators in emerging markets, it uses the prepaid model. Prepayment means that the subscriber buys airtime that is stored in his account and that he can only call for as long as his account is loaded with sufficient airtime and credit. In Millicom’s case, for example, prepaid airtime constitutes 95% of sales revenue. Such a model delivers huge opportunities for operators, who shift credit risk to the consumer and do not carry the cost for expensive, “subsidized” handsets.

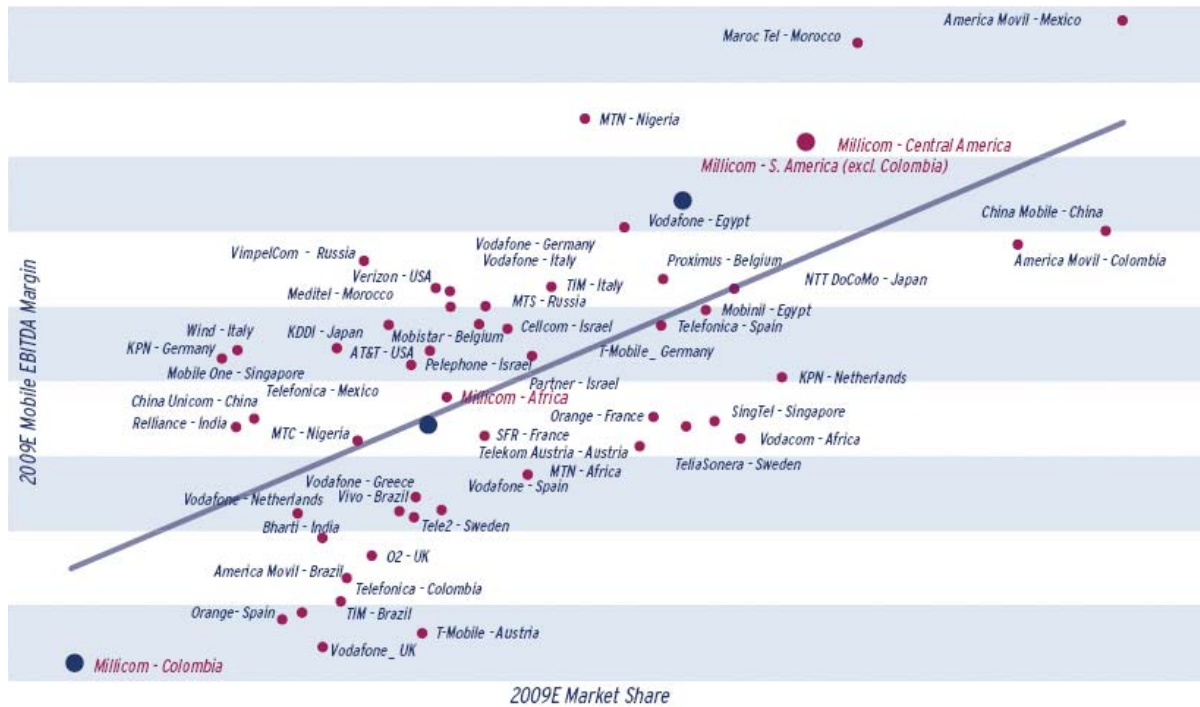
The absence of a handset subsidy and the prepaid model are the main factors behind mobile operators’ capacity to generate decent margins, an absolute necessity for operators as they invest massively in emerging countries, often with high risk profiles. The operators generate these high margins despite the fact that, as mentioned above, average spending per capita is around five times lower in emerging countries than in developed countries.



The charts below show that Millicom ARPU and margins tend to be related to the group's competitive position in its markets rather than the absolute level of GDP per capita. The chart below shows a clear correlation between market share and EBITDA margins. Exhibit 23 on the next page also illustrates this idea and shows the absence of correlation between ARPU and EBITDA margin, and to some extent between ARPU and GDP per capita.

average GDP per capita (weighted by the number of Millicom's subscribers in each country) is 13% lower, and the group's EBITDA margin in the former region is 20 percentage points higher than in the latter. Millicom holds leading positions in all of its Central American operations, while it is only number two in Bolivia and three in Paraguay. Similarly, average ARPU in Africa is 9% higher than in Asia, while GDP per capita is 40% lower, but EBITDA margins remain lower in Africa than in Asia. Ultimately, EBITDA margins generated by Millicom are similar in Asia, Africa and South America, while ARPUs are very different.

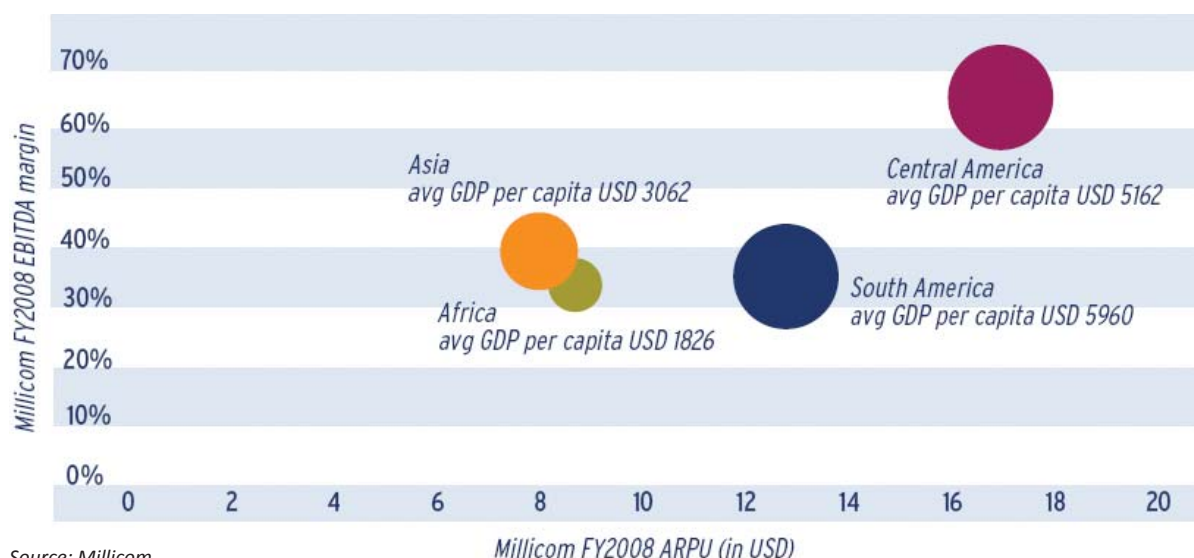
Exhibit 22: Relationship between Market share & EBITDA margin (Millicom)



Source: Millicom



Exhibit 23: Millicom ARPU and EBITDA margin by region



Source: Millicom

The size of each bubble is function of the weighted GDP per capita in the region (weighted with MIC subs in each country where MIC operates). The analysis presented here must be taken with care as the level of penetration differs from one country to another, and therefore the level of GDP per capita of the people having a mobile phone as well. Source: This graph is based on Millicom figures as of end 2008. GDP per capita figures come from the CIA Worldfactbook database.

Exhibit 24: Emerging Market Industry Snapshot

Emerging markets	GDP per Capita (\$)	Pop (mn)	YOY Pop growth	Penetration		Mob % of GDP	Subscribers			Annualized svc. Rev.	
				Mobile	Fixed		(mn)	YoY	Pre-paid	(US\$bn)	YoY
Bangladesh	690	165	1.8%	32%	1%	2.2%	52.4	17.5%	97%	2.1	15.1%
India	1,016	1,203	1.4%	44%	3%	2.1%	525.1	51.4%	95%	25.5	3.2%
Pakistan	956	164	0.9%	60%	4%	1.8%	97.6	8.5%	98%	2.8	3.4%
Indonesia	2,494	232	1.3%	70%	9%	1.4%	162.5	15.0%	98%	8.3	11.9%
Thailand	3,974	67	2.0%	97%	11%	1.8%	65.4	5.6%	90%	4.8	4.6%
Malaysia	7,605	28	1.7%	109%	15%	2.8%	30.2	11.5%	78%	5.9	5.0%
Philippines	1,764	92	2.0%	78%	4%	2.0%	72.1	9.8%	98%	3.2	-3.5%
Emerging ASIA	2,504	3,333	1.0%	54%	13%	1.9%	1,799.9	24.9%	83%	161.4	10.5%

Source: BofA ML Global Research estimates, AT Capital Research

Emerging markets	ARPU (US\$)		MOU (Min)		RPM (US\$)		Data % of ARPU	Monthly churn	EBITDA YoY(%)	SVC Mgn Yoy	No of players
	YoY	YoY	YoY	YoY							
Bangladesh	3.1	-8.9%	284	-6.3%	0.01	-2.5%	N.A.	1.6%	42.3%	(409)	6
India	4.3	-31.5%	375	-12.8%	0.01	-20.6%	11.1%	5.4%	29.6%	(266)	6
Pakistan	2.3	-2.3%	187	10.0%	0.01	-13.8%	N.A.	5.2%	35.5%	230	5
Indonesia	4.6	-1.8%	164	4.2%	0.03	2.4%	34.3%	11.0%	59.8%	(255)	4
Thailand	6.3	-1.1%	278	5.9%	0.02	-7.6%	16.5%	4.9%	47.4%	394	5
Malaysia	16.0	-6.0%	203	1.6%	0.08	-3.0%	19.7%	N.A.	46.3%	(59.00)	3
Philippines	4.0	-9.3%	27	68.3%	0.14	10.1%	46.5%	4.6%	63.0%	20	3
Emerging ASIA	11.7	-7.5%	350	1.6%	0.03	-9.3%	25.3%	4.9%	41.2%	(192)	

Source: BofA ML Global Research estimates, AT Capital Research

Note: Bangladesh churn rate is calculated by taking market share weighted churn rate of GP and Banglalink as of 2Q 10. Others as of 4Q 09



Mobile market scorecard – emerging markets									
Emerging markets	Market Potential				Market Growth		Revenue Growth		
	Mobile penetration	Wireline penetration	MOU per capita	Mobile spend/GDP	Real GDP Growth '10	Pop. Growth '04-09' CAGR	Service Revenue	Service revenue acceleration	RPM YoY
Bangladesh	32%	1%	89	2.2%	4.7%	1.8%	15.1%	-8%	-3%
India	44%	3%	163	2.1%	7.6%	1.5%	3.2%	-11%	-21%
Pakistan	60%	4%	112	1.8%	4.0%	1.8%	3.4%	-9%	-14%
Indonesia	70%	9%	115	1.4%	5.5%	1.4%	11.9%	3%	2%
Thailand	97%	11%	271	1.8%	3.8%	0.6%	4.6%	7%	-8%
Malaysia	109%	15%	220	2.8%	5.2%	1.7%	5.0%	0%	-3%
Philippines	78%	4%	21	2.0%	2.5%	2.0%	-3.5%	-5%	10%

Source: BofA ML Global Research estimates, AT Capital Research

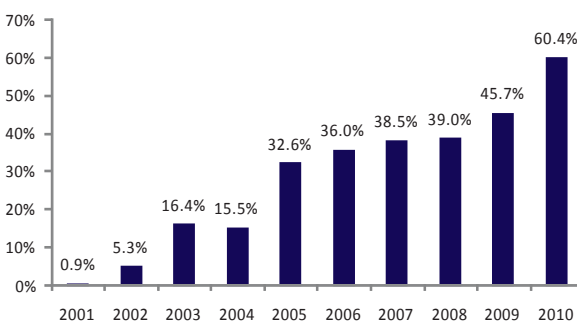
Mobile market scorecard – emerging markets								
Emerging markets	Service Margins		Competition				Summary	
	Average EBITDA	YoY (bps)	No of networks		HHI Index	HHI YoY change	Summary score	Momentum score
			2009	2010				
Bangladesh	42.3%	-409	6	Same	0.312	0.017	63%	33%
India	29.6%	-266	6	More	0.176	-0.001	37%	17%
Pakistan	35.5%	230	5	Fewer	0.231	-0.001	63%	50%
Indonesia	59.8%	255	4	Same	0.341	0.019	83%	100%
Thailand	47.4%	394	5	Same	0.343	0	57%	83%
Malaysia	46.3%	-59	3	Same	0.345	-0.001	67%	50%
Philippines	63.0%	20	3	Same	0.444	0.007	67%	33%

Source: BofA ML Global Research estimates, AT Capital Research

Capex Expenditure by Mobile Telcos will remain high

With 3G and provision of data services, we expect the Mobile Telecoms sector (being largely foreign owned), to continue to be the highest contributor to FDI, as is already the case, as can be seen in the chart below. Investment in the sector will largely relate to significant capex expenditure required to build out networks and license acquisition costs.

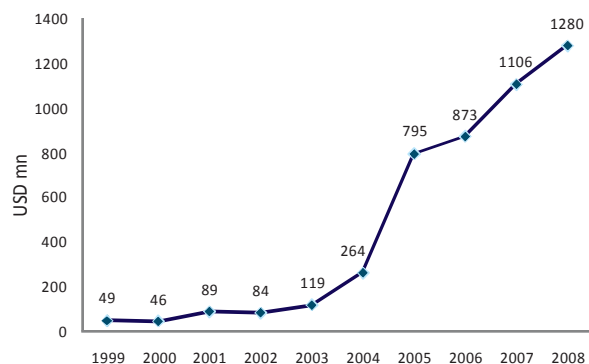
Exhibit 25 : Telecoms Sector Contribution to FDI (%)



Source: Bangladesh Bank; Figure for 2010 provisional, only for 9 months

In 2008, investment amounted to around USD 1.3bn, steadily increasing over the years as network coverage was expanded across Bangladesh.

Exhibit 26 : Telecommunication Investment (USD mn)



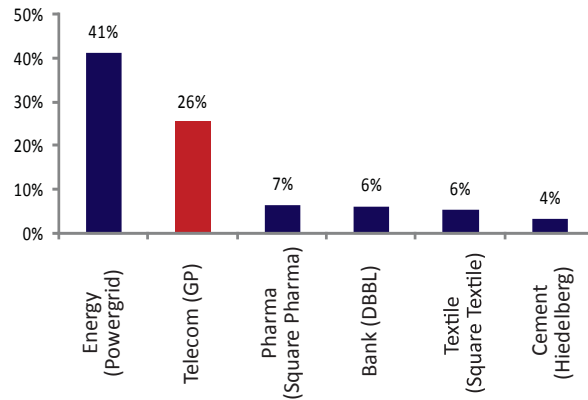
Source: AMTOB & AT Capital Research

Note: Investment in 2008 is annualized based on 3Q



Telecoms has one of the highest capex expenditures among any sector, with the continual need for technology upgrades across the country. The chart below, shows that Grameenphone's depreciation charge as a percentage of turnover is significantly higher than that of any sector aside from Energy (Desco, the state power transmission company). However, it is worth noting that Desco has revenue of around BDT 6bn in 2009, vs GP revenues BDT 65bn in 2009. So GP's absolute impact on the economy is much larger.

Exhibit 27 : Depreciation/ Turnover in 2009



Source: AT Capital Research



Industry Structure and Consolidation

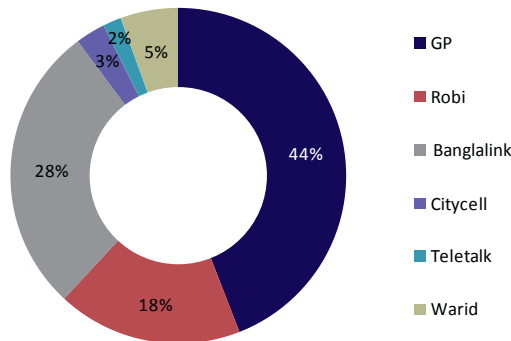
Bangladesh has six mobile operators, the newest of which, Warid Telecom, was licensed in December 2005 and launched GSM services in May 2007. Two other players had launched nationwide mobile services earlier in 2005, the first being Egyptian wireless group Orascom which re-launched previously struggling Sheba Telecom in February under the banner Banglalink; the second was state-owned BTCL (formerly BTTB) in March under the Teletalk brand. Grameenphone, a subsidiary of Norway’s Telenor, has 44% market share. Grameenphone listed in November 2009, which was the largest IPO in DSE history.

Second position in the market is currently being fought over by Banglalink and Axiata subsidiary ‘Robi’. Banglalink has achieved 28% of the market share on the basis of aggressive price discounting and substantial marketing investment. Axiata localized its Brand name in March 2010 as ‘Robi’ (Previously ‘Aktel’) with an aim to focus rural on the largely untapped market. Robi represents 18% of the total subscribers’ base. Competition to the GSM operators was boosted by another major international player, Singapore’s SingTel, buying into the country’s only CDMA-based telco Pacific Bangladesh Telecom Limited (CityCell) in June 2005.

Prospects for Consolidation

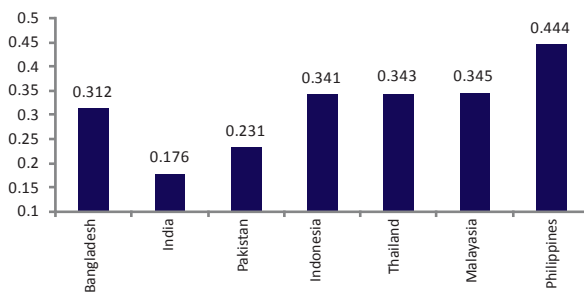
There are six operators in the wireless sector, with only one, GP, consistently profitable, making the sector ripe for consolidation. Up until recently, there was a view that the objectives of the shareholders of key players had been a major factor in limiting the move towards consolidation. The major shareholders of 5 of the 6 wireless carriers in Bangladesh are global players in wireless telecom (Telenor, Orascom, Warid, Axiata, DoCoMo, SingTel) which have strategic objectives vis-à-vis Bangladesh which make their investment horizon longer than typical financial investors.

Exhibit 28 Mobile Market Shares as of Sep’2010



Source: BTRC, AT Capital Research

Exhibit 29: HHI Index



Source: Bof AML Global Research estimates & AT Capital Research

1. The Herfindahl index, also known as Herfindahl-Hirschman Index or HHI, is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them. Named after economists Orris C. Herfindahl and Albert O. Hirschman, it is an economic concept widely applied in competition law, antitrust and also technology management. It is defined as the sum of the squares of the market shares of the 50 largest firms (or summed over all the firms if there are fewer than 50) within the industry, where the market shares are expressed as fractions. The result is proportional to the average market share, weighted by market share. As such, it can range from 0 to 1.0, moving from a huge number of very small firms to a single monopolistic producer. Increases in the Herfindahl index generally indicate a decrease in competition and an increase of market power, whereas decreases indicate the opposite.



Exhibit 30: Bangladesh Telecom Matrix

BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Wireless penetration	2.6%	6.8%	12.8%	21.6%	27.6%	31.8%	41.1%	49.8%
Increase		4.2%	6.0%	8.8%	6.0%	4.2%	9.3%	8.7%
Fixed line penetration	n/a	n/a	n/a	0.7%	0.8%	1.0%	0.6%	0.6%
Increase					0.1%	0.2%	-0.4%	0.0%
Subscribers (mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)	0.3	1.2	3.3	7.1	10.3	13.9	18.8	22.3
GrameenPhone (Telenor)	2.4	5.5	10.6	16.5	21.0	23.3	30.4	37.4
TM Int'l (Telekom Malaysia)	1.1	3.1	4.8	6.4	8.2	9.3	12.6	14.7
PBTL (SingTel)	0.3	0.5	0.9	1.4	1.8	2.0	2.2	2.8
Warid				2.2	2.3	3.0	3.7	6.2
BTTB		0.2	0.4	0.9	1.0	1.1	1.3	1.6
Total	4.0	10.5	20.0	34.4	44.6	52.4	69.0	85.0
YoY growth		162.6%	90.5%	72.1%	29.9%	17.5%	31.6%	23.2%
Subscriber market share (%)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)	6.4%	11.7%	16.4%	20.6%	23.2%	26.5%	27.2%	26.2%
GrameenPhone (Telenor)	59.8%	52.9%	53.2%	47.9%	47.0%	44.3%	44.1%	44.0%
TM Int'l (Telekom Malaysia)	26.3%	29.1%	24.0%	18.6%	18.4%	17.7%	18.3%	17.3%
PBTL (SingTel)	7.4%	4.4%	4.3%	4.1%	4.1%	3.7%	3.2%	3.3%
Warid				6.3%	5.2%	5.7%	5.3%	7.3%
BTTB		1.9%	2.1%	2.5%	2.2%	2.0%	1.9%	1.9%
Net subscriber adds (mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)		1.0	2.1	3.8	3.3	3.6	4.9	3.5
GrameenPhone (Telenor)		3.2	5.1	5.8	4.5	2.3	7.2	7.0
TM Int'l (Telekom Malaysia)		2.0	1.7	1.6	1.8	1.1	3.3	2.1
PBTL (SingTel)		0.2	0.4	0.6	0.4	0.1	0.3	0.6
Warid		-	-	2.2	0.2	0.7	0.7	2.5
BTTB		0.2	0.2	0.4	0.1	0.1	0.2	0.3
Total		6.5	9.5	14.4	10.3	7.8	16.6	16.0
YoY growth			46.1%	51.8%	-28.7%	-24.1%	112.2%	-3.3%
Market share of net adds (%)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)		15%	22%	26%	32%	46%	29%	22%
GrameenPhone (Telenor)		49%	54%	41%	44%	29%	43%	44%
TM Int'l (Telekom Malaysia)		31%	18%	11%	18%	14%	20%	13%
PBTL (SingTel)		3%	4%	4%	4%	2%	2%	4%
Warid		0%	0%	15%	2%	8%	4%	16%
BTTB		3%	2%	3%	1%	1%	1%	2%



MOU per sub (minutes/month)-Decembor								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)				246	245	271		
GrameenPhone (Telenor)				261	332	292		
Monthly ARPU - USD								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)		4.4	3.1	2.9	3.0	2.4	2.2	2.1
GrameenPhone (Telenor)	16.5	10.8	7.1	5.2	3.8	3.5	3.8	3.7
Post-paid subscribers (mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)			0.20	0.51	0.67	0.87	1.01	1.10
GrameenPhone (Telenor)			0.21	0.33	0.39	0.40	0.42	0.44
Warid			0.14	0.22	0.25	0.30	0.31	0.33
Total			0.55	1.23	1.51	1.72	1.92	2.08
Revenue (USD mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)	11.0	39.0	91.0	193.0	288.1	351.0	405.0	427.0
GrameenPhone (Telenor)	340.0	445.3	639.9	791.9	899.9	942.8	1,106.2	1,258.0
TM Int'l (Telekom Malaysia)		139.0	167.0	210.0	214.0	287.0	358.8	412.6
PBTL (SingTel)		21.0	44.0	39.0	56.0	81.0	90.0	98.0
BTTB			5.0	9.0	12.0	18.0	20.0	22.0

Source: Bof AML Global Research estimates & AT Capital R esearch
 Note : CY stands for Calender year



Chapter - 02

Telecom Sector Structure

- Grameenphone (GP) is the market leader with 44% market share. They have a strong position in the mass market, youth segment and enterprise segment. It also has around 3mn EDGE subscribers.
- GP has the most significant strength in terms of network coverage given it has the largest number of base stations. This will also help GP in revenue terms if there is greater infrastructure sharing.
- It also has the best distribution network, highest ARPU and also has a strong penetration to mobile internet via its Edge service. Its biggest vulnerability is aggressive price wars as it is perceived to be a premium price product. It also has the largest amount of spectrum after the 2008 re-allocation.
- Banglalink is in 2nd position with 28% of the market. They also have a strong presence in mass market and the SME market.
- Banglalink, is perceived to be the most aggressive in offering price discounts. It is also believed to have added staff the most substantively to support its aggressive growth campaign.
- 3rd placed operator, Robi has been focused in 2010 on building marginal subscriber additions with an aggressive marketing campaign after their re-branding from AKTEL to Robi.
- Robi is perceived to potentially be strongly placed to develop more sophisticated VAS products as well as for 3G given the 30% shareholding by NTT Docomo who have been dominant in Japan but also acknowledged a leading global innovator in 3G, Data and VAS services.
- Warid, the latest entrant in the market, began by focusing on the low income segment, Bharti Airtel, India's largest Mobile Company acquired a 70% stake in Warid in 2009.
- With Bharti's arrival they are likely to be aggressive on price, be strong on rural penetration given the contextually relevant experience in India, and also leverage their large portfolio/database of VAS products developed for the Indian market.
- CityCell, the lone CDMA operator, is experiencing limited growth. They are trying to leverage their less popular technology by providing better mobile internet services.
- State owned operator Teletalk is struggling to attract customers in this fast moving industry. It has less than 2% market share. Weak marketing, distribution, and substandard network are to blame.



Overview

Grameenphone is the market leader with 44% market share. They have a strong position in the mass market, youth segment and enterprise segment. It also has around 3mn EDGE subscribers. Banglalink is in 2nd position with 28% of the market. They also have a strong presence in mass market and the SME market is also mainly occupied by Banglalink. 3rd placed operator, Robi has been focused in 2010 on building marginal subscriber additions with an aggressive marketing campaign after their re-branding from AKTEL to Robi.

Warid, the latest entrant in the market, began by focusing on the low income segment. Bharti Airtel, India's largest Mobile Company acquired a 70% stake in Warid in 2009. There is an expectation that will focus on mobile internet and other Value Added Services. CityCell, the lone CDMA operator, is experiencing limited growth. They are trying to leverage of their less popular technology by providing better mobile internet services. State owned operator Teletalk is struggling to attract customers in this fast moving industry. It has less than 2% market share. Weak marketing, distribution, and substandard network are to blame.

Detailed below is a SWOT analysis of the top 3 wireless

market operators. GP has the most significant strength in terms of network coverage given it has the largest number of base stations. This will also help GP in revenue terms if there is greater infrastructure sharing. It also has the best distribution network, highest ARPU and also has a strong penetration to mobile internet via its Edge service. Its biggest vulnerability is aggressive price wars as it is perceived to be a premium price product. It also has the largest amount of spectrum after the 2008 re-allocation.

Banglalink, the number 2 player is perceived to be the most aggressive in offering price discounts. It is also believed to have added staff the most substantively to support its aggressive growth campaign. Robi the number three player is potentially strongly placed to develop more sophisticated VAS products as well as for 3G given the 30% shareholding by NTT Docomo who have been dominant in Japan but also acknowledged a leading global innovator in 3G, Data and VAS services. It is too early to do a SWOT analysis on Bharti's plans for Warid but one would imagine they are likely to be aggressive on price, be strong on rural penetration given the contextually relevant experience in India, and also leverage their large portfolio/database of VAS products developed for the Indian market.

Exhibit 31 : SWOT Analysis

		GRAMEENPHONE	BANGLALINK	AKTEL
STRENGTHS	Network Coverage	●●●	●●	●●
	Subscription Base	●●●	●●	●●
	Network Quality	●●●	●●	●●
	Distribution	●●●	●●	●●
	ARPU	●●●	●●	●●
	Price Perception	●●●	●●	●●
	Focus on VAS	●●●	●●	●●
	Internet Users	●●●	●●	●●
WEAKNESSES	Insufficient spectrum	●●	●●	●●
	Overstaffing	●●	●●	●●
OPPORTUNITIES	3G adoption	●●●	●●	●●
	Mobile Banking	●●●	●●	●●
	Subscriber Growth	●●●	●●	●●
	Infrastructure Sharing	●●●	●●	●●
THREATS	WiMAX threat	●●●	●●	●●
	Lowering Tariffs	●●●	●●	●●
	High Spectrum cost	●●●	●●	●●

● Strong
● Neutral
● Weak

Source: AT Capital Research



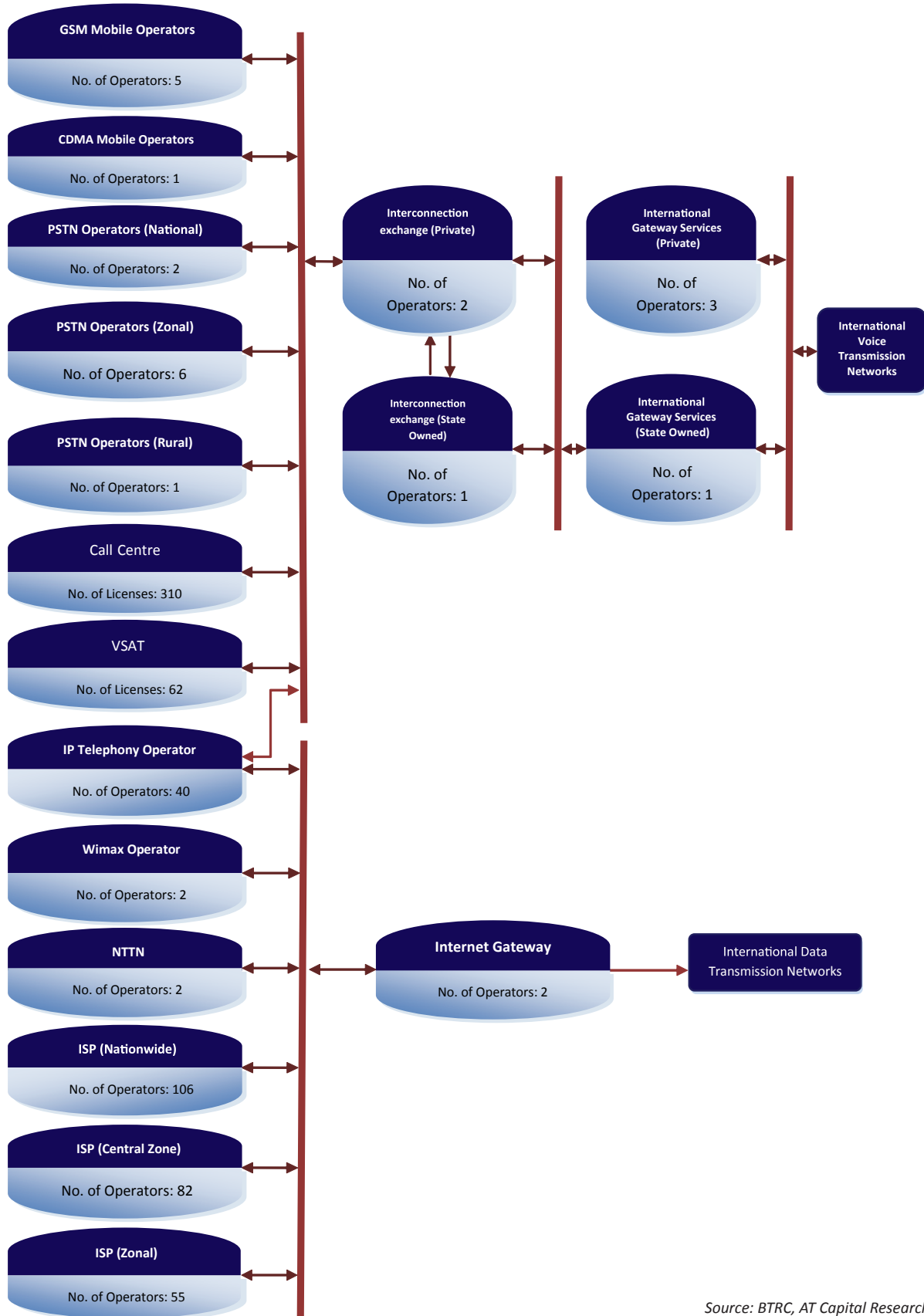
Exhibit 32 Technology Structure

Provider Name	Generation	Platform	Evolution	Frequency	Launce	Status	Network Details
Banglalink	2G	GSM	None	900	1997	Live	Dec-07: 90%, 61 Out of 64 districts
Banglalink	2.5G	GSM	GPRS	900	Dec 2006	Live	Dec-07: 'major cities and major districts'
Grameen Phone	2G	GSM	None	900/1800	March 1997	Live	June-08: >98%
Grameen Phone	2.5G	GSM	GPRS	900/1800	2005	Live	June-08: >95%
Grameen Phone	2.5G	GSM	EDGE	900/1800	Sep 2005	Live	June-08: major towns (launch: Dhaka,Chittagonj)
Citycell	2G	CDMA	IS-95A	800	March 1999	Live	June-08: 61 out of 64 districts
Citycell	2.5G	CDMA2000	1x	800	May 2006	Live	June-08: 61 out of 64 districts
Teletalk	2G	GSM	None	900	Dec 2004	Live	Live June-08: 61 out of 64 districts,>336 sub-districts
Teletalk	2.5G	GSM	GPRS	900	Q4 2006	Live	
Robi	2G	GSM	None	900/1800	Nov 1997	Live	June-08: ~97%, >3, 905 BTS (Dec-07)
Robi	2.5G	GSM	GPRS	900/1800	Jul 2005	Live	June-08: ~95%
Robi	2.5G	GSM	EDGE	900/1800	Mar 2007	Live	Trial expanded to commercial ~ April 2008
Warid Telecom	2G	GSM	None	900/1800	May 2007	Live	June-08: 61 out of 64 districts incl.major cities, highways
Warid Telecom	2.5G	GSM	EDGE	900/1800	May 2007	Live	June-08: 61 out of 64 districts incl.major cities, highways
Warid Telecom	2.5G	GSM	GPRS	900/1800	May 2007	Live	June-08: 61 out of 64 districts incl.major cities, highways

Source: AT Capital Research



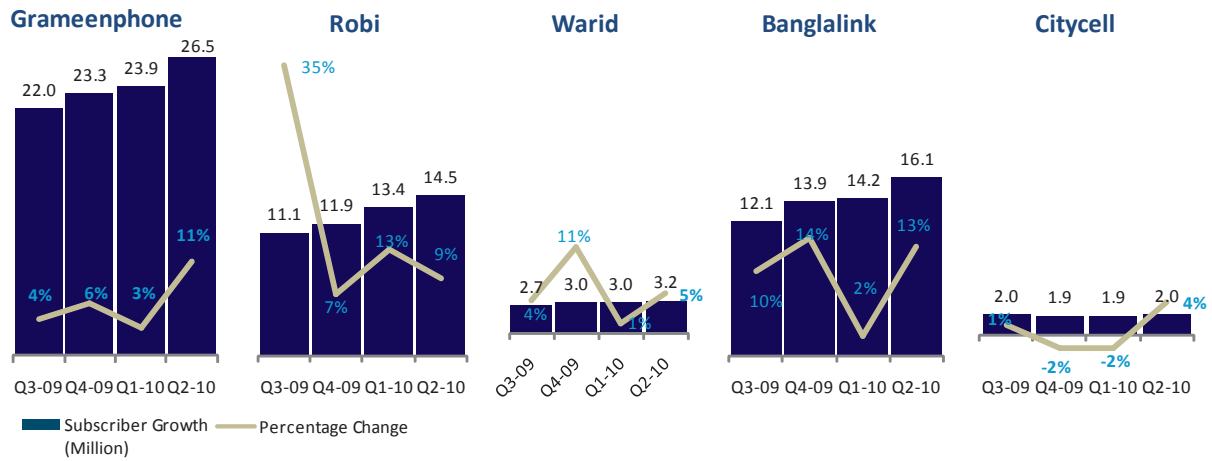
Exhibit 33 : Telecom Sector : Industry Players



Source: BTRC, AT Capital Research

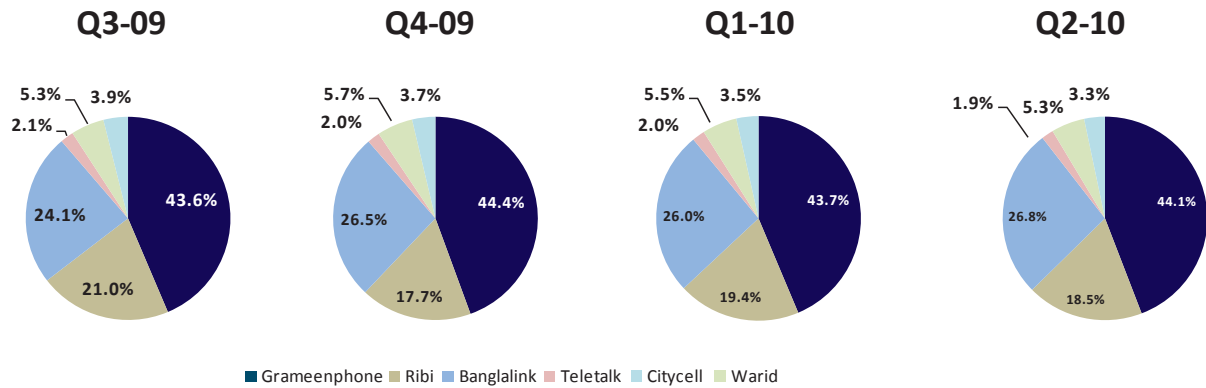


Exhibit 34 : Mobile Operators' Subscribers (mn)



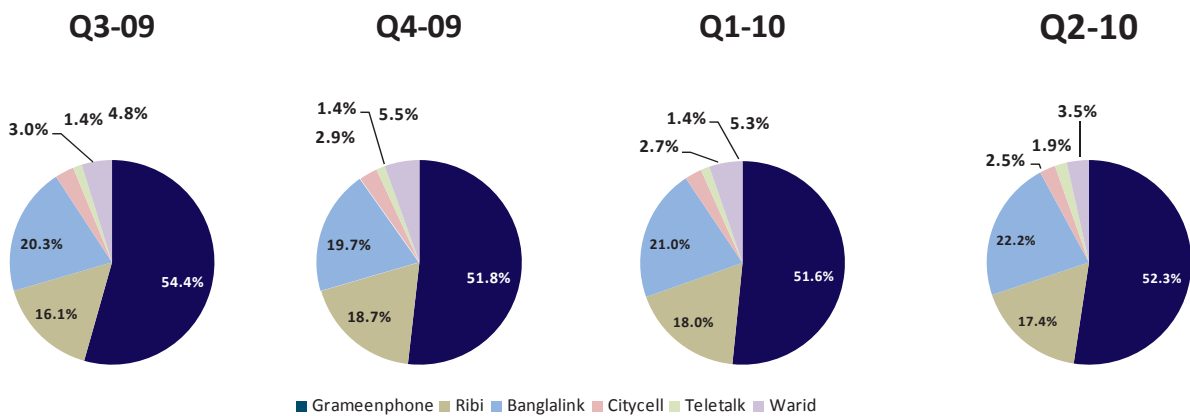
Source: BTRC, AT Capital Research

Exhibit 35 : Market Share (Subscribers)



Source: BTRC, AT Capital Research

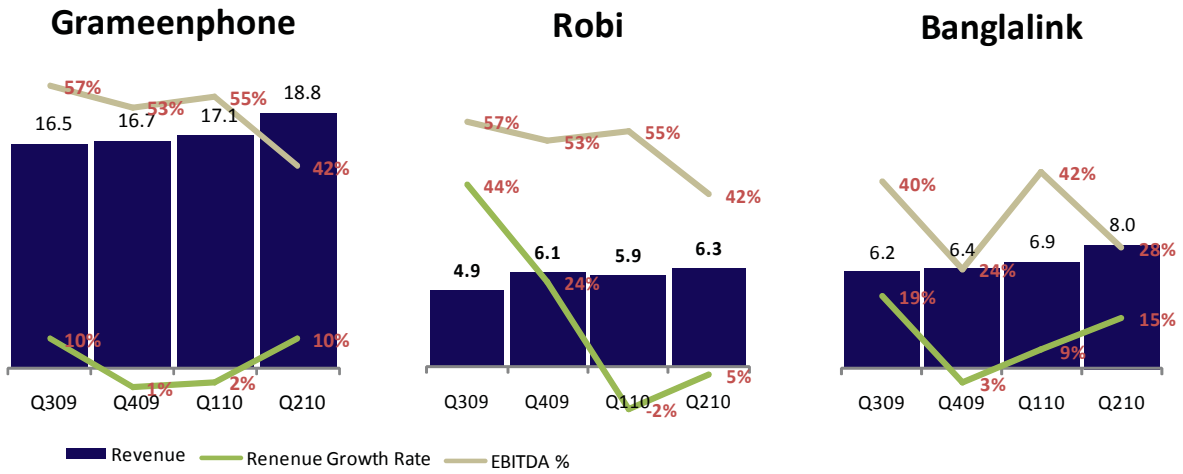
Exhibit 36 : Market Share (Revenue)



Source: Company Website, AT Capital Research

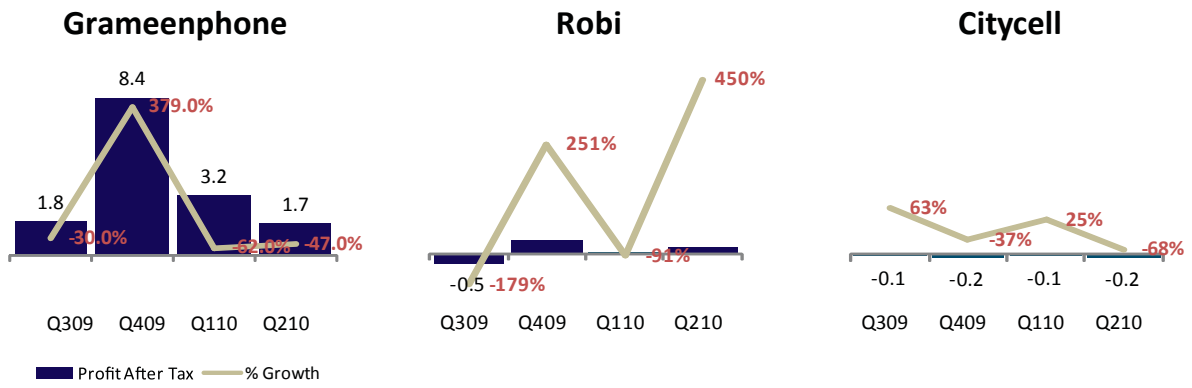


Exhibit 37 : Revenue (Bn BDT) / EBITDA margin (Reported)



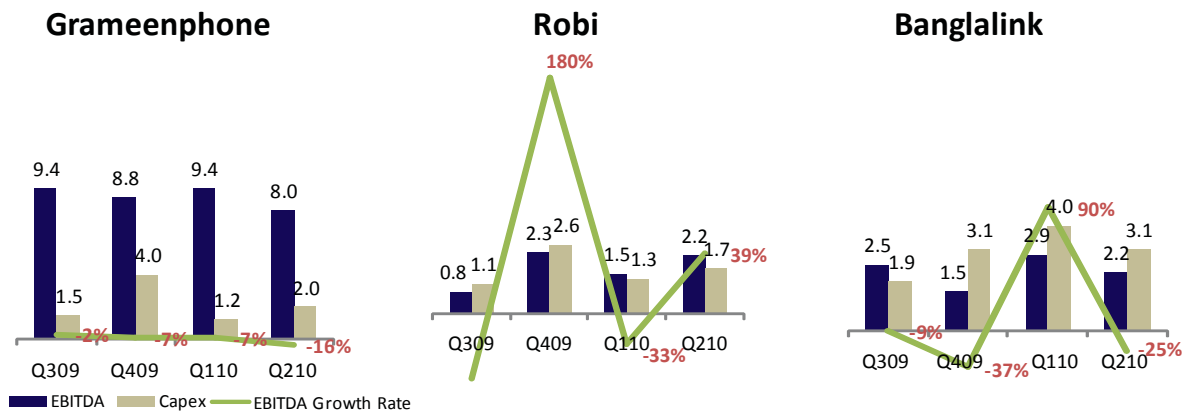
Source: Company Website, AT Capital Research

Exhibit 38 : Mobile Operators' Profit after Tax (Bn BDT)



Source: Company Website, AT Capital Research

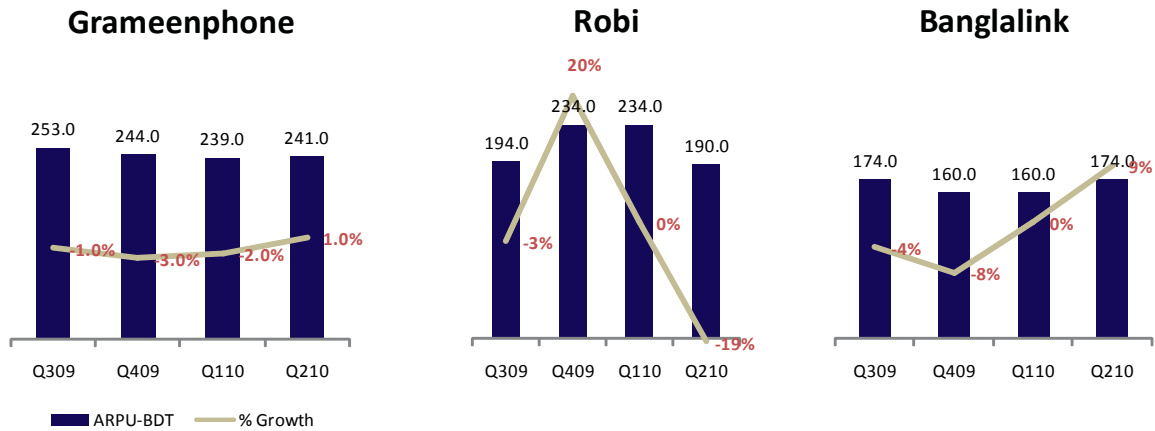
Exhibit 39 : Mobile Operators' EBITDA and CAPEX – Bn BDT



Source: Company Website, AT Capital Research



Exhibit 40 : Mobile Operators' ARPU-BDT



Source: BTRC, AT Capital Research

Exhibit 41 : Top 6 Mobile Operators at GLANCE

 <p>Consumer</p> <p>Prepaid</p> <ul style="list-style-type: none"> ● Shohoj ● Bondhu ● Aapon ● Smile <p>Xplorer Postpaid</p> <p>Emerging</p> <ul style="list-style-type: none"> ● Village Phone ● GP Public Phone <p>Data</p> <ul style="list-style-type: none"> ● EDGE <p>Youth</p> <ul style="list-style-type: none"> ● Djice Prepaid ● Djice Gang <p>Business</p> <ul style="list-style-type: none"> ● Business Solutions Prepaid ● Business Solutions Postpaid ● Ekota (SME) 	 <p>Consumer</p> <p>Desh</p> <ul style="list-style-type: none"> ● Desh Ekrate ● Ekrate Darun ● Desh 7fnf ● Rangdhanu <p>Postpaid</p> <ul style="list-style-type: none"> ● Package 1 ● Postpaid 500 ● Postpaid <p>Unlimited</p> <ul style="list-style-type: none"> ● Postpaid 1000 ● Call Control <p>Data</p> <ul style="list-style-type: none"> ● GPRS <p>Business</p> <ul style="list-style-type: none"> ● Enterprise Postpaid ● SME Postpaid ● PCO ● Call & Control 	 <p>Consumer</p> <p>Prepaid</p> <ul style="list-style-type: none"> ● Simple Plan ● Shasroyee Plan ● Shorol Plan ● Ek Second Plan <p>Postpaid</p> <ul style="list-style-type: none"> ● Simple Plan ● Normal Plan <p>Data</p> <ul style="list-style-type: none"> ● GPRS <p>Youth</p> <ul style="list-style-type: none"> ● Prothom prepaid <p>Business</p> <ul style="list-style-type: none"> ● Corporate <p>PCO</p> <ul style="list-style-type: none"> ● Uddokta ● EasyLoad
 <p>Prepaid</p> <ul style="list-style-type: none"> ● Postpaid <p>Data</p> <ul style="list-style-type: none"> ● CDMA1 	 <p>Prepaid</p> <ul style="list-style-type: none"> ● Basic (startup) ● My Favorites ● Day Talker ● Super Saver <p>Data</p> <ul style="list-style-type: none"> ● EDGE <p>Postpaid</p> <ul style="list-style-type: none"> ● Basic ● Super Benefits <p>Business</p> <ul style="list-style-type: none"> ● Corporate 	 <p>Consumer</p> <ul style="list-style-type: none"> ● Prepaid ● Postpaid <p>Data</p> <ul style="list-style-type: none"> ● GPRS

Source: AT Capital Research



Exhibit 42 : Mobile sector technology matrix



Source: AT Capital Research



Chapter - 03

The Economic Impact of Telecoms in Bangladesh

- Global mobile subscriber growth remains rapid led by Emerging Markets. In July 2010, The world's mobile subscription base crossed the 5bn mark. The spread of mobile phones in the developed world, together with the emergence of two main technology standards, led to economies of scale in both network equipment and handsets.
- A major support for the growth of the market was introduction of prepaid billing systems, which allowed customers to load up their phones with calling credit, widening access more broadly.
- Another factor that has helped hasten the sharp decline in mobile phone tariffs and accelerate penetration has been the emergence of greater competition. This is particularly true in Bangladesh where there are 6 major players where aggressive price competition to capture market share has resulted in the lowest mobile tariffs in the world despite a relatively high level of taxation.
- According to a World Bank analysis of 120 countries, for every 10 percentage point increase in the penetration of mobile phones, there is an increase in economic growth of 0.81 percentage points in developing countries, versus 0.60 percentage points in developed countries.
- This growth effect of mobile phones is higher than that of fixed-line phones, but less than internet access or broadband. However, since mobile phones have the highest penetration, the aggregate impact is greater for mobile.
- Telecommunications services help improve the functioning of markets, reduce transaction costs and increase productivity through better management in public and private sectors. These issues are more acute in developing economies than in developed ones.
- In a 2008 study, Deloitte estimated that in aggregate, including direct and indirect employment, more than 111,790 jobs have been created by the industry to date. The largest category of employment relates to retailers who sell airtime, SIMs and handsets.
- Mobile services dramatically improve access to emergency services, which would otherwise only be available to the wealthy. It also allows families to stay in touch with each other in the event of natural disasters, communicate with relief providers and obtain information for more rapid relief.
- BCG, in a 2009 study, noted three major areas in Bangladesh where increased internet usage could have the largest economic and social impact, namely in education, healthcare and rural development.
- BCG noted that Bangladesh, like many other developing economies, faces a number of critical obstacles to widespread Internet adoption. Fixed line coverage and quality are poor, particularly outside of the core urban areas. Internet broadband costs remain high. They conclude that wireless broadband could play an essential role in improving accessibility, particularly for sparsely populated and rural areas.



Overview

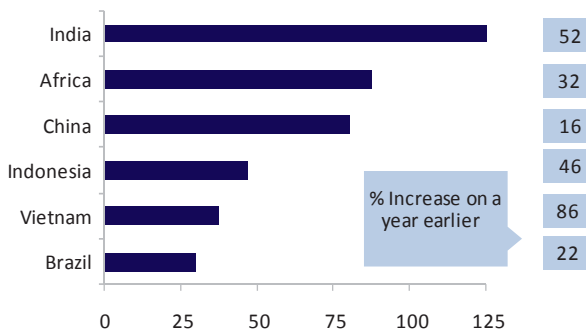
“How did a device that just a few years ago was regarded as a yuppie plaything become, in the words of Jeffrey Sachs, a development guru at Columbia University’s Earth Institute, “the single most transformative tool for development”?”

(The Economist, Special Report on Telecoms in Emerging Markets, Sep 24 2009).

The total number of mobile phones in the world surpassed the number of fixed-line telephones in 2002; in July 2010, world’s mobile subscription base crossed five billion mobile marks. The proportion of mobile phone subscriptions in developing countries increased from about 30% of the world total in 2000 to more than 50% in 2004 - and to almost 70% in 2007. (Wireless Intelligence Report 2008)

Exhibit 43

Voracious markets
New mobile phone subscriptions
Year ending March 2009, m



Source: Informa Telecoms & Media

Historically, poorer countries suffered from what Waverman (2005), termed “the Telecoms Trap”– the lack of networks and access in many villages increases costs, and reduces opportunities because information is difficult to gather. In turn, the resulting low incomes restrict the ability to pay for infrastructure rollout.

However, as highlighted in the above 2009 report from *The Economist*, a number of things came together to make mobile phones more accessible to poorer people and trigger the rapid growth of the past few years. The spread of mobile phones in the developed world, together with the emergence of two main technology standards, led to economies of scale in both network equipment and handsets. Lower prices brought mobile phones within reach of the wealthiest people in the developing world. That allowed the first

mobile networks in developing countries to be set up, though prices were still high.

The next big step was the introduction of prepaid billing systems, which allow people to load up their phones with calling credit and then talk until the credit runs out. When mobile phones first came in, subscribers everywhere talked first and paid later (a model known as postpaid), so they had to be creditworthy. Prepaid billing saves operators sending out bills and chasing up debts. It helped the spread of mobile phones among teenagers in Europe in the late 1990s because it offered parents a way of preventing their children from running up huge bills. It also dramatically expanded the market for mobile phones in poor countries.

Once the switch to prepaid was made, the biggest barrier to broader mobile access became the cost of a handset, which was still an expensive item in the late 1990s. But the price of a basic model steadily fell, from around USD 250 in 1997 to around USD 20 today. As handset-makers became aware of the scale of the opportunity in the developing world, they turned their minds to producing low-cost models. Grameenphone pioneered the idea of the “telephone lady”, extending loans to women in rural villages to enable them to buy a mobile handset, an antenna and a large battery so they could sell calls to other villagers. Taking a small cut on each call, they were able to pay off the loan and thereafter to use the proceeds to pay for health care and education for their families and to develop other businesses. This “village phone” model quickly extended mobile coverage to thousands of villages in Bangladesh.

Exhibit 44: Greater Competition Increases Mobile Phone Penetration



Source: The Economist

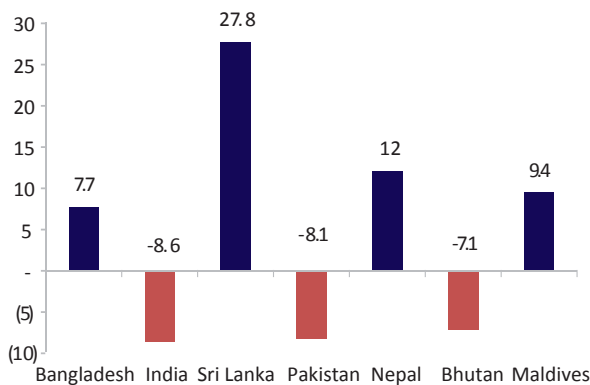
Another factor that has helped hasten the sharp decline in mobile phone tariffs and hence accelerate mobile phone penetration has been the emergence of greater competition. This is particularly true in Bangladesh where there are 6 major players (5 with



Global Telcos as parent companies and one owned by the government) where aggressive price competition to capture market share has resulted in the lowest mobile tariffs in the world despite a relatively high level of taxation. The marginal impact of just one additional mobile carrier on increasing penetration rates is illustrated in the chart above from *The Economist*.

In developing countries, modern telecoms systems are largely mobile systems and not fixed lines. The reason is the lower cost and faster rollout of mobile systems as compared to fixed lines. It has been estimated that a mobile network costs 50% less per connection than fixed lines and can be rolled out appreciably faster. The cost advantages of mobile phones as a development tool consist not only of the lower costs per subscriber but also the smaller scale economies and greater modularity of mobile systems. Morocco is a good example of the spread and impact of cell phones. In 1995, the Moroccan telecoms penetration rate was 4 fixed lines per 100 people and zero mobile phones per 100 people. Only eight years later, mobile penetration alone in Morocco was 24 per 100 people, while fixed-line penetration stayed essentially the same.

Exhibit 45 : Fixed Telephone Lines per 100 inhabitants CAGR (%) of SA countries (2005-09)



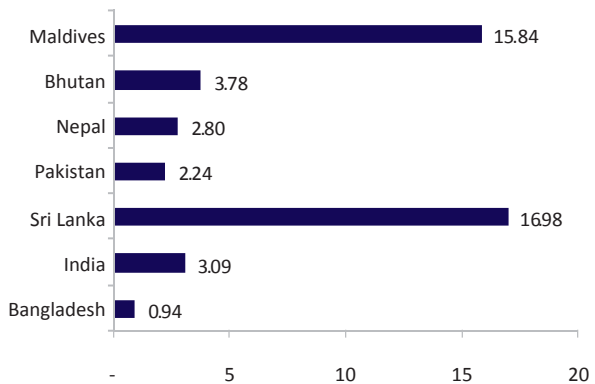
Source: ITU World Telecommunication/ICT Indicators Database.

Mobile Phones Boost Economic Growth

Waverman *et al* (2005) have found that mobile telephony has a positive and significant impact on economic growth. Extra 10 mobile phones per 100 people in a typical developing country added 0.6 percentage points of growth in GDP *per capita*, and this impact is about twice as large in developing countries than in developed countries. As Qiang (2009) noted “the results concur with the theory that mobile phones in less developed economies are playing the same crucial role that fixed telephony played in the richer economies in the 1970s and 1980s. Mobile phones substitute for fixed lines in poor countries,

but complement fixed lines in rich countries, implying that they have a stronger growth impact in poor countries.”

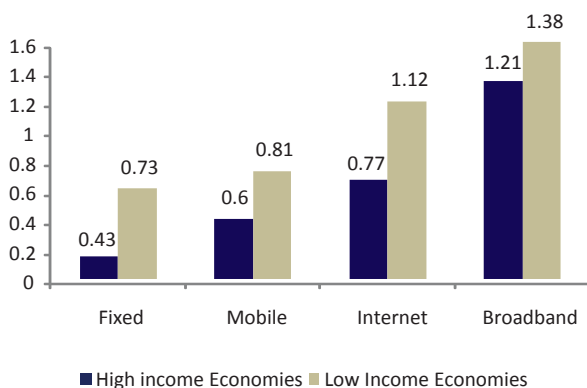
Exhibit 46: Fixed Telephone Lines per 100 inhabitants of South Asian Countries



Source: ITU World Telecommunication/ICT Indicators Database.

The World Bank conducted a 2009 analysis to test the impact of telecommunications penetration on economic growth rates at country-level. According to this analysis of 120 countries, for every 10 percentage point increase in the penetration of mobile phones, there is an increase in economic growth of 0.81 percentage points in developing countries, *versus* 0.60 percentage points in developed countries (Qiang, 2009). This growth effect of mobile phones is higher than that of fixed-line phones, but less than internet access or broadband. Since mobile phones have the greatest penetration, however, Qiang notes that “the aggregate impact is highest for mobile”. She also found that all telecoms technologies promoted growth more effectively in developing countries than in developed ones. This is because telecoms services help make markets more efficient, reduce transaction costs and increase productivity—all areas in which developing countries have further to go than developed ones.

Exhibit 47: ICT effect on Growth



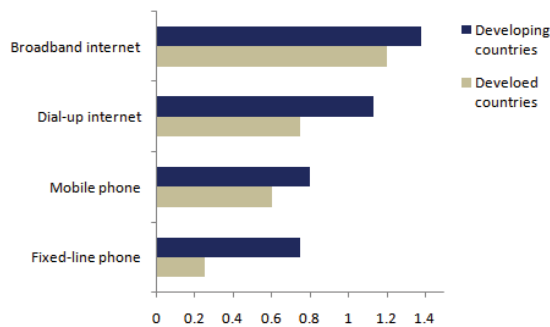
Source: World Bank, Qiang, 2009



The World Bank study also found that all information and communications technologies promote growth more effectively in developing countries than in developed ones. This is because Telecommunications services help improve the functioning of the markets, reduce transaction costs and increase productivity through better management in both the public and private sectors. These issues were more acute in developing economies than in developed ones. Therefore, developing countries gain more by resolving some of them through better access to telecommunications. Waverman (2005) notes that “Investment in telecoms generates a growth dividend because the spread of telecommunications reduces costs of interaction, expands market boundaries, and enormously expands information flows.”

Exhibit 48 : Hierarchy of boosts

Growth effects of ICT, percentage points*

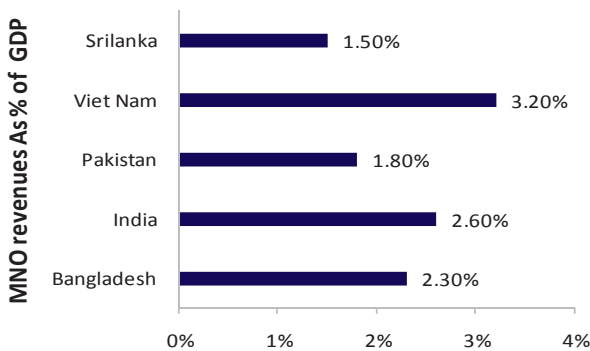


* Increase in GDP growth per 10-percentage-point increase in telecommunications penetration

Source: World Bank; Qiang 2009

A recent report by AT Kearney estimated the economic impact of mobile phones on various developing countries. The results are summarized in the chart below.

Exhibit 49 : Direct contribution of mobile operators to GDP, 2008



Source: Wireless Intelligence, Euromonitor, A.T. Kearney

Deloitte & Touche, in a 2008 study commissioned by Telecoms firm Telenor, assessing the importance of the mobile industry in economies, found a much larger impact, particularly in Bangladesh, when they took a wider definition of the direct and indirect, static economic contribution of the mobile industry in terms of taxation revenues, employment and GDP. Some of their key findings included:

Access to communications: Mobile phones provide the ability to communicate to those sectors of the community typically underserved by fixed line technology. This is particularly notable in developing countries where fixed line services are often not extended beyond the major urban areas and the connection and line rental prices are unaffordable to many. By achieving high population coverage, the sale of top-up cards in small denominations and improved affordability through low mobile handset prices, mobile telephony often replaces fixed line as the provider of universal service.

- **Social impacts:** Economic migration, from rural to urban areas and, increasingly, overseas has led to dispersion of family members. Mobile phones are facilitating regular communication and also allowing for wealth transfer, for example through mobile remittances. Mobile phone services also provide a structure for the wider sharing of Internet access in developing countries.
- **Productivity:** Mobile phones allow businesses to both develop and prosper through the provision of timely information and communications on the move. Positive efficiency effects can be seen in both the formal and informal sectors, for example through SMS based price notifications in the agricultural industry.

A particularly high direct impact was found within Bangladesh as a result of the high level direct investment by the MNOs, mainly in rolling out nationwide GPRS, and the high level of domestic manufacture of civil work infrastructure. Deloitte found that, for example, mobile services:

- **Reduce transaction costs:** Improvements in the information flows between buyers and sellers allow for the trading of information without travelling.
- **Provide opportunities for business expansion:** In the small trade and import / export businesses at the Odessa seaport, Ukraine, mobile communications proved a powerful tool to estimating demand, updating estimates and finding new customers.
- **Encourage entrepreneurialism:** Mobile phones reduce the cost of starting and running businesses. Many women in Pakistan have been able to start

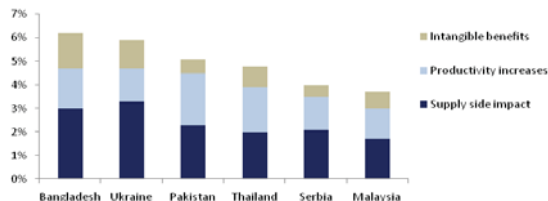


small businesses for the provision of beauty and hairstyle services, without the need to incur the initial costs of setting up beauty salons. Taxis are often shared in Thailand with a mobile phone being used to agree time shares.

- **Improve the ability to search for employment:** This is particularly important for countries such as Serbia which has high unemployment (20%) or Thailand where there is a high-level of temporary, informal employment.
- **Facilitate mobile banking:** This reduces the need to “meet in person” to conduct business.
- **Facilitate health**
- **Facilitate education**

They estimate that the increase in GDP due to raised productivity is between 0.8% in Thailand and 2.1% in Bangladesh. The higher value in Bangladesh represents the large number of subscribers who use a phone for business purposes and the lack of an established fixed line voice and data network in many areas. Intangible benefits of mobile ownership are widespread. These include the creation of social cohesion from the sharing of handsets and by allowing dispersed families to remain in contact to the stimulation of local content and increased access to emergency response services.

Exhibit 50 : Economic impact of the mobile communications industry in 2007 as a % of total GDP, by type of impact



Source: Deloitte & Touche

Deloitte also estimated that in aggregate, including direct and indirect employment, more than 111,790 jobs have been created by the industry to date in Bangladesh. The largest category of employment relates to retailers who sell airtime, SIMs and handsets. It is estimated that:

- There are over 81,000 points of sale for reload, these include dedicated telecoms outlets and mixed retail shops;
- 9,000 points of sale sell SIM, handsets and reload whilst the remainders are reload only;
- Over 300 handset repair outlets have opened throughout the country, employing 2000 staff; and

- Handset, airtime and SIM distributors account for 96% of FTEs in this category.

Mobile related employment from network capital expenditure provides the second largest employment category and is greater than total MNO employment. The significance of this category in overall employment comes from the rolling out of network and focus on domestic spend on capital.

Deloitte also noted that the proportion of network capex that remained in Bangladesh was found to be higher than in other similar studies they have undertaken. This principally results from local businesses being established to manufacturer towers, shelters and other supporting infrastructure within Bangladesh rather than relying on overseas imports. This has the double benefit of both increasing economic activity within Bangladesh and allowing the MNOs to purchase this equipment at up to a 30% lower price

Contribution to employment from the mobile value chain

Deloitte estimated that in aggregate, including direct and indirect employment, more than 111,790 jobs have been created by the industry to date. It can be seen that employment in related industries (indirect employment) constitutes a large proportion of the employment created by the mobile industry. This is due to the large number of parties who act as either suppliers to the MNOs or retailers or distributors of mobile services. The largest contributors are airtime and SIM distributors and retailers making up 50% of total FTE.

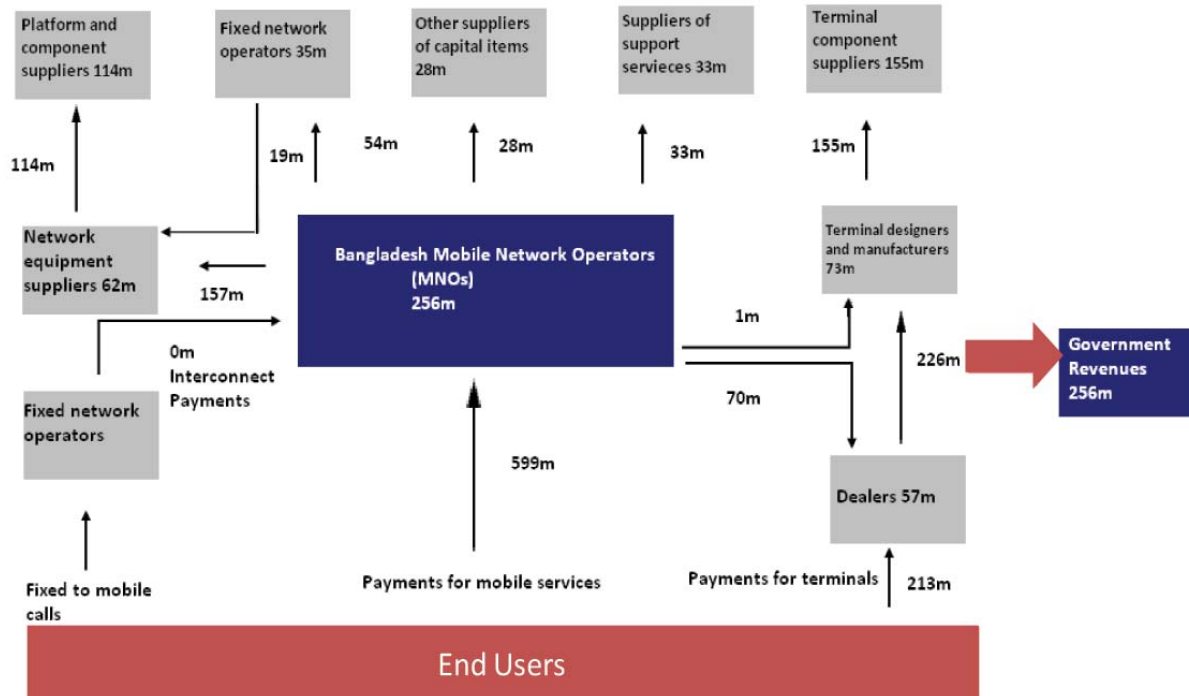
Exhibit 51: Employment Impact

Employment Impact	Number of employees (FTE)	Number of employees including multiplier
Mobile network operators	9,380	9,380
Fixed Operator	1,120	1,570
Network equipment suppliers	13,180	18,450
Other suppliers of capital items	4,450	6,230
Handset distributors and retailers	10,360	14,500
Support services	3,100	3,700
Airtime and SIM distributors and retailers	39,930	55,900
CICs	950	1,320
Total FTE	82,460	111,700

Source Deloitte: Operator data, interviews, industry reports and Deloitte analysis on average wage rates.



Exhibit 52: Mobile Value Chain



Source: Ovum, April 2006

Mobile Phones and Disaster Management

Mobile services dramatically improve access to emergency services, which would otherwise only be available to the wealthy. It also allows families to stay in touch with each other in the event of natural disasters, communicate with relief providers and obtain information that will allow them to obtain more rapid relief.

A study by the GSMA “The Roles of Mobiles in Disasters and Emergencies” into the use of mobile phones in disaster relief used network data and other evidence to try to understand how people used mobile phones in extreme circumstances. The research identified that mobile phones are used in the following situations:

- Early warnings.
- Disaster impact.
- Immediate aftermath.
- Recovery and rebuilding

One of the most consistent messages to emerge was the benefit of the timely spread of information in response to a disaster. The research found that while mobiles are only one element of a whole array of communications, they are especially effective at diffusing information rapidly to where it is most urgently needed. Particularly important is the superior resilience of mobile compared with fixed networks and the ability to install new capacity very quickly where needed. For example, in the aftermath of the

Asian Tsunami:

- Within a day of the disaster, Nokia flew in crews to start the reconstruction of the mobile network. In another day it had rerouted base stations on their way to other destinations, and reconfigured them to fit the pre-existing network. Also on the first day after the tsunami struck, Nokia delivered the first phones and technical support to relief agencies, primarily the Red Cross/Red Crescent.
- Sweden’s Ericsson AB was also present within a day to help rebuild the mobile network, donating 10 radio-base stations for Banda Aceh’s network along with hundreds of mobile phones and technical staff. They donated 1,300 mobile phones to restore communications in Sri Lanka.

Amongst the main conclusions was that using SMS (seldom available on fixed networks) rather than voice is more effective during emergencies. Text messages are more likely to get through (using less network capacity or can be queued and sent when there is free capacity) and ease congestion on the network.

This analysis shows that, in the immediate aftermath of a disaster the contribution of mobile services is substantial, due to the speed with which cellular networks can recover from damage. It is much easier to repair a wireless base station than hundreds of fixed-lines. This was strikingly demonstrated in the speed of restoration of mobile services to customers in the US after Hurricane Katrina.



The Economic Impact of Increased Internet /Penetration Broadband

“Broadband is today’s truly transformational technology. As with the dawn of other inventions that profoundly reshaped our society, most of us are yet to see the tremendous power and potential of these networks. It’s not just about fast web browsing. Through e-health, e-education, e-government, smart grids, smart transport systems and much more, broadband will power economic and social progress in the 21st century. When we first harnessed electricity, we thought: ‘lighting’. But the advent of the power grid was the tipping point that led to the building of skyscrapers, the rapid rise of large-scale industry, mass mobility, and even – through labour-saving home appliances – the emancipation of women.”

Dr Hamadoun Touré, Secretary-General of the ITU

The focus on the potential transformative benefits of Broadband in particular, and greater internet penetration more broadly, is of particular relevance to Bangladesh given the priority given to “Digital Bangladesh” by the Awami League Government. In their chapter “Economic Impacts of Broadband” in the World Bank’s “Information and Communications for Development 2009: Extending Reach and Increasing Impact”, economists Qiang and Rossotto, echoed the sentiment from the ITU Secretary General by stating that broadband’s economic significance can be put into context by referring to similar changes in other areas of infrastructure, such as road, rail, and electricity. Each of these infrastructure services transforms economic activities for citizens, firms, and governments; enables new activities; and provides nations with the ability to gain competitive and comparative advantages. They note that, “Though many of these advantages were unforeseen when original investments were made, they quickly became an essential part of economic lifestyles and activities. A similar assumption about the expected transformative benefits of broadband on economic and social variables has led many governments to set ambitious targets for its deployment.”

According to The World Bank, 2009 report, for every 10% increase in the penetration of broadband services, there is an increase in economic growth of 1.3% points. The growth effect of Broadband is significant and stronger in developing countries than in developed economies.

Qiang and Rossotto highlighted some of the potential benefits for individuals of greater broadband access and noted that broadband diffusion enables individuals outside the boundaries of traditional institutions and

hierarchies to innovate to produce content, goods, and services. The role of network users in the innovation process increases as they generate or contribute to new ideas (user-led innovation, or “the democratization of innovation”) and collectively develop new products (such as open source software).

In terms of the impact on firms and the corporate sector, in developed economies, broadband is revolutionizing the print, movie, music, gaming, and advertising industries by enabling direct involvement by users in creating digital content. Qiang and Rossotto also note that export-oriented firms also benefit considerably from broadband use. Broadband lowers the costs of international communications and improves the availability of information, enabling companies to access foreign markets more easily and become more competitive. Clarke and Wallsten (2006), in a study of 27 developed and 66 developing countries, found that a 1 percentage point increase in the number of Internet users is correlated with a boost in exports of 4.3 percentage points and an increase in exports from low-income to high-income countries of 3.8 percentage points.

The report also notes that broadband enables economic integration and encourages greater international competition in sectors and jobs that were previously uncontested. Rapid broadband diffusion and increasing speeds and bandwidth, along with the ongoing liberalization of trade and investment in services, have increased the tradability of many service activities—especially business services—and created new kinds of tradable services. The boom in broadband-enabled IT services and their clear contribution to GDP, employment, and exports have been well documented. In India, software exports jumped from less than \$1 billion in 1995 to more than \$32 billion in 2007; the software industry now accounts for more than three-quarters of the country’s services exports and employs 1.6 million people.

Case study of Broadband enabled Telemedicine

The use of Broadband-enabled telemedicine is widespread, both in developed and developing countries, yet there are few high quality studies assessing its diagnostics efficiency and outcome capabilities. Many studies do not separate new opportunities offered by telemedicine from evaluations, which is required to adhere to standards of high quality evidence. The best evidence for the effectiveness of telemedicine in medical specialties for which verbal interactions are key components of the patient assessment and when medical results comparables to in-person encounters can be achieved.



In remote areas without direct access to critically needed medical specialists, broadband networks allow health professionals to care for patients living in different rural locations using videoconference facilities. In such cases, even if the evidence of improved medical outcome is not proven, rapid diagnosis and treatment, reduced costs and travel time for patients and decreased medical errors are tangible benefits, especially in the context of the ever-falling costs of broadband connectivity solutions.

The Arawind Eye Hospital in the southern India state of Tamil Nadu provides such case in point. Using a wireless broadband network with speeds 100 times faster than a dial-up network, the hospital was able to connect five of its rural clinics in 2004 to provide eye services to thousands of rural residents. With high speed links to the hospital, the clinics screen about 1,500 patients each month through a web camera consulting with an Arawind doctor. This videoconferencing system enabled patients to have minor eye problems diagnosed and resolved locally, only those with more serious problems had to travel long distances to a hospital. Hence, patients were able to save on unnecessary travel time and cost, and avoided the corresponding loss in income. The hospital's study also showed that 85 percent of the men and 58 percent of the women who had lost their jobs due to sight impairment were reintegrated into the workforce after treatment. Thereby, the hospital was also able to address the shortage of rural doctors through this broadband system and the pilot project proved so successful after just 17 months that plans have been made to implement a similar system in 50 clinics serving half a million patients each year.

Source: University of California Berkeley 2008.

The Impact of Rising Internet Penetration and Broadband in Bangladesh

The previous section outlined some of the macro impacts of Broadband on developing economies. A more focused assessment on the current and future potential economic impact of the internet in Bangladesh has been provided by a recent study. In 2009, The Boston Consulting Group (BCG) were appointed by Telenor to conduct an in-depth examination of the drivers of adoption, the potential economic impact, and the possibilities for improving lives through education, healthcare, and other key levers. The study focused on three countries: Bangladesh, Serbia and Thailand. In the study, economic benefits are modeled based on six main factors. The demand side impact captures the benefits of businesses using the Internet, while the supply side impact measures the

GDP contribution of the activities that are undertaken to produce or consume Internet services.

BCG noted three major areas in Bangladesh where increased internet usage could have the largest economic and social impact, namely in education, healthcare and rural development. The report noted that the Internet has the potential to improve access to education and quality of education in multiple ways, and can be applicable to a broad spectrum of countries. For example, for countries for whom access to basic education is a problem, Internet-based self-learning initiatives can be used to supplement the school system. Such systems work by providing terminals that children can use outside of classroom hours, and leverage both their innate curiosity and a system of peer-supported learning. Studies suggest that such approaches improve academic results and help spread literacy, and, in fact, increase the level of engagement and desire to learn.

A shortage of skilled teachers in technical subjects or English, particularly in rural areas, is a common constraint faced by developing nations. In Bangladesh, for example, the student-teacher ratio at primary level is ~ 45:1, while in Thailand, the estimated student to qualified English teacher ratio is 628:1. One example of an Internet solution to this problem is to conduct lectures and lessons by video conference, using high-speed Internet connections to broadcast the session in real time to multiple classes of students. Such sessions can be made interactive, with the use of presentation material and opportunities for question and answer sessions. An added advantage is that the teacher can continue to be physically based in the urban areas while providing lessons to students in rural areas.

As developing economies mature, the focus in education typically moves from access to basic education to increasing tertiary enrolment rates, as the skill level of the workforce becomes an increasingly important competitive lever. The Internet can assist with this by providing affordable access to a range of online basic and advanced degrees.

Healthcare

Healthcare is a second area of priority for all countries, particularly developing countries like Bangladesh, where life expectancy is low at 63 years, and infant mortality is at 56/1000 live births, compared to 81 and 3/1000 respectively for Europe. A key constraint for most developing countries is the shortage of medical doctors, resulting in a patient-doctor ratio of 4000:1 in Bangladesh.



BCG noted that E-health initiatives can help improve healthcare access, particularly in rural areas. One example they gave is the Alokito initiative, where nurses go out to the field in specially-equipped vans to meet patients and perform basic procedures, such as taking blood pressure and setting up stethoscopes. The vans have a wireless broadband link to physicians in the main hospital back in the city, who are then able to see the patients, ask them questions and offer diagnoses. This significantly increases the number of patients that each physician can serve, and enables them to extend their expertise into rural areas without having to give up the comforts of urban life.

Another aspect of how the Internet can contribute to improving healthcare is in the tracking of disease outbreaks. Field medical officers can provide accurate, real-time information from remote areas using handheld computers with Internet connections, allowing local and international health organizations to track the spread of diseases. The key benefits of such a method are the speed and accuracy of data, as well as the time and manpower savings from direct data entry, thus making it scalable for large populations. Handhelds for Health in India is one example of such technology in action. The Internet is also a powerful tool for keeping the public updated on developments, e.g., areas to avoid, measure to take to reduce risk of infection, etc., with the possibility of offering rich, interactive communications that other media cannot match.

Rural development

BCG noted that the Internet can also help mitigate the rural-urban digital divide, by enhancing access to information and basic services, as well as lifestyle options, such as entertainment. The digital divide has been identified as a social concern that needs to be ameliorated, and widespread adoption of the Internet in rural areas is the best way to achieve this. With better access to information, rural residents can be made more aware of their rights, and hence better able to defend them should the need arise.

They also noted that the Internet can be used to cost-effectively address infrastructure gaps and enhance the provision of essential services, such as government, banking and remittances, to a large area at a far lower cost than traditional methods. This is particularly true in areas of low population density or poor transport links, which would require a very dense network of branches/outlets to effectively serve the population. Furthermore, the quality of services may not be high given the general unwillingness of skilled labour to work in rural areas. Online service provision avoids these concerns, and represent a high-quality, low-cost option that benefits all parties.

Constraints on Greater Internet Penetration

BCG noted that Bangladesh, like many other developing economies, faces a number of critical obstacles to widespread Internet adoption. Fixed line coverage and quality are poor, particularly outside of the core urban areas. Currently, approximately 90% of fixed lines are concentrated in the urban areas, where only 25% of the population lives. Until recently, access prices were also high. In 2006 the ITU estimated that the PPP adjusted price of basic Internet access (20 hrs a month) was almost USD 8, more than 3 times the equivalent in Thailand. Against the context of a GDP per capita of around USD 619, this clearly put the Internet out of the reach of the majority. However, this appears to be improving as mobile operators have started to offer cheap pre-paid packages. Awareness of the Internet and the benefits it can bring is low. In a survey in 2007/2008, almost three quarters of rural Bangladeshis surveyed admitted that they were not aware of the Internet.

These challenges are further complicated by the low levels of literacy in the country, particularly English literacy. Headcount literacy rates in Bangladesh are around 50%, where “literate” is defined as someone who is able to sign their own name. Based on current interfaces, this is likely to be insufficient for someone to effectively access the Internet. Although these can be mitigated by sharing of know-how within the family, or within a community, it highlights the need for relevant local content that is customized to the needs of the community, in terms of purpose, interface, functionality, etc.

The BCG Report noted that these problems and challenges are not unique to Bangladesh, but can in fact be found in various combinations in most developing and emerging economies. They make three policy recommendations:

1. Accelerate awareness building through creating community access points, which will help raise awareness in the short term, and offer local residents a low-cost entry point to experience the Internet. These centres can serve as one-stop shops offering a range of services, including basic Internet and email access, VoIP and video calls, education services, agriculture information, government services (such as applications for employment permits), etc. This will attract a wider pool of users, and, in time, build a group of advocates who can then recommend the Internet to their friends and neighbors. With this in mind, Bangladesh has mapped out a plan to build a network of telecentres nationwide, building on the success of the ~1K existing telecentres, such as Grameenphone’s Community Information Centres (CIC).



2. Provide schools with Internet access, which in many cases is the most cost-effective way to increase IT literacy and Internet awareness. The youth will generally be the most technologically savvy age group, and will also have the highest level of literacy, making them an ideal target group. Furthermore, the existing school infrastructure network provides physical infrastructure as well as teachers, although in most cases they will require IT-specific training. Governments should also seek creative solutions to lower the cost of providing equipment and resources, such as by working with NGOs and IGOs that already seek to provide schools with computers and Internet access. Attention must also be given to the development of customized local language educational content. As an alternative to directly producing the material in-house, the government can also play a facilitating role to accelerate private sector content development. In South Korea for example, exhibitions and competitions were held to stimulate innovation.
- 3) The final and perhaps most critical area is improving infrastructure, to ensure that those who want to access the Internet are able to do so at a reasonable standard of quality. Many governments globally have announced programs to invest heavily in fixed broadband networks, led by Australia, which has committed to spend USD 30B over the next 8 years to build its national broadband network.

GDP. On the consumer side, households are willing to pay more for entertainment, social networking and other “soft” benefits. This leads to greater penetration, up to 1.2 additional subscribers per 100 population in 2020, which represent an approximately 10% increase in the number of subscribers relative to the base case. It also adds up to 1.1% more to GDP contribution, and increases the impact of job creation by approximately 10%.

The report goes on to highlight that in view of the constraints with a fixed network, wireless broadband could play an essential role in improving accessibility, particularly for sparsely populated and rural areas. The primary advantages of wireless broadband are its lower construction cost, shorter timeline for rollout, and lower costs for end users. Wireless broadband has also been shown to provide an additional boost to business productivity, strengthening the value proposition for potential adopters. Although maximum download speeds are lower, relative to fixed line technologies, they are constantly improving, and should be sufficient for the vast majority of user needs. Perhaps most critically, given the budget constraints that face most developing economy governments, wireless broadband networks can be established without the need for government support or subsidies.

BCG outlines a “Higher Benefits” scenario, where businesses and households are assumed to derive greater benefits from the Internet than in the base case. E-business intensity gains grow at a faster rate, leading to accelerated adoption and a greater contribution to



Digital Bangladesh

This summary of the Digital Bangladesh is taken from a report prepared by the Access to Information Unit within the Prime Minister's Office that is coordinating much of the central push towards Digital Bangladesh.

As part of its agenda to build a Digital Bangladesh, the government has identified the mobile phone as a key medium of electronic service delivery to citizens. Although, mobile phones and their many technology options are already being utilized by several agencies of the government, to truly utilize its true potential, an effective and long-term partnership with the private sector is essential. Over 33 % of the population in this country currently has a mobile phone. With a government that is eager to give service to the neediest, and with private telecommunication firms that are eager to expand their businesses in rural Bangladesh, an effective national strategy for mobile governance and service expansion can unlock a win-win solution for both parties. Not only will it give people access to the information they truly need and save time and money in the process, by adding additional services like mobile money transaction and mobile commerce, it can also be used as a tool for economic growth. Concurrently, it can unlock a major new avenue for market expansion for mobile companies.

m-Health

Improving the delivery of health services to the majority of the citizens is a key challenge faced by the government. ICT is an enabler that can enhance the ability of the public service to adequately address service delivery backlogs, while providing citizens with a range of creative options for accessing services. Amongst the many ICT options available to the government to improve the efficiency and effectiveness of its delivery process, mobile technologies offer some exciting opportunities for a low cost, high reach service. There is strong evidence that mobile technologies could be instrumental in addressing slow response rates, government to citizen requests and poor access to services — particularly for low-income and marginalised populations in under-served rural areas — which are some of the keys areas where opportunities lie. In addition, mobile technologies offer significant opportunities for improving the back-office operations of government by electronically collecting medical data of the citizens, conducting health surveys and offering emergency services. Globally, tele-health is being looked at as a growing area of opportunity for the private sector and entrepreneurs to get involved in. Bangladesh should be no exception.

m-Education

In the education sector, there has been sizable improvement in providing education-related service delivery via mobile technology. Although scattered, m- Education initiatives are currently the highest in number. Telecommunication companies are publishing exam results and an online dictionary. Other services include mobile-based English lessons, GPA 5 holders' registration, etc. However, most of the initiatives are related to results publishing etc., and lack of proper planning and direction.

The focus has recently moved from delivering exam results to sending applications to various universities via mobile phone by connecting the central board's education database with this service. The application fee is also collected from the mobile account of Teletalk — the government service provider.

The program, currently being piloted in Shahjalal University, has generated good response, triggering government directives being sent out by the ministry of education to implement this for all universities in the country. However, opportunities are endless. Connecting the remote schools to internet via mobile broadband, providing teacher's training material via IVR, English learning and skills training via a subscription based model, are just a few examples.

m-Agriculture

Considering the needs and possibilities, there are not enough m-services in the area of agriculture. Major initiatives include IVR based Farmers' Call Centre by Banglalink, Early Disaster Warning alerts by Teletalk, GP and Banglalink, and agriculture content development for tele-centres by GP etc. Language barrier and the low level of literacy among farmers may be the reasons behind such few initiatives in the area. However, the Banglalink phone line Jiggasha has been quite successful in spite of all these barriers.

Service providers working with content providers must come up with voice-activated and enabled value added services in local language and context to increase the usage of these services even more. Partnership with MoA, MoFL and other relevant ministries and entities is a must for authentic content. Content providers will play a key role in the near future by creating and managing content in Bangla. Government institutions have the most acceptability among farmers. Yet, their services are not offered via mobile. Existing services at Tk.5 a minute are still too expensive for the farmers. It has to be made more affordable to create a real demand for this service.



m-Transactions

Only 5% of the population currently has access to formal banking. Making financing and banking accessible to as many people as possible remains a key focus for Bangladesh Bank and, as a result, the regulatory barriers are being lifted. On September 1, 2009, Bangladesh Bank approved a form of mobile banking known as digital wallet. Even though it is quite restrictive, with pilot phase set to start soon, further deregulation and clear guidelines can possibly have tremendous impact for remittance, development and SME sectors.

Providing services, both government and the ones related to livelihood, via mobile technology is not yet considered by telecommunication providers as potential profit-making opportunities. Rather it is still an extension of their CSR work. However, one only has to look internationally to see how major telecommunication players are increasingly looking at converting the mobile phone into a tool to access a wide array of services and information and, in effect, creating very profitable and sustainable business models.

We can see M-Pesa, the mobile payment company that has made dramatic changes in money transaction, bill payment, and small businesses in Kenya. In agriculture, for service and pricing models, we can see India's Kisan Sanchar, a successful joint venture between Airtel and IFFCO that provides specific agricultural information to farmers of India. Singapore now provides more than 150 government services via mobile. With the right balance of government regulation to protect its citizen, and private sector engagement in an encouraging business climate, Bangladesh too can be firmly positioned to achieve the vision 2021 of providing service to the doorsteps of the majority of its citizen.

Challenges and Opportunities

The A2I Team concluded with the following major recommendations:

“Establishment of a sustainable Digital Bangladesh requires a consistent and pro-people regulatory environment as well as a competitive market place supported by a state of the art infrastructure. Bangladesh faces considerable challenges on its way to achieving such standards. Some of the key challenges are:

- Relatively low investment for establishing last mile connectivity in non-urban areas due to the absence of sufficient commercial viability.
- Under-utilization of the present submarine cable capacity. Rapid cost depreciation of broadband Internet needs to be matched with the availability and accessibility of the ICT infrastructure by both public and private operators.
- Scarcity of power/energy sources, required for the functional effectiveness of LMC installations and information access points, specifically in rural and semi-urban areas.
- SIM Tax and high tax burden on the telecom operators.
- Lack of any viable revenue sharing model results in antitrust practices within the value added service industry.
- Lack of sufficient content in local language.
- Lack of ICT education and ICT awareness.
- Cyber Security threats and vulnerable mobile-banking system.
- Economic behaviour of the mass is a hindrance to ensure more revenue flow in the Value Added Service (VAS) market.

Strategic Priorities

Key strategies for connecting the millions of Bangladeshi citizens through nationwide information network need to address the challenges of equity, cost, regulations, relevance and civic awareness. The government also plans to focus on providing an integrated multimedia broadcasting service to reach the marginal sections of society.

Prioritize demand creation: Already Bangladesh has achieved almost 100% coverage in terms of mobile telephony and mobile-based Internet services. However, lot needs to be done to make sure that people at the proverbial lower end of the pyramid receive the benefit of the coverage by creating and sustaining demand. Discretionary pricing schemes for social and public services available over mobile phone, for example, should be introduced to ensure that people can access essential services at a lower cost. Discount schemes on license cost for the service providers based on the amount of time their customers use their mobile phones to access public services, for example, will incentivise the service provider to offer and promote such services at a lower cost. Similar discounts could be offered based on the proportion of rural use (call generating from rural areas) to total usage.



The government especially local government institutions need to leverage their local presence and credibility to popularize public services that are offered on-line to stimulate demand. Conventional media like radio, TV and print media as well as rural mediums like drama, etc. should be utilized to build sustained awareness among communities.

The important dimension of demand creation is to promote local content, both locally relevant content and local language content. Given that only a fraction of people can understand English, the need for Bangla content is undisputable. Incentive schemes and a regulatory framework should be designed to promote Bangla language content. Building the capacity of public institutions like Agricultural Information Services, the Directorate of Health, the National Text book and the Curriculum Board to enable them to develop digital content in local language can play a very important role.

Content based on Intelligent Voice Response (IVR) should be used by the illiterate as well as the visually challenged segment of the population. To expedite the creation of IVR content, a 'Text to Speech' application for Bangla language can go a long way. Given the critical nature of such applications, research grants should be awarded to Universities. Such a system could make existing digital Bangla content deliverable as voice.

A standard configuration of mobile phone should be developed. The configuration should consist of a standard Bangla keyboard layout, with all mobile phone coming with a Bangla user manual and specific default settings to enable the phones to receive services such as location based services that have already piloted in the country.

At present, there are different regulatory bodies for telecoms and broadcasting. There should be more coordinated regulatory framework to make it more flexible to adopt the new changes and benefits.

Competitive pricing policies and management of submarine cable bandwidth. Lower price and equal access for competing service providers would help to ease the gap of access to information faster. The open CLS (Cable Landing Station) policy should be adopted. Efforts towards reducing the scope for monopolies and unfair business practices should be taken at each stage of domestic and international connectivity.

Strategic innovation for LMC related revenue earning models in rural and semi-urban areas. Financial

incentives would help public or private providers to offer their services beyond profitable urban settings.

Community Radio (CR) could emerge as another channel of LMC for the base of the pyramid (BOP) population. If people's participation is ensured, CR could be a sustainable LMC platform for people-to-people communication and problem solving. The government has already granted 12 licenses towards achieving this goal. Now, the government should take steps to encourage community participation in making CR a success."



Chapter - 04

Data, 3G, Convergence

- Mobile data surpassed voice on a global basis in December 2009. It is forecast that mobile broadband users are expected to grow to more than 3.4bn by 2015 (from 360M in 2009). 80% of all people accessing the internet will do so using their mobile device.
- The main drivers for increased activity on the mobile devices are three-fold: better networks in the form of 3G (and future upgrades of 4G+), higher processing power devices being available for mass-market prices, and the fact that consumers are not only consuming but also producing content at an exponential pace.
- According to analyst firm ABI Research, global mobile voice revenue will peak in 2010, at USD 580 billion, before starting to contract from 2011 onwards. By leveraging the enormous demand for data, service providers can at least partially make up for declining voice revenues. In developing markets, voice revenues are likely to continue to expand but data will also become more important.
- Bangladesh has entered the mobile data wave, although 3G operation is still delayed as the licensing process has been postponed. However, mobile internet and data services have grown rapidly recently, with the majority of the nation's estimated four million internet users reportedly accessing the web via cellular networks.
- Some commentators have noted that operators who have focused on data services as their core service have benefited with high data Average Revenue per User (ARPU).
- As we quickly transition into the hyper growth phase of mobile data services, players who are designing affordable devices and services with "mobile data" in mind are the ones who will benefit from a higher uptick in adoption and sustainable consumer loyalty.
- The global smartphone boom that followed the introduction of iPhone in 2007 clearly changed the dynamics of the market and how consumers view their mobile devices. It is interesting to note that on such integrated devices, consumers only spend less than 20% of their time on voice; the rest is on other applications and services.
- The upcoming 3G spectrum allocation is expected to take place in 2011. The allocation will be done either by auction or beauty contest. It is understood that telecom regulator BTRC is going to allocate available (45 MHz) spectrum to four prospective operators.
- Given the low level of PC penetration among the broader population, 3G definitely holds the promise to provide the first experience of internet to millions of users.
- One of the key areas where operators, equipment vendors and value added service providers in the industry are focused is the rising importance of convergence and its impact on consumer spending patterns.
- Over the last few years, feature phones with the capability to play music, take pictures and tell a user's location, have become available in the market. In ensuring that consumer uptake of these services is high, players in the mobile ecosystem have built multiple business models that are creating challenges for traditional service providers.



Data

The “Wireless Internet” is a term that refers to a range of technologies and applications. People who read web pages on WAP browsers or with Opera on their smartphones are participants in the wireless Internet; more specifically, they likely have a data subscription with their mobile phone provider and are surfing what’s known as the “mobile Internet”. A stranger in the park using a 3G wireless aircard (or USB “dongle”) to connect her laptop to the Internet is also using the mobile Internet.

Mobile data surpassed voice on a global basis during December of 2009. This finding was based on Ericsson measurements from live networks covering all regions of the world. They found that data traffic globally grew 280% during each of the last two years, and is

forecast to double annually over the next five years. The crossover occurred at approximately 140,000 Terabytes per month in both voice and data traffic. The data traffic increase is contributing to revenue growth for operators when more and more consumers use data traffic generating devices such as Smartphones and PCs. During the same period, Ericsson show that traffic in 3G networks surpassed that of 2G networks.

Bangladesh has entered the mobile data wave, although 3G operation is still delayed as the licensing process has been postponed. However, mobile internet and data services have grown rapidly recently, with the majority of the nation’s estimated four million internet users reportedly accessing the web via cellular networks.

Exhibit 53 : Imperative for Broadband Growth in India

Constraint	Description	Imperative
Utility of Broadband Connection	<ul style="list-style-type: none"> • There is a perceived association of PC and internet with business applications. 	<ul style="list-style-type: none"> • Entertainment lead broadband penetration • Consumer education and free trial
Affordable Devices	<ul style="list-style-type: none"> • Cost of smartphones and PC’s still in the above USD 300 range. 	<ul style="list-style-type: none"> • Promote subsidies for institution/educational segment • Innovation from OEMs for low cost smartphone and affordable PCs for the mass market
Lack of Compelling Content	<ul style="list-style-type: none"> • Not enough variety of content and applications to appeal to all segments of people, especially those who do not already have internet access. • Limited content and applications for which the people are willing to pay . 	<ul style="list-style-type: none"> • Create an environment to enable growth of VAS ecosystem
Poor Consumer Experience	<ul style="list-style-type: none"> • Lack of spectrum leading to poor usage experience on 2.5G. • Content discovery and navigation still remains challenging for an average user. 	<ul style="list-style-type: none"> • Allocation of larger spectrum chunk to allow more spectrum to be dedicated to data access • Device service integration for better user experience
Business Case for Wireline Connectivity in Rural Areas	<ul style="list-style-type: none"> • Providing connectivity in rural areas is a challenge due to the high cost involved in laying new copper/fiber 	<ul style="list-style-type: none"> • BWA for connectivity in rural areas, for both common service centers and for individuals. • Spectrum vacation in the lower frequency bands for larger coverage in the rural areas.

Source: ABI Research

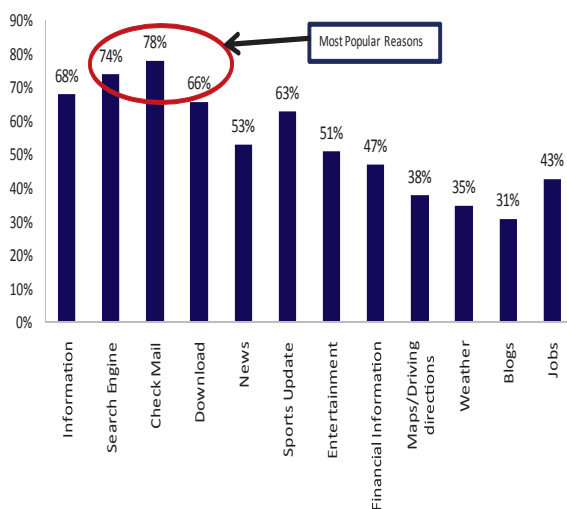


GP introduced Internet services in 2005 and EDGE in 2008. Major GSM operators are interested in moving up to 3G technologies. Three licenses are expected to be offered; the government has indicated one set of 2100MHz frequencies will be reserved for Teletalk, and has set a target of 1.5 million 3G users for the state-run Cellco in the next few years.

According to analyst firm ABI Research, global mobile voice revenue will peak in 2010, at USD 580 billion, before starting to contract from 2011 onwards. By leveraging the enormous demand for data, service providers can at least partially make up for declining voice revenues – but in areas where subscribers are accustomed to unlimited usage for a flat rate, network operators will face challenges. However, this is more relevant for developed markets than developing countries where subscriber growth is likely to remain strong. That being said, while the scope for substantial further increases in mobile penetration in Bangladesh mean that aggregate voice revenues for Telecoms operators can still increase significantly further, those mobile companies that most effectively position themselves to capture a greater share of the data markets as 3G networks are launch in the next few years are likely to enjoy the least ARPU deterioration.

In India accessing the mobile internet is done for a growing number of reasons. The trends highlighted in the table below are likely to be illustrative of future user preferences in Bangladesh. The chart below shows a survey of Indian mobile users in 2009 highlighted the following major reasons to access the internet.

Exhibit 54 : Internet Usage Purpose

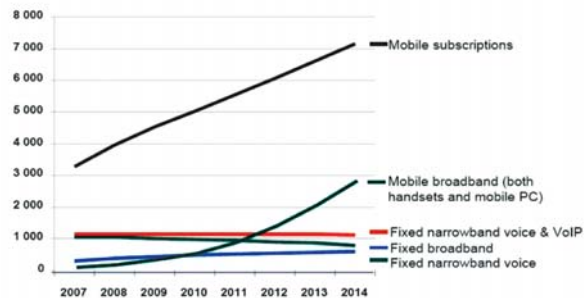


Source: Vital Analytics

Globally Opportunities Emerging in Data Markets

The mobile telecoms markets has continued to exceed expectations, with the bulk of the additions being led by developing economies. In the 2008/09 over 1 billion new subscriptions added, over 2 billion new devices sold, and over USD 300 billion in mobile data revenues. According to Ericsson Market outlook Nov, 2009, mobile broadband users are expected to be more than 3.4bn by 2015 (from 360M in 2009). 80% of all people accessing the internet will be doing so using their mobile device.

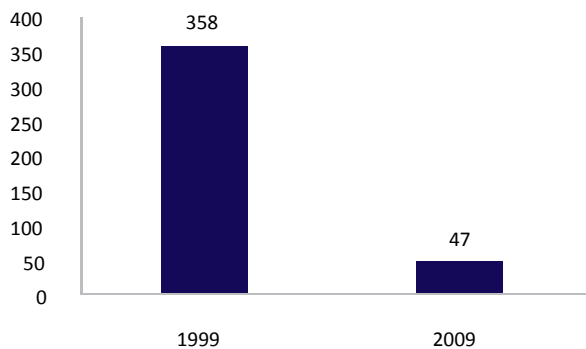
Exhibit 55



Source: Ericsson Market outlook Nov, 2009

As the chart below illustrates, estimates from Gartner show that the cost of phones has come down sharply over a 10 year period from an average of USD 358 in 1999 to USD 47 in 2009.

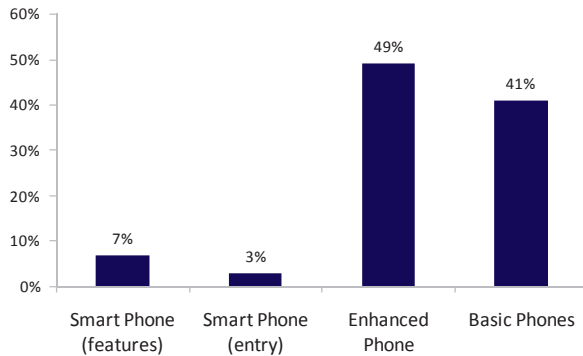
Exhibit 56 : Cost of phones over time



Source: Gartner



Exhibit 57 : Handset Sales in Developing Markets 2009



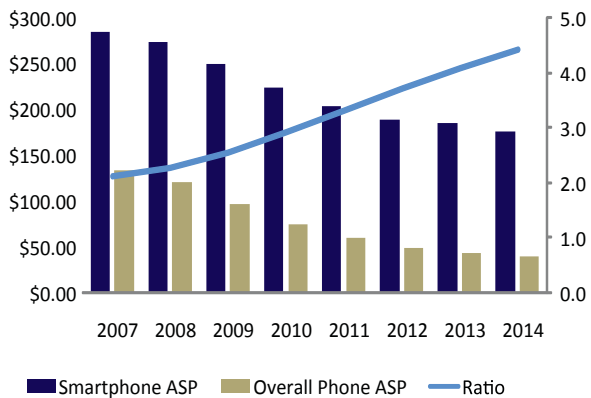
Source: Gartner

Exhibit 57 shows that Smartphones now account for approximately 10% handsets of developing markets. However, what’s often lost in the Smartphone euphoria is the remaining 90% of the market and the significant opportunity of data-enabling these customers. This is particularly relevant for a country like Bangladesh, very much at the lower end of the per capita income (currently estimated at \$ 680), and hence disposable income or spending power on mobile handsets end of the spectrum.

Chetan Sharma in a recent study (see **“The Untapped Mobile Data Opportunity”, Chetan Sharma Consulting, 2009**) has noted that “Operators who have focused on data services as their core service have benefited with high data Average Revenue per User (ARPU). As we quickly transition into the hyper growth phase of mobile data services, players who are designing affordable devices and services with “mobile data” in mind are the ones who will benefit from a higher uptick in adoption and sustainable consumer loyalty. However, as operators have migrated from 2G to 3G, many have missed an opportunity to customize or introduce new services that take advantage of devices being mobile, interactive, and always available. He goes on to note that, traditionally there has been a big gulf between the functionality of featurephones and the smartphones; however, there is an emerging category of devices that will provide the functionality of a smartphone for the price of a feature phone. Though the average selling price or the ASP of the smartphone has been dropping, the price is still high for a significant majority of the global subscriber base. If we take a look at the average selling price or the ASP of the two device categories, the ASP for both the smartphones and the featurephones have been on decline, however, the ratio of the two is on the rise, meaning that the price of the featurephones is dropping faster than that of the smartphones. As such, for the price-conscious population, featurephones will

remain a more attractive option. Consumers who are looking for a sub USD 50 device still want to the access applications such as Facebook, Twitter, Google search, and make VoIP calls.

Exhibit 58: Trends in Device Average Selling Price



Source: Chetan Sharma Consulting

The main drivers for increased activity on the mobile devices are three-fold: better networks in the form of 3G (and future upgrades of 4G+), higher processing power devices being available for mass-market prices around the world, and consumers are not only consuming but also producing content at an exponential pace. As such, the mobile ecosystem has evolved from the early days of ringtones and graphics into more rich content experiences such as high-fidelity and multi-user mobile games, very high quality broadcast video and social networking applications like Facebook and Twitter.

Additionally, the smartphone boom that followed the introduction of iPhone in 2007 clearly changed the dynamics of the market and how consumers view their mobile devices. It is interesting to note that on such integrated devices, consumers only spend less than 20% of their time on voice; rest is on other applications and services. Such a shift is also changing the service provider business models and how they run their operation and plan for future growth. Mobile media and data services are the dominant driver for growth as voice revenues decline.

Market overview:

The source of international bandwidth in Bangladesh is mainly SMW4 connectivity (total capacity 10 GB) and a small portion comes from satellite. In Bangladesh at present, there are only two players which are providing Int’l Bandwidth services:

- Bangladesh Telecom Company Limited (BTCL)
- Mango (IIG)



Exhibit 59 : IP Bandwidth cost of Bangladesh:

A. Submarine Cable IP Bandwidth (SMCIPBW)

Slab	Slab Bandwidth (Duplex)	Monthly Recurring Cost (MRC) (BDT/Mb/Month)
1	1-18 Mbps	27,000
2	19-45 Mbps	26,000
3	46-99 Mbps	24,000
4	100-& above	22,000

Note: Above charges are excluding 15% VAT

B. Satellite IP Bandwidth (SATIPBW)

Slab	Slab Bandwidth (Simplex)	Monthly Recurring Cost (MRC) (BDT/Mb/Month)
1	1-5 Mbps	1,30,000
2	6-10 Mbps	1,28,000
3	11-15 Mbps	1,25,000
4	16-& above	1,22,000

Note: Above charges are excluding 15% VAT

Source: AT Capital Research

Illustrative Telco Cost for Mobile Internet Service:

OPEX is 58% of total cost

CAPEX is 42%

33% reduction of OPEX will cause 19.14% reduction on total cost

Exhibit 60: Bandwidth Cost

Wholesale and Retail Cost (BDT '000s)				
Unit	Traffic	OPEX	Capital	Total
GPRS Mbytes	516,504,576.00	800,914.00	575,955.00	1,376,869.00

Wholesale and Retail Unit Cost (BDT)			
Unit OPEX	Unit Capital	Unit Total	Unit Total
1.55	1.12	2.67	3.87

Source: AT Capital Research

What would be the cost under new tariff scenario?? BTRC's New Directive

In 2009, Bangladesh Telecommunications Regulatory Commission (BTRC) reduced the price of internet bandwidth by about 33 per cent. The price of per MBPS bandwidth has been slashed to BDT 18,000 (USD 259.9) from BDT 27,000 (USD 390.0).

Exhibit 61: Financial impact in ceteris paribus assumption

IIG Operator	BW	Percentage of total BW	MRC including VAT	MRC including VAT @ BDT 18000	MRC including VAT @ BDT 14740
BTCL	194	45%	4,908,200	4,015,800	3,288,494
Mango Teleservices	216	50%	5,464,800	4,471,200	3,661,416
VSAT BW (Mbps)	20	5%			
Total	430	100%	10,373,000	8,487,000	6,949,910
Cost Reduced				1,886,000	3,423,090

Source: AT Capital Research

Potential Implications for Telco Data Services

We believe it is likely that Telcos will pass the benefit of BW cost reduction to customers. However, it should be noted that capex costs for build-out of network to provide such services will ultimately be passed onto the customer in tariffs. With better quality of service and a lower/affordable price they are likely to be able to acquire more subscribers. Which in the long-run would help boost the growth of the data market but still allow them to remain profitable if economies of scale are achieved.

Better QoS: At present some Telcos contention ratios are higher than would be accepted in some more developed data markets. With higher contention ratio, service providers accommodate higher number of subscribers, but that brings down the quality and speed of the internet service and can result in network congestion. According to ITU a Broadband Access Server (BAS) ratio between 20:1 (commercial) and 50:1 (household) are common, depending on the product. OFCOM in its Research report titled "The communications Market: Broadband Digital Progress Report" dated 2.4.2007, acknowledges the contention ratios of 50:1 and 20:1 for home and business customers respectively.



3G

The upcoming 3G spectrum allocation is expected to take place in 2011. The original deadline by the BTRC was in March 2008. It has been announced that in 2011, the allocation will be done either by an auction or a beauty contest. It is understood that telecom regulator, the BTRC is going to allocate available (45 MHz) spectrums to four prospective operators. It is expected that four GSM operators Grameenphone, Banglalink, Robi, Citycell and Warid will contest for three licenses, unless green field operators are also made eligible. The fourth license is reserved for the state run mobile operator Teletalk. Another important issue is the cost of 3G licensing. During the launch of a trial 3G network by Ericsson in August 2008, BTRC ex-chairman Maj Gen (retd.) Manzurul Alam put a valuation of USD 200mn on the licenses. However according to a recent publication by the Indian telecom ministry, the bidding for 3G started with USD 747.5mn and the provisional winning price for one slot of bandwidth to offer 3G mobile services across India was USD 3.7bn. A total of nine operators were awarded such licenses for an aggregate 3G license value of USD 14.7bn. Per subscriber 3G cost is USD 45.13 (Subscribers 325.7 mn as of July, 2010).

However, although Indian 3G license auctions have just been completed at relatively high valuations, it might be argued that the Indian 3G license renewal process is less relevant for Bangladesh in terms of setting appropriate prices for licenses here. As we highlight later in this report, in India much of the 3G spectrum that has been purchased is being utilized to improve service quality for voice given capacity limits rather than increasing data availability and penetration. So in that sense, it has operated as additional 2G frequency rather than 3G service delivery. A theme we come back to several times in this report is that wider broadband internet access has a large potential impact on increasing GDP growth in an economy like Bangladesh. In the context of delivering a Digital Bangladesh, ensuring a balance in having reasonable 3G license renewal costs to incentivize operators to invest in networks and infrastructure to ensure broader fast 3G data delivery is important.

The Indian 3G Experience and Lessons for Bangladesh

We draw from a paper, released jointly by FICCI and BDA (**3G & BWA: The Next Frontier: Business Models, Projections and Imperatives**), with relevant insights for Bangladesh. The majority of deployments in the metros and tier 1 cities are expected to be voice centric to address quality of service issues on 2G networks across these markets, and also to allow the

network to stabilize and be optimized before carriers start providing data intensive services.

3G networks are expected to significantly enhance user experience of existing data services, with limited introduction of video and other high bandwidth services by carriers; data ARPU of 3G subscribers is expected to be initially dominated by data connectivity charges.

Given the voice centric deployments, we do not expect introduction of any new innovative / differentiated applications and services by carriers on 3G networks, especially bandwidth intensive video services. However, we realize that there will be a significant improvement in the consumer experience for content consumption with high speed access and better device capability, which will result in higher data and VAS ARPU.

For India, BDA forecast 89.9 mn 3G subscribers (including 67.5 mn handsets and 22.4 modem subscribers) by 2013, representing about 12% of the overall wireless subscriber base and contributing USD 15.8 bn in service revenues in 2013. Annual 3G device sales are estimated to reach 81.3 mn in 2013, with replacement market contributing to 52% of device sales in that year.

By 2013, the industry ARPU (2G and 3G) will decrease to USD 4.1 at a CAGR of only -3.1%, buoyed by increasing revenues from 3G, and the overall share of VAS ARPU will increase from the current level of 9% to 23%. They project 3G ARPU to reach USD 18.3 by 2013 (on a base of 67.5 mn 3G handset only subscribers), with revenues from these users totaling USD 12.8bn in 2013. Data is expected to contribute 29% to 3G ARPU from handset users

Industry inputs suggest that WiMAX will provide strong competition in the residential and enterprise / SME broadband segment, and will be used primarily for offering fixed services. But the WiMAX subscriber projection is constrained by desktop and laptop penetration.

In the Indian 3G licensing rules, roaming for 3G is not mandatory and it is on the 3G spectrum owners' discretion to allow roaming to other 2G / 3G service providers. This will benefit the national 3G spectrum owners in creating a differentiated value proposition of seamless network coverage for their users from the day of launch of 3G services.

Given the low level of PC penetration in the consumer segment in India, 3G definitely holds the promise to provide the first experience of internet to millions of



users in India. This could be through a wide array of devices including connected computing devices, low cost portable internet devices and affordable mini notebooks. However, one of the key challenges in increasing device led internet penetration is building the utility of content for consumers. Barring the segment which uses internet for educational purposes, the other big driver for mass adoption of the internet has to be entertainment. However, to help 3G really gain adoption among consumers, development of a mobile VAS ecosystem is critical.

While the mobile VAS market has evolved from the earlier on-deck only versions to open access portals, a number of initiatives still need to be undertaken for fully developing this market. The VAS contribution to revenue is upwards of 20% in emerging markets such as China, even without introduction of 3G, as compared to sub 10% in India. Some of the enablers need to come from the regulator and the government for development of a robust VAS ecosystem. It is also worth emphasizing that in India, much of the 3G spectrum that has been purchased is being utilized to improve service quality for voice given capacity limits rather than increasing data availability and penetration. So in that sense, it has operated as additional 2G frequency rather than 3G service delivery.

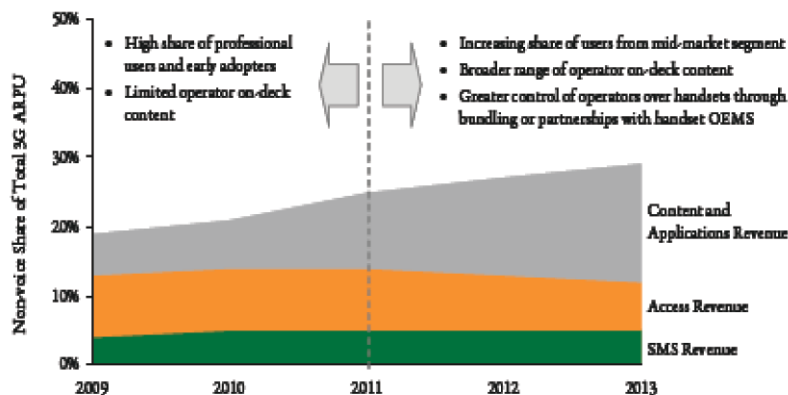
The initial target segment for 3G will be high ARPU corporate and professional users - for this representative Category A telecom circle, it is estimated that the top 9% of mobile subscribers contribute to approximately 29% of circle revenues and more importantly 45% of margins, and therefore this customer segment will be the prime focus for carriers for migration to 3G. This top 9% segment primarily includes corporate customers, professionals and other high-end users (e.g. youth, housewives). This will drive carriers' 3G business model (data / voice pricing, content aggregation strategy and handset bundling) for driving incremental data ARPU.

High ASP of 3G handsets is expected to remain the biggest near term entry barrier for adoption of 3G services. Although a few handset manufacturers have already announced the launch of sub USD 100 devices, prices levels of 3G handsets are not expected to reach the level of 2G handset ASPs in the absence of substantial volumes.

The adoption rates will increase significantly if carriers begin subsidizing 3G modems and bundling them with flat rate data plans. This has been the experience across multiple global markets, with 3G dongles accounting for as high as 30% of monthly postpaid 3G subscriptions in some cases. In France, dongles account for almost 40% of telecom carrier SFR's corporate and SME segment sales per month and represent 30% of SFR's corporate revenues. Another important segment is the emerging computing devices segment (as shown in exhibit 63), which will witness bundling by PC manufacturers in partnership with carriers offering bundled devices.

The initial uptake of 3G services by corporate / professional users and early adopters is expected to result in data ARPU being dominated by access charges with content and application revenues contributing only marginally. We expect that data ARPU for 3G subscribers will witness a healthy growth, however, it will be limited initially to access, internet browsing, messaging and e-mail application revenues. The corporate / professional segment is unlikely to have a high propensity for downloading paid content and applications, except when initially experimenting with a new 3G device. Content and application revenue will be significant once the 3G subscriber mix also includes the mid-market segment (e.g. young employees in the IT / ITeS segment and students), which will drive ARPU from games, music and other entertainment applications. Also, for the corporate segment, many services (e.g. CRBT) are bundled as part of the overall tariff package with little or no incremental user charges.

Exhibit 62: Non Voice ARPU Share of Total 3G ARPU for handset subscribers



Source: BDA Analysis



Exhibit 63: Emerging Computing Devices



Source: BDA Analysis

Exhibit 64 : Likely Impact and Target Segments of Emerging Computing Devices

Device Category	Display Size	Price	Usage	Target Segments	Likely Impact
WCDMA/HSPA Chip Embedded Laptops	11 inches+	USD 400+	<ul style="list-style-type: none"> Content creation, editing and consumption Internet access 	<ul style="list-style-type: none"> All Laptop users (new sales and replacement) 	<ul style="list-style-type: none"> Will not impact the PC sales but will increase broadband uptake
Netbooks	7 to 10 inches	USD 270+	<ul style="list-style-type: none"> Internet access, e-mail, spreadsheets, presentations and entertainment (movies/music etc.) 	<ul style="list-style-type: none"> Complementary device for users always on the move such as sales staff First device for middle income segment consumers due to lower price 	<ul style="list-style-type: none"> Will increase PC sales as well as broadband penetration
Mobile Internet Devices	4 to 6 inches	USD 250+	<ul style="list-style-type: none"> Voice calls Internet/web browsing, e-mail, search, navigation and calendar 	<ul style="list-style-type: none"> Corporate/professionals 	<ul style="list-style-type: none"> Will increase the uptake of mobile internet
Thin Client/Thin Computing	External monitor	USD 150 USD 225	<ul style="list-style-type: none"> Internet access Web-based applications 	<ul style="list-style-type: none"> Primarily for first time users Substitute for desktop/laptop especially for rural areas due to low power requirements 	<ul style="list-style-type: none"> Will foster penetration in school, Government institutions and other organizations Will increase access to computing devices

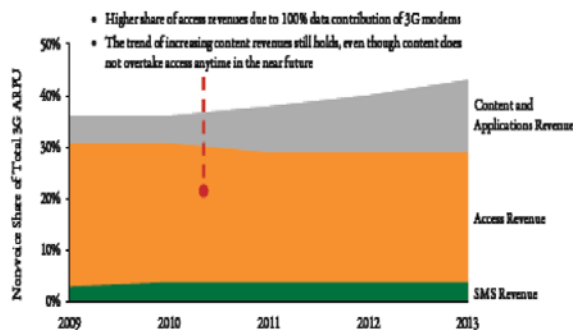
Source: BDA Analysis



Embedded Laptops are standard configuration laptops (multi-core processors, multi GB hard disk storage) with embedded wireless modems (supporting multimode functionality), which eliminate the need for an external USB dongle or data card. Industry inputs suggest that such embedded laptops will be widely available in the market by 2011 at almost the same price points as current standard laptops. The incremental cost of embedded chip was approximately USD 70 in 2009 and is expected to fall to USD 40 by 2010.

We expect a mix of limited and unlimited data plans on 3G, with unlimited plans being introduced in the market as and when the network capacity for 3G data service increases.

Exhibit 65: Non Voice ARPU Share of Total 3G ARPU for handset & Modem subscribers



Source: BDA Analysis

The blended data ARPU for 3G (including handsets and modem revenues) has a high share of access revenues, which declines over time with increasing share of content and application revenues.

Similar to the experience in international markets, data ARPU in India is also expected to reach an inflection point only after the introduction of feature rich handsets, better device-service integration and differentiated content. While voice will remain the dominant application across segments, the type of data services and applications introduced in India and their relative adoption will vary by consumer segment, handset capabilities, network capacity and carrier marketing strategies.

Consumer experience will also be driven by carrier focus on the high end segment, who can afford high price mobile devices, which will truly enable a rich 3G experience and contribute to incremental data ARPU. As per experience in other developed markets, high quality browsing experience on mobile directly contributes to greater data usage. The enhanced web experience on the Safari browser of the Apple iPhone

has directly increased data consumption, with over 75% of iPhone users in the US agreeing that they browse more on the iPhone than they did before, due to the better experience.

AT&T reported USD 90 as its ARPU from iPhone users in Q1 2008, even before the launch of the 3G version of the device.

iPhone users have generated monthly data ARPU of up to USD 30 as opposed to data ARPU of USD 12 for an average AT&T consumer. The growth in data ARPU for iPhone users has not been led by the introduction of many new services as web based applications remain the most used data functions on the device.

However, as carriers begin to focus on the mid-market consumer segment, innovative entertainment based content and applications will gain more traction.

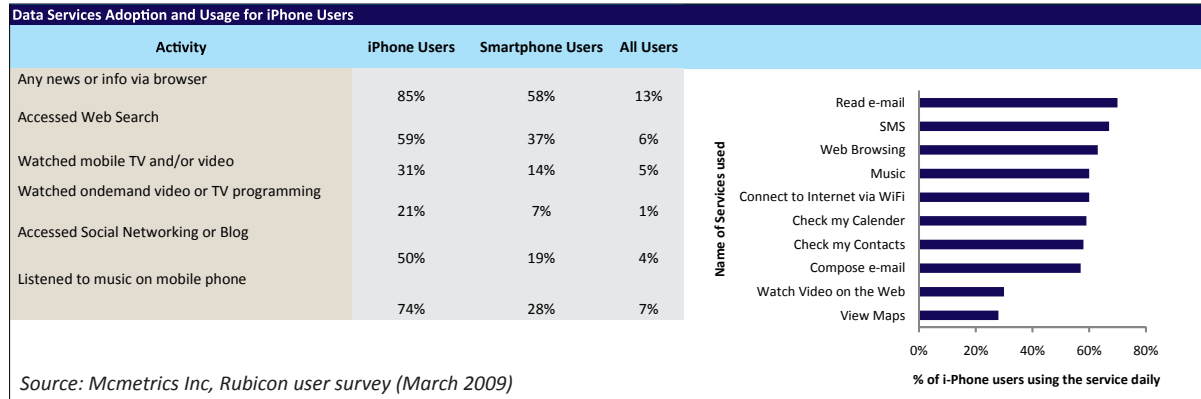
One differentiating factor between mature global 3G markets and the Indian market is the preference by Indian consumers for entertainment based content over information centric content. In a consumer survey, except email (which would be primarily for the enterprise segment), there was a clear user preference for entertainment and sports based content. This content preference is not expected to change even with the arrival of 3G supporting high access speeds and improving the quality of a user's browsing experience. We will thus witness the mid-market segment adopting 3G primarily driven by innovative entertainment based services and applications.

We expect a similar phenomenon in India, with increasing data ARPU for the mid-market segment only after the issues of content discovery and customer education are addressed, and the overall process of downloading and using the application becomes convenient for the end user. This will be enabled, in part, by players in different parts of the telecom value chain identifying ways to bypass carriers and have a direct relationship with end consumers. Some of these models include upfront payment for content (e.g. Nokia 'Comes with Music' handsets), over the top download with or without billing support by carriers (Apple app store, Motorola music store, Nokia Ovi) and content side-loading from retail outlets (memory cards preloaded with music / movie content in mobile retail stores).

The type of data services and applications and their relative adoption will vary by consumer segment, carrier network deployment / marketing focus and handset capabilities. The degree of adoption of different categories of services will vary by consumer segments. With faster internet access,



Exhibit 66 : Data Service Adaptation & Usage for iPhone User



web based services and email will see greater uptake almost immediately, especially in the corporate and professional segment. The timing of introduction of bandwidth intensive video services (along with their price points) will depend on network capacity, but is expected to cater to the larger mid-market consumer segment. Popular VAS applications such as games and music are expected to drive 3G services adoption among youth.

Given that introduction of 3G and BWA services will

address the issues of access speeds and reliability, focusing on consumer education and awareness becomes critical to address utility issues. The carrier focus on consumer education for data intensive services has been limited, primarily because they did not have sufficient spectrum capacity to handle widespread adoption (with most carriers not actively promoting GPRS data modems, and high end applications like video clip downloads, etc.), and they have only limited broadband infrastructure (both wireline and wireless).

Exhibit 67 : Application usage patterns in Emerging Markets vs Developed markets

	US	Europe	China	India	Brazil	Russia
	Email	Email	Entertainment (55%)	Games	Email	Entertainment (55%)
Top 5 Website Categories (% of mobile internet users)	-65%	-46%		-38%	-57%	
	Weather	Search	Games	Email	Music	Search
	-41%	-25%	-36%	-33%	-27%	-29%
	Search	News/Politics (26%)	Music	Entertainment (55%)	Entertainment (55%)	Email
	-29%		-31%			-24%
	News/Politics (26%)	Weather	News/Politics (26%)	Music	Games	Music
		-24%		-18%	-18%	-24%
City Guides/ Maps (24%)	Sports	Business/Finance (18%)	Sports	Movies	Games	
	-22%		-15%	-12%	-24%	

Source : Neilson, Mobile Media Marketplace Report- BRIC, US, Europe, Q1 2008



Exhibit 68 : Potential services offerings in 3G and their target segments

	Services/Applications	Corporate/Professionals	Youth & Early Adopters	Mid-Market Segment	Rural/Low End Incremental Subscribers
Web-Based Services	Information Search	●	●	●	○
	SNC/Blogging	●	●	●	○
	News Feeds	●	●	●	●
E-mail	On the Web	●	●	●	○
	Client (Push Email)	●	○	○	○
Music	Music Downloads	●	●	●	●
	Live Streaming	●	●	●	○
Video	Clip Casting	●	●	●	○
	Downloads	●	●	●	●
	Calling/Conferencing	●	●	○	○
Games	Online Gaming	●	●	●	○
	Games Downloads	●	●	●	●
Utility	M-Commerce	●	●	●	●
	Location Based Services	●	●	●	○
	Enterprise Applications	●	○	○	○

● Immediate Adoption ● Near Term Adoption ● Medium Term Adoption ○ Long Term Adoption

Source: BDA Analysis

ICT Convergence and Implications for BD Telcos

One of the key areas where operators, equipment vendors and value added service providers in the industry are focused is the rising importance of convergence and its impact on consumer spending patterns. The pace at which device development has progressed in the last few years has enabled the rise of a new class of devices, and enabled a new set of services that were hitherto impossible to deliver on the mobile handset. For instance, over the last few years—feature phones with the capability to play music, take pictures and tell a user’s location—have become available in the market. In ensuring that consumer uptake of these services is high, players in the mobile ecosystem have built multiple business models that are creating challenges for traditional service providers.

According to the World Bank’s “Information and Communications for Development 2009: Extending Reach and Increasing Impact”, CHAPTER 2, “Convergence is shorthand for several changes occurring in the ICT sector. Broadly speaking, convergence refers to the erosion of boundaries among previously separate services, networks, and business models in the sector.” According to that report, there are three main forms of convergence.

The first, service convergence, or “multiple play,” allows a firm to use a single network to provide several communication services that traditionally required separate networks. The second form is network convergence, where a common standard allows several types of networks to connect with each other. Consequently, a communication service can travel over any combination of networks. While these two forms of convergence are technological, the third form, corporate convergence, results from mergers, acquisitions, or collaborations among firms. Under the third form, newly organized business entities offer multiple services and address different markets. The Table on the following page summarizes the three forms of convergence and associated benefits, risks, and policy implications.

The fundamental technology drivers for convergence have been the digitization of communication and the falling costs of computing power and memory. Both factors have increased a network’s capacity to carry information while bandwidth remains fixed. Consequently, the capacities of telephone, cable TV, and wireless networks have grown steadily. More recently, the growing use of Internet protocol (IP)-based packet-switched data transmission has made it possible for different devices and applications to use any one of several networks and for previously separate networks to interconnect.

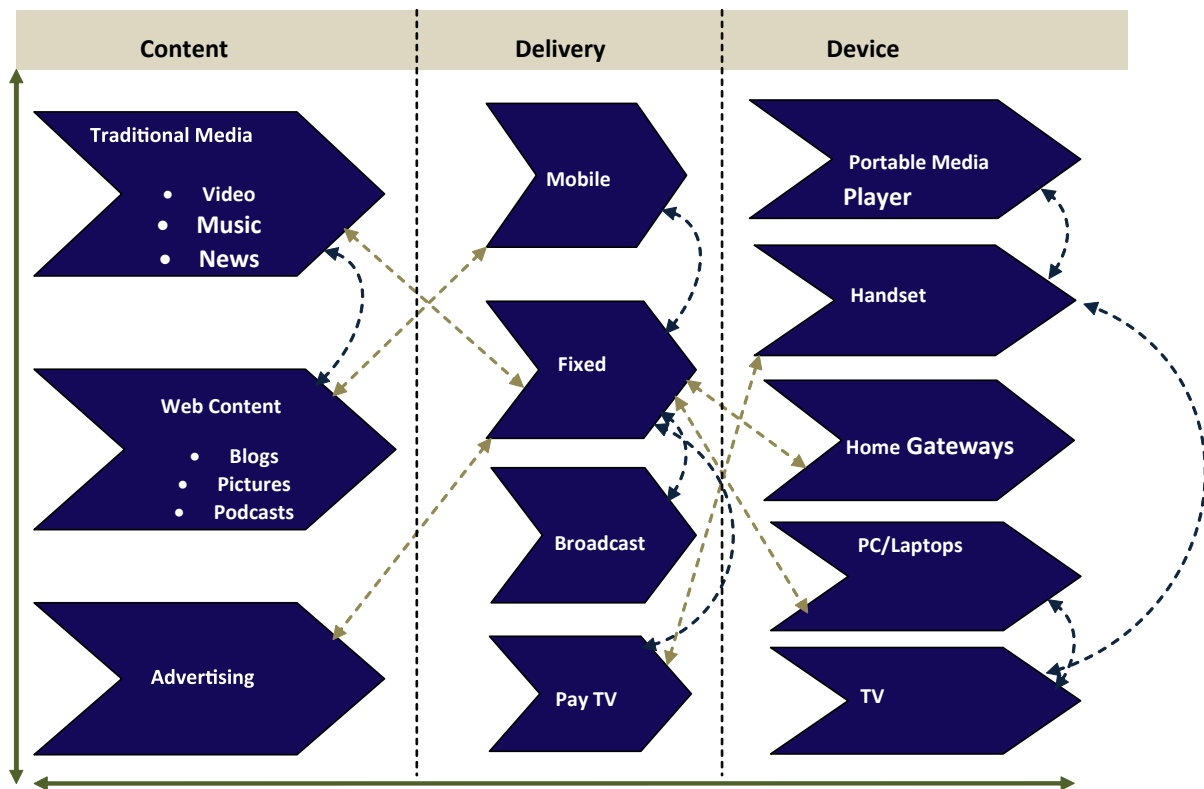


Exhibit 69 : Different Forms of Convergence What is Convergence?

Dimensions	Service convergence	Network Convergence	Corporate convergence
Definition	Service providers use a single network to provide multiple services.	A service can travel over any combinations of networks.	Firm in one sector acquire, merge, or collaborate with firms in other sectors.
Example	Service offer telephony, television and Internet services using telephone, cable television or fixed wireless networks. Examples include providers in Chile, Arab, Republic of Egypt, India, Poland and Ukraine.	Internet telephony services such as Skype and Jajah carry voice telephony using the internet and traditional networks. In the United Kingdom, BT's Fusion service carries calls over WiFi (wireless fidelity) and cellular networks.	Internet, media, and telecommunications firm's partner, merge, or expand their range of services. Such developments have occurred in Brazil, Nigeria, and Sri Lanka.
Benefits	Service providers can enter new sectors, use their networks more efficiently, offer discounts, and increase access to new ICT services.	Reduced costs can lower tariffs. Network integration permits mobility for consumers and expands coverage.	Mergers create opportunities for new services and markets, lower costs and tariffs, and increase the coverage of individual firms.
Risks	Subscribers could be locked into one service provider. Similar firms especially those without their own broadband networks, might get pushed out of the market.	Service providers could reduce investments in network infrastructure, showing build-out.	Mergers could lead to market dominance, less competition, and less diversity of media content.
Policy implications	Multiple plays changes the scope and boundaries of markets and alters entry barriers.	Connecting different networks allows location-and network-independent service provisions.	Mergers create new business models and alter the market structure, changing the dynamics of the sector.

Source: World Bank 2009

Exhibit 70 : Convergence



Source: Capgemini Analysis



Convergence is both a threat and an opportunity for players

Convergence has far-ranging implications for ICT service providers and users. It changes business models, expands markets, increases the range of services and applications available to users, and alters market structure and dynamics. Furthermore, given that ICT is a critical input to economic and social activities, convergence has an indirect effect on social and economic development.

The evolution of digital video broadcasting (DVB) and mobile TV will enable the use of triple play over wireless networks, further extending the reach of services. The provision of DVB over cellular networks has recognized potential to increase the number of TV viewers in countries such as Kenya and the Philippines. South African media conglomerate Naspers has plans to expand its mobile television services into four new African markets, after introducing it in Namibia, Kenya, and Nigeria (Reuters 2008).

Thus, if service providers build service-converged networks, then financial services, public services, and entertainment applications will be able to reach a far larger portion of the world’s population. Similar possibilities arise from the mixed use of cable TV, wireless broadband, and other ICT networks. The well-known success of mobile telephony worldwide has had as much to do with market liberalization as with high demand and low cost technologies. Research on the diffusion of advanced telecommunications services in developing countries finds that the rate of adoption depends on the existence of an appropriate business environment—which, in turn, is directly dependent on the regulatory and policy environment.

A key strategic consideration for governments is the implication of convergence for competition and market structure in the ICT sector. If developing countries seek to maximize the benefits of convergence, they could consider policies that increase access to advanced technologies and innovative, high-quality services by opening markets and removing regulatory barriers to new technologies and business models (Guermazi and Satola 2005, p. 25). Such policy frameworks will create the conditions needed to promote competition. Governments seeking to maximize the benefits and minimize the risks of convergence will have to think strategically about their policy responses to convergence. If policies restrict convergence from playing out in the market, do not promote competition, or fail to address the risk of monopolization, they will lead to suboptimal outcomes that reduce the development impact of ICT.

Some countries resist the introduction of convergence. Others “wait and watch,” embarking on changes only when they consider them necessary. A third response is to create enabling policies for convergence. These three categories describe how countries have responded to convergence. Governments may believe that convergence will undermine social, political, cultural, or economic goals. In developing countries, VoIP is often perceived as potentially undermining the revenues of incumbent telecommunications operators (and of government, if the incumbent is a state enterprise) — especially when lack of competition has allowed these firms to draw large monopoly rents (ITU 2007, p. 13). Similarly, the political, cultural, and social importance of broadcasting and media often makes governments wary of new providers.

Exhibit 71: Policy Responses to Convergence around the World

Indicators	Resist	Wait and Watch	Enable
Perceptions	Government believes that convergence may undermine social, political, cultural, or economic goal.	Government believes that existing policies accommodate convergence, or decides not to act.	Government believes that convergence can benefit the ICT sector and economy at large.
Actions	Government takes steps to prevent new services and providers from entering the market.	Government makes no policy changes. Issues are dealt with on a case-by-case basis.	Government updates policies, promotes industry responses, or directly invests.
Outcomes	New services cannot develop legally, but may still defeat restrictions. Users lose potential benefits from innovations and cost reductions. Government faces increasing pressure to remove restrictions.	Case-by-case decisions allow progress but expose policy inconsistencies. Growing uncertainty discourages investors and operators. Government faces increasing pressure to revise policies.	Market evolves with new services and business models. Growth and innovation accelerate. Users benefit from increased access and choice, and reduced prices.

Source: World Bank 2009



Chapter - 05

Mobile Value Added Services

- Mobile Value added services (VAS) are fast becoming a major part of the revenue mix for telecom and media companies around the world.
- It has been estimated that Emerging markets will drive the growth of global mobile value-added-service (VAS) revenues from \$200bn in 2009 to \$340bn in 2014.
- Operators and service providers in emerging markets have been more innovative and proactive in developing and deploying mobile VAS than their counterparts in the developed world, especially in the areas of mobile payments, P2P funds transfer and agricultural information services.
- In addition, in a competitive market, VAS helps to build stronger relationships with customers, as customer data can be mined to create customized services that increase loyalty and enhance stickiness.
- It is important to develop a “VAS ecosystem”. Cooperation between content providers, device makers, application developers and operators is vital to create the most effective business models. Operators can play a potentially central role in this ecosystem through leveraging their own unique capabilities and providing leadership.
- An additional market opportunity in Bangladesh is the market for VAS to corporates from simple applications such as using SMS for scheduling appointments to streaming product videos, product manuals and guides to a salesperson’s mobile phone. The applications are wide ranging and could offer considerable first-mover advantage for service providers who can address this market quickly.
- Less than 5% of the population, most of whom are primarily located in urban centres, have bank accounts. The advent of mobile technology can enable banks to have a presence in rural areas instead of a traditional branch-based environment. Thus, m-Payment/ m-commerce will play a significant role for both the un-banked and banked population, facilitating comprehensive payment distribution channels for the quick delivery of international and domestic transfer of funds in rural areas.
- Growing interest in the field of mHealth, the provision of health-related services via mobile communications, reflects a growing body of evidence that demonstrates the potential of mobile communications to radically improve healthcare services, even in some of the most remote and resource-poor environments.
- Legal barriers have been lifted in making online commerce and transaction possible. An example of early adoption of E-commerce in Bangladesh is Cell Bazaar which provides regular, reliable, market information on the price, availability and supplier options of essential goods. Information is provided on a pay-as-you-use service.



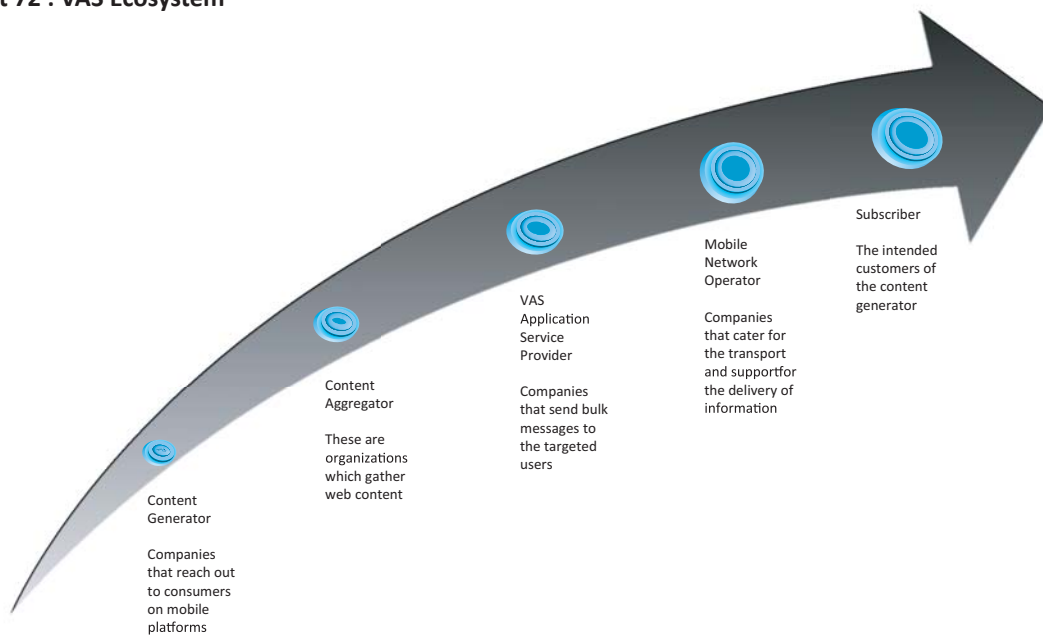
Overview

Mobile Value added services (VAS) are fast becoming a major part of the revenue mix for telecom and media companies around the world. Some estimates suggest Mobile data is now typically between 25% and 40% of revenues in developed economy markets and by far the fastest growing service. Until the last year or so, this has been driven by SMS and ringtones but other services like mobile email and mobile broadband have grown significantly over the last few years and there is now a broad range of services offered. The success of Apple’s iPhone App Store – with more than 1.5 billion applications downloaded within the first 12 months of operation – that allows users to download a vast array of different applications to their iPhone – only serves to emphasize that when the experience is right, mobile users are looking for ways to add to their device – and are in many cases prepared to pay to get what they want.

funds transfer and agricultural information services. The reason being that these services are having a big impact on the day-to-day lives of the local population and are contributing to the social and economic development of the population in these markets, Informa said, citing services such as M-Pesa from Safaricom in Kenya, the Rural Information Service from China Mobile, the Please Call Me service from MTN in South Africa, and the CellBazaar service from Grameenphone in Bangladesh.

As well as driving revenues directly, value added services can enhance performance in other ways. Critically, in a competitive market, they help to build stronger relationships with customers, as customer data can be mined to create customized services that increase loyalty and enhance stickiness. In India there are vibrant software and media industries and a

Exhibit 72 : VAS Ecosystem



Source: Accenture

Informa Telecoms & Media estimates emerging markets will drive the growth of global mobile value-added-service (VAS) revenues from \$200bn in 2009 to \$340bn in 2014. In fact, operators and service providers in emerging markets have been more innovative and proactive in developing and deploying mobile VAS than their counterparts in the developed world, especially in the areas of mobile payments, P2P

strong tradition of entrepreneurship that have already created a rich community of VAS developers building applications in use around the world. However as Accenture has noted despite this, “Mobile VAS in India appears to lag most other countries, even when compared with other developing markets, leading to a “VAS Vacuum”.”



They observed three main reasons for this. First, the mobile operators have to date focused on acquiring customers in the urban areas where VAS has not been needed or used as a differentiator. Secondly, SMS usage in India is much lower than in other developing markets, perhaps a function of low literacy rates, and certainly inversely correlated with high voice usage. Finally, the later release of 3G spectrum and licenses may also mean that operators have not yet devoted the resources to develop VAS applications, which typically happens when at least one player starts actively to push its 3G network.

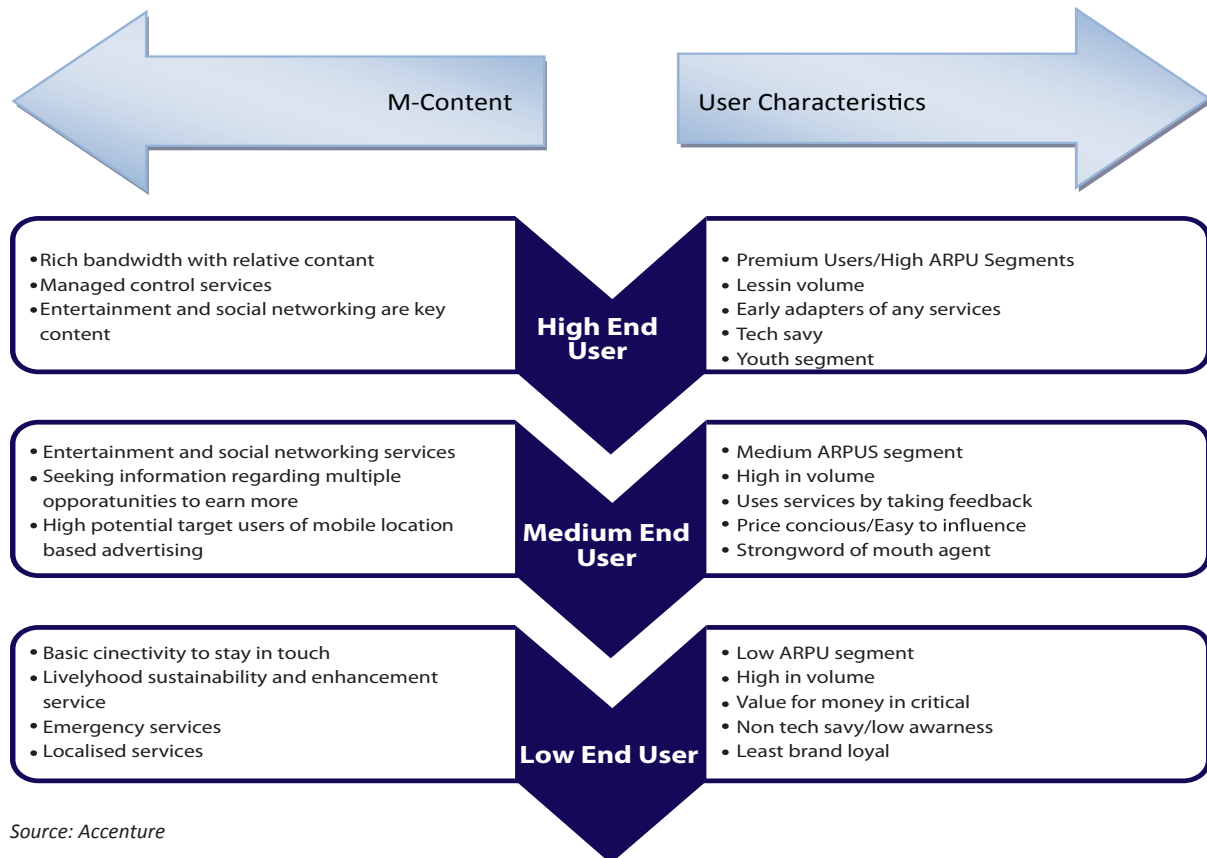
One concept they highlight is to “Embrace the VAS Ecosystem”. Specifically, in India with several large global players and hundreds of small local innovators, the odds are heavily stacked against a single company having all of the expertise in house to provide and sustain the innovations needed to deliver a portfolio of VAS services. Cooperation between content providers, device makers, application developers and operators is vital to create the most effective business models. Operators can play a potentially central role in this ecosystem through leveraging their own unique capabilities and providing leadership on key issues such as pricing and payment transparency, security of copyright and content.

An example of a small private sector company that is innovating in VAS services for Bangladesh is In4Mobile, a joint venture between a Danish company, Zonning Multimedia and a Bangladeshi company, FutureLeaders. They are developing mobile marketing as well as mobile enterprise tools and software. (See <http://in4mobile.com/>)

Accenture also note that VAS can provide the opportunity and means for differentiation. Sticky services help to lock in customers by helping them manage their lives through services such as address book storage, SMS back up, and a range of personalized content and social networking tools. Operators can mine customer data to generate insight about the types of service bundles that would suit specific customer segments and use these to help drive retention. (see “*Mobile Value Added Services in India: Filling the VAS Vacuum to drive high performance*”, Accenture Communications and High Tech), Vasanth Balakrishnan)

This concept can be extended into the future development of VAS and mobile applications (apps) in Bangladesh. GP is already working on a common and easily accessible mobile applications platform to

Exhibit 73: M- Content



Source: Accenture

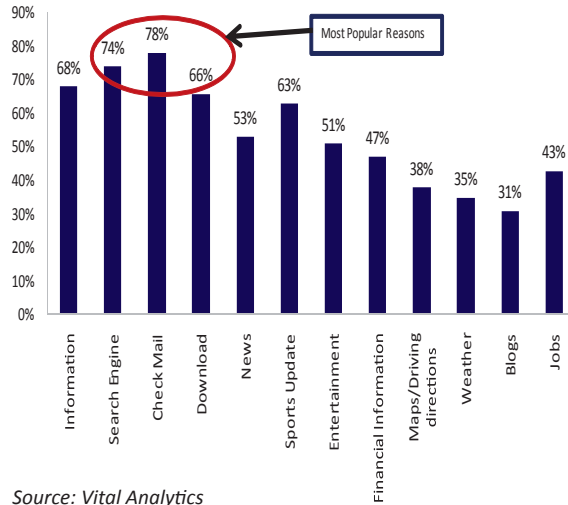


encourage and make it easier for smaller software and apps developers in Bangladesh to develop new and innovative content for mobiles there. An additional market opportunity in Bangladesh is the market for VAS to corporates from simple applications such as using SMS for scheduling appointments to streaming product videos, product manuals and guides to a salesperson’s mobile phone, the applications are wide ranging and could offer considerable first-mover advantage for service providers who can address this market quickly.

VAS, Financial Services VAS/Mobile Banking and E-Commerce.

Exhibit 74 shows a survey of Indian mobile users in 2009 highlighted the following major reasons to access the internet

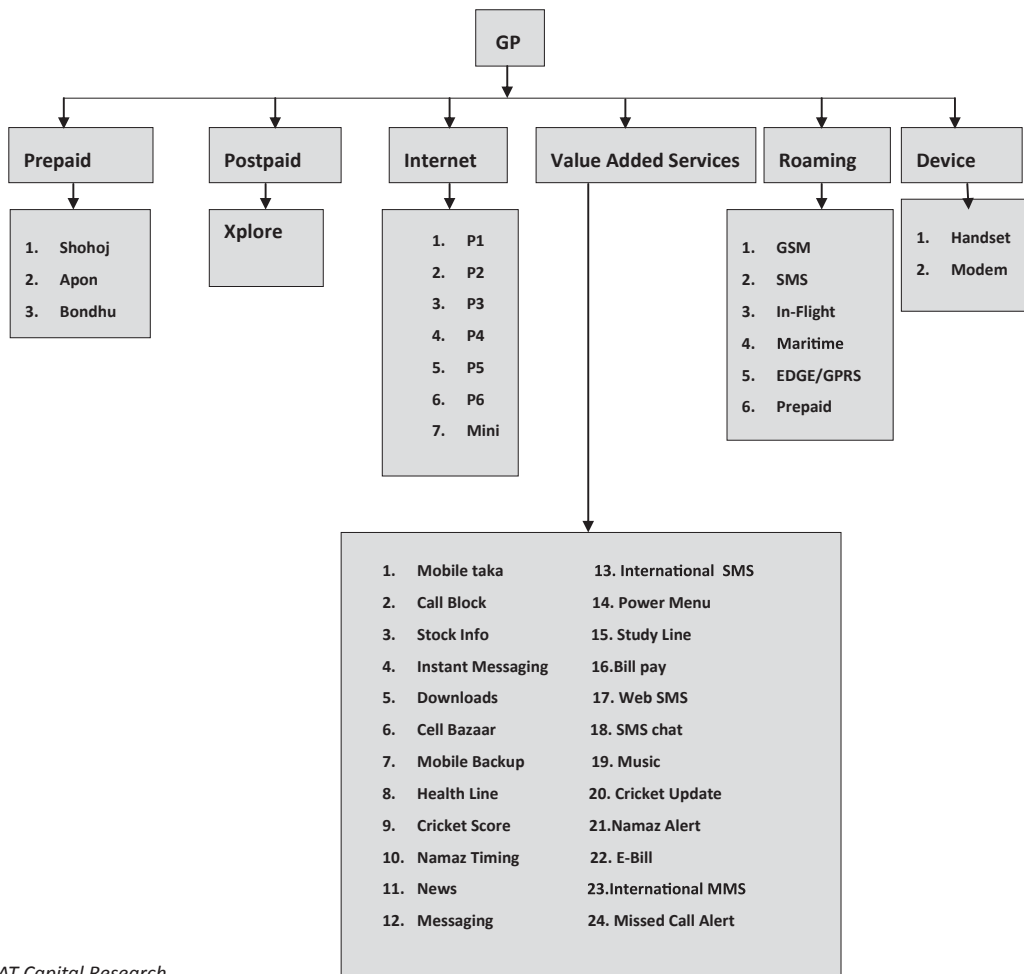
Exhibit 74 : Internet Usage Purpose



Source: Vital Analytics

The table below summarizes some of the current VAS services offered by market leader GP. But all of the 6 Telecoms companies are developing a wide range of VAS services which we summarize in the end of each of their company profiles in chapter 8. In the next sections, we summarize some of the largest areas for VAS development in Bangladesh, namely Agricultural

Exhibit 75 :Mobile VAS – GP



Source: AT Capital Research



Telecoms and Agricultural VAS

In Bangladesh, there is little doubt that a large proportion of the next phase of mobile phone penetration will be in rural areas. Furthermore, with such customers likely to be very price sensitive and careful in voice mobile phone usage, squeezing margins and depressing ARPUs, Value Added Services (VAS) represent further revenue streams in a market where voice is commoditized. Since 2008, multiple operators in India have started agricultural information services targeting rural subscribers and a similar trend is beginning among the Telcos in Bangladesh. Most of the agricultural VAS includes a mix of crop advisory information, weather updates and market price information.

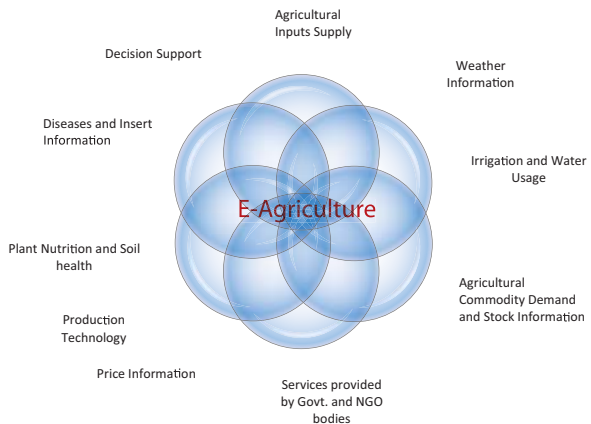
Although the proportion of Bangladesh's GDP accounted for by agriculture has continued to decline (in 2009 18.6%), it still accounts for almost 70% of employment in the country. The Grameen Village phone concept and Community Information Centres (CICs) have already increased the accessibility of information to a broader range of rural Bangladeshis. However, increased and more effective use of ICT in the Agriculture sector has the potential to have the biggest impact on rural development as well as help cushion declining ARPUs as marginal mobile penetration increasingly moves outside of urban centres into the villages.

In a country like Bangladesh, where farms are extremely small, cultivation is dependent on the uncertainties of variable rainfall and average output is generally low. Value addition in agriculture requires technological, institutional and price incentive changes designed to raise the productivity of smaller farmers.

The diagram below outlines some of the potential information of interest to the farmer. Internet connectivity either through mobile phones or computers accessed through central village hubs like GP's CICs can help develop a critical mass of agricultural information as follows:

Database building: Data like cropped area, yield, fertilizer use, inputs supply, price, insect, disease or pest attack, nutrient uptake, seed, irrigation, land use etc. could be collected by the Ministry of Agriculture from the root level from farmers in the field and then be updated from the smallest administrative unit level over the country like Upazillas. Web based software, allow users to update and view data and make relevant queries from any corner of the country if the user is connected to the Internet.

Exhibit 76: Spatial skeleton of E-Agriculture



Source: Saiful Islam

A research report by Vodafone on Mobiles in India included a detailed assessment of the Agricultural needs for farmers there and the potential use of mobile-enabled services. This is clearly contextually relevant for Bangladesh. The authors noted that the broad categories of information required were common to all of them, irrespective of their location and crops. These categories were: know-how which helps a farmer with fundamental information such as what to plant and which seed varieties to use; contextual information such as weather, best practice for cultivation in the locality; and market information such as prices, demand indicators, and logistical information. These are set out in following charts.

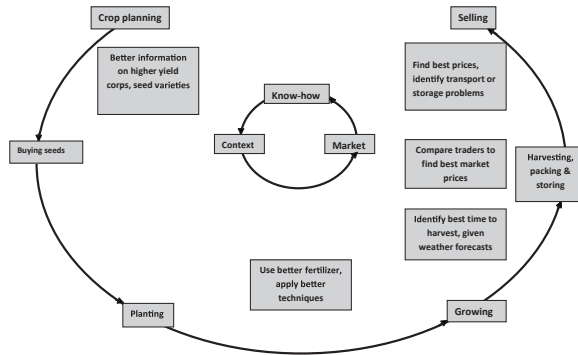
Exhibit 77: Farmers' information needs

Category	Examples	Typical Information Needs
Know-how	<ul style="list-style-type: none"> • Crop choice • Seed variety 	<ul style="list-style-type: none"> • What are options for new crops or seed varieties. • Are there higher value crops or better seed varieties I could be planting?
Context	<ul style="list-style-type: none"> • Weather • Plant protection • Cultivation best practices 	<ul style="list-style-type: none"> • When should I harvest? • When should I sow? • What are cultivation best practices for my crops and soils? • What input should I use? • How to best apply them? • Where can I find them?
Market Information	<ul style="list-style-type: none"> • Market Prices • Market Demand • logistics 	<ul style="list-style-type: none"> • What are prices and demand in relevant markets? • Has there been a transport breakdown?

Source: Vodafone (2009)



Exhibit 78 : Information needs through the Agricultural Cycle



Source: Vodafone (2009)

Of this range of information requirements, it was found that small farmers prioritized weather, plant protection (disease/ pest remediation), seed information and market prices as the most important. In Uttar Pradesh and Rajasthan, close to 90% of farmers reported seed information as the highest priority, while over 70% cited market prices as the most important category.

While farmers were interested in the other categories of information, such as cultivation best practices and crop choice, only a minority of the sample prioritized them. Typically these other categories would be most significant where the farmer was seeking to try new strategies in order to increase yields and revenues, although almost all farmers will need to introduce crop changes periodically. It was found that most farmers had access to a variety of non-mobile enabled information sources that they consulted for agricultural information. This included TV, radio, newspapers, other farmers, government agricultural extension services, traders, input dealers, seed companies and relatives. However, the perceived quality and relevance of the information provided by these sources was highly variable. Most of the farmers interviewed lacked access to consistent, reliable information for many of their needs and often relied on a combination of traditional knowledge, experience and guesswork to make decisions. With the exception of villages with access to successful ITC rural kiosk programs, most of the farmers surveyed did not have a single channel or access platform that served as a comprehensive source for their information needs.

It can then be disseminated either through communal internet centres such as GP's CICs, or alternatively through text based mobile messaging services. A recent detailed survey of farmers preferences in Bangladesh suggest ICT via mobile phones is likely to

be far more effective than using traditional computer centres (*"How can ICTs be used and appropriated to address agricultural information needs of Bangladeshi farmers"*, Dey, Prendergast and Newman (2009).

The authors noted that "the proper dissemination of information for agricultural and rural communities is a crucial tool in the fight against poverty and deprivation. Information helps the poor to avail the opportunities and also reduce their vulnerability. Kiplangat (1999) postulates that "dissemination of relevant information to the farming communities can facilitate the effective adoption of agricultural inputs, decision making on markets and adoption of scientific methods. However, lack of dissemination of information across the agricultural supply chain is a major concern in the developing world."

They also note that most mobile telephony devices and services have been designed to meet the needs of businessmen or teenagers in western cities. This has resulted in designs that are inappropriate for village use, e.g. most mobile phones in Bangladesh do not support Bengali, so users are forced to navigate English menus and send text messages in Latin characters, and the one phone that uses Bengali comes from West Bengal, a province in India. The word it uses to select an option has a different meaning in Bangladesh. There it means to vote in an election. The problem here is to understand better farmers' needs, before starting to design ICT applications.

In the survey it was noted that most of the farmers are semi-literate or illiterate which limits their access to printed sources of information about farming and cultivation. The Ministry of Agriculture of the Government of Bangladesh employs advisers, known as block supervisors, to help farmers resolve problems that they encounter. There are two block supervisors in each Union Parishad (a unit of local government). Joyag is a Union, while Shaturia is an Upazila – sub-district (which consists of nine unions). A typical union consists of fifteen villages with almost 100,000 inhabitants. Almost eighty percent of the families live on agricultural activities in typical Bangladeshi villages. Two block supervisors are inadequate to support farmers of such a vast area. Hence, contacting these block supervisors is a major concern for the farmers.

Farmers have their own way to collect information about fertilizers, pesticides and appropriate prices for their produces. Farmers move from one bazaar to another to learn about the prices and sources of fertilizers. Research has observed that farmers easily accepted the use of the mobile telephony to find fertilizer prices. This was possible, because the traditional process could easily accommodate the use



of the technology. Farmers were still contacting the same people (other farmers or the dealers) about the same issue (prices and sources of fertilizers). Without changing the human agents (farmers and the people they contacted for information) and the nature of communication, a cheaper and easier mechanism could be developed with the help of the technology. As one of the farmers said:

“Yes now I understand. If I go to three different shops it costs me the whole day and can cost me BDT 50 for the rickshaw fair. Now I can save this time and BDT 50 by making three phone calls costing me maximum BDT 9.”

Dey et.al noted three information needs of farmers that potentially could be met using mobile ‘phones and telecentres.

1. Sources and prices of inputs including fertilizers are important information needs of Bangladeshi farmers. The fieldwork found that the telecentres did not address this issue, but that simply substituting mobile telephone calls to suppliers into their existing processes worked
2. New crop pests had become a problem due to climate change and new agricultural technology. As a result farmers require solutions for strange pests and plant diseases. Again research found that the telecentres had not yet found quicker and easier ways to provide solutions for pests and plant diseases. Nor was this just-in-time information need addressed by the existing agricultural extension system (with only 2 extension workers for 10000 people).
3. Information on crop selling prices in different markets has, in principle, the potential to improve farm income and even cut out middlemen.

A recent LIRNEASIA research paper (“*Agricultural Value Added Services (VAS) through Mobile 2.0*” Lokanathan and Samarajiva, 2009) makes a number of recommendations on how best to develop Agri VAS that is relevant to Bangladesh Telcos as they consider their rural penetration strategies. These include:

- 1) Telecommunication companies are best to leave content provision to the specialists. When content comes from specialized information providers, customers value the information more. Such providers are best placed in generating customizable, relevant

and timely information.

- 2) Mobile based agricultural information services, need greater visibility. Proactive awareness building by companies will help popularize the service. Telecommunication operators need to view such services as potential revenue generators by themselves rather than as teasers to increase their subscriber market share.
- 3) With lower literacy levels, small farmers prefer voice based solutions more than text based solutions. If it is text based, then use of local languages remains key. Text also allows for advice to be stored and used later. Greater access requires more awareness.
- 4) Farmers see value in such services only when the information provided by these services is timely and relevant to their own specific produce. Generic crop advice is not valued highly. Even with respect to market prices, they require accurate prices from the markets of their choice; which varies from farmer to farmer. Customized content therefore, is more the forte of specialized VAS companies like RML. Their market price information for example (which they collect themselves), are viewed to be more accurate and their customized crop advise and weather updates were found to be valued more than the generic information available via services such as those offered by IKSL.

The report notes that a variety of business models are being employed, mostly as partnerships between telecommunication companies and other organizations. With some farmer organizations, especially fertilizer cooperatives having millions of members, telecommunication companies are seeing them as a viable partner in order to increase their subscriber numbers. In terms of specific Indian examples, the report notes that for example, IFFCO Kisan Sanchar Ltd. (IKSL), a joint venture between Bharti Airtel and IFFCO (a fertilizer cooperative with over 55 million farmers) even issue specialized branded SIMS for IFFCO members (Airtel has over 1.5 million subscribers of this specialized IKSL package), which includes free agricultural VAS. However, operators are even getting into joint ventures with specialized VAS companies as seen by Mandi on Mobile (BSNL & OnMobile) and Mandi Bhav (Tata Teleservices and Impetus Technologies). Only one example exists of a VAS company going at it alone which is service provided by Reuters Market Light (RML). RML has chosen to specialize in information collection and



sending customized content for each of its subscribers; but, in some regions, even they have partnered with an operator (Idea Cellular’s Idea Krishi subscription plan). Most operators are using agricultural VAS as a teaser to increase their rural subscriber base and reduce churn. They have for the most part treated the potential of the VAS itself to generate additional revenues as a second priority. Hence, some of the services are being offered for free by operators. When it is a paid service, it is generally via a time-based subscription model (one month, 3 month, 6 month or annual subscriptions). Pricing varies from service to service, but generally ranges from INR 15-100 per month. Usage based pricing is also available on some

services (e.g. Mandi on Mobile), but is less common.

The Vodafone Indian Mobiles Report looked at two mobile services targeting farmers, IFFCO Kisan Sanchar Limited (IKSL) and Reuters Market Light (RML) and the Fisher friend program for fishermen. Each of these sources and distributes information in different ways, but all three provide an assortment of information categories.

IKSL and Reuters Market Light found in a sample of farmers, 41% of those interviewed were subscribers to one of the two services and no farmer in the sample subscribed to any other similar service.

Exhibit 79: Mobile information services for farmers

	IFFCO-IKSL	Reuters-RML
Launce date	June 2007	October 2007 (pilot in January 2007)
Cost	Free voice messages; Helpline service available at Rs. 1/minute	<ul style="list-style-type: none"> • Rs. 175 for 3 month packages • Rs. 350 for 6 months • Rs. 650 for 1 year
Nature of Delivery	Voice message S	MS-text message
# of Daily Messages	5	4
Information Provided	<ul style="list-style-type: none"> • Weather • Crop/animal husbandry advisory • Market Prices • Fertilizer availability • Electricity timings • Government schemes 	<ul style="list-style-type: none"> • Weather • Crop advisory • Market-Price (2 crops 3 markets of choice) • News (commodity specific and general-occasionally includes market demand estimates.

Source: Vodafone (2009)



Case Study: Broad band's Role in Raising Rural incomes in Developing Countries

Experience shows that access to broadband networks has had a positive impact on rural incomes in developing countries. In India, the E-Choupal program was started in 2000 by ITC, one of India's largest agricultural exporters. The program operates in traditional community gathering venues (choupals) in farming villages, using a common portal that links multimedia personal computers by satellite. Training is provided to the hosts, who are typically literate farmers with a respected role in their communities. The computers give farmers better access to such information as local weather forecasts, crop price lists in nearby markets, and the latest sowing techniques. Collectively, these improvements have resulted in productivity gains for the farmers. E-Choupal also enables close interaction between ITC and its rural suppliers, which increases the efficiency of the company's agricultural supply chains, eliminates intermediaries, and improves terms of business. The fact that ITC pays a higher price than its competitors for exportable products has encouraged farmers to sell their increased output to the company. By 2008, E-Choupal had reached millions of small farmers in more than 40,000 villages, bringing economic and other benefits. It aims to reach 100,000 villages by 2010.

Another program, launched by the Songtaaba Association, has allowed female agricultural producers in Burkina Faso to become economically empowered through broadband. Songtaaba, an organization manufacturing skin care products, provides jobs to more than 3,100 women in 11 villages. In order to provide its members with regular access to useful information and improve the marketing and sales of their products, the association set up telecenters in two villages equipped with cell phones, Global Position System, and computers with highspeed Internet connections. The telecenters, managed by trained rural women, help the association run its businesses more efficiently. The organization also maintains a Web site that offers its members timely information about events where they can promote or sell their products.

In the two years following the establishment of the telecenters and the launch of the Web site in 2005, orders have increased by about 70 percent, and members more than doubled their profits.

Sources: Agenda 2007; Bhatnagar and others 2002; ITC 2008; M. S. Swaminathan Research Foundation 2008; Shore

Exhibit 80 : Example of the ITC 'e-choupal' model-Wheat in Uttar Pradesh

Problem	Examples	Solution
Lack of consistent, reliable information	<ul style="list-style-type: none"> Inputs, diseases, sophisticated farming practices, accurate weather reports. Market prices (in advance of market arrival) 	<ul style="list-style-type: none"> Information provision through e-choupal Other services (soil-testing, advice) available through regional hub.
Lack of availability of inputs	<ul style="list-style-type: none"> Seed, fertilizer, pesticide, fungicide, weedicide, medicine. 	<ul style="list-style-type: none"> Supply of inputs provided
Access to Markets and Storage	<ul style="list-style-type: none"> Crowded physical market place (could take 2-3 days to enter) Lack of storage (less leverage over when to sell-worse for perishable products) Transport costs to non-local markets. 	<ul style="list-style-type: none"> Direct procurement by ITC Deal negotiated at time of farmer's choosing Transport costs reimbursed
Middlemen dominate the supply chain	<ul style="list-style-type: none"> Unfair practices-higher transaction costs, lower amount paid to produce. 	<ul style="list-style-type: none"> Direct procurement Transparent pricing known in advance Payment based on gradations of quality

Source: World Bank (2009)



Customisation: All IKSL subscribers in the state received the same voice messages irrespective of location or crop choice. By contrast, RML allowed farmers to choose two crops and customised the information each farmer received. RML also supplied weather information at the *taluka* level – approximately a 50 km radius.

Access: IKSL's voice messages were sent at unpredictable times during the day and required that the farmer access them at the moment they were received. RML delivered information via text message at preset times during the day, enabling more convenient access to the farmer at a time of his choosing. However, an important factor in choice of delivery method is literacy. Most IKSL farmers reported that the voice message was preferable to a text message for this reason. RML subscribers largely preferred text messages and did not report literacy concerns.

It is clear that voice based solutions such as IVR are more suitable for small farmers with low literacy levels. However, voice based solutions are costlier to implement. The E-Chaupal experience outlined in Exhibit 80, however, remains an inspirational example of the potential impact of ICT in agricultural at the bottom of the pyramid.

Note: The specific range of services provided can vary among individual e-choupals

Some lessons from India, relevant for the Bangladesh agricultural sector for mobile-enabled information service providers:

- Customization and frequent updating adds substantial value. Generic information triggers dissatisfaction and reduces the frequency with which farmers access the service.
- Secondly, where literacy concerns are not paramount, text messaging offers significant advantages over voice-based delivery in terms of convenience and content flexibility.
- Finally, information should be customized to Bengali over English language and any platform should be intuitive for subscribers to understand. Most of the farmers interviewed in India were prepared to pay for information services as long as they felt that they would get the information they wanted – relevant, timely and reliable. There is little reason not to believe that will not be the case for farmers in Bangladesh.

Finally, it may be useful to consider whether and how much mobile phones may be increasing overall market efficiency reflected in decreasing price dispersion in wholesale agricultural markets.

Mobile Banking

The vast majority of the Bangladeshi population live in rural areas, outside the coverage of traditional banking services. Less than 5% of the population, most of whom are primarily located in urban centres, have bank accounts. On the other hand 40 million or 30% of the population have mobile phones, and the penetration of mobile technology is increasing day by day.

Mobile Banking: Mobile banking (also known as M-banking or SMS banking) is a term used for performing balance checks, account transactions, payments etc. via a mobile device such as a mobile phone. Mobile banking is most often performed via SMS or the Mobile Internet but can also use special programs downloaded to a mobile device. The standard package of activities that mobile banking covers are: mini-statements and checking of account history; alerts on account activity or passing of set thresholds; monitoring of term deposits; access to loan statements; access to card statements; mutual funds/equity statements; insurance policy management; pension plan management; status on payment of cheques; ordering cheque books; balance checking; recent transactions; due date of payment (functionality for stop, change and deleting of payments); PIN provision, change of PIN and reminder over the internet; blocking of (lost/stolen) cards; domestic and international fund transfers; micro-payment handling; mobile recharging; commercial payment processing; bill payment processing; peer to peer payments; and deposit at banking agent.

The advent of mobile technology can enable banks to have a presence in rural areas instead of a traditional branch-based environment. Thus, m-Payment/ m-commerce will play a significant role for both the un-banked and banked population. This particular payment service will eventually facilitate a comprehensive payment distribution channel for the quick delivery of international and domestic transfer of funds in rural areas. The service can also provide a new channel to facilitate new account acquisition for banks, utility bill payments, point-of-sale purchases, and funds transfers Person to Person, Person to Business, Person to Govt, and versa. Although some forms of mobile payment such as utility bill payments and rail ticket purchasing has started, no standard on this has been established yet. Strategic priorities in this area would be developing policy guidelines in areas such as mobile banking and payment through mobile phone.



Remittance: Steps have been taken to make remittance faster through the use of mobile technology. There are two banks which are piloting the process currently. The banks are accepting SMS messages as confirmation along with pin numbers and when the pin numbers are shown by the recipient, money is being disbursed quickly.

Bangladesh Bank in a recent policy research paper has noted that: “Although e-banking has bright prospects, it involves some financial risks as well. The major risk of e-banking includes operational risks (e.g. security risks, system design, implementation and maintenance risks); customer misuse of products and services risks; legal risks (e.g. without proper legal support, money laundering may be influenced); strategic risks; reputation risks (e.g. in case the bank fails to provide secure and trouble free e-banking services, this will cause reputation risk); credit risks; market risks; and liquidity risks. Therefore, identification of relevant risks, and formulation and implementation of proper risk mitigation policies and strategies are important for the scheduled banks while performing e-banking.”

However, the authorities remain positive and committed to mobile banking. BB noted that: “Mobile banking is a prospective area for two reasons: it covers almost all activities involved in retail banking; and mobile phone network has already been spread all over the country covering more than 30 million people. Because of convenience, a sizeable share of the unbanked people can be brought under the network especially in rural areas with flourishing mobile banking. In this context, it is important to formulate relevant acts, policies, and adopt operative guidelines.

(See E-Banking in Bangladesh: Some Policy Implications by Mohammad Mizanur Rahman, Assistant Director, Bangladesh Bank Policy Action Unit, BB Quarterly Review)

Mobile Health

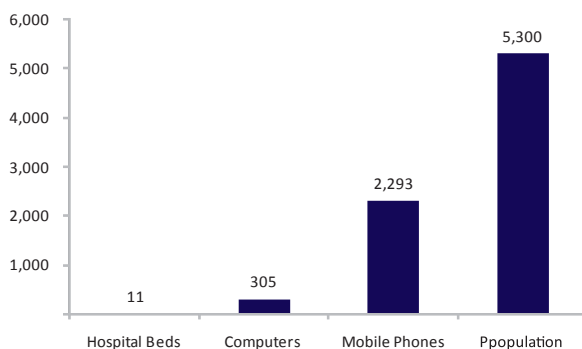
Growing interest in the field of mHealth—the provision of health-related services via mobile communications—reflects a growing body of evidence that demonstrates the potential of mobile communications to radically improve healthcare services—even in some of the most remote and resource-poor environments. In Bangladesh Grameenphone is already providing “789 Healthline Services” to all subscribers where consultations are available over the phone for medical advice, emergency advice, information on drugs and lab test advice. The initiative was awarded the GSMA Award for “Best Use of Mobile for Social and Economic Development” at the 3GSM World Congress held in Barcelona, Spain in February 2007.

This section draws heavily on the excellent report “ M-Health for Development: The Opportunity for Mobile Technology for Healthcare in the Developing World” by Vital Consulting on behalf of the United Nations Foundation and the Vodaphone Foundation Technology Partnership which we will refer to as M-Health (2009). The report notes that a growing number of developing countries are using mobile technology to address health needs. The mHealth field is remarkably dynamic, and the range of applications being designed is constantly expanding. The key applications form Health in developing countries are:

- Education and awareness
- Remote data collection
- Remote monitoring
- Communication and training for healthcare workers
- Disease and epidemic outbreak tracking
- Diagnostic and treatment support

Exhibit 81 illustrates that developing world citizens have plentiful access to mobile phones, even while other technologies and health infrastructure are scarce. This explosion of mobile phone usage has the potential to improve health service delivery on a massive scale. For example, mobile technology can support increasingly inclusive health systems by enabling health workers to provide real-time health information and diagnoses in rural and marginalized areas where health services are often scarce or absent altogether.

Exhibit 81: Technology and health-related statistics for developing countries (millions)



Source: M-Health for Development: The Opportunity for Mobile Technology for Healthcare in the Developing World” by Vital Consulting



Awareness

MHealth (2009) notes that short message service (SMS) messages now offer a cost-effective, efficient, and scalable method of providing outreach services for a wide array of health issues. In education and awareness applications, SMS messages are sent directly to users' phones to offer information about testing and treatment methods, availability of health services, and disease management. Formal studies and anecdotal evidence demonstrate that SMS alerts have a measurable impact on and a greater ability to influence behavior than radio and television campaigns. SMS alerts provide the further advantage of being relatively unobtrusive, offering recipients confidentiality in environments where disease (especially HIV/AIDS) is often taboo. In the developing world, SMS alerts have proven particularly effective in targeting hard-to-reach populations and rural areas, where the absence of clinics, lack of healthcare workers, and limited access to health-related information all too often prevent people from making informed decisions about their health.

SMS message campaigns can be set up either as one-way alerts or interactive tools used for health-related education and communication. For example, a citizen may sign up to take a survey, delivered via SMS message, quizzing them on their knowledge about HIV/AIDS and the location of the nearest testing center. Depending upon their responses, information regarding where and how to receive a free test will be transmitted. This interactive model has been deployed in several countries (e.g., India, South Africa, and Uganda) to promote AIDS education and testing and provide information about other communicable diseases (such as TB), as well as to promote maternal health and educate youth about reproductive health.

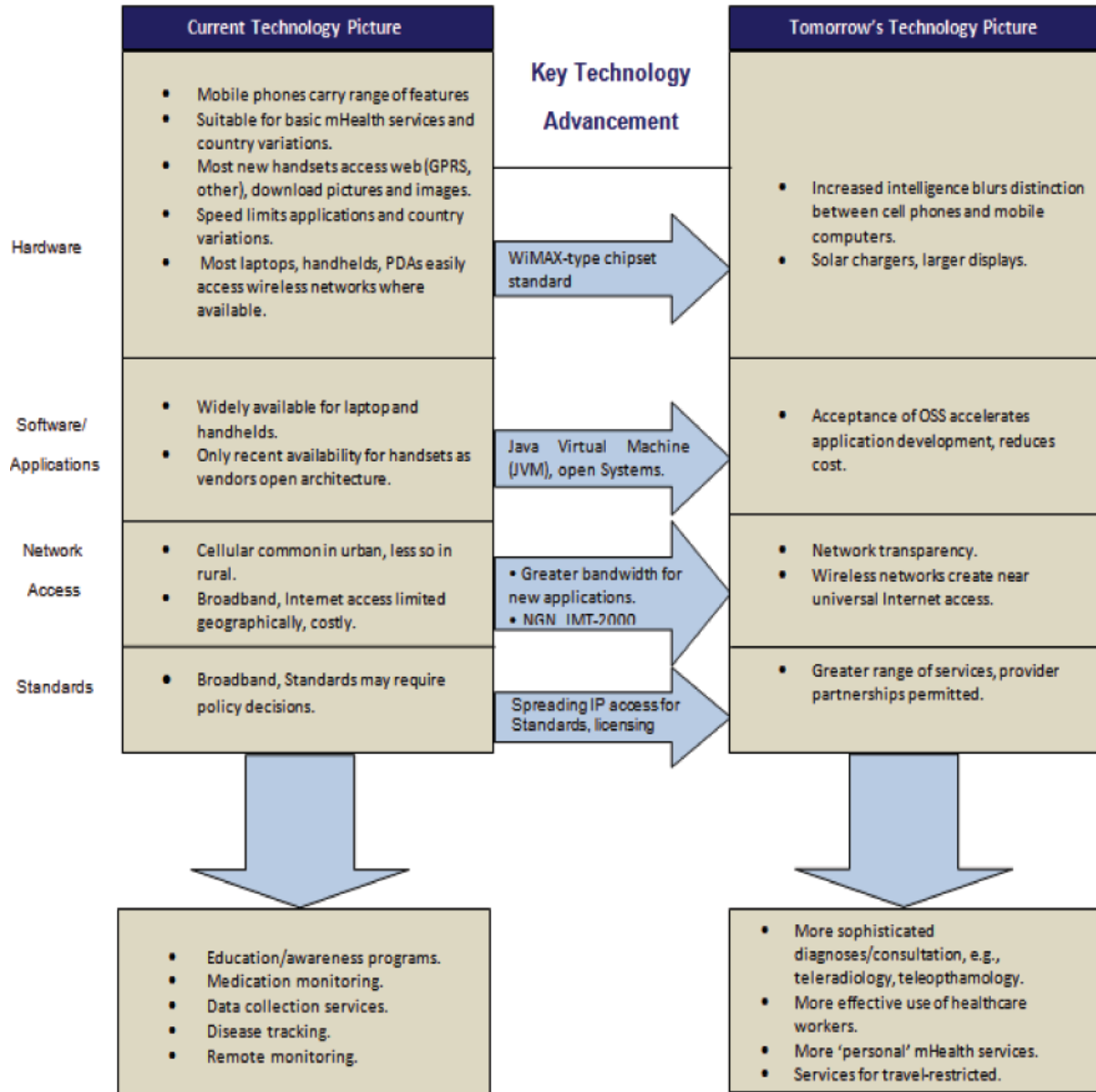
Improved Patient Health

Published clinical studies of mHealth programs point to an increasingly strong case for expanded mHealth implementation. Patient health has been improved in three ways:

- **Improved disease management:** A recent US study on the use of wireless-enabled PDAs by Type 2 diabetes patients found greater improvements in blood sugar indicators among regular users than among less frequent users.
- The report concludes that “the field of mHealth is at an inflection point. With dozens of projects implemented and proven benefits, all trends indicate that investment will continue and mHealth projects will serve an ever wider range of constituents in the years ahead. At the same time, technological innovations will bring enhanced benefits, particularly in the areas of data collection, patient monitoring, and remote diagnostic and treatment support, where application development is already proceeding at breakneck speed.
- Health needs in the developing world are rapidly evolving to include chronic diseases, in addition to the communicable diseases most often associated with developing countries. MHealth is well-positioned to address these challenges using currently available technology. For example, SMS alerts can be equally useful in raising public health awareness of HIV/AIDS and in ensuring patient adherence to treatments for chronic diseases such as diabetes. Emerging technologies, such as wide-area wireless systems, will also be an asset in tackling today's health challenges and those of tomorrow.
- **Improved compliance with treatment regimes:** A 2007 Thai study showed that TB patients who received daily text message medication reminders jumped to over 90% adherences. A device called SIMpill that uses mobile technology to monitor and direct medication adherence also showed promise.
 - **Improved public awareness outcomes:** In South Africa, Project Masiluleke, which promotes an AIDS hotline through SMS messages, resulted in a 350% increase in phone calls to the hotline.



Exhibit 82 : Key Technology Advancement



Source: Vodafone



E-Commerce and Cell Bazaar

E-COMMERCE:

Electronic commerce, commonly known as e-commerce or eCommerce, or e-business consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks. The amount of trade conducted electronically has grown extraordinarily with widespread Internet usage. The use of commerce is conducted in this way, spurring and drawing on innovations in electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. Modern electronic commerce typically uses the World Wide Web at least at some point in the transaction's lifecycle, although it can encompass a wider range of technologies such as e-mail as well.

A large percentage of electronic commerce is conducted entirely electronically for virtual items such as access to premium content on a website, but most electronic commerce involves the transportation of physical items in some way. Online retailers are sometimes known as e-tailers and online retail is sometimes known as e-tail. Almost all big retailers have electronic commerce presence on the World Wide Web.

Electronic commerce that is conducted between businesses is referred to as business-to-business or B2B. B2B can be open to all interested parties (e.g. commodity exchange) or limited to specific, pre-qualified participants (private electronic market). Electronic commerce that is conducted between businesses and consumers, on the other hand, is referred to as business-to-consumer or B2C. This is the type of electronic commerce conducted by companies such as Amazon.com. Online shopping is a form of electronic commerce where the buyer is directly online to the seller's computer usually via the internet. There is no intermediary service. The sale and purchase transaction is completed electronically and interactively in real-time such as Amazon.com for new books. If an intermediary is present, then the sale and purchase transaction is called electronic commerce such as eBay.com.

Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of the business transactions.

Key Constraints on Growth E-Commerce

Consumer Protection and Privacy: A major fear involved in e-commerce is security and privacy. Security and privacy need to be guaranteed. Lapses in security can be devastating, ranging from allowing customer information to be accessed by outside parties to the actual theft of credit cards and malicious tempering of content and back end systems. If the business and individuals are to conduct electronic transactions on the Internet, it must be ensured that such transactions are completely secure and hacker proof and also ensure that customer information is maintained in a secured location and not shared without customer consent. The potential of the electronic medium to intrude into privacy of individuals and corporations has already received considerable media attention abroad. So, a comprehensive cyber law is very important for the ISPs and the successful operation of e-commerce. Domestic laws and regulations [9] of individual country may be applied to protect the individual privacy in the database and transmission.

E-contract: As companies increasingly adopt electronic transaction methods, they need to be aware of the legal environment when buyers and sellers complete transactions without any face-to-face meetings or exchange of written documents. Many businesses and consumers are still wary of conducting extensive business over the Internet because of the lack of a predictable environment governing transactions. The practices and laws affecting product and service warranties, true in advertising, seller liability and other codes created for physical commerce will need to be interpreted or extended to include e-commerce. So, there is a necessity to redefine the validity and formation of contract. Government may consider the "Model Law" [8] of UN commission on International Trade Law (ITL) which has widely acclaimed by many countries.

Taxation: E-commerce has challenged the basic principle of international taxation such as physical presence, place of establishment etc, which has formed the basis for assessing tax liability. The Internet lacks the clear and fixed geographical lines of transit that historically have characterized the physical trade of goods. Thus, while it remains possible to administer tariff for product ordered over the Internet but ultimately delivered via surface or air transport, the structure of the Internet makes it difficult to do so when product or service is delivered electronically. As electronic commerce grows corporations, localities and governments have become more and more concerned about losing sales tax revenues from electronic transactions across borders. For the proper development of e-commerce, it should be neither to be tax advantaged nor penalized.



Education Awareness: To get the benefit of e-commerce fully it is imperative to educate people in the skills required in the IT. Without IT education we cannot exploit the full potential of e-commerce. Government, business and consumer representative should work together to educate consumers about electronic commerce, to foster informed decision making by consumers participation in e-commerce, and to increase business and consumer awareness of the consumer protection framework that applies to their on line activities.

Building Trust: In an electronic market place there is no or limited face-to-face contact between buyer and the seller unlike the transitional physical transactions. The transactions are impersonal, anonymous and automated. Such dehumanized business environment accompanied by all kinds of technical innovation necessarily brings up opportunities for fraud by individual consumers and corporation alike. E-commerce can always be used in a very sophisticated way and in fact there has been cases of very disturbing scams and abuses in the Internet. These include false investment promises [1] in the e-mail advertising and jam mailboxes and servers, get quick rich scheme etc. For such reasons a sense of distrust has prevailed in the evolution of many aspect of e-commerce. Individuals therefore must be protected against such crimes and dishonest practices. All participants in the game have a stake that will ensure honest value is delivering for value received. For building trust it is necessary to establish a Certification Agency (CA) [3] that is recognized by and acceptable to the international organization. That mentis, the; system should be so designed that it builds a confidence between all players in the field of e-commerce

Current Initiatives in Bangladesh

Because of the extreme dependence on cash, the technological innovations still has not borne any fruit in easing domestic remittances. Legal barriers have been lifted in making online commerce and transaction possible. The creation of a digital signature system has also been in place. Currently two private banks are piloting online transaction via Internet. Once that is enabled, locally issued credit card could be used to make online payments for web purchases. This can usher new development for SMEs. However, when cross-border transaction is approved by the central bank, significant changes in the expanding market access is more likely.

Case Study of Cellbazaar:

Cellbazaar allows users to buy or sell goods and services using their mobile phones either by SMS, WAP or web. It acts as a platform for buyers and seller to locate each other and technology allows users to post information such that it can be edited, searched and explored over cumulative databases by any type of handset.

Cellbazaar provides regular, reliable, market information on the price, availability and supplier options of essential goods. Information is provided on a pay-as-you-use service. It may be used by private individuals or small and medium sized enterprises.

Over one million users have accessed the service since its launch in July 2006. There are on average 210 new postings and 34,000 hits on the site per day. It has been particularly credited with socio-economic development in rural areas by networking people from various parts of the country and improving the volume of trading of basic goods (e.g. rice, sugar, used goods) in previously unconnected rural populations.

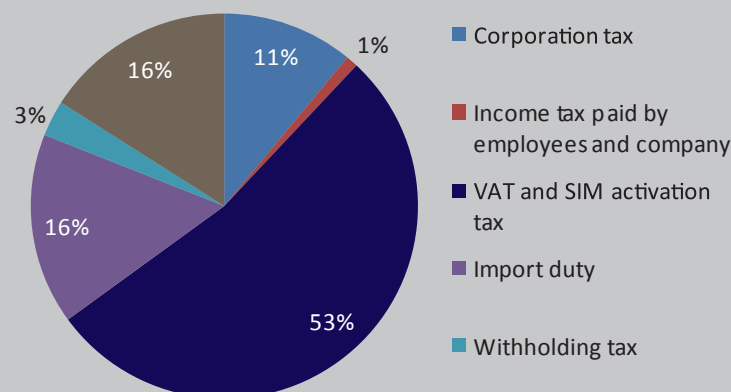


Chapter - 06

Taxation in the Telecoms Sector

- Emerging countries need to align taxation approaches affecting mobile broadband with ICT national objectives. If mobile broadband is understood as a key social and economic development lever, taxes cannot represent an obstacle for diffusion.
- High taxes on mobile services run counter to governments' commitment to improving access to communications. While mobile is widely recognized as equivalent to fixed communications in terms of providing connectivity, there are still significant differences in some countries in the tax treatment of these two communications platforms.
- A July 2010 report published by GSMA and TAS on taxation and broadband penetrations notes two broad models:
 - Firstly, the universalization and protectionism approach represents a strategy aimed at minimizing taxes in order to maximize wireless service deployment. If it includes a sector specific tax, this is fairly low and, typically, focuses on handsets.
 - At the other end of the spectrum, the tax maximization and service distortion approach implicitly recognizes the wireless industry as a primary source of revenues for the treasury and attempts to recover high taxes on both handsets and services, regardless of whether this might have a negative impact on service diffusion or introduce sector distortion. 1) Additional penetration: 0.1%-0.2%, representing 1.9%-3.9% additional subscribers; 2) Wealth creation (additional GDP): \$11.4 million-\$53 million; 3) Accumulated loss/gain in tax collection on the most conservative case, loss of USD 21 million; on the most positive case, USD 5 million

Breakdown of 2007 tax revenues from mobile operators by source



Source: Deloitte analysis



Overview

“It is clear that the defining change in the world’s poorest economies will be led by revolution in access to communications and not, as in the world’s most advanced economies, by the evolution of IT. Economic and rapid network build times and high consumer demand combine to make mobile communications not a replacement for PC and fixed-line telecommunications but the only way by which billions of people in the world will access not only voice and simple text services but ultimately the whole range of content and applications that are enjoyed in developed economies. This transformation will drive the growth of these economies. Communications is as much a part of the underlying infrastructure upon which economic and social advancement depends as roads, schools and banks. Governments must create the conditions for the rapid and complete access to communications that society needs. The mobile industry has already done a lot of the work in seeking business opportunities and profits at the bottom of the pyramid. Initiatives like the GSMA’s Emerging Market Handset programme reducing the entry level cost of handsets, individual operator strategies like the Grameen Village Phone and the implementation of micro pre-pay top-ups make the industry possibly unique in its leadership and focus in this sector. “

(CK Prahalad, Author of Fortune at the Bottom of the Pyramid”)

A regular theme in regulatory constraints on Telecoms sector growth is that high taxes on mobile services run counter to governments’ commitment to improving access to communications. For example, while mobile is widely recognized as equivalent to fixed communications in terms of providing connectivity, there are still significant differences in some countries in the tax treatment of these two communications platforms.

The next section draws heavily on a recent report by the GSMA and Telecoms Advisory Services (“The Impact of Taxation on the Development of the Mobile Broadband Sector, Katz, Flores-Roux and Mariscal, July 2010). The Report notes that “Emerging countries need to align taxation approaches affecting mobile broadband with ICT national objectives. If mobile broadband is understood as a key social and economic development lever, taxes cannot represent an obstacle for diffusion. In this context, the study indicates that a reduction in taxes affecting mobile broadband will translate into higher service adoption, which will ultimately generate additional GDP. In other words, for

every dollar reduced in taxes, emerging countries will generate additional GDP ranging between US \$1.4 and US \$12.6. Furthermore, the foregone tax revenues will be partially or totally compensated by taxes collected on a larger GDP.” The report underlines both that Bangladesh is one of the higher taxed countries for Telecoms and also the potential economic of reducing mobile sector taxation.

In the report, the Taxonomy of taxation was constructed by compiling all potential levies, both generic and sector specific, that can be imposed on mobile services. Based on a comparative analysis of approaches followed by 102 countries, four alternative mobile service taxation models were identified:

Universalization of service:

Reduce taxes as much as possible to stimulate wireless adoption; this approach attempts to harmonize objectives of universal service with fiscal policy, recognizing that the policy emphasis should be less on collecting revenues for the state treasury than maximizing diffusion of ICT platforms likely to have an impact on economic growth and consumer welfare (e.g. China).

Direct taxation without sector discrimination:

Recognizing the distorting effect of sector-specific taxes, this approach comprises higher value-added taxes in order to grow tax revenues, but does not include any wireless telecommunications sector specific taxes that could potentially introduce a sector distortion (e.g. South Africa).

Direct taxation and sector specific taxes: this approach combines a high value-added tax with sector specific levies (e.g. Argentina, Mexico, and Brazil).

Service tax revenue maximization: this model defines wireless communications as an attractive source of tax revenues, by combining high value added tax, high sector specific taxes and/or a fixed levy similarly (e.g. Bangladesh and Turkey); alternative approaches to handset taxation were identified.

Sector discrimination based on moderate import duty:

this approach comprises a value-added tax combined with low duty (e.g. South Africa and Mexico).

Sector discrimination based on high import duty but no telecom tax:

this model combines high import duty and value-added tax, but includes no sector specific taxes on handsets (e.g. Argentina).



Sector discrimination based on high value-added tax and import duty but low handset specific tax: this approach combines high value-added tax with a sector specific levy (e.g. Turkey).

Handset tax revenue maximization: this model defines mobile communications as an attractive source of direct taxation, by combining high value added tax, high customs duty, and a high sector specific levy (e.g. Brazil) or low import duty and high sector specific taxes (e.g. Bangladesh).

Exhibit 83 : Mobile Service taxation Approaches

		Service Taxation			
		Universalization of service	Direct Taxation without sector discrimination	Direct Taxation and sector specific taxes	Service tax revenue maximization
Handset Taxation	Sector discrimination based on moderate import duty and telecom tax		South Africa	Mexico	Tanzania
	Sector discrimination based on high import duty but no telecom tax	Malaysia China Yemen		Argentina	Venezuela Turkey
	Sector discrimination based on high VAT and import duty but low handset specific tax			Brazil	Bangladesh
	Handset tax revenue maximization				
		Universalization and Protectionism	Protectionism	Sector distortion	Tax maximization & sector distortion

Source: AT Capital Research

By combining the two typologies – service taxation and handset levies – taxonomy of four approaches to mobile taxation were developed (see Exhibit 83) .

The universalization and protectionism approach represents a strategy aimed at minimizing taxes in order to maximize wireless service deployment. If it includes a sector specific tax, this is fairly low and, typically, focuses on handsets.

At the other end of the spectrum, the **tax maximization and service distortion approach** implicitly recognizes the wireless industry as a primary source of revenues for the treasury and attempts to recover high taxes

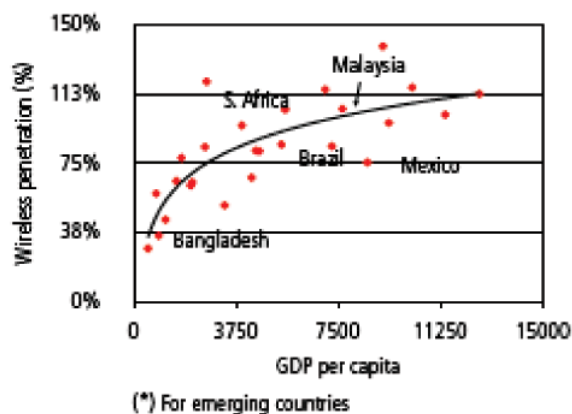
on both handsets and services, regardless of whether this might have a negative impact on service diffusion or introduce sector distortion.

Between the two approaches at opposite ends of the spectrum, the **protectionist** or **sector distortion** models represent moderate approaches that differentiate themselves on the basis of sector specific taxes.

Perhaps a result of the high levels of taxation, when related to the level of economic development, Bangladesh, Brazil and Mexico has a wireless penetration lagging the size of their economy.



Exhibit 84: Economic Development & Mobile Penetration (*) (2009)

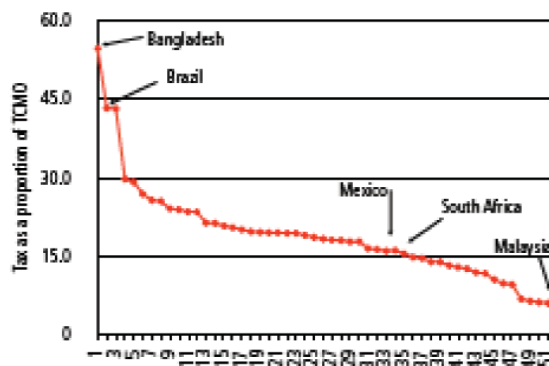


Source: ITU, Wireless Intelligence, Merrill Lynch, world Bank TAS Analysis

The taxation approaches of all five countries have been positioned along the distribution of Total Cost of Mobile Ownership (see Exhibit 85).

The approaches of Bangladesh, Brazil, Mexico and South Africa are having a negative impact on the diffusion of wireless broadband with a consequent detrimental effect on economic growth. The economic impact of the current tax structure of all four countries was estimated following a structured approach. Based on a range of estimates of demand elasticity, an economic model calculated the positive impact on wireless diffusion that a reduction of the tax burden could yield, and assessed the incremental impact on the economy.

Exhibit 85: Tax percentage of total cost of ownership of mobile services



Source: Deloitte (2008), Updated by TAS

Bangladesh: For every dollar that taxes are reduced over the 5 year period ending in 2014, 0.6 to 4.5 dollars will be created in additional GDP. The effect of lowering taxes on Total Cost of Mobile Ownership from the current 54.8% to 53.8% will have the following cumulative effects:

- Additional penetration: 0.1%-0.2%, representing 1.9%-3.9%
- Additional subscribers (or 137,000- 277,000)
- Wealth creation (additional GDP): \$11.4 million-\$53 million (0.01-0.04% additional GDP by 2014)
- Accumulated loss/gain in tax collection: on the most conservative case, loss of USD 21 million; on the most positive case, USD 5 million

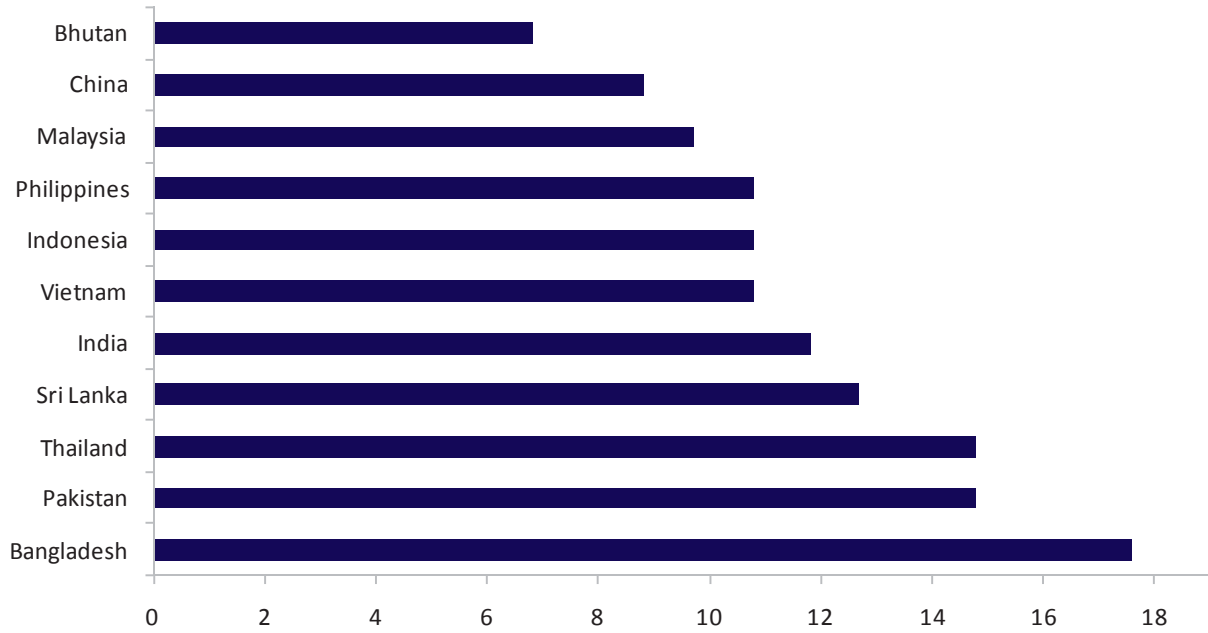
Exhibit 86 : Examples of Telecom-specific Taxes in Asia Pacific, 2008

Country	Examples of Telecom-Specific Taxes (not exhaustive)
Bangladesh	12% duty on handsets (decreased from 25% in 2009/10 budget)
	\$11.63 tax on SIMs
	12.24% tax on usage charges
India	13% tax on handset imports
	\$1.36 tax on SIMs
	10.3% tax on usage charges (reduced from 12.5% in Feb 2009)
Pakistan	\$3 tax on handset imports
	\$3 tax for activation
	\$0.10 tax on usage
	\$0.002 per SMS (introduced in 2009-10 Budget)
Srilanka	33% tax on handset imports
	10% tax for Mobile Subscriber Levy
	Additional taxes like Environment Conservation Levy (2%), Nation Building Tax (3%)

Source: A.T. Kearney Analysis for GSMA; Interviews with regulatory bodies, regulator websites,



Exhibit 87 : Tax as proportion of Total cost Mobile Ownership (TCMO) (in %)



Source: "Global tax review 2006-07 by deloitte"



Chapter - 07

Bangladesh Regulatory Challenges and License Renewal

- The market is regulated by an independent agency, the Bangladesh Telecommunication Regulatory Commission (BTRC) that was created in 2002 and is responsible for licensing operators, ensuring compliance with license terms and conditions, managing radio spectrum, monitoring quality of telecoms services, settling interconnection disputes and approving tariffs.
- The Ministry of Posts and Telecommunications (MoPT) acts as policy maker in the sector. However, the 2010 revision to the Telecoms act proposes transferring some powers from BTRC to the Ministry.
- At a macro level, Regulation seeks to promote the interests of consumers, and to facilitate the contribution of telecoms to the overall economy by remedying market inefficiencies and promoting competition.
- Telecoms are heavily regulated not just because of the size of the industry, but also because of the importance of telecoms services in the wider economy. The regulators are generally driven by the principles of increasing competition without restricting levels of investment.
- As the World Bank noted in a 2005 report, a major challenge facing regulators in developed and developing countries alike is the need to strike the right balance between ensuring certainty for market players and preserving flexibility of the regulatory process to accommodate the rapidly changing market, technological and policy conditions.
- Licenses of four operators (including GP, Banglalink, Robi and Citycell) are expiring in 2011. No procedure has been defined for renewal of the licenses in the existing regulatory framework and instruments. Moreover, the fee for renewal and other terms and conditions have not been decided yet.
- In these circumstances, it has become very difficult for mobile operators to make any long term investment. An early, fair, transparent and participatory renewal process and resultant renewal of mobile cellular licenses on reasonable terms would promote investors' confidence and would act as an incentive for long term investment in Bangladesh.
- The introduction of Third-Generation (3G) wireless technologies which allow wireless carriers to provide data capabilities and IP interfaces makes it necessary to clarify the management of spectrum used for 2G services, and the methods to be used to migrate current 2G services to 3G services for current 2G license holders.
- Any potential regulatory shift that will impact the mobile landscape in Bangladesh is the eventual introduction of number portability. Number portability is a regulated facility which enables subscribers of publicly available telephone services (including mobile services) to change their service provider whilst keeping their existing telephone number.
- However, many EM mobile subscribers are actually multiple SIM holders. This suggests that the introduction of number portability might have a smaller impact on established incumbents in markets like India and Bangladesh than has been the experience in more mature markets in developed economies.



Overview

The Bangladeshi telecommunications sector was opened to competition with the 1998 National Telecommunications Policy and 2001 Telecommunications Act. The market is regulated by an independent agency, the Bangladesh Telecommunication Regulatory Commission (BTRC) that was created in 2002 and is responsible for licensing operators, ensuring compliance with license terms and conditions, managing radio spectrum, monitoring quality of telecoms services, settling interconnection disputes and approving tariffs. The Ministry of Posts and Telecommunications (MoPT) acts as the policy maker in the sector.

Nationwide operating licenses were initially issued to Hutchison Bangladesh Telecom Limited (HBTL) for mobile and fixed wireless applications and to Bangladesh Rural Telecom Authority (BRTA) for rural telephony. Pacific Bangladesh Telecom (PBTL) acquired HBTL in 1991. Since then four licensed private sector mobile operators and a number of value added service providers, including Internet Service Providers, entered the Bangladeshi market. The fixed segment of the market continues to be dominated by state-owned enterprises and the low level of investments depends on the government's scarce availability of funds. The mobile sector has received a more steady flow of investment since the entry of larger private sector players led by GrameenPhone.

The Objectives of a Regulatory Framework

Regulation seeks to promote the interests of consumers, and to facilitate the contribution of telecoms to the overall economy by remedying market inefficiencies and promoting competition. Operators often have significant market power (SMP), in an industry where scale matters, and so, other third party interests require protection. Regulators have been largely concerned with controlling incumbents, but as competition progresses, they regulate new players.

Telecoms are obliged to provide their customers with connectivity that may be off their networks. This means it is not possible to have closed networks and scale adds power when negotiating interconnects (access to other networks). Regulation is therefore the key to ensuring scale advantages are not abused.

Telecoms are heavily regulated not just because of the size of the industry, but also because of the importance of telecoms services in the wider economy. The regulators are generally driven by the principles of increasing competition without restricting levels of investment. The liberalization of the telecoms market has seen a dramatic increase in the number of operators.

History of Bangladesh Telecoms Regulation

The legal and regulatory situation in Bangladesh can be divided in two eras: pre-2001 and post-2001.

Pre-2001 Telecommunications Legal and Regulatory Regime

The Telegraph Act 1885: In the Indian sub-continent the first legislation after the invention of telegraph is "The Telegraph Act 1885", which is still in force to the extent it has not been surpassed by the Bangladesh Telecommunication Act 2001. It contains a number of provisions and also defines "Telegraph" and "Message". Under the Act, a Telegraph Authority was established but the powers of establishing telegraph and interception remained with the Government.

Wireless Telegraphy Act 1933: With the developments in wireless telegraphy a need was felt to address it in a regulatory framework in the Wireless Telegraphy Act 1933 (the "WTA"), which contains provisions regarding wireless communication, wireless telegraphy apparatus and its licensing.

The 1998 Telecommunications Policy and 2001 Telecommunications Act: Outlines the liberalization of the telecoms sector, the introduction of nationwide competition to the market and the promotion of private sector participation. The BTRC is responsible for licensing operators; ensuring compliance with license terms and conditions; managing and monitoring radio spectrum; monitoring quality of telecoms services; settling interconnection disputes; and approving tariffs.

Until the distribution of three mobile cellular licenses in 1996, the market was monopolised by CDMA operator Pacific Bangladesh Telecom Limited (PBTL, or CityCell). The subsequent launch of Grameenphone, Telekom Malaysia International Bangladesh (TMIB, rebranded as AKTEL, and recently as Robi) and Sheba Telecom (now Banglalink) belatedly injected some competition into the market, but initially failed to stimulate growth to the level desired by the government. The state had long hoped to encourage wireless take-up by introducing fresh competition and in autumn 2004 the BTRC commissioned the Infrastructure Investment Facilitation Centre (IIFC) to review the country's spectrum management and decide on the best course of action. Due to the poor organisation of the former regulator and fixed line incumbent BTCL (formerly BTTB), much of the country's unused frequency was held by existing operators — a considerable portion



by BTCL itself, which only relatively recently began to utilise the frequency following the launch of its Teletalk GSM-900 service in late 2004. After taking on board the IIFC’s research, in July 2005 the government finalised a comprehensive new national frequency plan to ensure the proper allocation and use of spectrum; the plan includes arrangements to monitor unauthorised usage of frequencies and powers to seize and reallocate unused spectrum.

The UAE’s Abu Dhabi Group (ADG) did not wait for the regulator to finish its spectrum plan, and applied for a licence in March 2005 via its cellular subsidiary Warid Telecom. After an open auction, in December that year Warid won a 15-year concession for GSM services in the 1710MHz-1765MHz/1805MHz-1860MHz frequency band. Its closest rival in the bidding for the USD50 million license was Jordan’s Umniah, although twelve other bidders were involved including domestic fixed line companies RanksTel, National Telecom and Dominox.

After completing a project to recover unused frequencies, in April 2008 the BTRC began new discussions on how to allocate 20MHz of mobile spectrum to alleviate network congestion in

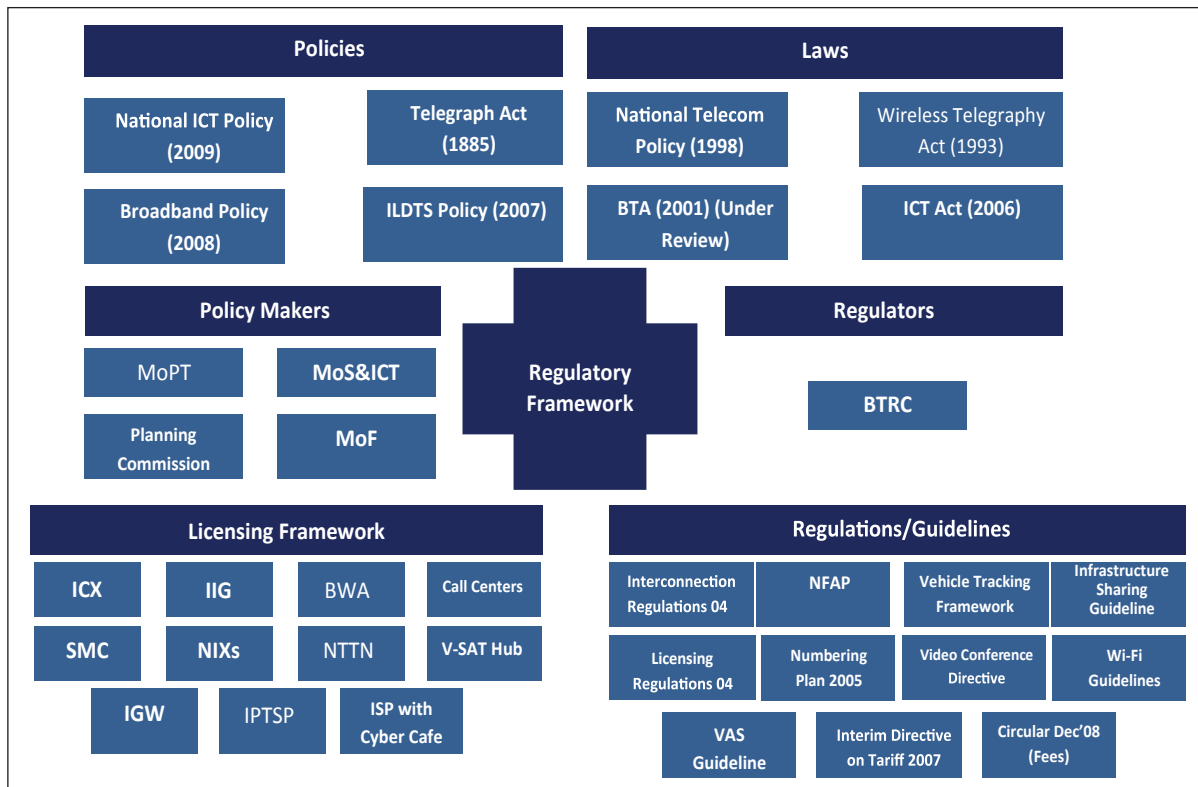
Bangladesh’s rapidly growing market. Telcos have blamed spectrum shortages for deterioration in service quality, including increased numbers of dropped calls and network busy signals. Operators have also claimed that the congestion has raised their costs as they have been forced to build more base stations to compensate for the lack of capacity. The spectrum was offered to operators at a very high prices.

The diagram below illustrates the broad framework for Telecoms regulation in Bangladesh.

SIM Registration

In response to the threat of bombing from militants, the BTRC introduced a pre-paid mobile phone registration scheme in February 2006 in order to track ownership and restrict the use of unregistered handsets. With this and other security issues increasingly to the fore, in March 2006 the regulator requested that all cellcos dismantle their GSM network infrastructure within 8km of the Indian border in an attempt to counter criminal activity. It said that cross-border communication made possible by the base stations was hindering anti-smuggling and anti-terrorist operations. The operators were not pleased with the

Exhibit 88 : Framework for Telecoms regulation in Bangladesh



Source: AT Capital Research



regulator’s schemes, due to the potential negative effects on their revenues. For instance, in the first few months of pre-pay user registration, retail figures for SIM cards fell due to the difficulties some customers encountered obtaining the required proof of identity. By the deadline for registration of previously unregistered SIM cards at the end of May 2008 there were still more than a million SIM cards left with no user details. These were subsequently deactivated. At one point it had been thought that over three million users could be cut off.

License Renewal

“A major challenge facing regulators in developed and developing countries alike is the need to strike the right balance between ensuring certainty for market players and preserving flexibility of the regulatory process to accommodate the rapidly changing market, technological and policy conditions.” (“Mobile License Renewal: What are the Issues? What is at Stake?”, Guermazi and Neto, World Bank, June 2005)

The status of the mobile cellular operators with respect to their license, spectrum and renewal is as follows:

Exhibit 89 : Cellular Operators Status of license, spectrum and renewal

Company	Subscribers as of August'10 (Million)	Technology	Spectrum in MHz			Expiry
			800	900	1800	
Axiata (AKTel)	11.5	GSM	N/A	7.4	5.4	2011
					2	2026
Banglalink	17.5	GSM	N/A	5	7.5	2011
					2.6	2026
Citycell[1]	2.0	CDMA	10[2]	N/A	N/A	2011
Grameenphone	27.9	GSM	N/A	7.4	7.2	2011
	27.9				7.4	2026
Teletalk[3]	1.1	GSM	N/A	5.2	10	2019
Warid	3.4	GSM	N/A	N/A	15	2020

[1] License was issued in 1989 for a period of 25 years initially.

[2] 10 MHz in Dhaka metropolitan area and 7 MHz in rest of the country.

[3] License issued to BTTB initially on 01 September 2004 then transferred to Teletalk in 2005

Source: AT Capital Research

Notable features of the cellular market in Bangladesh regarding renewal:

- Licenses of four operators are expiring in 2011;
- This is going to be first full renewal in Bangladesh in the mobile cellular sector;
- No procedure is defined for renewal of the licenses in the existing regulatory framework and instruments;
- Fee for renewal and other terms and conditions have not been decided yet.

In these circumstances, it has become very difficult for mobile operators to make any long term investment. An early, fair, transparent and participatory renewal process and resultant renewal of mobile cellular licenses on reasonable terms would promote investors’ confidence and would act as an incentive for long term investment in Bangladesh.

“As much as possible, policy makers and regulators should strive to promote investors’ confidence and give incentives for long-term investment. They can do this by favoring the principle of ‘renewal expectancy’, but also by promoting regulatory certainty and predictability through a fair, transparent and participatory renewal process. For example, by providing details for license renewal or reissue, clearly establishing what is the discretion offered to the licensing body, or ensuring sufficient lead-times and transitional arrangements in the event of non-renewal or changes in licensing conditions. Public consultation procedures and guaranteeing the right to appeal regulatory decisions maximizes the prospects for a successful renewal process.”¹ (Guermazi and Neto(2005))

The World Bank paper also noted that in many developing countries there is a tendency to leave the renewal process to the discretion of the licensing authority without providing many details on the terms, criteria, and conditions for renewal. A study of a sample of mobile licenses shows that conditions of renewal are usually loosely drafted. Providing details for license renewal or reissue is an important guarantee for regulatory certainty, which is a prerequisite for attracting potential investors entering the market of developing and emerging economies.

Strategic and timely planning to resolve issues can give that positive signal to investors. Under the French Post and Telecom Code, the regulator has to initiate the renewal process at least two years before the expiry date of the license, and has to propose the new conditions for renewal to the Minister of Telecommunications, which then notifies the license holders of the new terms.

1 Mobile License Renewal: What are the Issues? What Is at Stake? by Boutheina Guermazi and Isabel Neto (WPS3729)



Post-2001 Telecommunications Legal and Regulatory regime

The existing legal and regulatory regime for the telecommunication sector is governed by the Bangladesh Telecommunications Act 2001 (the "BTA"). The other key documents are the statutory notifications, regulations and telecom related policies. In all the current regulatory instruments of Bangladesh, there are references to "renewal".

BTRC has issued Bangladesh Telecommunication Regulatory Commission (Licencing Procedure) Regulations, 2004 under the BTA, which talks about "renewal" in Regulation 5(7):

"5(7). The Commission shall determine the duration of different categories of licence, renewal and other conditions, rights and liabilities."

Guerhazi and Neto(2005) note that the first condition likely to undergo changes during the license renewal is the license fee. The term "license fee" covers two types of payments: (a) the upfront fees paid by the new entrant in form of a lump sum payment, and (b) recurrent annual payments that operators are required to pay to cover regulatory expenses associated with the provision of their services, and in some cases spectrum annual fees. In the case of mobile licenses involving the use of scarce resources, different approaches have been used to determine the upfront fee and the annual spectrum fees. It is increasingly recognized by policy makers and regulators that whatever method is used, the upfront payment needs to reflect the economic value of the spectrum and to ensure its efficient use.

The authors go on to note that "A major concern when renewing a license in determining the renewal fee and the new recurring fees is that the fees do not result in negative impacts on sector development. High license fees (whether at license attribution or license renewal) might impact the financial stability of the operators and reduce the possibility of further investment... In addition, high license fees would result in a substantial tax on consumers to the extent that the fees are passed on to them. Higher than reasonable licensing fees levied on operators may, in practice, translate into rent-extracting behavior, or constitute a barrier to competition."

In Bangladesh's case, the last mobile cellular license (in fact a GSM license) was issued to Warid in 2005 for a fee of USD 50 million. This fee was determined through an open auction process.

The BTRC prepared a framework² for grant of licenses

² http://www.btrc.gov.bd/licensing/operators/bwa/bwa_

for WiMAX through an open auction held on 24 September 2008. As a result of the auction three licenses were offered with the license on the highest bid received in auction i.e., BDT 2,150,000,000³. Reportedly BanglaLion Communications, the highest bidder, chose 2585-2620 MHz, BRAC BDMail Network Limited opted for 2320-2365 MHz and Augere Wireless Broadband Bangladesh Limited was awarded 2365-2400 MHz⁴. However later BRAC BDMail Network Limited could not pay the license fee and consequently the offer to it was revoked.

Three main renewal processes are likely:

Administrative process: A process in which parties sit and negotiate the terms and condition of renewal including renewal fee. This kind of process is inherently non-transparent, unless the BTRC proceeds with public knowledge (e.g., a press release for start of process) or holds a public consultation.

Re-auction of spectrum: In this process License/spectrum is auctioned allowing external bidders to also bid and the highest bid becomes the benchmark for renewal. Existing operators are given the first right of refusal. Norwegian and Pakistani models are close to this process. This process is comparatively transparent and would determine true value of the spectrum/license; however it is time consuming as auction is involved.

Mixed process: In this case, third parties are invited to register interest at reserve price, negotiated or set by government/regulator. If any third party shows interest the licence/spectrum is re-auctioned and if none show interest existing operators can win the renewal at the reserve price. In this process it is possible for existing operators to get more spectrum.

On the Mixed Process, it is worth reflecting on the experience of Norway as this may provide some lessons for Bangladesh. The 900 MHz licences of Telenor and Netcom, two main GSM Operators of Norway expired on 31 October 2005. Before the expiry of license the Ministry of Transportation and Communications, Norway conducted an open consultation in April-May 2004. In November 2004 the Minister announced that Telenor and Netcom would be offered a licence renewal (12 years) for an up-front renewal fee of NOK 100 million and an annual fee of NOK 9.6 million. If, however, third parties showed interest an auction would be carried out with a reservation price of NOK 100 million⁵. No third party showed interest; therefore Telenor and NetCom were offered licence renewal

guidelines.pdf

3 http://www.thefinancialexpress-bd.info/search_index.php?page=detail_news&news_id=46510

4 http://www.thefinancialexpress-bd.info/search_index.php?page=detail_news&news_id=46510

5 <http://www.secinfo.com/d139r2.zEK.htm>



without a re-auction. Telenor and Netcom accepted the offering of the Minister (otherwise it would have triggered an auction).

The introduction of third-generation (3G) wireless technologies which allow wireless carriers to provide data capabilities and IP interfaces, makes it necessary to clarify the management of spectrum used for 2G services, and the methods to be used to migrate current second generation services to third generation services for current 2G license holders. The reason for this is that both generations will coexist until a significant number of mobile customers consider migrating to the new generation of services, and until the current license holders (interested in offering next generation mobile) develop strategies to evolve their networks to 3G. In crafting the rules for transition, a leading principle is to ensure continuity of the service for the consumers.

Among the issues likely to arise in the renewal process is whether the license holders will be allowed to reuse their second generation spectrum and reform it to support next generation services. Another option, if 2G is to be discontinued, is to have operators return their spectrum at expiry period for redistribution. Licenses may then be given to the same, or to other operators. The transition from 2G to 3G is likely to be gradual, and 2G will (possibly) still be used in parallel for lower bandwidth services such as voice.

In many countries, however, the issue of transitional arrangements to accommodate current 2G license holders has raised concerns among industry players. They argued that such a treatment gives mobile incumbents unfair competitive advantage over new entrants, as they are guaranteed to offer a range of 3-G compatible services, even if they do not apply for a license.

Going Forward: Likely Regulatory Process

The BTRC appointed a consultant in 2009 to advise on a Unified Licensing Regime (ULR) including drafting license templates with an expectation that they would help in preparing the templates for renewal of mobile cellular licenses too. One potential outcome is that the BTRC adopt an administrative process for license renewal rather than auctions, as was the case for Warid or indeed the 2008 additional spectrum sales.

In 2008, GP and some other mobile operators had been negotiating with BTRC to get additional spectrum in 1800MHz. Finally on 29 September BTRC granted 17.5MHz block of additional wireless spectrum to three mobile operators⁶. GrameenPhone was awarded 7.4 MHz, whereas Banglalink and AKTEL's were offered 5.1 MHz and 5 MHz respectively, at the rate of BDT

6 <http://telecomnewsbd.wordpress.com/2008/09/30/3-mobile-operators-get-extra-spectrum/>

800,000,000 per MHz⁷ but with the price being too high, Banglalink and AKTEL opted to take only 2.6 MHz and 2.0 MHz respectively.

The experience with Wimax licenses underlines the risks in an auction process where the price ends up becoming uneconomic. BTRC prepared framework⁸ for grant of licenses for WiMAX through an open auction held on 24 September 2008. As a result of the auction three licenses were offered, based on the highest bid received in auction i.e., BDT 2,150,000,000⁹. Reportedly BanglaLion Communications, the topmost bidder chose 2585-2620 MHz, BRAC BDMail Network Limited opted for 2320- 2365 MHz and Augere Wireless Broadband Bangladesh Limited was awarded 2365-2400 MHz¹⁰. However later BRAC BDMail Network Limited could not pay the license fee and consequently the offer to it was revoked. So it might be argued that the auction process resulted in licenses being purchased at levels that might become economically unsustainable. The 3G auctions in Europe a decade ago also saw license costs that imposed a huge debt burden on Telecoms companies over several years that constrained their capex and infrastructure investment.

A final consideration in the license renewal process is for the BTRC to consider allowing consolidation in the market in the shape of trading of spectrum and merger/acquisition to promote competition. As the World Bank noted in their analysis of Telecoms regulatory frameworks: "in cases of market failure, the secondary market may facilitate efficient reallocation and reassignment of usage rights without the need for regulatory intervention"¹¹.

Mobile Number Portability

Any potential regulatory shift that will impact the mobile landscape in Bangladesh is the eventual introduction of number portability. Number portability is a regulated facility which enables subscribers of publicly available telephone services (including mobile services) to change their service provider whilst keeping their existing telephone number. Its purpose is to foster consumer choice and effective competition by enabling subscribers to switch between providers without the costs and inconvenience of changing telephone number. The change has been delayed several times in India although the Telecom Regulatory Authority of India (TRAI) chairman announced mid-August that mobile number portability (MNP) would

7 http://www.telegeography.com/cu/article.php?article_id=25327

8 http://www.btrc.gov.bd/licensing/operators/bwa/bwa_guidelines.pdf

9 http://www.thefinancialexpress-bd.info/search_index.php?page=detail_news&news_id=46510

10 http://www.thefinancialexpress-bd.info/search_index.php?page=detail_news&news_id=46510

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be introduced from October 31. However, it was introduced in Pakistan in 2006 and an interesting LIRNEASIA paper by Tahani Iqbal discusses that country’s experience and lessons for its introduction to other South Asian Markets.

For new operators in the mobile sector, high switching costs act as a barrier to winning over subscribers from competing networks; furthermore, operators have to offer tariffs low enough to outweigh the cost of switching networks. As a result, regulators have found it necessary to introduce MNP services, as they reduce switching costs and facilitate consumer choice and ensure effective competition. To date, number portability has been adopted in about 60 developed countries with mature telecom markets, including several developed Asian countries. MNP was introduced in the early part of 2000 in most of Europe and the USA, while Singapore was among the earliest countries to adopt the facility in 1997.

Churn refers to the percentage of subscribers that discontinue service (either voluntarily or involuntarily). Churn can have a very large impact on valuation because the more subscribers you lose (or churn) the more new (or “gross”) subscribers you have to add to increase or maintain the subscriber base. A company uses marketing dollars and commissions to add new subscribers, and it could be expensive. As a result, assuming it costs all companies the same amount of money to add a new customer, the operator with the higher churn rate would have a lower operating margin, all other things being equal.

The MNP service also encourages churn, as mentioned above, which service providers generally strive to keep at a minimum. High churn rates are especially useful for new entrants into the mobile market, because they are able to acquire subscribers to their networks. MNP helps these firms to acquire new subscribers, but operators are faced with the task of having to retain their existing subscribers, which may sometimes be harder to do. Service providers have to take extra efforts to ensure that they do not lose their own subscribers while trying to entice subscribers from other networks to take up their services, and striking this balance can be tricky.

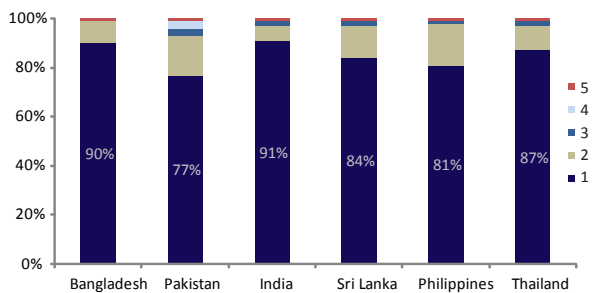
There are, therefore, both positive and negative consequences to high churn rates. Iqbal (2009) notes that unlike the developed and mature telecom markets of the US, Europe and South East Asia (such as Japan and Korea), the bulk of mobile users from these developing economies, especially in South Asia, are considered to be low-end, non-premium customers. A big portion of the base comprises of prepaid who already have a high churn rate. The number loyalty amongst the prepaid subscribers is much lower and they do switch networks often even in the absence of MNP. In India, over 92% of the base is prepaid and have a churn rate of 3-4% per month (~40-45% annualized). Their basic aim is to be able to communicate in the most inexpensive manner, and as such, they adopt a variety of cost-minimizing strategies; one such strategy is the use of

multiple mobile SIMs from different operators, in order to avail of on-net call tariffs and benefits. Friends-and-family calling networks, which facilitate cheaper calls and messages between select phone numbers, are also used as part of their cost-saving communication strategies.

According to the findings of the T@BOP3 LINEASIA study completed in 2008, the most popular strategy is to make calls from mobiles to other mobiles when rates are lower (on-net, off-peak); the second most popular strategy is missed calling or as is commonly known in South Asia, ‘ring-cuts’. The fact the MNP will reduce user awareness on where their calls are being routed, will limit their ability to make use of on-net tariffs. This can only be overcome if mobile markets move towards undifferentiated pricing schemes between services providers.

In order to make use of the various on-net tariff promotions and free minutes that operators provide, the findings of the study suggest that many BOP mobile subscribers in all of the countries studied are actually multiple SIM holders. Obtaining a new connection has now become so cheap and accessible, research found an urban male respondent was likely to have three SIMs while a rural male respondent had two; urban female respondents were also likely to have 2 SIMs while their rural counterparts had only one connection. In India, 9 percent of all BOP mobile subscribers own more than one SIM, while in Pakistan the corresponding figure is 23 percent. This is so even in the Maldives – which was not part of the teleuse@BOP3 study – where subscribers tend to have SIM cards of both operators in order to avail of on-net call plans (Galpaya, 2008). What is interesting is that these subscribers are not from SECs D and E, yet they employ the same strategies for saving money on communication.

Exhibit 90: Number of active SIM cards owned for personal use (% of BOP mobile owners)



Source: LIRNESIA

This suggests that the introduction of number portability might have a smaller impact on established incumbents in markets like India and Bangladesh than has been the experience in more mature markets in developed economies.

Chapter - 08

Wireless Company Profiles



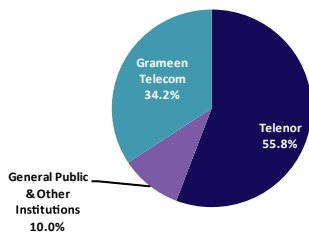


GrameenPhone

At a glance

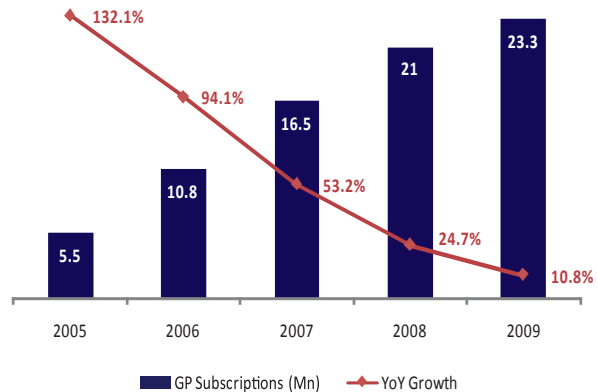
- GP is the number 1 mobile operator with 44% market share (September, 2010). Number of subscribers stands at 28.65 mn (Sep '10).
- For 2010 up to end Q3, total revenues were BDT 55.1 bn versus BDT 48.6 bn for same comparable period in 2009, whereas EPS for 2010 up to end Q3 was BDT 5.73 against BDT 5.37 for the same period in 2009.
- For the fiscal year ended December 2009, GP generated total revenues of BDT 65.3Bn (USD 942.8mn) and EBITDA of BDT 37.2Bn (USD 537.1mn), representing an EBITDA margin of 57 %.
- Q2'10 ARPU stands at BDT 241 (USD 3.47), ARPM BDT 0.83 (USD 0.0119) which were BDT 255 (USD 3.67) and BDT 0.85 (USD 0.0122) respectively in the same period of 2009.
- Initial capex cycle of geographical coverage build-out complete.
- Subscriber churn levels at 1% per month in 2010; amongst the lowest in emerging Asian markets.
- One of the largest ISPs in Bangladesh with approximately 4.5mn active subscribers
- Its network covers over 99.14% of the population in all 64 districts of Bangladesh and 88.84% of the total land area, and the network infrastructure included around 114,000 TRXs in more than 7,200 base stations.
- Grameenphone operates on both GSM 900 & 1800 bands with a bandwidth of 22MHz. The recent allocation of 7.4MHz to GP in addition to the 14.6MHz it already has will help to decrease the pressure on GPs network. GP has 11300 base stations in over 6500 locations across Bangladesh.

Exhibit 91: Ownership structure:



Source: DSE website

Exhibit 92 : GP Mobile Subscribers (Million)



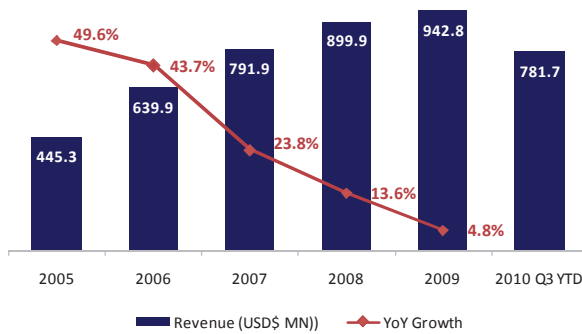
Source: BTRC and AT Capital Research

Overview

- Grameen Phone (GP) started operations in 1997. In 2009, GP offered 69,439,400 ordinary shares at BDT 10 (USD 0.14) each, in addition to a BDT 60 (USD 0.87) premium, totaling BDT 4.86bn (USD 70.18mn) & got Listed on DSE & CSE.
- Quickly after its inception in 1997, GP established itself as the leading mobile operator in the country by providing superior coverage and better network quality perception than its competitors.
- In the last 4 years, market dominance of GP has slowly eroded through intense competition, falling from 63% in 2005 to about 44% (September 2010).
- GP's ARPU has been constantly declining, as mobile voice tariffs continue to fall and as greater numbers of subscribers come from lower income groups. From USD 5.4 in Q1'07, the ARPU has come down to USD 3.03 in Q3'10 (Q2 2010 USD 3.47).
- GP was the first mobile operator to introduce prepaid mobile connections in Bangladesh in 1999. Apart from internet services through EDGE, Grameenphone is also the only medium through which Cell Bazaar operates a service where people can buy and sell products through a mobile. It also operates a telemedicine service called Health line. It provides a host of other VAS services including ringtones, welcome tunes, SMS-MMS, instant messaging, sports-news updates, stock market updates, electronic ticketing service etc. GP plans to introduce mobile banking services in the country once the regulations are in place.

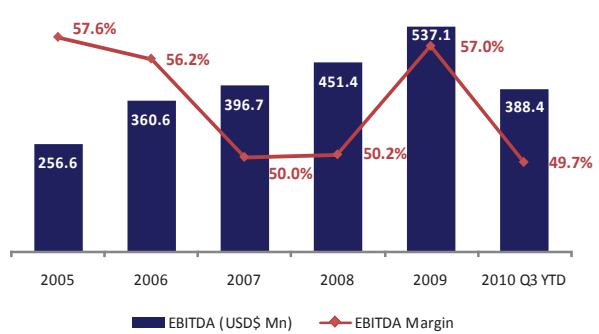


Exhibit 93 : Revenue (USD Million)



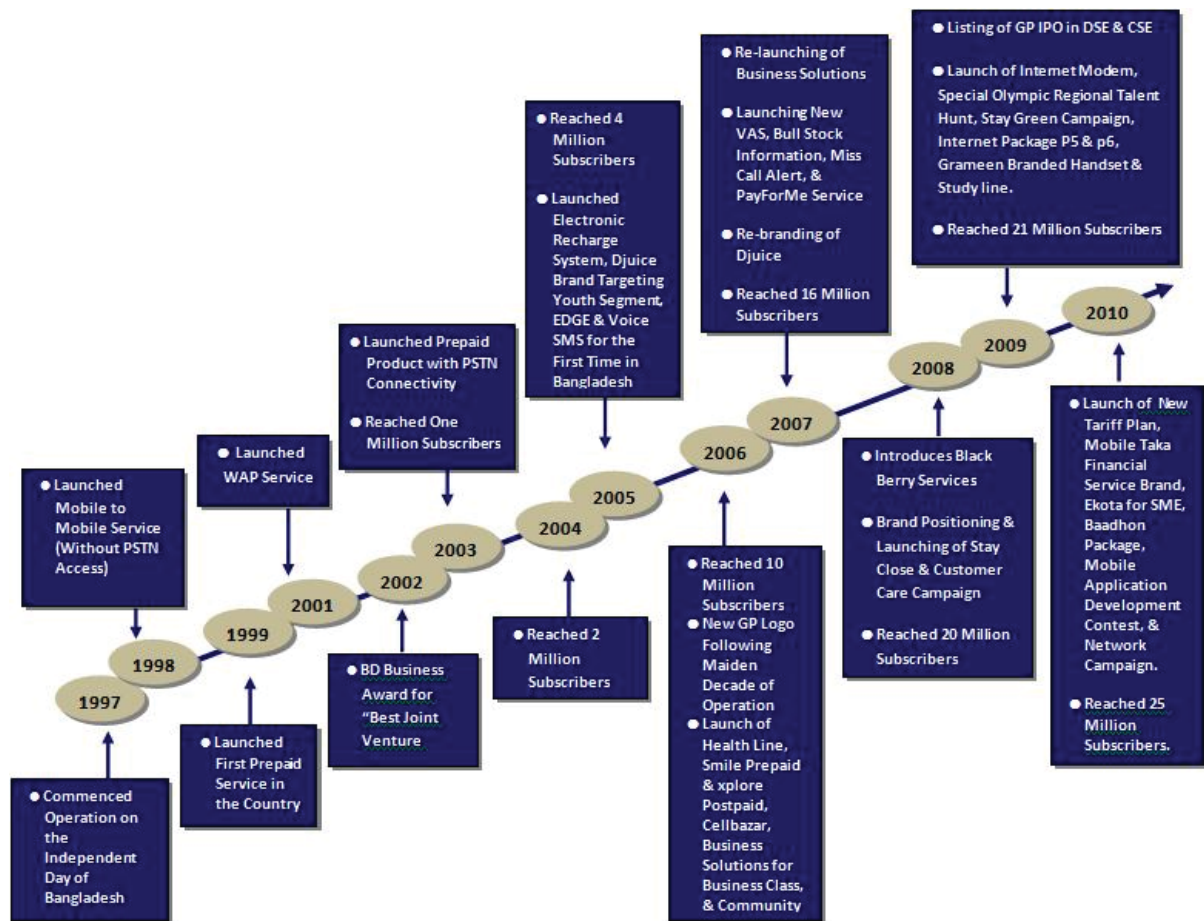
Source: Annual Report and AT Capital Research

Exhibit 94 : EBITDA (USD Million)



Source: Annual Report and AT Capital Research

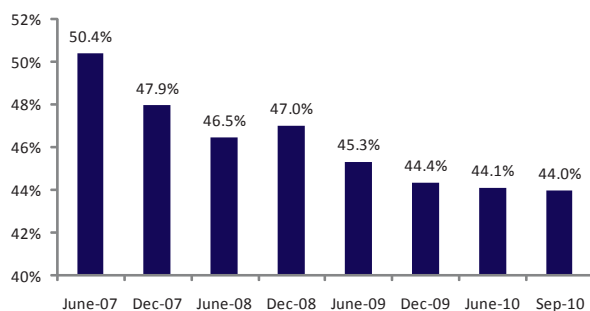
Exhibit 95 : History of Grameenphone



Source: AT Capital Research



Exhibit 96: Market Share GP



Source: BTRC and AT Capital Research

Exhibit 97 : GP Earning Trend

	2005	2006	2007	2008	2009
Revenue (USD mn)	445.3	639.9	791.9	899.9	942.8
Growth%	n/a	43.7%	23.8%	13.6%	4.8%
EBITDA(USD mn)	256.6	360.7	396.7	451.4	537.1
Growth%	n/a	41%	10%	14%	19%
EBITDA margins%	57.6%	56.4%	50.1%	50.2%	57.0%

Source: AT Capital Research, Company website

- CAGR of subscriber 18.8% between 2007 & 2009
- CAGR of revenue 9.31% in the same period.
- Decline in ARPU by 44% from Q4'07 to Q3'10.
- Revenue is growing at a declining rate from 2005 to 2009.

Shareholder Profiles

- **Telenor-Ownership: 55.80%**
- More than 184 million mobile subscribers worldwide.
- World's seventh largest mobile service provider in terms of subscribers.
- Have operations in 13 countries.
- Strong subscription growth, particularly in Asian operations.
- Named the sector leader in mobile telecommunications by the Dow Jones Sustainability Indexes (in which year).
- Revenues 2009: USD 17.15bn
- Workforce 2009: 40000
- Listed on the Oslo Stock Exchange and headquartered in Norway.
- Telenor AS ("Telenor") is the leading telecommunications company of Norway listed on the Oslo Stock Exchange with a market capitalization of ~USD 9.0bn as of November 12, 2008
- In addition to Norway and Bangladesh, Telenor has interests in mobile telephony companies in Sweden, Denmark, Hungary, Russia, Ukraine,

Montenegro, Thailand, Malaysia, Pakistan and Serbia with more than 150 million mobile subscribers worldwide as of September 30, 2008

- **Grameen Telecom-Ownership: 34.2%**
- Grameen Telecom is a nonprofit company affiliated with Noble award winning Grameen Bank
- Operates "Village Phone" program to over 297,079 (Q2, 2010) rural.
- Head quartered in Dhaka, Bangladesh.
- Grameen Telecom ("GTC") is a not-for-profit company in Bangladesh, working in collaboration with Grameen Bank, winner of the Noble Peace Prize in 2006, along with Professor Muhammad Yunus
- GTC's mandate is to provide easy access to GSM cellular services in rural Bangladesh and create new opportunities for income generation through self-employment by providing villagers, mostly poor, rural women, with access to modern information and communication-based technologies
- In conjunction with Grameen Bank, GTC administers Village Phone Program, through which GP provides its services to certain rural customers

General public & other Institutions: 10%

Growth strategy & near-term objectives

- Grameenphone has been developing its rural market offering and their rural footprint has been strengthened through their new product 'Baadhon' bundled with low cost handsets.
- Grameenphone still maintains leadership in the enterprise and mass market with the highest (44%) market share.
- Grameenphone do have very good focus in data market. The introduction of 3G in 2010 is also on the cards. Moreover they provide data cards with enhanced Micro SD features, Internet mini-pack for economy data users etc.
- GP plan to introduce mobile banking in Bangladesh and working with Central Bank of Bangladesh to develop a regulation for the business. This is a potentially lucrative business given its large subscriber base, increasing remittance inflows (over USD 10bn '09) and an estimated only 5% of the 150mn population having bank accounts.
- Innovative VAS like telemedicine, Community Information Center etc.
- GP used a large portion of the fund that is collected from the scheduled Q1'09 IPO for network enhancement.
- GP has recently selected Huawei for its network equipment supplier for better cost efficiency to maintain the competitiveness in the market.
- Penetrate rural Bangladesh with voice and data services



- Internet connectivity to bridge the digital divide
- Financial Services to unbanked population
- Efficient utilization of existing investment through Infrastructure Sharing

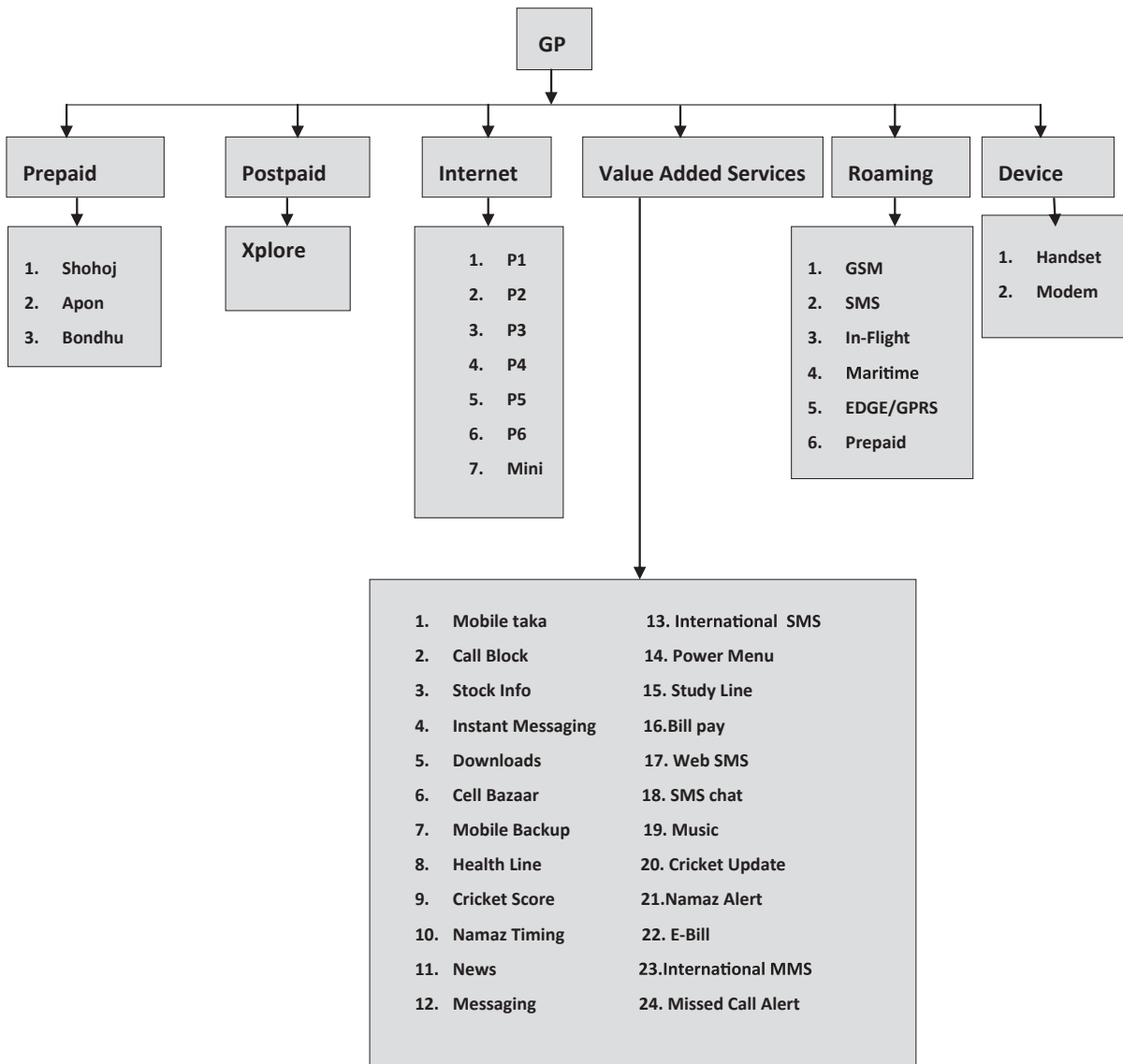
Infrastructure Sharing

- Compliance with regulatory directives
- Efficient utilization of national resources
- Competitors are customers

Diversification of Business

- Grameenphone IT Ltd. Fully owned subsidiary
- Commercial operation started from April 2010
- IT services to GP, local and global clients
- System integration and maintenance services

Exhibit 98: VAS - GP



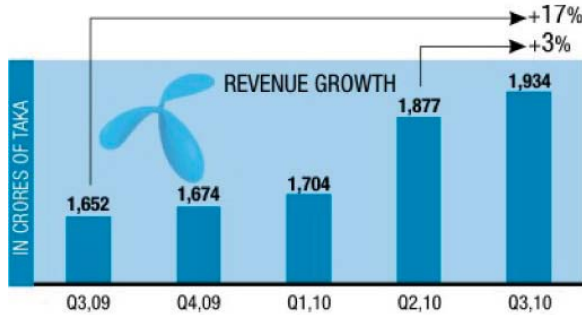
Source: AT Capital Research



Grameenphone Press Highlights

GP revenue soars

Mobile company declares 35pc interim cash dividend



Telecom giant Grameenphone earned BDT 19.34bn (USD 274.1mn) in revenue in the third quarter up 17% from the same period last year. Increased subscription through subsidization of SIM tax contributed to the leap in revenue earnings. The top mobile phone operator reported BDT 55.15bn (USD 781.7mn) revenues for the first nine months of 2010, which is a 14% increase from the same period a year ago. The company has also declared a 35% interim dividend in cash for this year based on its half-yearly performance. During the first nine months it added 5.4mn subscribers with 2.2mn added in the third quarter. The total number of GP subscribers now stands at 28.7mn, which is 44% of the country's total of 65.1mn subscribers.

<http://www.thedailystar.net/newDesign/news-details.php?nid=159713>

GP to purchase solar power to run its base stations

The Financial Express, Tuesday, Sep 07, 2010

Grameenphone Ltd signed agreements with three solar power producing companies for purchasing solar power to operate 140 of its off-grid base station sites Sunday, reports UNB.

Grameenphone is the first telecommunication company in Bangladesh to deploy solar power at a large scale under power purchase agreement, said a press release. Under the agreements the suppliers will install solar panels in Grameenphone's Base Transceiver Station (BTS) premises and maintain them. Grameenphone will buy electricity on unit (Kwh) consumption basis for a contract period of 10 years with a buy back option after that period.

Grameenphone will deploy solar power in 140 sites by the end of 2010. When completed, up to 1.15 million

litres of diesel fuel will be saved per year and annual carbon emission will be reduced by 3062 tonnes. http://www.thefinancialexpress-bd.com/more.php?page=detail_news&news_id=111452

GP adds highest 5.30mn new clients in 2009-10 fiscal

The Financial Express, Sunday, July 25, 2010

Grameenphone (GP) has included 5.30mn new subscribers in its network in the 2009-10 fiscal which is the highest among the country's six mobile operators. Launching a number of new packages, providing quality services and re-organizing rural and urban distribution line have helped to push up its growth to take the total subscriber base to 26.46mn. The total number of subscribers of Banglalink stood at 16.10mn at the end of the last fiscal, as the company added 5.06mn new consumers in one year. The total number of mobile users of the country's six operators reached 59.98mn on June 30, 2010, which was 46.29mn at the same period in 2009.

<http://www.thedailystar.net/newDesign/news-details.php?nid=147330>

BY THE NUMBERS

Listing year

2009

Paid-up capital

Tk 1,350.3 crore

Face value

Tk 10

Yesterday's closing price

Tk 255.7

Dividend for 2009

60 percent cash

PE ratio based on last audited financials

21.17

Market capitalisation

Tk 32,609 crore

GP posts strong revenue

The Daily Star, Monday, July 19, 2010

Grameenphone (GP) shares rose around 7% on July 18 after the telecom company reported a 12% increase in revenue for the first half of 2010. The mobile phone operator's total revenue for the first half to June this year was BDT 35.81bn (USD 519mn). Total revenue in the second quarter of 2010 was BDT 18.77bn (USD 272.03mn) also up by 15% compared to the same period a year ago. The growth came mainly in voice revenues because of subscription growth and revenues from sale of GP handsets and data cards. Data revenues also contributed to the consistent



revenue growth and increased by 68% compared to the first half of 2009. With the rise in revenue, GP's consolidated profit after tax went up to BDT 4.83bn (USD 70mn) achieving only 1.3% growth in the first half of 2010 with weighted average earnings per share (EPS) of BDT 3.58 (USD 5 cents).

<http://www.thedailystar.net/newDesign/news-details.php?nid=147330>

GP crosses 25mn subscribers

The Financial Express, Monday, May 24, 2010

Grameenphone Ltd, country's largest mobile phone operator crossed 25mn active subscriber base on 22nd May. More than a third of the country's 150mn population is now under mobile phone coverage. Voice communication through mobile telephony started with CDMA (code division multiple access) technology introduced by Pacific Bangladesh Telecom Ltd., the owning company of Citycell, in 1993. The expensive communication device started to become handy gradually after the introduction of GSM (Global System for Mobile Communications) technology by Grameenphone and AKTEL (now Robi) in 1997. Grameenphone remains the market leader followed by Banglalink and Robi.

http://www.thefinancialexpress-bd.com/more.php?news_id=100981&date=2010-05-24

GP logs robust profit



The Daily Star, Wednesday, May 5, 2010

Grameenphone (GP) reported BDT 3.16bn (USD 45.8mn) net profit with earnings per share (EPS) of BDT 2.34 (US 3 cents) in the first quarter this year. But the mobile operator's share price suffered the deepest fall in more than two months following its corporate declaration on 4th May 2010. The 38% profit rise in the first quarter from BDT 2.28bn (USD 33.04mn) net profit in the same period last year was an outcome of the company's internal cost cutting strategy. The leading cell phone operator also earned the highest-

ever revenue of BDT 17bn (USD 246.38mn) in the first three months to March 2010 which recorded 8% increase from the same period of 2009. Among the six mobile operators in the country, only GP is listed on the bourses. Now its shareholding structure is 55.8% for Norway's Telenor, 34.2% for Grameen Telecom and 10% for general and institutional investors.

<http://www.thedailystar.net/newDesign/news-details.php?nid=137037>

GP launches BR e-ticketing service

The Financial Express, Friday, March 5, 2010

The Bangladesh Railway (BR) has started an innovative service to allow its commuters to reserve train tickets 10 days in advance over their mobile phone through Grameenphone's 'Mobitaka' service. The electronic ticketing service was launched by Grameenphone (GP) with data support from Bangladesh Railway and CNS, the authorized ticketing partner of the Bangladesh Railway. Initially the electronic ticketing service will be offered for all the intercity trains starting from Dhaka Kamalapur Railway, Dhaka Airport and Chittagong stations and gradually all other intercity trains will be incorporated under this service.

To buy a digital train ticket through the 'Mobitaka' ticketing service a person will access a menu from his mobile phone and input the required travelling information. After providing input the customer can either 'book' the tickets for a stipulated time period or purchase the ticket instantly subject to seat availability. A digital train ticket number will be sent to his mobile which can be used to obtain a paper-based ticket from the train station at the time of travel. A customer will pay a service fee of BDT 20 (US 29 cents) per seat for availing an electronic ticket through this service.

http://www.thefinancialexpress-bd.com/more.php?news_id=94047

GP rings up hefty profit



The Daily Star, Wednesday, February 10, 2010



Grameenphone (GP) logged over 400% growth in net profit last year according to its first financial disclosure. The leading mobile phone operator said the massive growth was due mainly to the implementation of a cost-cutting strategy and innovative branding for both voice and data services. Unaudited accounts showed the profit after tax reached BDT 14.96bn (USD 216.8mn) in 2009 from BDT 2.99bn (USD 43.3mn) a year ago and thus earnings per share (EPS) increased to BDT 12.08 (US 18 cents) per share at the end of 2009 from BDT 2.46 (US 4 cents) a year ago. Furthermore the unaudited accounts for the fourth quarter showed that GP has made net profit of BDT 8.4bn (USD 121.7mn) with basic EPS of BDT 6.44 (US 9 cents) against BDT 2.6bn (USD 37.7mn) and BDT 2.14 (US 3 cents) for the same period of previous year.

<http://www.thedailystar.net/newDesign/news-details.php?nid=125667>

GP, AKTEL tie up to share network

The Daily Star, Monday, February 8, 2010

Following Banglalink's footsteps, AKTEL on February 7, 2010 joined forces with Grameenphone to share network infrastructure, aiming to present low-cost services to the untapped rural market. Network sharing among the three big players will help them minimize infrastructure costs by utilizing resources together. This initiative will mutually benefit both operators in terms of providing faster and cost-effective services to valued subscribers.

Mobile penetration rate in Bangladesh is only 34% which is mainly urban-dominated. The operators are unwilling to roll out their rural networks due to poor business returns. Each operator will have to spend a minimum of BDT 40,000 (USD 580) to a maximum of BDT 80,000 (USD 1160) a month to run a single base transceiver station (BTS), which can handle around 3,000 calls at a time. BTS operation costs are increasing by the day because of electricity constraint and increasing petroleum prices in using generators for power backup. To minimize operational costs,

the telecom regulator introduced an infrastructure sharing guideline in 2009 under which operators can share their excess network capacity.

<http://www.thedailystar.net/newDesign/news-details.php?nid=125380>

GP, Banglalink team up for low-cost rural links

The Daily Star, Wednesday, February 3, 2010

Mobile operators Grameenphone and Banglalink have joined forces to share network infrastructure to take services at low costs to the untapped rural market. The partnership will help Banglalink expand its outreach via GP's infrastructure. Network-sharing between the two big players that occupy a combined 70% share of the six-operator market will help both minimize infrastructure costs by utilizing resources together. Infrastructure to be shared includes BTS, spectrum, antenna, feeder cable, radio access network, microwave radio equipment, billing platform, switching centers, router, base station controller, optical fiber access and backbone transmission network and database.

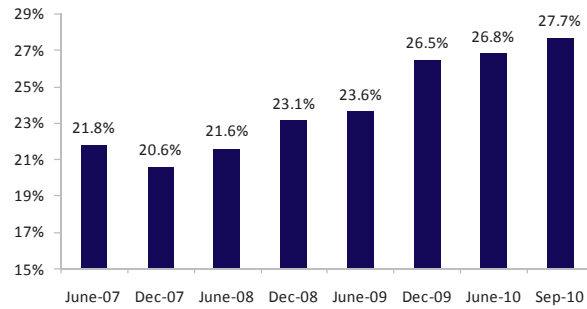
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Banglalink

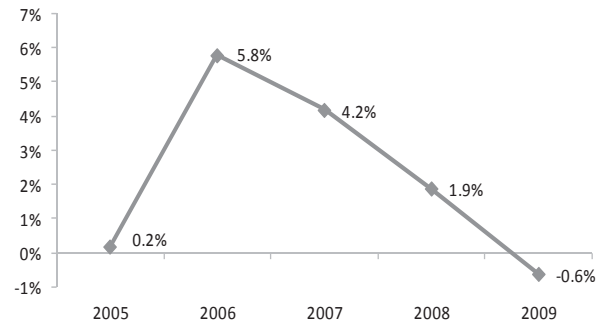
- Orascom Telecom Bangladesh Limited (“Banglalink”) is a 100% owned subsidiary of Orascom Telecom Holding S.A.E., Egypt, (“OTH”) in Bangladesh. The company started operations in 1997 as Sheba Telecom. In September 2004, OTH purchased 100% of Sheba Telecom (pvt.) Limited in Bangladesh for USD 50mn. Then it re-branded and launched its services as “Banglalink” in February 2005.
- Banglalink attained 1 mn subscribers by December 2005 and 3 mn subscribers in October 2006. By December 2007, Banglalink overtook Aktel (Robi) to become the second largest operator in Bangladesh with more than 7.1 mn customers. As of September 2010, it had around 18.1 mn active subscribers, with a 27.8% market share in the mobile market.
- Recent growth has been fuelled by innovative products and services targeting different market segments, aggressive improvement of network quality and dedicated customer care, creating an extensive distribution network across the country, and establishing a strong brand that emotionally connected customers with Banglalink.
- Banglalink has rapidly expanded its network in the last three year and now covers over 94% of the population in all 64 districts of Bangladesh with a over 3980 base across Bangladesh as of December 2009. It operates in the GSM 900 & 1800 frequency bands with 17.5MHz spectrum.
- Banglalink raised BDT 7.07 bn (USD 101.95 mn) through the issuance of a five-year senior secured bond in March 2010 to expand its network into rural areas and improve the quality of its services.
- It provides a host of other VAS services including ringtones, welcome tunes, SMS-MMS, instant messaging, sports-news updates, bill payment through banks, SMS banking, and yellow pages directory services. Compared to its competitors, Banglalink is less focused on VAS.

Exhibit 100 : Market Share (Banglalink)



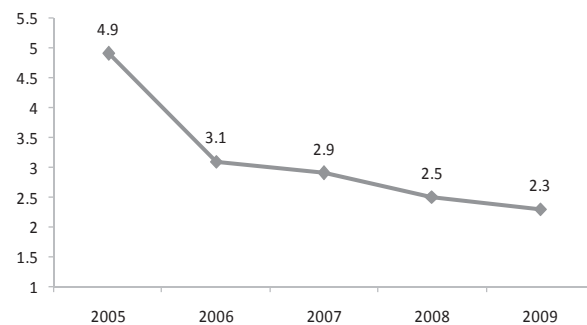
Source: AT Capital Research and BTRC

Exhibit 101 : CHURN Rate



Note: Here negative churn rate is due to deactivation program.
Source: AT Capital Research & Orascom Annual Report 2009

Exhibit 102 : ARPU (3 Months-USD)



Source: AT Capital Research

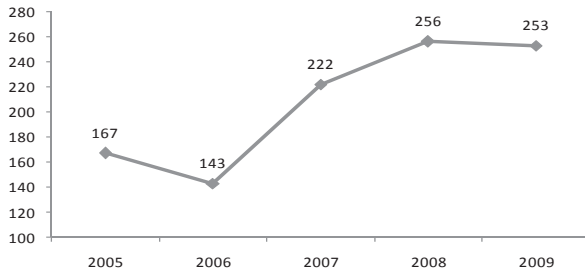
Exhibit 99 : Banglalink Earnings Trend

	2005	2006	2007	2008	2009
Revenue (USD mn)	39.0	91.0	193.0	288.1	351.0
Growth%	n/a	133%	112%	49%	22%
EBITDA(USD mn)	(39.0)	(25.0)	(42.0)	13.7	117.2
Growth%	n/a	n/m	n/m	n/m	757%
EBITDA margins%	-100.0%	-27.5%	-21.8%	4.7%	33.4%

Source: AT Capital Research

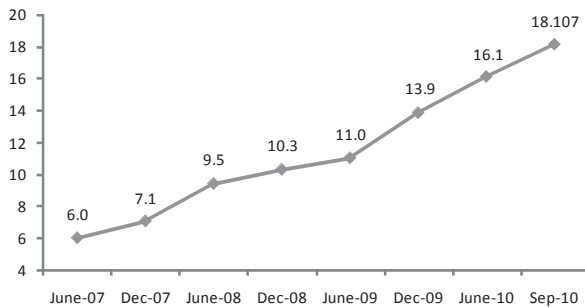


Exhibit 103 : MOU (mn)



Source: AT Capital Research

Exhibit 104 : Banglalink Subscribers (mn)



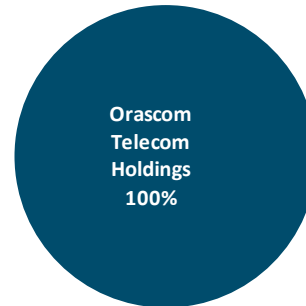
Source: BTRC

Operation:

- Although MOU has increased from 141 to 253 between Q1'06 & Dec'09, ARPM has fallen from USD 0.083 to USD 0.05 in the same period, resulting in a fall from ARPU USD 3.5 to USD 2.3.
- 2009 revenue USD 350.99mn, EBITDA USD 117.24mn.
- Banglalink achieved USD 214 million in revenue, about 10% of Orascom's total revenue, in the first six months of 2010. Its revenue earnings increased by nearly 15% in the second quarter of 2010 compared to the previous quarter.
- 100% owned by Orascom Telecom Holdings.
- CAGR of subscribers is 39.97% between 2007 & 2009,
- CARG revenue growth of 34.9% in the same period.
- Although it was loss making until, its EBITDA margins have been increasing rapidly over the last 2 years.

Shareholder Profiles

Exhibit 105 : Ownership Structure (Banglalink)



Source: Company website

Orascom Telecom Holdings Limited Ownership: 100%

- Part of Orascom Group of Companies of Egypt.
- One of the largest network operators in the Middle East, Africa, and South Asia, having operations in 7 countries.
- Has over 93mn subscribers (Dec'09).
- OTH employs around 20,000 people.
- Revenue of USD 5.065bn (2009).
- Listed on the Cairo & Alexandria stock exchange and London Stock Exchange.
- It is headquartered in Cairo, Egypt.

Orascom Telecom Holding s.a.e. ("Orascom Telecom" or "OTH") was established in 1998 and has grown to become a major player in the global telecommunications market. OTH is considered among the largest and most diversified network operators in the Middle East, Africa, and South Asia. Orascom Telecom is a leading mobile telecommunications company operating in eleven emerging markets with a combined population of 498 million with an average mobile telephony penetration of approximately 46% as of 31st December 2008.

Orascom Telecom operates GSM networks in Algeria ("OTA"), Pakistan ("Mobilink"), Egypt ("Mobinil"), Tunisia ("Tunisiana"), Bangladesh ("Banglalink"), and North Korea ("Koryolink"). OTH has an indirect equity ownership in globalive wireless which has been granted a spectrum license in Canada. OTH was also awarded the management contract of one of the two Lebanese mobile telecommunications operators ("Alfa") from the Government of the Republic of Lebanon. Through its subsidiary Telecel Globe, OTH also operates in Burundi, the central African republic,



Namibia and Zimbabwe. Orascom Telecom had over 88 million subscribers as of September, 2009.

OTH's first operation was the Egyptian company for mobile services commonly known as Mobinil. Mobinil is a market leader serving over 24.2 million subscribers representing a market share of 43.6% (as of September 2009). Mobinil is one of Egypt's five largest companies on Cairo & Alexandria stock exchange in terms of market capitalization.

At the beginning of 2009 OTH has been awarded the management contract of Alfa, one of two Lebanese mobile telecommunications operators, owned by the Republic of Lebanon. The management contract extends for one year and is renewable for another year. Under this contract, OTH is required to increase the number of subscribers of Alfa from around 600,000 at the end of 2008 to around 1 million at the end of 2009.

Koryolink is the first 3G mobile network to operate in the Democratic People's Republic of Korea ("DPRK") and is established as a joint venture between OTH (75%) and Korea Posts and Telecomm Corp. ("KPTC") (25%). OTH was awarded the license to establish a 3G mobile network in DPRK in January 2008. Koryolink will deliver world-class voice and data communication services to the people of the DPRK.

OTH established a strong presence in the GSM association (the world's leading wireless industry representative body) only five years after its inception. OTH's chairman and CEO, Mr. Naguib Sawiris, was selected to join the GSM Association's CEO board in 2002. OTH is traded on the Cairo & Alexandria stock exchange and on the London Stock exchange its GDR is traded.

Potential New Partner - Vimpelcom:

Norwegian-Russian telecoms firm Vimpelcom has announced its intention to acquire a majority stake in Banglalink's owning company Orascom Telecom, in a deal that will create the world's fifth largest mobile operator. Vimpelcom on October 04 signed a multi-billion dollar deal with Egyptian billionaire Naguib Sawiris' holding firm Weather Investments. At the closing of the transaction, Vimpelcom will own, through Weather, 51.7% of Orascom Telecom Holding and 100% of Wind Italy, Vimpelcom said in a statement. The cash and shares transaction also includes a USD 1.8bn payment in cash. The overall value of the transaction was not disclosed, but Russian business daily Vedomosti said it would be worth USD 6.4bn.

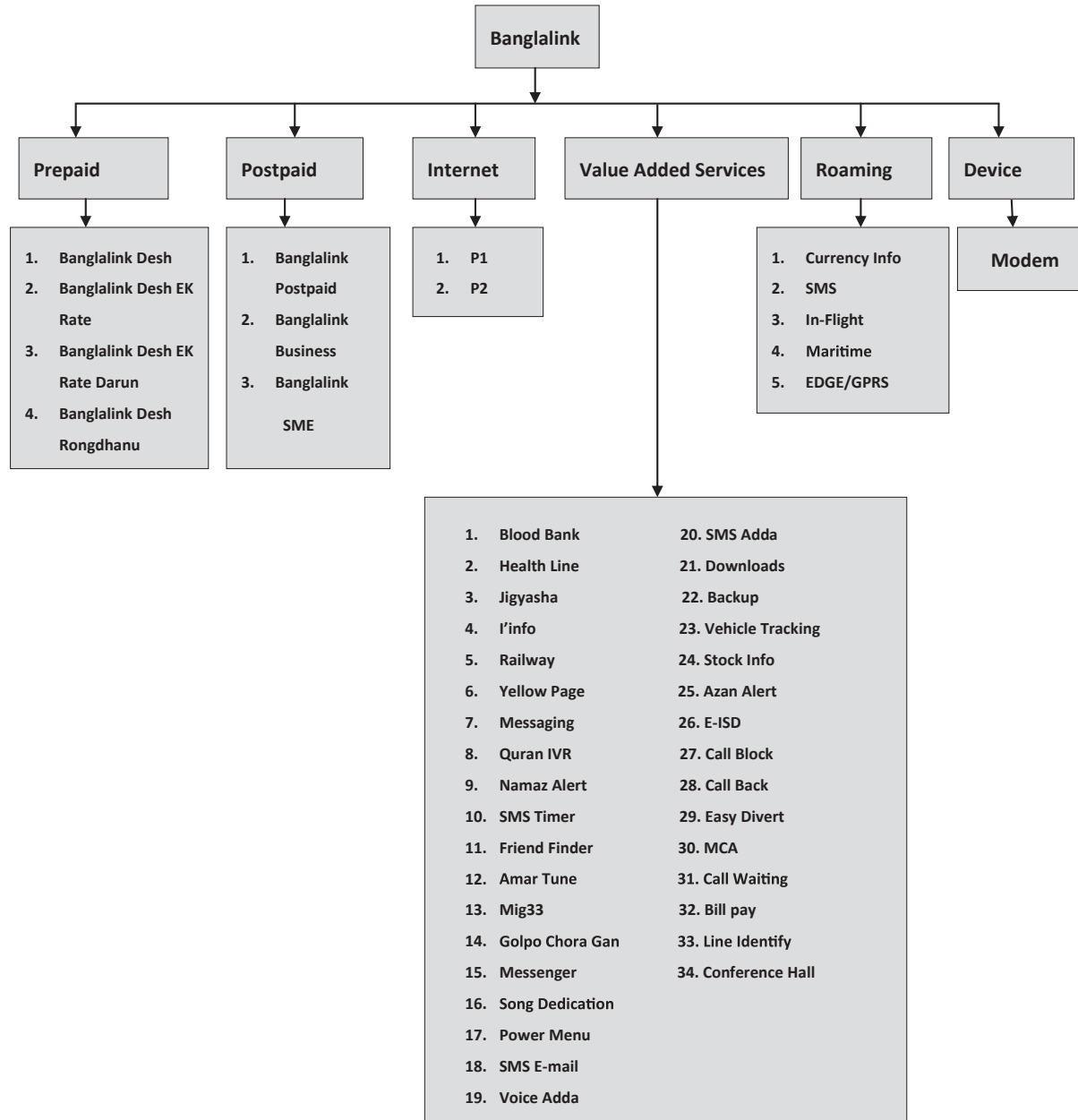
Vimpelcom is a joint venture of Norwegian telecoms firm Telenor and Russian banking group Alfa Group, whose creation was sealed at the end of 2009 after a prolonged squabble between the two groups. Vimpelcom said that as part of the transaction, Weather Investments will receive a 20% economic stake and an 18.5% voting stake in Vimpelcom group. After the transaction, Telenor will hold 29.3% of the voting rights in Vimpelcom and Alfa Group 36.4%

Growth strategy & near-term objectives

- Banglalink's primary focus is to maintain growth in subscribers and gain in market share.
- Proactive marketing initiatives to enhance subscriber growth & increase loyalty, including life time validity, bonus on incoming, late-night offer & 1 second pulse etc.
- Compared to GP, Banglalink appears to focus less on Internet/Data services.
- In the SME segment Banglalink appear to have a successful penetration strategy.
- Although CEO of Orascom Holdings Limited Naquib Sawiris expressed interest in acquiring a 3G license, Banglalink has not participated in recent 3G field trials conducted by Ericsson.



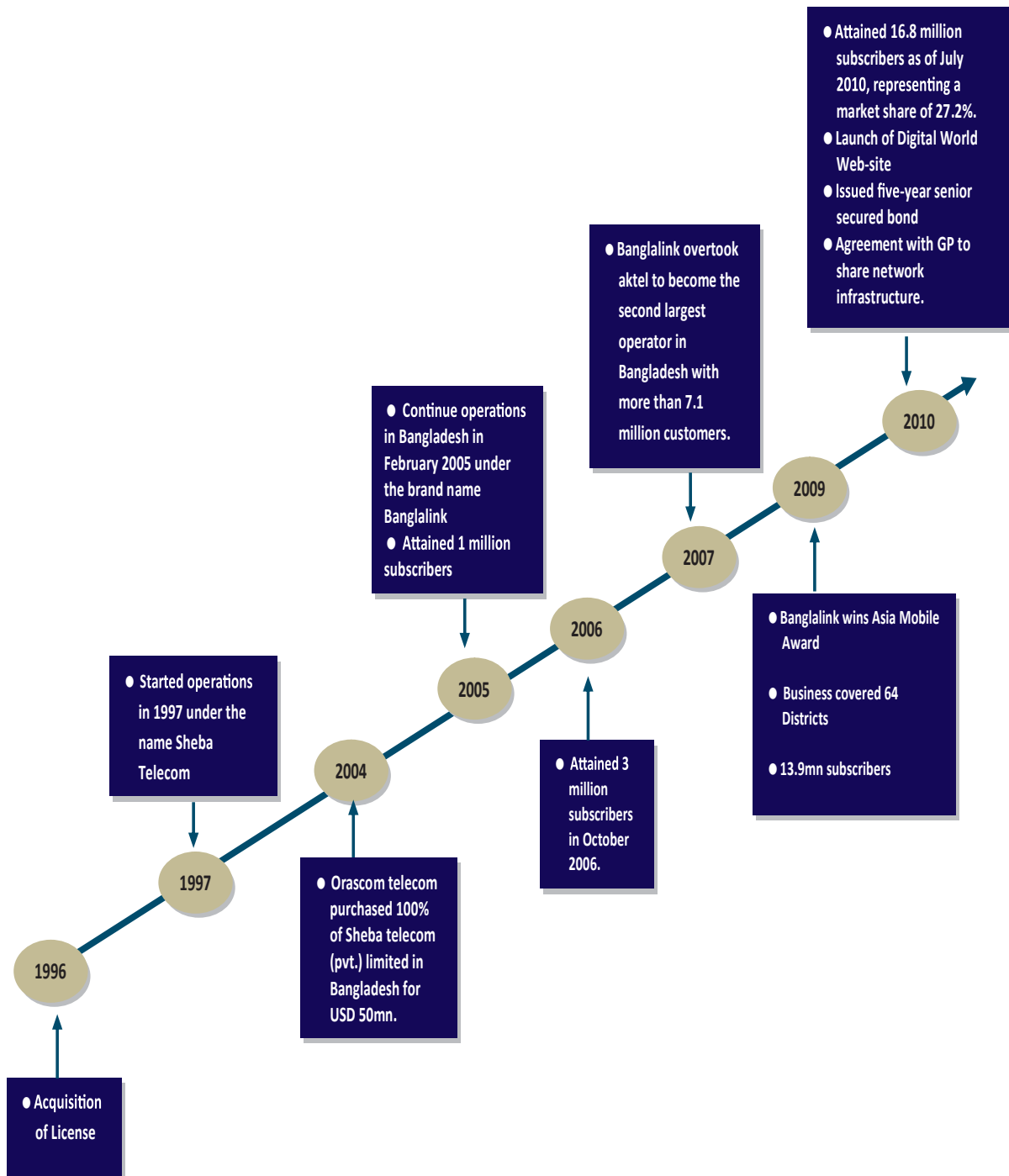
Exhibit 106: VAS - Banglalink



Source: AT Capital Research



Exhibit 107 : History - Banglalink

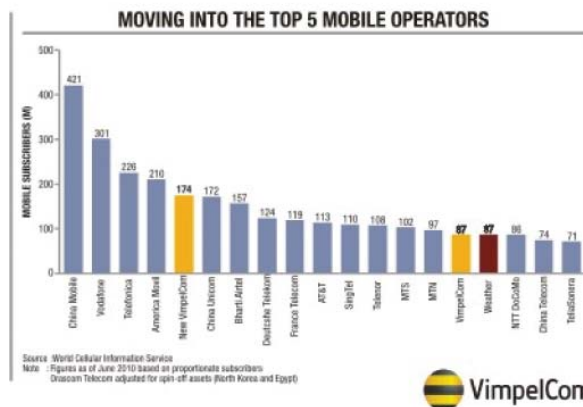
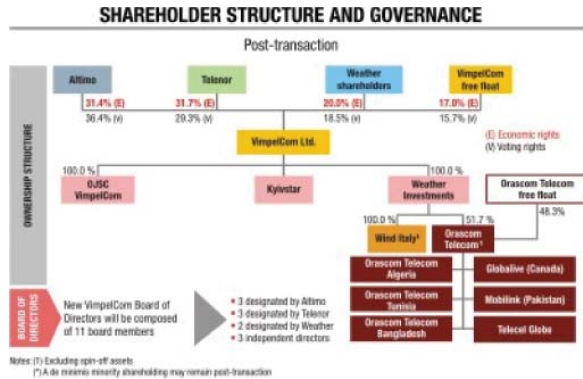


Source: AT Capital Research



Banglalink Press Highlights

**Banglalink owner gets new partner
Norwegian-Russian firm Vimpelcom to acquire
51.7% of Orascom**



The Daily Star, Wednesday October 6, 2010

Norwegian-Russian telecoms firm Vimpelcom will acquire a majority stake in Banglalink's owning company Orascom Telecom, in a deal that will create the world's fifth largest mobile operator. Vimpelcom on October 04 signed a multi-billion dollar deal with Egyptian billionaire Naguib Sawiris' holding firm Weather Investments. At the closing of the transaction, Vimpelcom will own, through Weather, 51.7% of Orascom Telecom Holding and 100% of Wind Italy, Vimpelcom said in a statement. The cash and shares transaction also includes a USD 1.8bn payment in cash. The new deal is expected to spur Banglalink, the second largest mobile operator after Grameenphone in Bangladesh, into further investments, industry analysts said. The analysts observed that this would also inject additional growth, mobilisation and dynamism into the country's telecom market.

Vimpelcom is a joint venture of Norwegian telecoms firm Telenor and Russian banking group Alfa Group, whose creation was sealed at the end of 2009 after

a prolonged squabble between the two groups. Currently, another Telenor subsidiary, Grameenphone, is operational in Bangladesh and leads the telecom market with more than 2.7 crore subscribers. The overall value of the transaction was not disclosed, but Russian business daily Vedomosti said it would be worth USD 6.4bn.

Bangladesh's growing mobile industry has witnessed several instances of changes in ownership in recent years. Nine months back; India's Bharti Airtel acquired a 70% stake in Abu Dhabi Group's Warid Telecom, sixth largest mobile operator in Bangladesh. Earlier in 2008, NTT DoCoMo, Japan's largest telecom operator, acquired AK Khan and Company's 30% stake in Aktel, third largest in Bangladesh, for USD 350 million.

Vimpelcom said that as part of the transaction, Weather Investments will receive a 20% economic stake and an 18.5% voting stake in Vimpelcom group. The transaction will create a new global telecom player with over 174 million mobile subscribers globally. After the transaction, Telenor will hold 29.3% of the voting rights in Vimpelcom and Alfa Group 36.4%. Vimpelcom has licences for operations across Russia, where it owns Beeline, and Ukraine, where it has the Kyivstar brand. Its operations also cover Kazakhstan, Uzbekistan, Tajikistan, Georgia, Armenia, Kyrgyzstan, Vietnam and Cambodia. The statement said Vimpelcom expected the transaction to be complete by the first quarter of 2011.

<http://www.thedailystar.net/newDesign/news-details.php?nid=157324>

Banglalink plots IPO: report
The TelecomAsia.net June 01, 2010

Bangladeshi cellco Banglalink is mulling floatation on the local bourse - but only if the government eases it's notorious SIM card tax. Shakil Rizvi, president of the Dhaka Stock Exchange, told the *Financial Express* that he discussed the IPO proposal recently with Banglalink's chief executive officer Ahmed Abou Doma.

Bangladesh Telecommunication Secretary Sunil Kanti Bose hinted last month that the upcoming budget – due to present to parliament later this month - will likely include some tax relief for mobile operators, said the *Daily Star*. The report said a parliamentary body has recommended the BDT800 (USD 11.57) SIM card tax be abolished.



An IPO for Banglalink could raise funds for 3G licensing and network rollout as the government is angling to issue at least four 3G licenses by July or August, possibly via auction. The second-ranked operator successfully raised USD 102mn in the country's largest corporate bond offering, conducted in March. Other operators are also hoping to cash in on Bangladesh's limited telco liquidity since only one - Telenor-backed GrameenPhone – out of the country's six operators is listed.

On the other hand, Axiata Bangladesh, which owns the third largest operator Robi (formerly Aktel), and government-owned cellco Teletalk, are also plotting local stock market listings.

<http://www.telecomasia.net/>

Mobile operators Grameenphone and Banglalink have joined forces to share network infrastructure to take services at low costs to the untapped rural market.

The partnership will help Banglalink expand its outreach via GP's infrastructure Network-sharing between the two big players that occupy a combined 70% share of the six-operator market will help both minimize infrastructure costs by utilizing resources together.

The announcement came at a time when Indian giant Bharti Airtel is set to debut in Bangladesh with the fourth largest operator Warid Telecom, targeting untapped rural customers as well. "The deal is part of an aggressive strategy to roll out networks together in the rural market," said an official. Grameenphone and Banglalink together serve 37.13mn customers out of the 52.43mn mobile subscriber market.

According to a posting by Grameenphone to the Dhaka Stock Exchange (DSE) website yesterday, "Grameenphone Ltd (GP) and Orascom Telecom Bangladesh Ltd (Banglalink) signed an agreement on February 1 to share GP's telecom infrastructure to expand Banglalink's network across the county."

This initiative will mutually benefit both operators in terms of providing faster and cost effective services to subscribers. It is believed that infrastructure sharing agreements such as this will ensure sustainable utilisation of national resources, according to the announcement. Grameenphone shares increased 2.64% to BDT 286.80 on that Day.

"We are happy to share our infrastructure with Banglalink, in line with BTRC's infrastructure guidelines. We also thank BTRC for taking a lead and advocating such sharing among operators," said Oddvar Hesjedal, Grameenphone chief executive officer.

"I strongly believe that this is a partnership that will benefit the industry as a whole and also enable Banglalink to roll out its network faster and cost effectively. More importantly, such kind of infrastructure sharing optimises utilisation of a scarce national resource," said Hesjedal.

Banglalink, which traditionally practises an aggressive marketing strategy, has recently announced a plan to raise BDT 4.25bn (USD 61.36mn) through bonds to update its network to firm up a foothold in the future data market.

"To ensure the best interests of customers, the country's two largest telecom operators have joined hands, which will utilise the best possible resources. Customers of both the companies will enjoy better services in terms of network," said Ahmed Abou Doma, managing director and CEO of Banglalink.

Bangladesh's mobile penetration rate is only 34%, which mainly remains an urban-dominated market. The operators are unwilling to roll out their rural networks due to poor business returns.

Each operator will have to spend a minimum of BDT 40,000 (USD 577.5) to a maximum of BDT 80,000 (USD 10,155.07) a month to run a single base transceiver station (BTS), which can handle around 3,000 calls at a time.

Infrastructure to be shared includes BTS, spectrum, antenna, feeder cable, radio access network, microwave radio equipment, billing platform, switching centres, router, base station controller, optical fibre access and backbone transmission network and database. Banglalink will invest BDT 7.5bn (USD 108.3mn) in network expansion this year, as it has started drawing down from proceeds of the country's biggest corporate bond, the company said Saturday.

The country's second largest mobile telephony firm, owned by Egypt's Orascom Telecom, last month sold bonds equivalent to USD 102mn at 13.5%, payable after every six months and due in 2014, dwarfing Grameenphone's USD 71mn in the initial public offering.



Although alarmed at Indian Bharti Telecom's entry to the Bangladesh telecom market, Banglalink officials said the company would go ahead with the investments, and its total capital would reach more than BDT 50bn (USD 721.9mn) by 2014.

"The market is going to be tough, no doubt. But we want to thrive in the competition," a senior company official involved in the planning said. "We've issued the bond for network equipment purchase and expansion into rural areas. So that's very much on track," he said.

Backed by revenue growth, officials said the company would follow the path towards profitability by 2014, although its net loss amounted to BDT 1.3bn (USD 18.77mn) as of June 2009.

According to company figures, Banglalink's revenue grew by 21.8 per cent last year to USD 350mn, compared with USD 288mn a year ago. The company projects to double its number of customers by 2014, "if the environment proves not so hard."

At the end of February, Banglalink was the second largest operator in the country with 14.13 million customers, trailing the leader Grameenphone with 23.75 million. Axiata Ltd is the third largest operator.

Once the second largest, Axiata, co-owned by Japanese NTT DoCoMo and Malaysian Axiata Berhad, lost out to Banglalink, and its position slipped back to the third with 10.13 million. Warid, Citycell and Teletalk have 3.0 million, 1.94 million and 1.04 million subscribers respectively.

Telecom analysts see another bout of competition in Bangladesh's mobile telephony sector with Bharti Airtel's buying of 70% of Warid Telecom for an initial investment of USD 300mn.

Bharti has already taken control of the management and the board of Warid Telecom, while the Abu Dhabi Group will retain 30% and have its nominees on the board.

The Banglalink official said his company is ready to face the competition and mapping out strategy to cutback operating costs, and has already forged strategic partnership with Grameenphone and others to meet that end. "That will help reduce our operating costs. We're concerned. At the same time, we're moving ahead with different strategies," the official told the FE. He said his company would closely follow the strategy to be employed by Bharati Airtel and would take necessary steps to face the potential competition.

Officials said Banglalink would ramp up capital expenditure and invest as much as BDT 19.5bn (USD 281.55mn) in 2011 before bringing it down to BDT 11.8bn (USD 170.37mn)

Banglalink may submit IPO proposal by December

The Financial Express, Wednesday, Sep 8, 2010

The country's second largest mobile phone company Banglalink, a brand of Egypt-based Orascom Telecom is likely to submit its Initial Public Offering (IPO) proposal to the stocks regulator by December this year. The Banglalink's Chief Executive Officer (CEO) Ahmed Abou Doma sat with the DSE authorities during his visit to DSE on May 30, 2010 in a move to go public.

"At that meeting, Banglalink's CEO spoke about some of their problems going public, but he was optimistic about overcoming the problems. The CEO also said the government's initiatives to cut taxes on SIMs would help his company go public," the DSE president Shakil Rizvi told the FE.

However, the DSE president said that by this time the telecom authorities have decided in principle to go public. "Now they are working towards the goal," he added.

"We also heard that Banglalink will offload shares without any private placement, which would help the general investors to buy a larger amount of shares in the overheated market," he said.

http://www.thefinancialexpress-bd.com/more.php?page=detail_news&news_id=111547

Banglalink to go public if budget favors telecom sector

The Financial Express, Monday, May 31, 2010

The country's second largest telecom company Banglalink may go public if the upcoming budget favours the telecom sector. Banglalink is the second largest cellular service provider in Bangladesh after Grameenphone. As of November 2009, Banglalink had a subscriber base of 12.99mn. In April 2010, the number of Banglalink subscribers stood at 14.94mn. It is a subsidiary wholly-owned by Orascom Telecom.

http://www.thefinancialexpress-bd.com/more.php?news_id=101766&date=2010-05-31

Banglalink now 15mn strong

The Daily Star, Monday, May 10, 2010

Mobile phone operator Banglalink has so far added around 15mn subscribers to its network, showing its strong position in terms of customer acquisition in the six-player market. The company is in second place with Grameenphone having highest market share. For customers, Banglalink has offered some benefits including free talk time, SMS (short message system) and a special package for postpaid customers to



celebrate the 15mn landmark. The telecom regulator's available data shows that Grameenphone had 23.9mn customers followed by Banglalink's 14.2mn and Robi's 10.9mn as of March. The total number of mobile subscribers in Bangladesh reached 54.7mn in March 2010.

<http://www.thedailystar.net/newDesign/news-details.php?nid=137731>

Banglalink issues more bonds on high demand

The Daily Star, Thursday, March 11, 2010

KEY FACTS

Banglalink seals deals with local investors to borrow Tk 707 crore through bonds

Earlier, the company had planned to raise Tk 425 crore through bonds

26 institutional investors agree to buy bonds

The interest rate is 13.5 percent a year

The tenure of Tk 1 crore-valued bond is five years

The money will be used for network expansion in rural areas

The company's total investment stands at Tk 7,974 crore in 2009

Banglalink has sealed a deal with subscribers to borrow BDT 7.07bn (USD 102.5mn) through bonds to expand its network in the near-untapped rural telecom market. The figure is an increase from its initial bid for BDT 4.25bn (USD 61.6mn). The company was inspired by over-subscription of its bond offer by private placement. Banglalink is offering 13.5% interest a year for its five-year senior secured bond of BDT 10m (USD 144,927) each which is proposed to be redeemed by 2014. The amount will mainly be spent on network expansion to the deep rural areas and improve service quality. Citibank NA is acting as the lead arranger and placement agent for the bond offer.

In the first nine months of 2009, the operator registered 25% growth in revenue to over BDT 17.96bn (USD 259mn) from a year ago. In the same period, Banglalink achieved EBITDA (earnings before interest, taxes, depreciation and amortization) of BDT 6.58bn (USD 95mn) because of a decrease in customer acquisition and interconnection cost. The cell phone operator invested a total of Tk 79.74bn (USD 1.16bn) until the end of 2009 in Bangladesh. EBITDA margin for the third quarter of 2009 remained steady at 40%. Aggressive marketing made Banglalink the market's second largest operator at the end of 2007, after

overtaking Aktel in terms of subscriber acquisition. As of September 2009 Banglalink had a 24.2% share in the six-operator mobile market.

<http://www.thedailystar.net/newDesign/news-details.php?nid=129539>

Banglalink to go aggressive

The Daily Star, Sunday, March 7, 2010

Mobile phone operator Banglalink plans to continue its aggressive marketing strategy after adding more than 14mn customers to its network in five years. The operator celebrated its fifth anniversary on March 5, 2010. The operator recently raised BDT 4.25bn (USD 61.6mn) by issuing bonds. This is an initiative to make ready the company's network to provide services to rural areas and introduce new technology. As a result after two or three years all operators are expected to go to the rural areas. However, it is very expensive to roll out rural operations.

<http://www.thedailystar.net/newDesign/news-details.php?nid=128988>

Banglalink to raise BDT 4.25bn (USD 61.6mn) in bonds

The Daily Star, Wednesday, January 27, 2010



Banglalink moves to raise BDT 4.25bn (USD 61.6mn) through bonds in a bid to shore up its foothold in Bangladesh's growing telecom market. The second largest mobile phone operator has already taken steps to raise the debt capital through private placement to meet capital expenditure mainly for strengthening its network. It offers 13.5% interest per annum for of its five-year tenure bond of BDT 10mn (USD 144,927) each, which is proposed to be redeemed by 2014 through amortization of principal amount on a year-on-year basis. The Securities and Exchange Commission (SEC) has already given a go-ahead to the Banglalink plan to raise funds through secured bonds.

<http://www.thedailystar.net/newDesign/news-details.php?nid=123633>

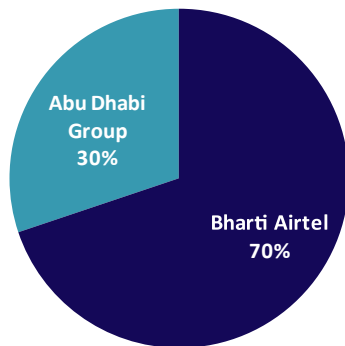


Warid

At a glance

- Warid has 3.581mn subscribers with a market share of 5.5% (Sep, 2010).
- It has network coverage in 64 districts, operating on GSM 900 & 1800 bands occupying 15MHz of frequency.
- Ownership Structure:

Exhibit 108 : Ownership Structure (Warid)



Source: Company Website

Overview

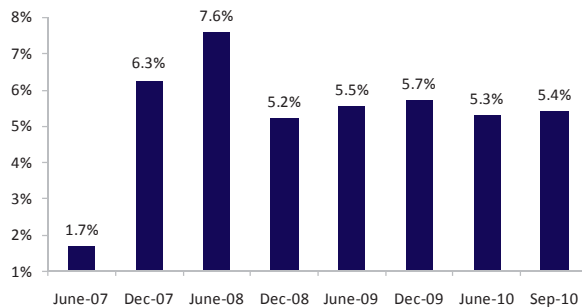
- Paid USD 50mn in Dec 2005 for a nationwide GSM license.
- Warid Telecom commenced its operations in May 2007 under a landmark MOU that was agreed by the Dhabi Group and the Government of Bangladesh worth USD 1.0bn, out of which USD 750mn was exclusively committed for investment by Warid in the telecommunication sector of the country.
- Succeeding the MOU signing, the BTRC license for telecom service provision was issued to Warid Telecom, followed by the signing of interconnectivity agreement with all the existing telecom companies of Bangladesh
- Had a flying start achieving 1mn mobile subscribers in its first 70 days of operations and currently it is the fourth largest company having a market share of 5.5%.
- Uses NGN network and deploys a distribution network of 124 distributors and 34,000 retailers.
- Has spent over USD 500mn on its infrastructure build out. It has plans for further USD 250mn network expansion for accommodate a large targeted subscriber (nearly 7mn) by the end of 2010.

- India's Bharti acquired 70% stake of Warid Telecom for an initial investment of USD 300 mn in 2010.

Warid offers a wide range of value added products and services which include SMS, GPRS-EDGE, mobile data services, infotainment services, Caller Ring Back Tone, Ringtones download, Picture Messaging, MMS, and Voice Greetings.

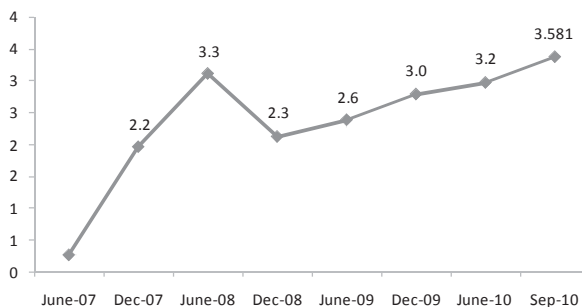
CAGR of Subscribers is 16.8% between 2007 & 2009
Revenue for 2009 is USD 8.69mn

Exhibit 109 : Market Share (Warid)



Source: AT Capital Research, BTRC

Exhibit 110: Subscribers (mn) Warid



Source: BTRC

Growth strategies:

- Warid is focusing on building and improving its network reach and quality ahead of new customer acquisition. It was one of three parties which took part in recent mobile equipment manufacturer Ericssons 3G trials.
- They focused on Price leader strategy.
- Warid Telecom partners with some of the leading vendors in the telecom industry who help in providing the best and the latest network solutions for our businesses. These vendors include cellular giants Ericsson, Nortel, Siemens, Cisco and Huawei.



Shareholders’ Profile:

Abu Dhabi Group-Ownership: 30%

The Abu Dhabi Group Consortium (The Abu Dhabi Group) is one the largest UAE based group of investors actively participating in investment activities in countries like Pakistan, Bangladesh, Iran, Uganda, Republic of Congo, and the Middle East. The market value of only the consortium portfolio can easily be stated to be in excess of USD 10bn. The Company operating under Abu Dhabi Group:

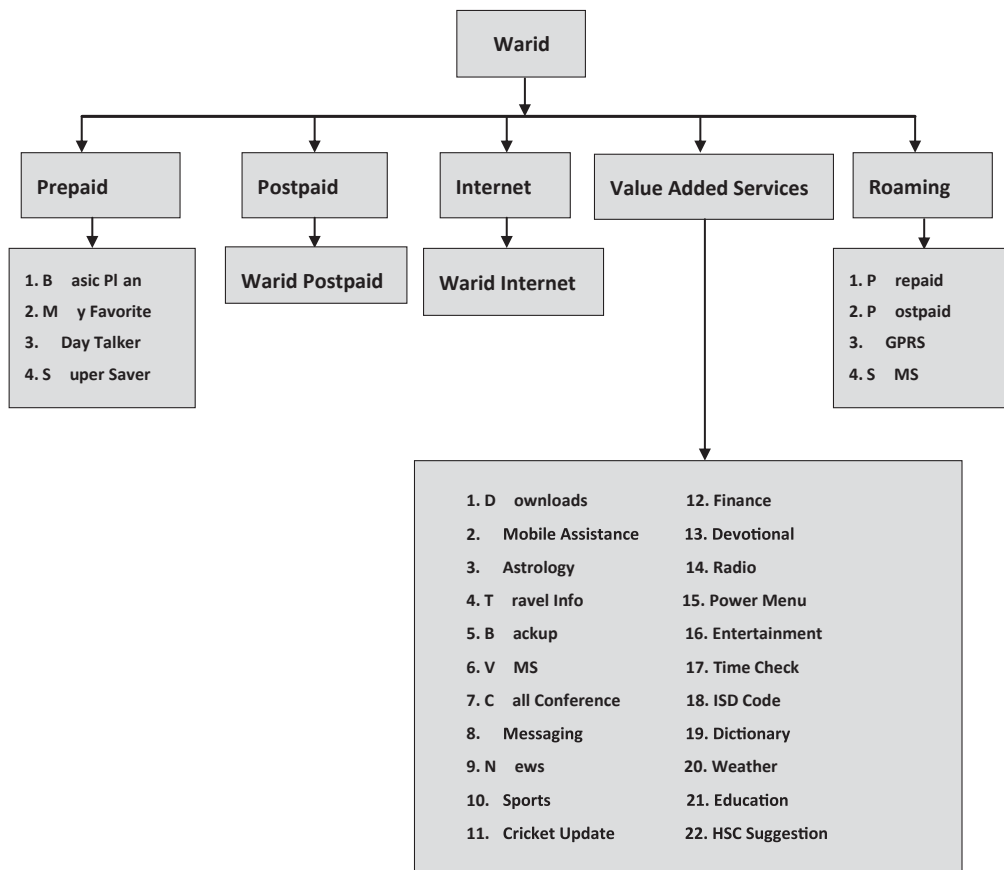
- Warid Telecom International LLC, UAE
- Warid Telecom (Pvt) Limited, Pakistan
- Wateen Telecom (Pvt) Limited, Pakistan
- Warid Telecom International Limited, Bangladesh
- Warid Telecom Uganda Limited, Uganda
- Warid Congo SA, Republic of Congo

Bharti Airtel: 70%

- Have Operation in 22 countries and 3rd LARGEST wireless operator in the world .

- It is one of world’s leading providers of telecommunication services with presence in all the 22 licensed jurisdictions (also known as Telecom Circles) in India, and operations in Srilanka, Bangladesh and recently started operation in Africa.
- Rated as the ‘**Powerful Brand**’ in the Economic Times-Brand Finance ‘Brand Power (the only corporate brand to be awarded the AAA rating).
- Bharti Airtel served an aggregate of 183.37mn customers as of June 30, 2010
- Revenue - USD 2.63bn, EBITDA USD - 947mn EBITDA Margin - 36.9% in the period of 2009-2010.
- Net Profit Margin 13.7%, ROCE 18.4%, ROE 21.3% in the period of 2009-2010
- After acquisition of 70% stake in Warid it is expected that Bharti will enter market with low-priced highly segmented offers .Expected to operate with their signature business model based on low cost and innovation

Exhibit 111 : VAS - Warid



Source: AT Capital Research



Warid Press Highlights

Bharti Airtel up for network expansion

Bharti Airtel, the latest entrant to Bangladesh's telecom market, has inked a deal with global network service providers Ericsson and Huawei to enhance its network capacity. The Indian telecom giant, which entered the Bangladesh market early this year by acquiring a 70 percent stake in Warid Telecom, said the deal will help strengthen its presence in the country through better services.

The agreement between the three parties was formally announced at a press conference at the Westin Dhaka hotel yesterday. High officials from Bharti Airtel, Warid as well as Ericsson and Huawei were present at the event. The partnership, based on Bharti's business and network expansion model in India and Sri Lanka, will ensure that Airtel's mobile network in Bangladesh is ready for 3G (third generation), officials said.

"Two things are now crucial to strengthen our presence in the Bangladeshi market," said Atul Bindal, president of Mobile Services of Bharti Airtel. "One is to ensure better quality of our voice services and the other is to tap the potential demand for non-voice services in the remotest region."

"For example, there is a huge demand for m-commerce, internet and healthcare services through mobile telephony in the rural areas," Bindal said.

<http://www.thedailystar.net/newDesign/news-details.php?nid=157580>

Warid, Citycell to share infrastructure

The Daily Star, Monday, April 12, 2010

Warid and Citycell have teamed up to share infrastructure for mutual benefits. Besides base transceiver stations (BTS), the companies will share towers, poles, transmitter equipment, transmission bandwidth and power. Bangladesh Telecommunication Regulatory Commission (BTRC) issued an infrastructure sharing guideline on September 8, 2008, making such sharing mandatory for all operators. Earlier, the top three operators Grameenphone, Banglalink and Robi signed infrastructure sharing deals separately to minimize the costs of their network expansion in rural areas. Among the six mobile operators, Warid has 3 million customers and Citycell 1.94 million. Mobile operators added 54.15 million customers to their networks at the end of February 2010.

<http://www.thedailystar.net/newDesign/news-details.php?nid=134015>

Bharti explores another acquisition in Bangladesh

The Daily Star, Wednesday, February 24, 2010

Indian telecom giant Bharti Airtel is going to explore another acquisition in Bangladesh after acquiring a 70% stake in Warid telecom. Bharti didn't provide further details about the acquisition. Bharti plans to make an investment of BDT 20.7bn (USD 300mn) for the recently concluded Warid deal in Bangladesh. Earlier this week, Bharti confirmed that it had entered exclusive talks with Kuwait's telco, Zain, for its South African assets. The two groups will be in dialogue until March 26 to set a future course of action.

<http://www.thedailystar.net/newDesign/news-details.php?nid=127637>

Bharti Airtel moves to clear Warid debt

The Daily Star, Monday, February 8, 2010

Bharti Airtel is ready to pay out Warid Telecom's liabilities of BDT 2.31bn (USD 33.5mn) to local financial institutions as part of its investment plan that includes massive network expansion. Warid's new partner presented its investment plans in response to the telecom regulator's orders and said it is ready to start operations in Bangladesh in a month. The company also announced a plan to invest BDT 20.7bn (USD 300mn) initially, which will be increase to BDT 69.0bn (USD 1.0bn) later. BTRC approved the acquisition move asking Bharti to submit its investment plan by February 4, 2010.

<http://www.thedailystar.net/newDesign/news-details.php?nid=125373>

Airtel to carve out own brand in Bangladesh

The Daily Star, Monday, January 18, 2010

Bharti Airtel is set to introduce its own brand in Bangladesh, targeting the youth and rural population in the six-operator mobile market. The brand will be named Airtel. The company, which has already acquired a 70% stake in Abu Dhabi Group's Warid Telecom, plans to localize its branding in Bangladesh, considering the cultural proximity. Earlier, Bharti Airtel said it would inject BDT 20.7bn (USD 300mn) in initial investment to take over a 70% stake in Warid. As per the deal, the transition is going to be completed in the next three months. Warid will issue new shares at a nominal price to hand 70% of its stake to Airtel. Airtel also will bear all of Warid's debt to local banks and other organizations.

<http://www.thedailystar.net/newDesign/news-details.php?nid=122161>

**Bharti Airtel gets green light to buy Warid stake**

The Daily Star, Tuesday, January 05, 2010

The telecom regulator gave a go-ahead on January 04, 2010 to Bharti Airtel's USD 300mn initial investment proposal to buy a 70% stake in Warid, the fourth largest mobile company in Bangladesh. The boss of Bangladesh Telecommunication Regulatory Commission (BTRC) said the Indian telecom giant will take over a 70% stake in Warid by creating new shares. Abu Dhabi Group has so far invested USD 600mn for Warid operations in Bangladesh out of which half of the amount came as foreign direct investment.

Bharti Airtel is one of the Asia's leading providers of telecommunication services with presence in all the 22 licensed jurisdictions in India, and in Sri Lanka. It served an aggregate of 113,439,670 customers as

of September 30, 2009 according to the company website. The company also deploys, owns and manages passive infrastructure of telecom operations under its subsidiary Bharti Infratel Ltd. Bharti Airtel at first expressed interest to invest in Bangladesh's mobile phone market in October 2008 during a meeting with BTRC officials at South Asian Telecommunication Regulators' Council in New Delhi. With the BTRC approval, Bharti Airtel would be the first Indian telecom operator to enter Bangladesh's mobile market to compete with Bangladesh-Norway joint venture Grameenphone, Egypt-based Banglalink, Malaysia-Japan joint venture AKTEL, Bangladesh-Singapore joint venture CityCell and state-run Teletalk.

<http://www.thedailystar.net/newDesign/news-details.php?nid=120538>

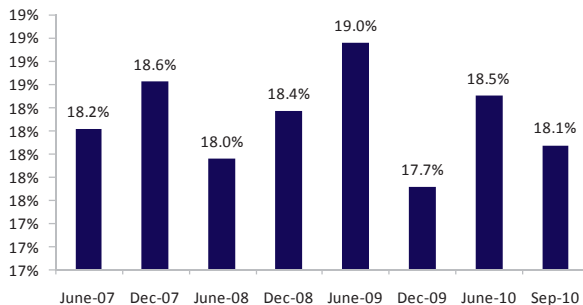


Axiata Bangladesh :

At a glance

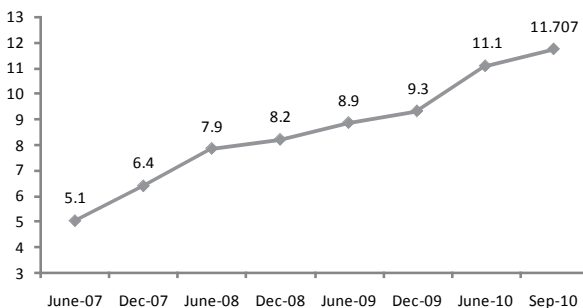
- Axiata (Bangladesh) Limited formerly known as Telecom Malaysia International (BD) Limited is a joint venture between (70%) and NTT DoCoMo(30%).
- It commenced its operation in 1997 under the brand name Aktel among the pioneer GSM mobile telecommunications service providers in Bangladesh. Later, on 28th March, 2010 the company started its new journey with the brand name Robi.
- Robi is the third largest mobile phone operator in Bangladesh in terms of revenue and subscribers (11.7mn as of Sep, 2010).
- Robi (formerly known as Aktel) boasts of the widest international roaming service in the market, connecting over 553 operators across 207 countries.
- Robi covers over 84% of the Bangladesh population and operates in the GSM 900 and 1800 Bands occupying 17.8MHz of spectrum.
- In Q2 2010 revenues were BDT 6.3bn, EBITDA of BDT 2.2 bn and profit after tax was BDT 0.3 bn. ARPU was BDT 190

Exhibit 112 : Market Share (Axiata BD Ltd.)



Source: BTRC, AT Capital Research

Exhibit 113 : Subscribers (mn) Axiata BD Ltd.



Source: BTRC

Overview

- Robi (formerly known as Aktel) launched its operations on the 15 November, 1997 in Dhaka and on 26 March, 1998 in Chittagong.
- Robi was the first mobile operator to connect Tetulia and Teknaf, the northern and southern most points of Bangladesh.
- Robi was formed as a joint-venture between Telekom Malaysia and A.K. Khan Company.
- All along through its inception it was ranked as No.2 mobile operator and was placed far behind the industry leader GrameenPhone in terms of revenue and number of subscribers. Robi (formerly known as Aktel) started investing heavily with funds from Telekom Malaysia (the majority stake owner) on expanding its network in 2001 but the investment was far too inadequate in comparison with GrameenPhone's investment.
- In early 2008 A.K.Khan & Company announced it was selling its 30% stake and Vodafone, etisalat and NTT DOCOMO were among the potential buyers. After months of negotiation NTT DoCoMo sealed a deal with A.K.Khan & Company for USD 350mn on June 2008, valuing the company at around USD 1.2bn. The deal was completed on September 19, 2008.
- It supports 2G voice, CAMEL Phase II & III and GPRS/EDGE service with high speed internet connectivity. Its GSM service is based on a robust network architecture and cutting edge technology such as Intelligent Network (IN), which provides peace-of-mind solutions in terms of voice clarity, extensive nationwide network coverage and multiple global partners for international roaming.
- Robi offers a wide range of value added products and services which include SMS, GPRS, mobile data services, infotainment services, SMS banking, Caller Ring Back Tone, and Ringtones download, Picture Messaging, MMS, Voice Greetings, Call Blocking. It has recently introduced missed call alert service, Radio Robi, Robi goongoon, Song dedication services as well.
- Moody International Bangladesh, the certification body, assessed Robi Quality Management System and acknowledged its passionate concern for quality of process, product and service and it

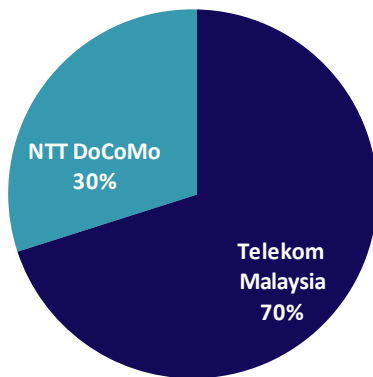


has been re-assessed and rewarded with ISO 9001:2008 certification after complying with all requirements.

- Recently Robi signed a USD 100mn deal with Bangladesh’s third largest mobile operator and Chinese vendor Huawei in order to use their sophisticated technology.
- Subscription growth is CAGR of 20.48% between 2007 & 2009
- 2007 EBITDA affected by USD 21mn fine by telecoms regulator for illegal VoIP operations but after 2007 in 2008 & 2009 it grew rapidly.

- More than 53mn subscribers. 49mn are email/internet users (June30, 2010)
- Revenues of USD 8bn
- Over 23,079 employees
- Its aims to introduce innovative products and services, and leveraging the experience of shareholders NTT DoCoMo and Telekom Malaysia, are a pioneer in introducing 3G services in Bangladesh to accelerate subscriber growth.

Exhibit 114 : Ownership Structure (Robi)



Source: Company Website

Shareholders’ Profile

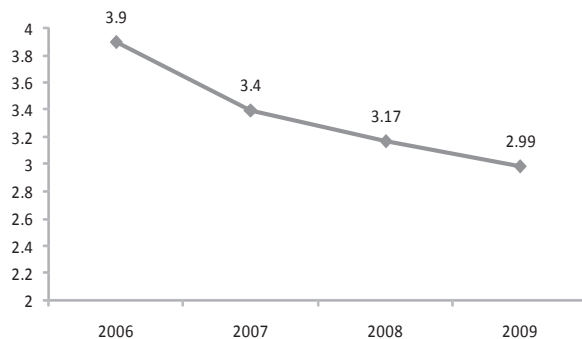
Telecom Malaysia International: Ownership 70%

- An emerging leader in Asian communications, with operations in 10 countries.
- Over 50mn customers in Asia.
- Headquartered in Malaysia
- Listed in Malaysia stock exchange (Bursa Malaysia)

NTT DoCoMo: Ownership 30%

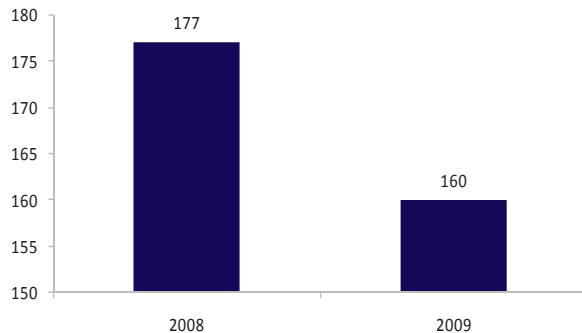
- Operations in 16 in countries
- Headquartered in Japan
- Listed on the Japan, London and New York Stock exchanges

Exhibit 115 : ARPU (USD)



Source: AT Capital Research

Exhibit 116 : MOU



Source: AT Capital Research and annual report

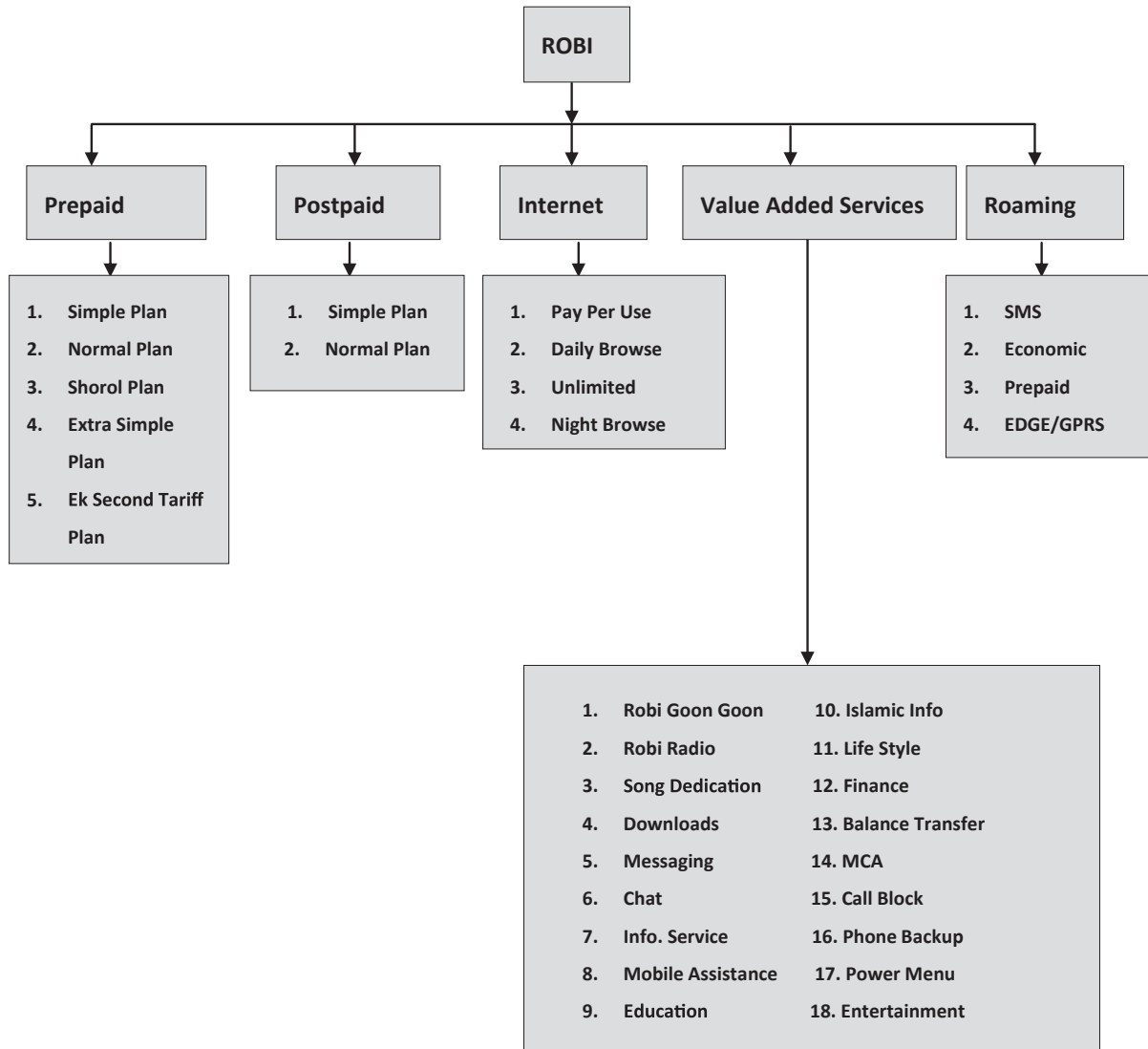
Exhibit 117 : ROBI Earnings Trend

	2005	2006	2007	2008	2009
Revenue(USD mn)	139.0	167.0	210.0	214.0	287.0
Growth (%)	N/A	20.1%	25.7%	1.9%	34.1%
EBITDA(USD mn)	89.0	89.0	63.0	63.0	97.0
Growth (%)	N/A	0.0%	-29.2%	0.0%	54.0%
EBITDA margins (%)	64.0%	53.3%	30.0%	29.4%	33.8%

Source: AT Capital Research



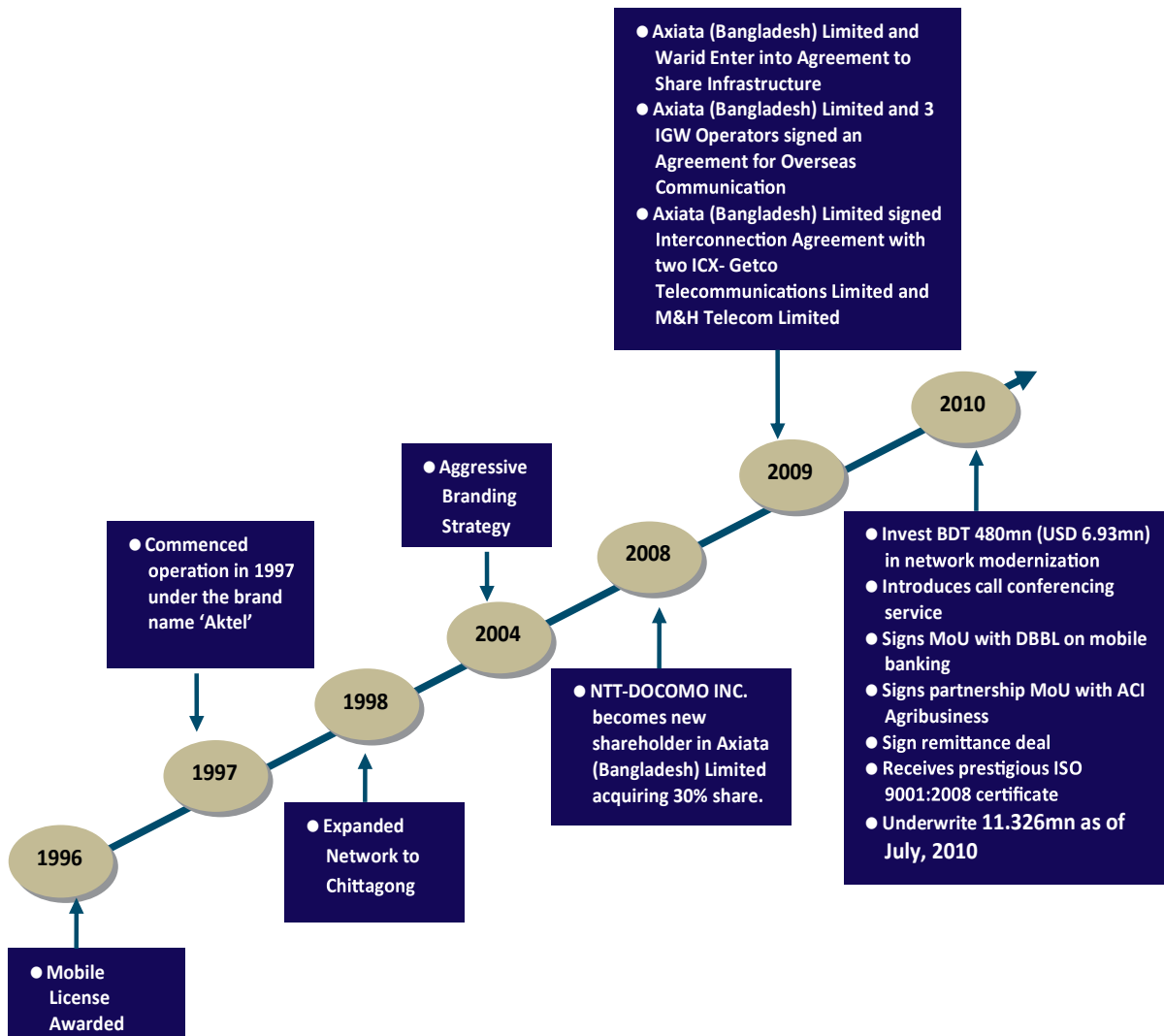
Exhibit 118 : VAS - ROBI



Source: AT Capital Research



Exhibit 119: History ROBI



Source: AT Capital Research

Axiata Press Highlights

Robi profits drop in higher revenues in Q2
The Financial Express, Friday, Aug 27, 2010

Axiata Bangladesh that uses the Robi brand witnessed its profits drop on higher revenues in the second quarter (Q2), an online telecom news portal reported.

Revenues for the quarter (Q2) were BDT 6.26bn (USD 0.09bn), up 37 per cent from BDT 4.58bn (USD 0.066bn) a year earlier, making it Axiata Bangladesh's highest ever quarterly revenue, telecompaper.com quoted. Axiata Bangladesh saw its profit drop 43 per cent to BDT 341mn (USD 4.9mn) from BDT 598mn (USD

8.60mn) in Q2 2009, due mainly to higher depreciation and tax expenses. The operator ended the period with 14.55 million subscribers, up 55 percent year-on-year and 9.0per cent from the first quarter.

Meanwhile, Robi is set to modernize and expand its network across the country. It has already embarked upon a series of programmes to enhance its quality of service, mainly by upgrading its technical resources. In this regard, the company has recently chosen Ericsson to supply and install microwave MINI-LINK transmission system.

http://www.thefinancialexpress-bd.com/more.php?page=detail_news&news_id=110254



Robi signs BDT 6.9bn (USD 100mn) deal with Chinese bank

The Daily Star, Tuesday, June 15, 2010

China Development Bank (CDB), the largest bank for international investment and financing in China, signed a BDT 6.9bn (USD 100mn) deal with Bangladesh's third largest mobile operator Robi and Chinese vendor Huawei on 14th June. Under the terms of a memorandum of understanding, Robi will purchase telecom equipment from Huawei to expand its network and improve mobile services. CDB has already provided loans worth BDT 17.94bn (USD 260mn) to telecom operators in Bangladesh.

<http://www.thedailystar.net/newDesign/news-details.php?nid=142736>

Robi plans infrastructure sharing with Banglalink to cut cost, boost growth

The Financial Express, Monday, June 14, 2010

Robi has planned to share infrastructure with fellow mobile phone operator Banglalink as part of its cost-cutting drive. Together the two companies would have 26mn subscribers, accounting for some 45% of the country's total mobile phone users. Grameenphone has 25mn subscribers. The move is mainly aimed at cutting costs. In February 2010, the two mobile operators tied up with Grameenphone in similar infrastructure sharing deals, which the authorities say was aimed at tapping fast growing rural market.

http://www.thefinancialexpress-bd.com/more.php?news_id=103014&date=2010-06-14

Costly rebranding cuts into Robi's net profit

The Daily Star, Monday, May 31, 2010

High costs of rebranding and subscriber acquisition have cut deeply into the net profits of Robi. The company has reported a 91% decline in net profits to BDT 62mn (BDT 0.9mn) in the first quarter of 2010. The profitability increased to BDT 62mn (USD 0.9mn) in the January-March period from BDT 21mn (USD 0.3mn) in the same period a year earlier. The rebranding campaign increased Axiata's operating costs by 12.3% in the first quarter. Against its total earnings, Robi counted 61.6% in operating costs in the last quarter of 2009. The figure increased to 73.9% in January-March 2010.

<http://www.thedailystar.net/newDesign/news-details.php?nid=140892>

Robi to invest BDT 480mn (USD 70mn) in network modernization

The Financial Express, Tuesday, April 27, 2010

Robi (an Axiata brand) will invest BDT 480 million (USD 70mn) in network modernization and expansion, which will improve its customers' experience when making calls and using wireless internet facilities. The programme is in partnership with Nokia Siemens Networks, which is well known for having a strong mix of technology and delivery experience. It will focus on implementing energy efficient equipment and reduce the use of air conditioners at all levels of the network, particularly in the radio-based station area. Experts estimate with the new energy efficient equipment, it could save 30% of power consumption in its operations.

http://www.thefinancialexpress-bd.com/more.php?news_id=98721&date=2010-04-27

AKTEL rebrands itself as focus shifts to rural market

The Daily Star, Monday, March 29, 2010



Axiata (Bangladesh) Ltd has rebranded itself with a new look by introducing Robi to take its products to the mostly untapped rural market. 'Robi' replaces the earlier brand name of 'AKTEL'. AKTEL, initially a joint venture between Telekom Malaysia and the local AK Khan Group, launched services in 1997 in Bangladesh. Later, the company was renamed Axiata (Bangladesh) Ltd after Japanese NTT DoCoMo bought AK Khan's 30% share in AKTEL in 2008. Axiata is now aiming to localize all of its branding. The word Robi has been chosen as it carries a range of meanings representing the emotional and cultural bonds of Bangladeshis. Bangladesh's total mobile subscriber base was 54.15mn as of February 2010. Grameenphone is the market leader with 23.75mn customers, followed by Banglalink with 14.13mn and Robi with 10.31 million.

<http://www.thedailystar.net/newDesign/news-details.php?nid=132017>

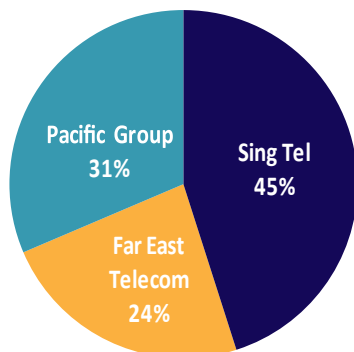


Citycell

At a Glance

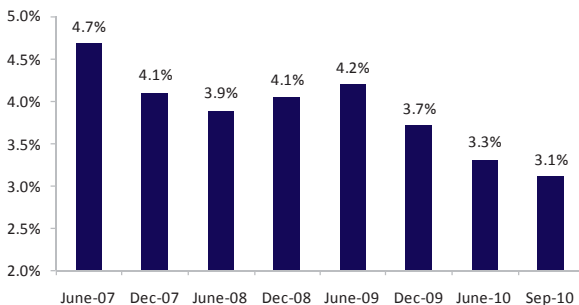
- Only CDMA operator in the market.
- Fifth player in the market with 1.907 mn subscribers and 2.9% market share as of Sep 2010.
- Uses 10MHz of spectrum.
- Ownership Structure:

Exhibit 120 : Ownership Structure (Citycell)



Source: Company Website

Exhibit 121 : Market Share (Citycell)



Source: AT Capital Research and BTRC

Overview

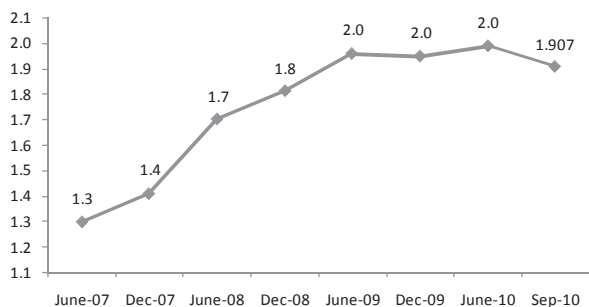
- Citycell, then known as Bangladesh Telecom Limited (BTL), was awarded wireless communications license in 1989. It started operations in 1993 as the first mobile telecoms firm in South Asia using AMPS technology.
- Until 1997, Citycell was the only mobile operator in the country. Since then, its market share has fallen to only 2.9 % as of Sep 2010, due to strong competition and one might argue a lack of strategic focus.
- Citycell shifted from AMPS to CDMA in 1999,

the only CDMA operator in the country. It uses CDMA2000 1X and 10MHz of spectrum. It covers all 64 districts of Bangladesh, although its network quality has been suspect.

Citycell offers a wide range of value added products and services which include SMS, Internet, mobile data services, infotainment services, Caller Ring Back Tone, Ringtones download, Picture Messaging, MMS, Voice Greetings. It is heavily focusing on internet services recently.

- Subscriber CAGR is 17.60% between 2007& 2009.

Exhibit 122 : Subscribers (mn) Citycell



Source: BTRC

Shareholders' Profile:

Citycell (Pacific Bangladesh Telecom Limited) has been converted into a Public Limited Company with effect from 28 March, 2008 in compliance with the Notification No. SEC/CMRRCD/2006-159/Admin-03/23 of Securities and Exchange Commission of Bangladesh. The shareholders of the company are as follows:

- Pacific Motors Limited
- Pacific Traders Limited
- Pacific Industries Limited
- Far East Telecom Limited
- SingTel Asia Pacific Investments Pte Ltd
- SingTel Consultancy Pte Ltd
- Singapore Telecom Paging Pte Ltd

Singtel-Ownership: 45%

- Over 293mn subscribers across Asia Pacific (2010)
- Captured 45.2% of the mobile market of the Asia Pacific market excluding Japan.
- Mobile operations in 7 countries
- Revenues of USD 16.87bn in 2009
- Listed on the Singapore and Australian Stock exchanges.



- Pacific Motors Limited-Ownership: 31.43%
- Far East Telecom-Ownership: 23.57%

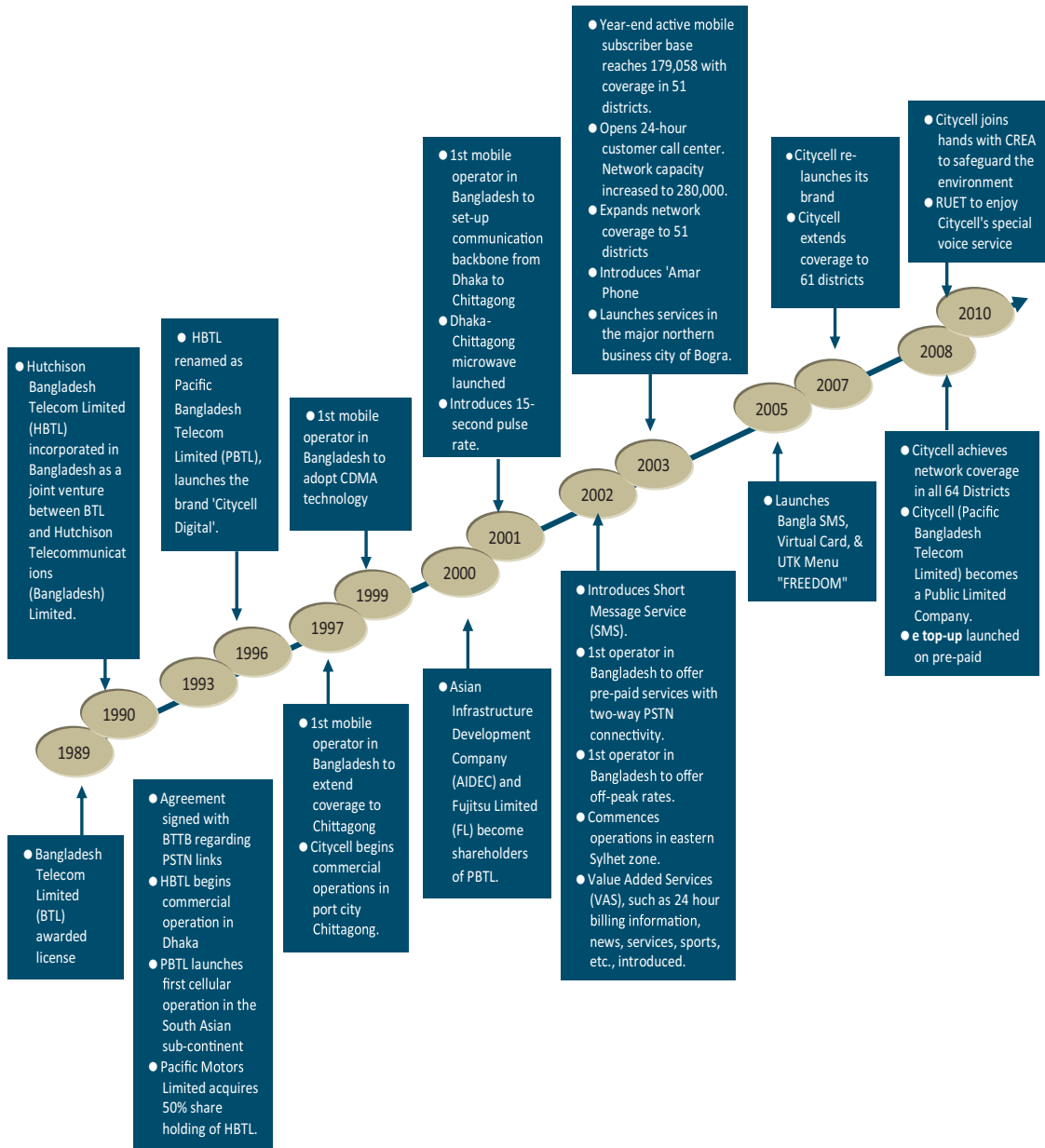
Growth Strategy:

- City cell is heavily focusing on the wireless internet market in order to diversify from its struggling mobile operations.

- With only three 3G licenses expected to be awarded, Citycell is unlikely bid for them.

- The exit strategy of Citycell shareholders would be complicated due to its struggling sales and around USD 350mn of debt.

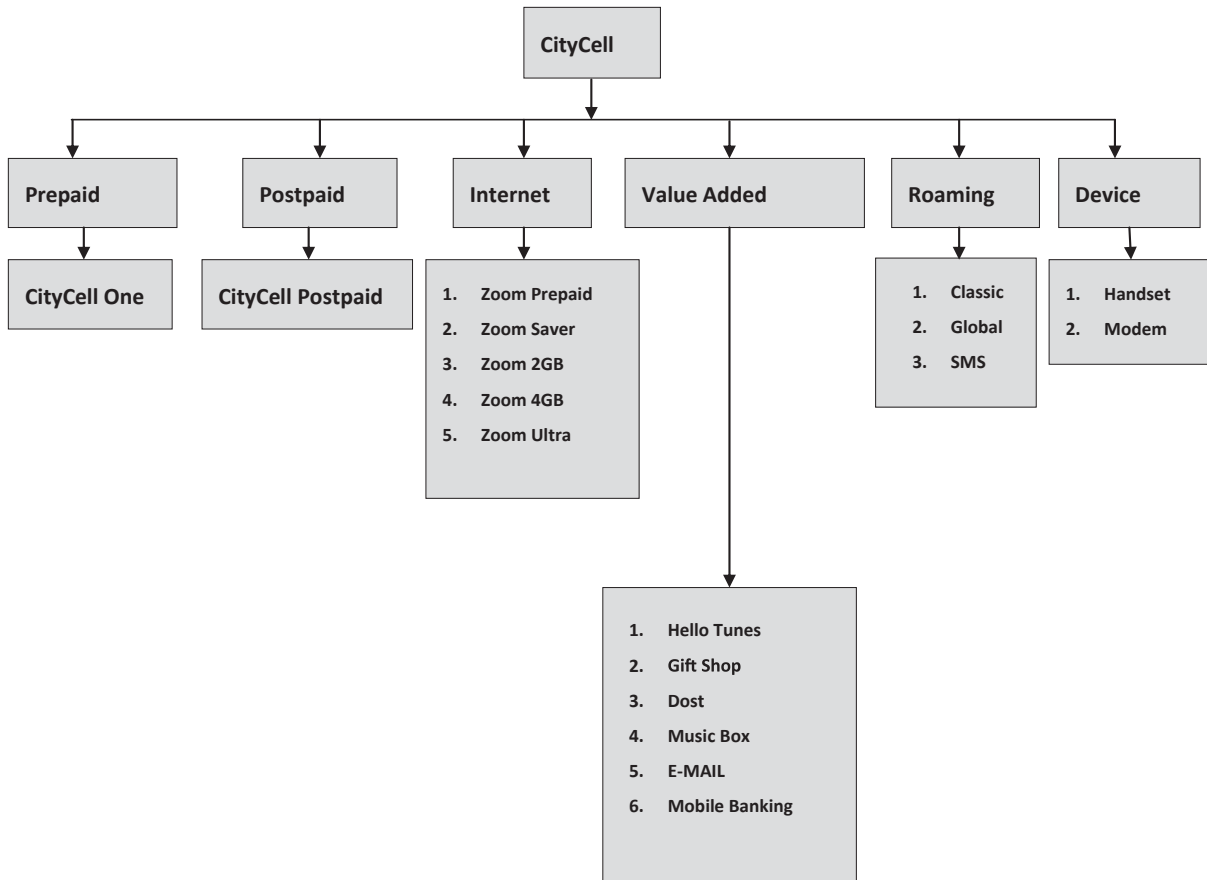
Exhibit 123 : History Citycell



Source: AT Capital Research



Exhibit 124: VAS - Citycell



Source: AT Capital Research

Citycell Press Highlights

Banglalion, Citycell team up

The Daily Star, Tuesday, June 22, 2010

Banglalion Communications Ltd and Pacific Bangladesh Telecom Ltd (Citycell) signed a deal on 21st June to share Banglalion Wimax modems. Working together would enable both companies to share infrastructure, which will reduce costs and help compete as the market will get bigger now. Banglalion also plans to expand to Sylhet and Rajshahi. With Citycell’s support, Banglalion aims to cover all the major cities of Bangladesh by the year-end.

<http://www.thedailystar.net/newDesign/news-details.php?nid=143608>

Citycell takes up joint venture with BIID

The New Age, Tuesday, April 27, 2010

Citycell and Bangladesh Institute of ICT in Development (BIID) have undertaken a joint initiative named Batighar project. This is a social business initiative under Citycell’s Corporate Social Responsibilities umbrella. The objective of this project is to implement the facets of ICT to improve the life of the country’s rural people and encourage developing local entrepreneurship. Key working areas of Batighar project will be agriculture, farmer counseling, SME, telemedicine etc. In doing so, the Batighar project will use various services of Citycell including Zoom Ultra and Citycell Value Added Services.

<http://www.newagebd.com/2010/apr/27/busi.html#19>

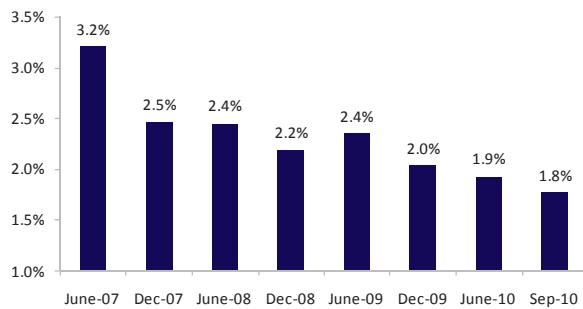


Teletalk

At a glance

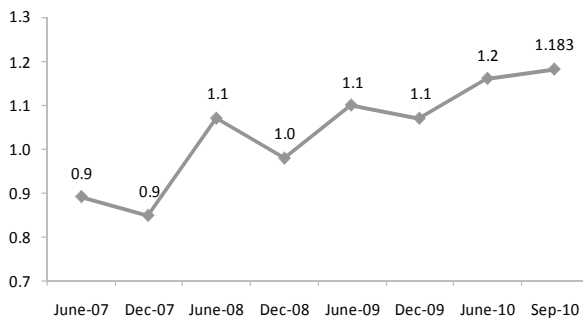
- The smallest player (no-6) in the market with 1.8% share of the market and 1.18mn subscribers (Sep '10)
- Teletalk has already established its network foothold in 64 Districts, 402 Upazilas, and most of the highways. Teletalk is continuing its network expansion to reach more corners of Bangladesh.
- 100% owned by Bangladesh Government.
- Around 500 employees.
- CAGR (Subscribers) is 12.2% between 2007 to 2009

Exhibit 125 : Market Share (Teletalk)



Source: AT Capital Research and BTRC

Exhibit 126 : Subscribers (mn) Teletalk



Source: BTRC

Overview

- It is the only Bangladeshi mobile operator and the only operator with 100% native technical and engineering human resource base.
- Teletalk Bangladesh Limited (the "Company") was incorporated on 26 December, 2004 as a public limited company under the Companies Act, 1994 with an authorized capital of BDT 20,000,000,000 being the only government sponsored mobile

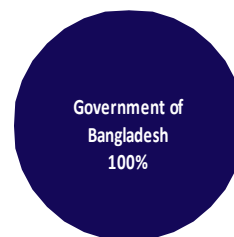
telephone company in the country. On the same day the Company obtained Certificate of Commencement of Business.

- They use GSM 900 technology.
- Teletalk is ready to provide with the help of third party software, mobile interactivity for the citizens of Bangladesh with m-Governance. This may includes, but not limited to
 1. Mobile based Live Citizen Reporting Solution
 2. Mobile User Info bank (Database of Mobile Users of Bangladesh)
 3. Agriculture information services for the farmers and also for the end users, like product price in different parts of the country.
 4. Product ID for all consumer products/Organization.
 5. Interactivity between Government and the Citizens.
- Teletalk, the smallest operator, is planning a public flotation of 25% of the equity.

Teletalk offers a wide range of value added products and services which include SMS, GPRS-EDGE, mobile data services, Push pull services ,VMS(Voice mail services), International SMS, International roaming, Missed call alert, MCBS(Malicious call blocking service), Ringtones download, Picture Messaging, MMS, Teletalk is owned by the state-owned incumbent fixed-line operator, BMI expects that special consideration may be given to the company when it comes to apportioning licenses.

Vietnam's Ministry of Defence-owned operator Viettel is said to be interested in acquiring the operations of Teletalk.

Exhibit 127 Ownership Structure (Teletalk)



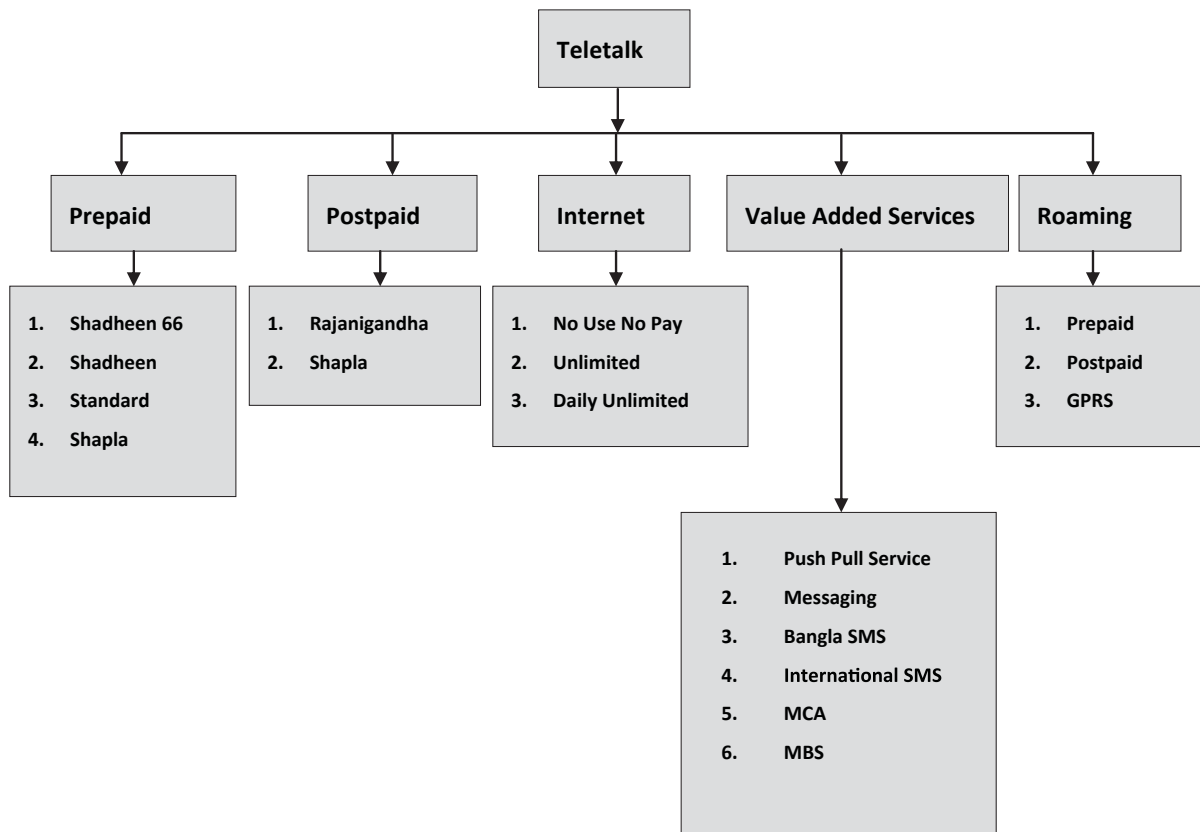
Source: Company website



Growth Strategy:

- It seems likely that Teletalk will be awarded a 3G license (ahead of all other players, significantly) as it is the only state owned telecom company.
- As well as a USD 211mn loan at 2% interest from China to help expand its network in key areas of the country.
- Teletalk Bangladesh Limited is the Mobile phone operator in Bangladesh which is operating 2G GSM and 2.5G GPRS/EDGE Tele-services in Bangladesh and they have a good chance to have 3G license as they are 100% state owned.

Exhibit 128 : VAS - Teletalk



Source: AT Capital Research



Teletalk Press Highlights

The Bangladeshi government is planning a public float of 25% of the equity it owns in struggling cello Teletalk.

The company – the smallest of Bangladesh’s six mobile firms, with 1.1 million customers – has finalized plans for a local listing later this year, telecommunications secretary Sunil Kanti Bose. The IPO could take place within three months, a Teletalk. “We have made all necessary preparations and are waiting the government’s final nod,” he said.

IPO proceeds will be used to upgrade the network to 3G, said the official. Teletalk is angling for 1.5 million 3G subscribers and 4 million 2.5G subscribers in two to three years. “We need to invest at least \$260 million to launch 3G telecom services in the country,” said the Teletalk source.

“We hope [a] direct listing of the company would raise a significant amount of that [funding].” The remaining 3G funding could come from a loan from China’s Exim Bank, New Nation reported.

The IPO plans come on the heels of Orascom Telecom-controlled Banglalink successfully raising USD 102mn in the country’s largest corporate bond offering. Axiata

Bangladesh, which owns Bangladesh’s third largest operator Robi (formerly Aktel), is also gearing up for a local IPO amid a pent-up demand for telecom stocks in Bangladesh.

The biggest operator, Telenor-backed GrameenPhone, was the first to jump on the IPO bandwagon, raising USD 140mn late last year. Wateen has more than 150,000 broadband users, mostly Wimax customers, as well as 12,000 fiber optic customers.

China agrees to offer BDT 14.6bn (USD 211mn) for Teletalk upgrade

The Daily Star, Friday, January 15, 2010

China has agreed to provide BDT 14.6bn (USD 211mn) as a soft loan to state-run mobile operator Teletalk to develop its upcoming 3G (third generation) networks. The loan agreement will be signed at the state level. The Chinese government will provide the loan through China Exim Bank at a 2% interest rate in the next two years, and the loan repayment time might be 20 years in line with discussions. However, under the possible agreement, Teletalk will have to import all equipment for its 3G-expansion project from China-originated vendors, while CMEC will have the authority to select the vendors. BTRC is now working to prepare the final guideline for 3G spectrums. The 3G-spectrum auction is expected to take place by June this year.

<http://www.thedailystar.net/newDesign/news-details.php?nid=121913>



Chapter - 09

Telecoms Infrastructure Sharing

- Infrastructure sharing has become a bigger focus for the Bangladesh market given recent agreements between GP, Banglalink, Robi, Warid and Citycell. A recent report from Cap Gemini analyzing the Indian market experience in this area provides valuable insights for Bangladesh and in this chapter of the report, we draw heavily from their analysis (*“Mobile Tower Sharing and Outsourcing: Benefits and Challenges for Developing Country Operators”*)
- Infact, CityCell and Aktel (Now Robi) have shared respective site and towers since 2003, which was the first of infrastructure sharing initiative in the industry. CityCell and Warid have shared respective site and towers since June 2008 and the BTRC had issued the “Guidelines for infrastructure sharing” on September 8, 2008
- Tower sharing helps in spurring competition due to a reduction of entry barrier for new operators. More importantly, from a regulatory perspective, like in the case of India, the pooling of tower infrastructure helps operators expand into rural markets achieving the objectives of universal coverage, while ensuring that operators do not incur significant CAPEX in doing so.
- Tower sharing and outsourcing agreements between mobile operators and tower companies offer both OPEX and CAPEX benefits for incumbents and new entrants depending on the sharing model.
- In India, according to CapGemini estimates, operating costs associated with the running and maintenance of tower infrastructure, like diesel generators, air-conditioning equipment, and security and site rentals, form a significant portion (nearly 60%) of operator OPEX.
- These costs are compounded in rural areas due to limited infrastructure facilities such as roads and a steady supply of electricity.
- Also a trend seen in India is establishing a separate tower company that helps incumbents to unlock the inherent value of their physical infrastructure. Forming independent tower companies that attract additional tenants can aid operators to generate additional revenues, thereby creating value from an otherwise depreciating asset.
- While tower sharing and outsourcing offer significant advantages to operators, the initiative is not without its disadvantages. Operators face a host of challenges, some strategic and some operational, in driving the full benefits of tower sharing. Key strategic challenges include likely loss of competitive differentiation and erosion of control, while operational challenges revolve around day-to-day coordination and planning.
- Regulators also need to ensure that the high demand in developing markets does not lead to unrealistic pricing of tower services. Regulators would need to ensure presence of an effective costing mechanism that would encourage uptake while simultaneously allowing existing operators to recoup investments.



Overview

Infrastructure sharing has become a bigger focus for the Bangladesh market given recent agreements between GP, Banglalink, Robi, Warid and Citycell. In fact, CityCell and Aktel (Now Robi) have shared respective site and towers since 2003, which was the first of infrastructure sharing initiative in the industry. CityCell and Warid have shared respective site and towers since June 2008 and the BTRC had issued the “Guidelines for infrastructure sharing” on September 8, 2008. A recent report from Cap Gemini analyzing the Indian market experience in this area provides valuable insights for Bangladesh and in this chapter of the report, we draw heavily from their analysis (see “Mobile Tower Sharing and Outsourcing: Benefits and Challenges for Developing Country Operators”).

Operators across the world, particularly so in developing markets, face challenges in sustaining margins with declining ARPU. Population distribution patterns in developing markets complicate the situation since access to telecom services vary significantly between urban and rural areas. Operators in these countries need to balance the cost of operations in congested and saturated urban setups with the costs of new network rollouts in other areas. In this context, tower sharing offers a compelling proposition for savings costs and reducing time-to market. Estimates indicate that towers constitute almost 50% of the total capital expenditure (CAPEX) for an operator.

Mobile operators have typically followed a phased approach when it comes to the adoption of tower infrastructure sharing/outsourcing initiatives. Figure 146 illustrates these approaches along with examples of operators in developing markets who have implemented them.

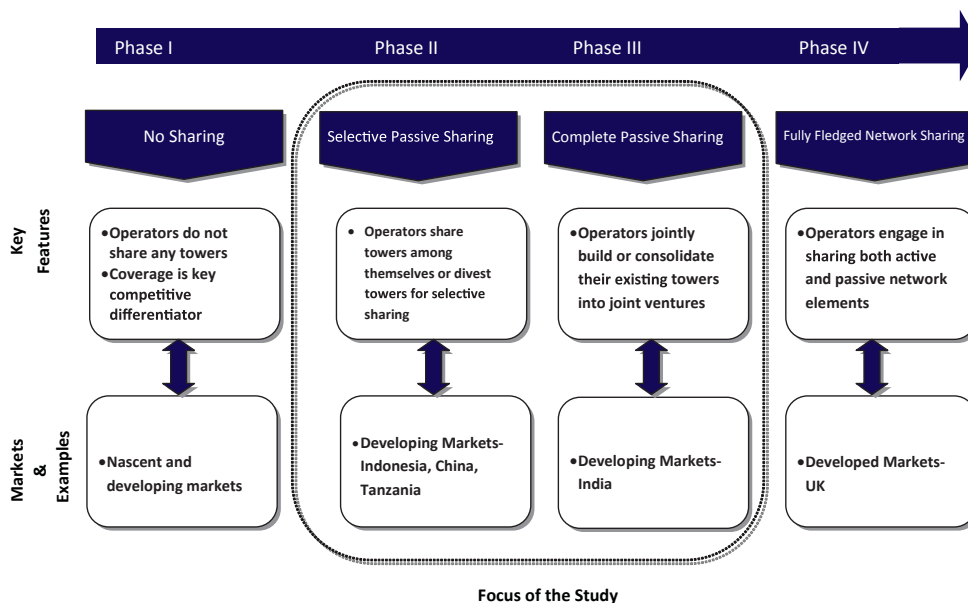
Regulation

Tower sharing has largely been an operator-led initiative in most developing markets. However, regulators have also played a significant part in ensuring uptake of tower sharing initiatives. Tower sharing prevents the proliferation of masts thereby reducing the environmental and visual impact of operator networks especially in urban and ecologically sensitive areas.

Exhibit 129 show the evolution cycle of network assets ownership, depicting the scope for tower sharing and outsourcing in developing markets.

In emerging markets with low penetration levels, operators are faced with the dual challenge of maintaining margins, while ensuring rapid rollout to keep pace with the growth in subscriber numbers. In such locations, cost savings from tower sharing and outsourcing offer a compelling proposition for operators. Estimates indicate that tower sharing

Exhibit 129: Evolution Cycle of Network Asset Ownership



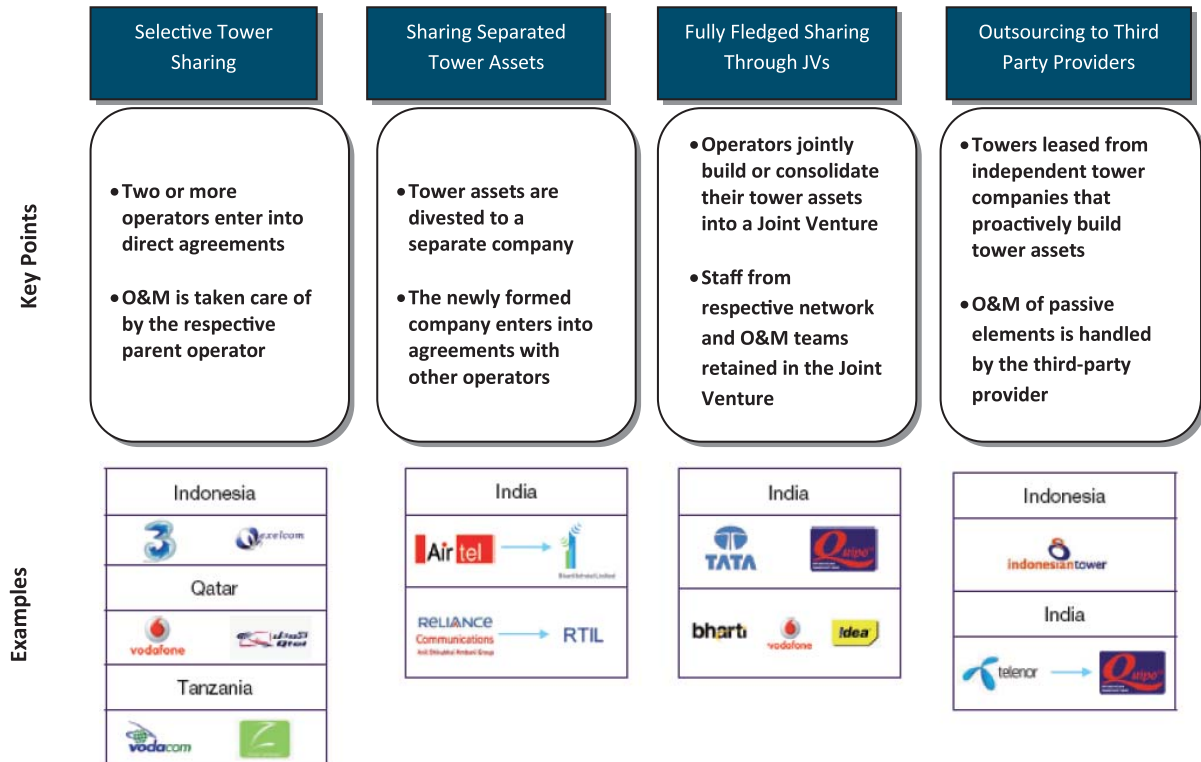
Source: Capgemini TME Lab Analysis



could help operators in India and the Middle East achieve total savings of US\$4 billion and US\$ 8 billion respectively in the next five years. Such savings result from the benefits of having reduced capital expenditure (CAPEX) and operating expenditure (OPEX).

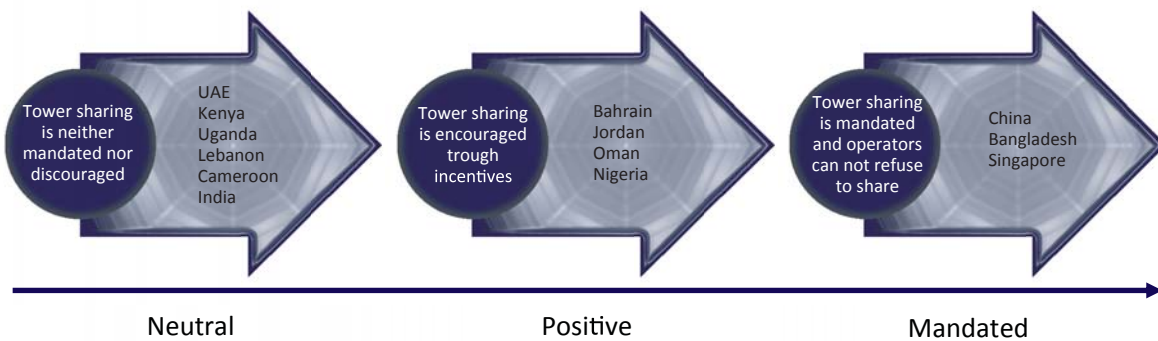
Tower sharing also helps in spurring competition due to a reduction of entry barrier for new operators. More importantly, from a regulatory perspective, like in the case of India, the pooling of tower infrastructure helps operators expand into rural markets achieving the objectives of universal coverage, while ensuring that

Exhibit 130: Overview of Approaches to Sharing Passive Infrastructure



Source: Capgemini TME Lab Analysis, Company websites

Exhibit 131 : Snapshot of Regulatory Stance on Tower Sharing in Developing Markets 2008



Source: Capgemini TME Lab Analysis



operators do not incur significant CAPEX in doing so.

Given these benefits, regulators in developing markets have taken various steps to encourage their adoption. Figure 131 shows the regulatory stance adopted by regulatory authorities in various developing countries.

Benefits of Tower Sharing/Outsourcing

Tower sharing and outsourcing agreements between mobile operators and tower companies offer both OPEX and CAPEX benefits for incumbents and new entrants depending on the sharing model (see Exhibit 132).

Exhibit 132: Benefit of Tower Sharing & Outsourcing Under Different Models

Operating Model	Benefits to Incumbent	Benefits to New Entrant
Selective Tower Sharing	<ul style="list-style-type: none"> Reduction in OPEX. Helps plug network inadequacies, especially in urban areas. 	<ul style="list-style-type: none"> Not applicable since new entrant does not have any asset to share.
Sharing Separated Tower Assets	<ul style="list-style-type: none"> Savings through removal of depreciation costs. Transfer CAPEX to OPEX. Unlocks latent value by opening up equity. 	<ul style="list-style-type: none"> Not applicable to new entrants/Greenfield operators.
Fully Fledged Sharing Through Joint Ventures	<ul style="list-style-type: none"> Savings through reduced O&M costs. Creates high entry barriers for other competitors. 	<ul style="list-style-type: none"> Helps cut down on CAPEX costs.
Outsourcing to Third-party Providers	<ul style="list-style-type: none"> Similar savings potential as a joint venture model. 	<ul style="list-style-type: none"> Lower CAPEX with slightly increased OPEX. Ensure quicker time-to-market.

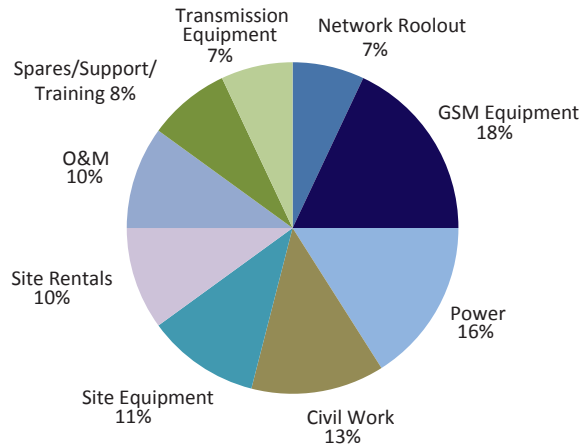
Source: Capgemini TME Lab Analysis

Benefits of Tower Sharing for Incumbent Operators

Reduction in OPEX

Operating costs associated with the running and maintenance of tower infrastructure, like diesel generators, air-conditioning equipment, and security and site rentals, form a significant portion (nearly 60%) of operator OPEX (see Figure 133). These costs are compounded in rural areas due to limited infrastructure facilities such as roads and a steady supply of electricity. For instance, in India the operational costs per tower have been estimated by analysts to increase by up to 20% in remote inaccessible terrain.

Exhibit 133: Breakdown of Tower Expenses, Capex+Opex as % Total Cost, Typical site 2008



Source: Nortel

For incumbent operators, sharing their existing tower assets helps in reducing the cost of network operations significantly. For instance, in the MEA region, it is estimated that tower sharing with a tenancy ratio of two would enable operators to achieve an annual tower OPEX reduction of 12-15% resulting in savings of US\$1 billion. In India, where tower sharing has seen significant traction, some operators have been able to bring down the cost of network operations by over 40% in the previous year through sharing arrangements, mainly in urban areas.

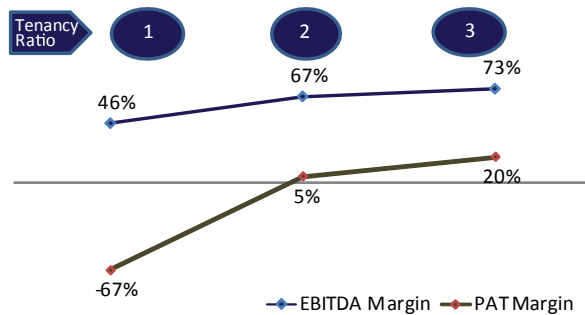
Unlocking Value from Existing Assets

Establishing a separate tower company helps incumbents to unlock the inherent value of their physical infrastructure. Forming independent tower companies that attract additional tenants can aid operators to generate additional revenues, thereby creating value from an otherwise depreciating asset. With incremental operating costs being low, additional tenants on towers lead to very high margins

(See Exhibit 134). In developing markets the tenancy ratio per tower ranges between 1.1 and 1.3 compared to 2.2 -3.0 in developed markets such as the US12. Our estimates indicate that a typical breakeven tenancy ratio per tower site in developing markets of Asia, Middle East and Africa is 1.5. Furthermore, the valuation of a separate divested tower entity significantly impacts the valuation of the parent operator. For instance, in India, tower subsidiaries of incumbents like Reliance Communications (13,000 towers) and Bharti Airtel (39,281 towers) have witnessed valuations of US\$5.5 billion and US\$8.5 billion respectively after divesting in 2007. They contributed 10% and 12.5% to their respective parent company core valuation.



Exhibit 134: Impact of Tenancy Ratio on EBITDA & PAT of Tower Company



Source: Capgemini TME Lab Analysis, Asian Operators Data

Benefits of Tower Sharing and Outsourcing for New Entrants

Reduced Time--to--Market

Installation of cell sites is an expensive, complicated and labor-intensive process as there are a number of municipal clearances and government approvals required.

For greenfield operators, partnerships in the form of joint ventures and sharing agreements with incumbent operators and tower companies are particularly attractive as they help reduce time to market significantly. For instance, in the Caribbean island of Panama, towards the end of 2008, following a request from the regulator, the incumbent operator América Móvil closed a tower sharing deal with new entrant Digicel in two weeks.

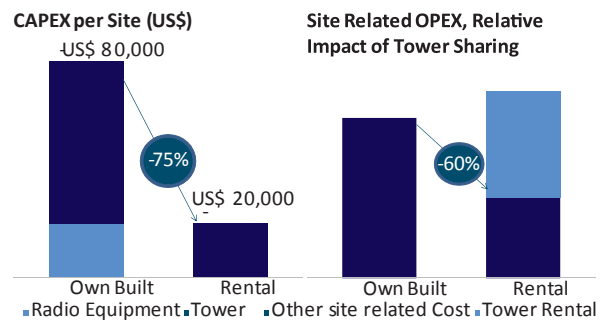
Challenges and Risks

From an economic and operational point of view, tower sharing is a complex process requiring synchronization between the sharing parties on multiple strategic and operational issues. In this section, we examine the potential challenges stemming from passive tower sharing/outsourcing agreements.

Operator Challenges

While tower sharing and outsourcing offer significant advantages to operators, the initiative is not without its disadvantages. Operators face a host of challenges, some strategic and some operational, in driving the full benefits of tower sharing. Key strategic challenges include likely loss of competitive differentiation and erosion of control, while operational challenges revolve around day-to-day coordination and planning (see Exhibit 136).

Exhibit 135: Impact on Telenors’s CAPEX & OPEX with Tower Outsourcing



Source: Telenor, Telenor Entering India, February 2009

Erosion of Competitive Differentiation

The biggest challenge for operators in striking sharing and outsourcing deals is to find the right balance between competition and cooperation. Sharing a network could likely lead to significant losses in opportunity to compete on the basis of network quality and coverage for incumbents whereas a standalone approach may prove detrimental to the cost structure in the long run. Operator fear of erosion of competitive advantage due to tower sharing recently came to the fore in Canada.

Despite the regulator mandating tower sharing under reasonable circumstances, the incumbents have been extremely reluctant to share their towers with a new entrant in the market.

Loss of Strategic & Operational Flexibility

Alignment on a mechanism for identification of potential cell sites, cost-sharing mechanisms and the creation of a governance model will prove challenging in a joint venture between multiple operators. Furthermore, agreement on operational priorities, co-ordination between operations teams and overcoming technological implementation issues will also act as hurdles given the differing operational models and targets involved.

The long-term nature of sharing agreements holds the possibility of a substantial loss in operational and financial flexibility. For instance, the typical tenure for agreements in India is fifteen years as in the case of Swan Telecom (Etisalat) and Reliance Communications owned RTIL20 and in some cases as long as twenty years as with that of Telenor with Quippo and Tata Teleservices²¹. Such long lockin periods may heighten tenant risks in terms of restricting the ability to adapt to changing market and regulatory conditions.



Risk off Information Sharing

For new entrants, entering into agreements with incumbent-owned tower companies is fraught with the risk of possible leakage of critical business information to the parent company. With sharing of staff as well as operational templates, company specific information which may be proprietary to the tenant may end up with the parent operator potentially compromising the efficacy of business decision making.

Regulatory Challenges

The primary challenge for regulators lies in the prevention of cartels and anticompetitive behaviour. Incumbent operators may get into agreements which

in effect could create duopoly environments that keep out new entrants. Regulators also need to ensure that the high demand in developing markets does not lead to unrealistic pricing of tower services. Regulators would need to ensure presence of an effective costing mechanism that would encourage uptake while simultaneously allowing existing operators to recoup investments.

Furthermore, regulators need to strike a balance to ensure that regulatory levies and taxes do not disincentives the industry. Regulators would need to set up arbitration mechanisms to resolve compliance related issues and disputes among operators that flow from setting up complex tower sharing agreements.

Exhibit 136: Challenges in Tower Sharing & Outsourcing

Operating Model	Challenges facing Incumbent	Challenges facing New Entrant
Selective Tower Sharing	<ul style="list-style-type: none"> • Risk of competitive counteraction. • Erosion of competitive differentiation. • Operational coordination. 	N/A
Sharing Separated Tower Assets	<ul style="list-style-type: none"> • EBITDA dilution. • Regulatory risks. • Identification of prospective tenants. 	N/A
Fully Fledged Sharing Through Joint Ventures	<ul style="list-style-type: none"> • Loss of strategic control and flexibility. • Exit agreements. • Reduced control. • Regulatory risks. 	<ul style="list-style-type: none"> • Loss of strategic control and flexibility. • Stake valuation • Reduced control. • Regulatory risks.
Outsourcing to Third-party Providers	<ul style="list-style-type: none"> • Loss of strategic and operational flexibility. • Reduced control and lack of equity participation. 	<ul style="list-style-type: none"> • Confidentiality. • Long lock-in periods. • Reduced control and lack of equity participation.

Source: Capgemini TME Lab Analysis



Chapter - 10

Telecoms Primer

- In the past, operators focused on networks, where there was an exclusivity of supply, and outsourced industry R&D to equipment manufacturers (i.e. Nokia, Ericsson etc), and distribution to third parties (eg Carphone Warehouse in the UK)
- In the modern world network exclusivity is disappearing as the equipment manufacturers increasingly look to manage, and even own infrastructure, and other media operators and upstarts, such as Google, are entering the distribution place.
- In order to respond telecom operators are investing more in R&D to deliver new products and are seeking to take control of distribution channels, both on-line and on the high street, and finally are investing in brand and market segmentation to more appropriately target the consumer.
- With growth slowing and developed markets in the maturity phase of development new product innovations, which could be additional services and products that exploit existing infrastructure or open up new market environments, are required, such as telecoms operators offering TV services
- Over the past 15 years the technology has moved from traditional analogue mobile telephony to 2G (which is the most prevalent today) and is slowly moving to 3G. The switch between 1G and 2G was mostly the move to digital technology, which offers encryption and greater security, and 3G is a move to greater bandwidth.
- The 3G idea is based on higher data speeds and advances in mobile computing allowing for a much richer mobile experience than 2G. One early application has been in providing mobile internet access for laptop users, with the speed of the 3G network allowing business users to access office networks and the internet at close to office speeds.
- On the consumer side, mobile phones themselves have been greatly enhanced for 3G. The new handsets usually offer high-resolution colour screens and built-in digital cameras, as well as greatly increased processing power.
- 3G technology will enable service providers to offer enhanced inter-user services such as video-messaging and video-calls, priced at a premium to voice calls. It is also hoped that users will pay to access multimedia content, for which revenues will be shared with content providers. Content thus far has included more sophisticated games (including 3D graphics and online gaming); and video clips, such as music videos and short segments of news, comedy, or weather reports.



Overview

This section draws heavily on “ Telecoms for Beginners” An Industry and Technology Primer” by Peddy, Bloxham and Jenkins, Deutsche Bank Equity Research, 2007

The telecom sector can appear confusing: the stakeholders are many and often have contradictory objectives. Balancing government/political designs, huge employee numbers, an increasing competition without limiting investment in an environment of technological evolution and substitution, can appear overwhelming. However, fundamentally the drivers of telecom business models are simple: penetration, customers and ARPU whilst balancing investment levels.

Evolving value chain

One of the major drivers of the current change in the cycle is the revolution in the structure of the European

telecom value chain. In the past, operators focused on networks, where there was an exclusivity of supply, and outsourced industry R&D to equipment manufacturers (i.e. Nokia, Ericsson etc), and distribution to third parties (such as Carphone Warehouse in the UK) and this meant that the consumer relationship was minimal.

In the modern world network exclusivity is disappearing as the equipment manufactures increasingly look to manage, and even own infrastructure, and other media operators and upstarts, such as Google, are entering the distribution place. In order to respond telecom operators are investing more in R&D to deliver new products and are seeking to take control of distribution channels, both on-line and on the high street, and finally are investing in brand and market segmentation to more appropriately target the consumer.

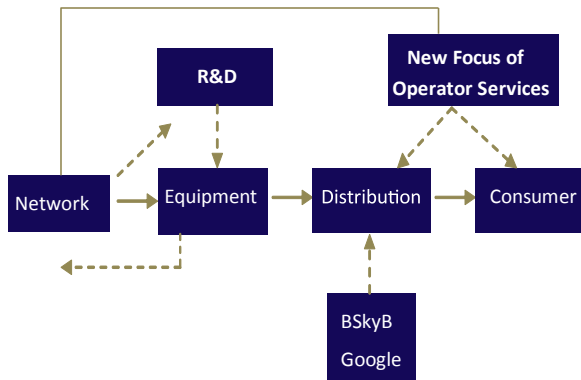
Exhibit 138 : Possible Application of Michael Porter’s Five Forces into the Telecoms Space



Source: Deutsche Bank



Exhibit 137: The Evolving Telecom Value Chain



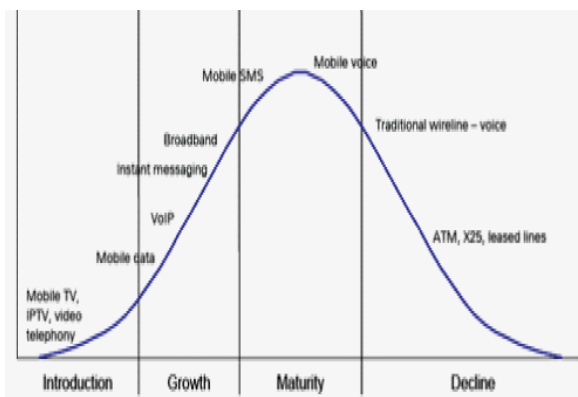
Source: Deutsche Bank

Usage drivers: New product innovation

Average revenue per user (ARPU) is one of the most common measures of customer value in the telecoms world, especially in the mobile environment. It is most often driven by usage, either with an incremental pricing-based model (i.e. a charge is incurred for every call made) or through a bundle (i.e. a flat rate package with specified or unlimited usage).

With growth slowing and many markets in the maturity phase of development new product innovations, which could be additional services and products that exploit existing infrastructure or open up new market environments, are required. In following exhibit 139 we flag where we believe different products/services currently are in the product life cycle and we highlight the maturity of the leading revenue streams (mobile voice and traditional wireline). There are however new services and products that offer hope for the future, such as telecoms operators offering TV services.

Exhibit 139: European Telecoms Product Life Cycle



Source: Deutsche Bank

However, it should be noted that there is balance between those new services that are substitutionary and those that are revolutionary products. A substitutionary product merely deflates existing pricing whereas a revolutionary product opens up a new segment to the market that is incremental (i.e. the mobile phone). In following Figure we have attempted to show which products and services are substitutionary to existing offers and which are revolutionary products. For those that are substitutionary, we have listed which other business areas have they affected.

Exhibit 140: Classifying New Products & Services

Product/ Services	Categorization	Affected Business
Mobile Voice	Revolutionary	
Mobile SMS	Revolutionary	
Mobile Data	?	
Broadband	Substitutionary	Traditional Wire line Access (PSTN & ISDN)
VoIP	Substitutionary	Wire line & Mobile Voice
Instant Messaging	Substitutionary	Email, SMS, Voice
Mobile TV	Revolutionary	
IPTV	Substitutionary	Traditional TV (Terrestrial, Cable, Satellite)
Video Telephony	Substitutionary	Wire line & Mobile Voice

Source: Deutsche Bank

Telecoms over the ages: Pre-1980

Before Alexander Graham Bell, the Scotland born scientist and inventor, widely considered to be the father of the telephone, communication was a haphazard affair, and was carried out using basic tools such as paper, couriers, noise, carrier pigeons, beacons, semaphore and flags.

With developments in electronic communications and with advances in cable technology, networks were developed. Initially these were local area networks, but then national and international connections were made that facilitated long distance communication. Originally, most national calls were switched manually by operators but in the 1960s there was the first international direct-dial call between the UK and USA.



Transatlantic services started in 1927 using two-way radio, but the first trans-Atlantic telephone cable was laid in 1956, with TAT-1, providing 36 telephone circuits. The first experimental satellite was commissioned in 1962 (Telstar 1). With the laying of TAT-8 in 1988, the 1990s saw the widespread adoption of systems based around optic fibres, which introduced a 10-fold increase in capacity, which has since been expanded by many multiples again.

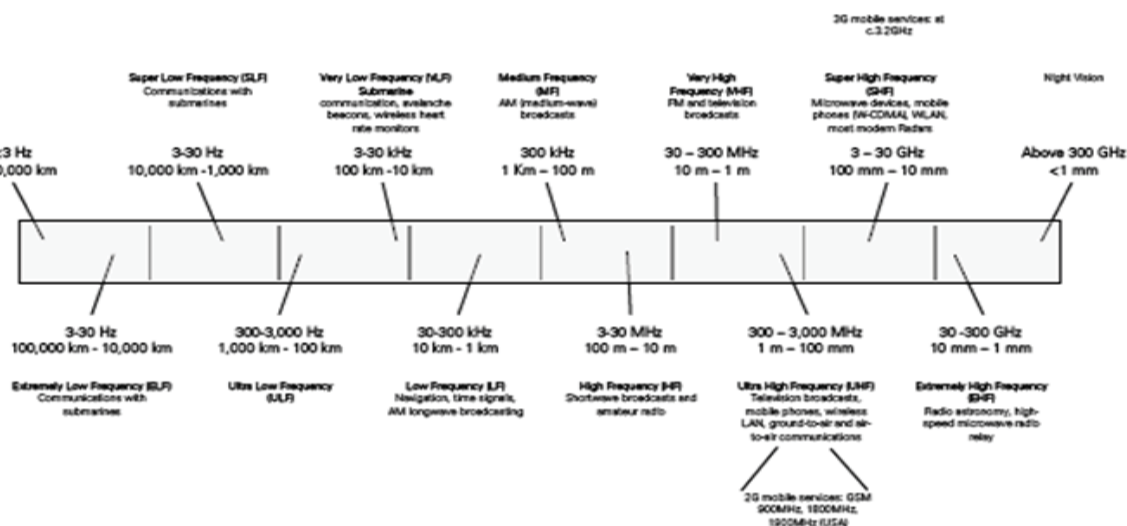
In Europe, telecoms was deemed a “philanthropic” investment predominately lead by governments and often combined with the national postal operators (therefore building a complete communication monopoly). Indeed, before the privatisation wave of European telecoms in the 1990s most governments had to separate out into different legal entities the telecommunications business from the post office. Indeed in some countries such as Austria, the post office still owns most of the property that houses the telecoms operators’ switches.

Exhibit 141: A History of Transatlantic Cable

Cable Name	Date(s)	Initial No. of Channels	Final No. of Channels	Western End	Estern End
TAT-1	1956-1978	36	48	Newfoundland	Scotland
TAT-2	1959-1982	48	72	Newfoundland	France
TAT-3	1963-1986	138	276	New Jersey	England
TAT-4	1965-1987	138	345	New Jersey	France
TAT-5	1970-1993	845	2,112	Rhode Island	Spain
TAT-6	1976-1994	4,000	10,000	Rhode Island	France
TAT-7	1978-1994	4,000	10,500	New Jersey	England
TAT-8	1988-2002	40,000	.	USA	France
TAT-9	1992-2004	80,000	.	USA	Spain
TAT-10	1992-2003	2x565 Mbit/s	.	USA	Germany
TAT-11	1993-2003	2x565 Mbit/s	.	USA	France
TAT-12/13	1996	12x2.5 Gbit/s Transatlantic	.	USAx2	GB, FR
TAT-14	2000	64x10 Gbit/s Transatlantic	.	USAx2	GB, FR, NL, D, DK
CANTAT-1	1961-1986	80	.	Newfoundland	Scotland
CANTAT-2	1974-1992	1,840	.	Nova Scotia	England
CANTAT-3	1994	2x2.5 Gbit/s	.	Canada	Europe
PTAT-1	1989	3x140 Mbit/s	.	US-Bermuda	Ireland-UK

Source: Deutsche Bank & Wikipedia

Exhibit 142: The Frequency Spectrum



Source: Deutsche Bank



In the USA, AT&T was formed through the amalgam of different geographically diverse US telecoms companies and it was not until the 1920s that the concept of universal services was developed. In the Boston Consulting Group matrix relative development of European and US telecoms is highlighted. In 1980, with penetration growth slowing, the industry was deemed “utility like” and, as can be seen, was a relatively simple. Indeed, the fax machine was deemed a revolution in the industry in the mid-1970s as it stimulated demand for incremental lines and volumes. It was also the first mover of the telecoms industry outside voice, and it started to challenge the postal services as a distributor of hard copy information. It was also the first move to immediacy.

Technology: Mobility

Wireless Calling. Cellular systems are engineered so that a service area is divided into multiple cells approximately one to five miles in radius. Each cell contains a relatively low power transmitter, a receiver, and signaling equipment — the base station. The base station in each cell is connected by microwave or telephone line to the mobile telephone switching office (MTSO), which is connected to the landlines. This is similar to a local carrier’s central office. The MTSO controls the automatic transfer of calls from cell to cell as a subscriber travels, coordinates calls to and from a mobile unit, allocates calls among the cells within the system, and connects calls to the local landline telephone system or to a long distance telephone network. Each conversation in a cellular system involves a radio transmission between a subscriber unit and a base station, and between the base station and the MTSO.

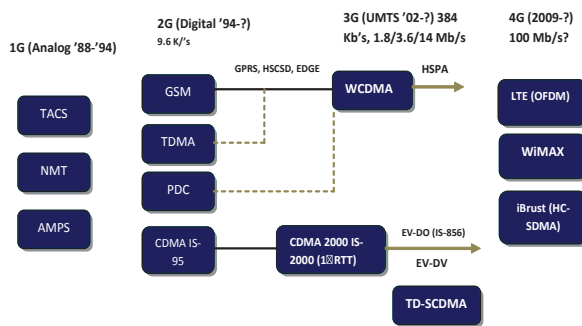
Quality of service can be more variable in wireless communications than in wireline, since quality depends on the strength of the signal, which in turn depends on the proximity of the caller to the base station. Service has improved over the years as the power of the equipment along the entire communications path has increased. In addition, base station power is optimized throughout networks. The MTSO and base stations periodically monitor the signal strength of calls in progress.

The signal strength of the transmission between a subscriber unit and the base station in any cell declines as the unit moves away from the base station. When the signal strength of a call declines to a predetermined level, the MTSO hands off the call in a fraction of a second to the base station of another cell, where the transmission strength is greater. If the subscriber unit leaves the service area of the cellular system, the call is disconnected unless an appropriate technical interface has been established with an adjacent system.

The electro-magnetic spectrum and the allocation of frequencies are key to the mobile industry, which is in the Ultra High Frequency (UHF) range. This allocations of spectrum effectively creates a barrier to access and a capacity restraint, whereas in the fixed-line arena capacity barriers are negligible.

Over the past 15 years the technology has moved from traditional analogue mobile telephony to 2G (which is the most prevalent today) and is slowly moving to 3G. The switch between 1G and 2G was mostly the move to digital technology, which offers encryption and greater security, and 3G is a move to greater bandwidth.

Exhibit 143: Technological Developments in Mobile Technology



Source: Deutsche Bank

The main change in voice traffic has been in its technology-migration from PSTN towards mobile networks, (typically at a significant pricing premium although declining all the time) and increasingly to VoIP, (typically at a significant price discount).

The current weight of traffic remains skewed towards the wire line network with around 70% PSTN, 30% mobile (this is based on data in the UK, which is around the European average) but in some markets, such as Finland and Portugal the scale of mobile minutes is over 50%. VoIP is not yet significant on this measure, but also hard to quantify being often on private networks and much less regulated. It is also an IP technology which means the voice message in converted into a data byte and then it is impossible to differentiate from another data use (email, web download etc), which make s the measurement of VoIP minutes nearly impossible. In some market however, such as France and the Netherlands around 25% to 30% of broadband customers have VoIP access technologies as well.



The mobile industry exploded with the advent of the pre-paid phone, but the catalysts for usage were a combination of declining per minute tariffs and bundles. Mobile usage tends to switch to post-paid as it becomes normalised and as firms try to convert pre-paid customers to more profitable contracts. New mobile phone users often take up pre-pay and then switch to post-paid.

1G technology

The development of mobile telephony can be traced as far back as 1946 when the Swedish police tested a system to connect its police cars to the national network. The early mobile phone units were rather bulkier than the contemporary models and were mostly manufactured for installation in vehicles. These were based on technologies such as PTT (Push to Talk), MTS (Mobile Telephone System), IMTS (Improved Mobile Telephone Service), which are in common referred to as 'Zero-generation' technologies as they were the predecessors of the first generation of cellular telephones. It took more than 37 years from the first testing in 1946 for the first commercial mobile system to become available in Chicago and Washington/Baltimore in 1983. The Motorola DynaTAC 8000X (following page figure) was the first mobile unit to receive FCC approval in 1983. It was truly the first mobile unit which could connect to the telephone network without the assistance of an operator and could be carried about by the user and hence dawned the 1G era. One key step-up from the previous generation technologies was the digitisation of the control link between the mobile phone and the cell site.

Exhibit 144: Motorola DynaTAC 8000X



Source: Deutsche Bank

Several mobile technologies emerged from different parts of the world during the early part of the 1980s. NMT (Nordic Mobile Telephone) used in the Nordic region, Eastern Europe and Russia, AMPS (Advanced Mobile Phone System) used in the US, TACS (Total Access Communications System) used in UK and Spain, C-450 in West Germany, Portugal and South Africa, Radiocom 2000 in France, and RTMI in Italy were most prominent 1G technologies.

One of the downside of 1G technologies was its analogue signal which allowed for cloning and eavesdropping as the line was not secure. There was also no roaming market due to the technological differences in different markets and the lack of roaming deals (which allow a customer from one network to access another in a different country). This was also a time when operators expected mobile technology to be a premium bespoke services for businesses rather than a mass market technology.

2G and 2.5G (GSM and GPRS)

The launch of digital mobile technology in the early 1990s was the major catalysts for the growth in the mobile. Its digital signal gave greater security and the harmonisation of technologies was key to driving down handset pricing but also allowing international roaming.

GSM covers all of Europe, and in fact has presence across all continents, being dominant outside of Japan and the USA. Remote areas are less well covered, but operators will tend to aim for coverage in excess of 95% geographic coverage in Europe (99% population coverage). The reason GSM became dominant in Europe was largely down to the EU which decided the technology should be roll-out consistently as a single standard. The strong growth in European mobile and the dominance of Ericsson and Nokia in the telecom equipment growth phase, allowed GSM to become a cost effective and reliable technology that was then roll-out in other international markets. Japan remains the only large market where there is no GSM technology.

As such 2G, or GSM (Global System for Mobile communications, originally Groupe Spécial Mobile), is the world's most widespread mobile technology. In the Americas, there is a split between GSM and the IS-95 standard (CDMA), which is also significant. The GSM network consists of a huge number of medium-sized base stations, which communicate with mobile phones using microwaves. Like all mobile networks, it provides mobile devices with connections to a fixed network, the PSTN (later technologies connect to the internet) and other mobile networks to which it is physically linked.



The GSM network is very low-powered, with mobile phones transmitting at less than 5 watts. This means that the signals travel small distances, leading to the cellular element of GSM networks. A traditional broadcasting system, such as TV, transmits over a very wide area, so that everyone can access the same signal. This means that once the available spectrum has been filled (ie there is no additional capacity), the limit of channels is reached.

In contrast, a mobile phone must transmit to a relatively small area, and furthermore divides this area around it into different cells, transmitting to each area on a different channel, with channels occupying different portions of spectrum so that there is no interference. Another transmitter nearby can then use the same channels, and merely by making sure that its cells of a particular frequency are not adjacent to another base station's cells of that frequency, it ensures non-interference. This approach means that bandwidth can be recycled; i.e. the same portion of the spectrum can be used as a different channel very frequently. The effect is analogous to speech, whereby if there is a tannoy, one might distinguish a few different sounds on it. But, if a room is full of people all of whom speak quietly to each other, a very large number of conversations can take place totally separately, even whilst each signal would interfere were they heard together.

Exhibit 145: Base Stations Communicate with Each Cell on a Different Frequency (Represented by Different Colors), to Stop Interference.



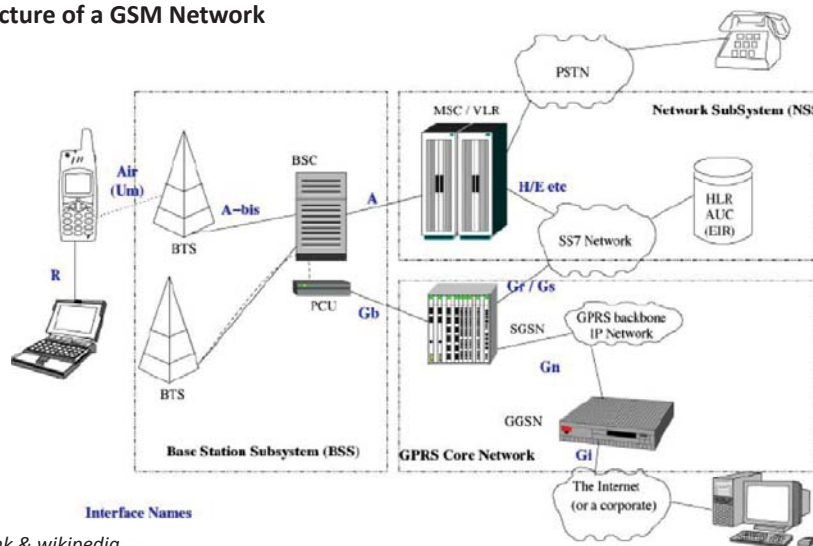
Source: Howstuffworks

2.5G, or General Packet Radio Services (GPRS), is an interim technology between 2G and 3G, to connect mobile devices to the internet. It is rather like dial-up internet access on a mobile phone, offering speeds of 56-114kbps, and working as a packet-switched network, making it very efficient in terms of bandwidth, therefore permitting basic data services on mobile.

Building a mobile network was historically expensive, and has become harder as public concern has grown over health risks suggested by some to be associated with proximity to masts. Owners of networks will typically rent out some of their capacity to companies that establish mobile brands without owning any infrastructure (MVNOs): thus many companies for whom telecoms is not a core offering have exploited their brands (e.g. Virgin, Tesco).

Most 2G licences were offered free of charge or for a small annual fee, in return for specific network investment and roll-out commitments. However, as the value of the mobile telecom industry has risen, the costs of subsequent licences has varied greatly in

Exhibit 146: Structure of a GSM Network



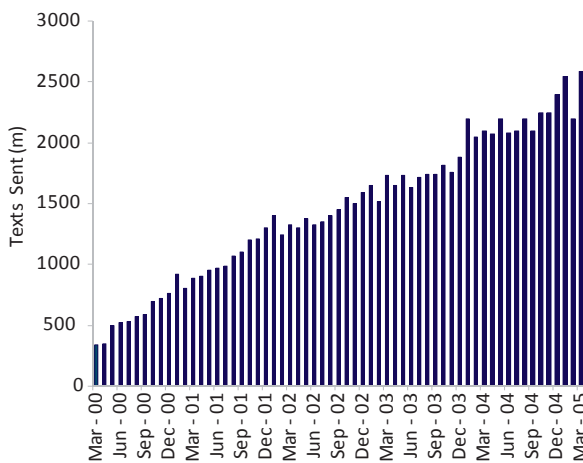
Source: Deutsche Bank & wikipedia



price among countries, with some still issued for free, on the condition that network coverage is extended to hard-to-reach rural areas, whilst the charges for other have been bid up in auctions (such as Germany and the UK in the 3G environment).

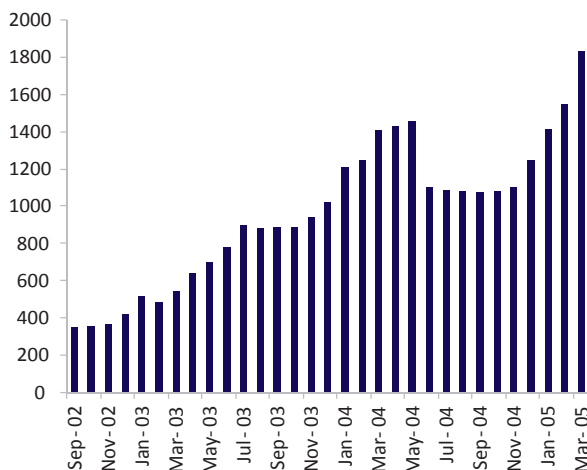
Voice remains the most common usage of mobile networks and consequently mobile data remains in its early stage of development but the growth is strong. However, to date the ability to driver revenue had been the missing link. SMS has been a successful quasi-data technology, which has exploited a messaging channel, which was originally established in networks to allow maintenance. With the growth in prepaid, SMS usage has exploded.

Exhibit 147: Consistent Growth in Text (SMS) Messages



Source: Mobile Data Association

Exhibit 148: Growth Continues in WAP Uses



Source: Mobile Data Association

SMS (short messaging service)

One of the barriers to the early exploiting of SMS was the lack of operator’s billing systems. But once these were in-place and the consumer realized it was a cheaper form of communication, SMS volumes have exploded. Short message services are developing very rapidly throughout the world. In 2000, just 17bn SMS messages were sent; in 2001, the number was up to 250bn, and 500bn SMS messages in 2004. In recent years, SMS has also become a conduit to interactive TV voting and commentary.

2G and 2.5G (CDMA and 1xRTT)

Code Division Multiple Access (CDMA)-based mobile standard was developed in 1989 as a concept and gradually emerged as an alternative to the most widely-used GSM, which is based on Time Division Multiple Access (TDMA). Greater capacity even in its basic form and scalability in terms of ability to develop extensions that enable greater bandwidth are the key advantages of CDMA. It can serve more users per unit of bandwidth (say 1 MHz) compared with other core technologies such as TDMA and FDMA. Moreover, CDMA laid the foundation for the development of 3G technologies. It is important to note in this regard that three of the five ITU standards for 3G (defined under IMT-2000 programme) are CDMA based.

The code division principle allows multiple signals to be transmitted in the same bandwidth, but in different codes, with each channel listening to its specific code; hence fitting multiple channels into the one portion of bandwidth. The technology requires significant processing.

CDMA2000 1x-RTT is one of the earliest versions of the technology. Although it qualifies to be a ‘3G’ technology as it supports a data rate of above 144 kbit/s, it is considered by most to be a 2.5G service as it is several times slower than ‘true’ 3G speeds. CDMA2000 1x, the core CDMA2000 wireless air interface standard, is known by many terms: 1x, 1xRTT, IS-2000, CDMA2000 1X, 1X, and cdma2000. The suffix ‘1xRTT’ stands for ‘1 times Radio Transmission Technology’ to represent the version that operates in a pair of 1.25-MHz radio channels (vis-à-vis 3xRTT, which represents three pairs of 1.25-MHz radio channels). Release 0 supports bidirectional peak data rates of up to 153 kbps and an average of 60-100 kbps in commercial networks. Release 1 can deliver peak data rates of up to 307 kbps.

The world’s first commercial launch of a CDMA-based network took place in September 1995 when Hutchison Telecom launched CDMA-based services



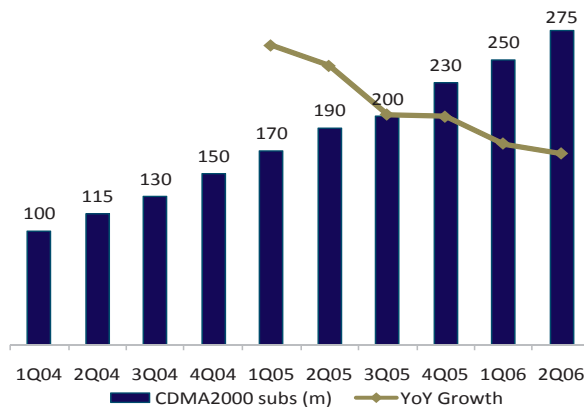
in Hong Kong. The first CDMA commercial launch in the US took place shortly afterwards in the spring of 1996. There were over 50 million CDMA subscribers worldwide, served by 83 operators in 35 countries, by the turn of the century.

3G and 3.5G

The third generation of mobile systems (3G) is also built on the base technologies of 2G systems (hence sharing all of its functionality), but uses new phones and base stations to provide much better bandwidth, of 144Kbps-2Mbps. The system in Europe is termed Universal Mobile Telecommunications System (UMTS), but sometimes called 3G. The technology to run European UMTS is Wideband Code Division Multiple Access (W-CDMA). In the rest of the world, a mixture of W-CDMA and the incompatible CDMA2000 1xEV-DO systems are being deployed. CDMA remains in its infancy but growth is starting to accelerate.

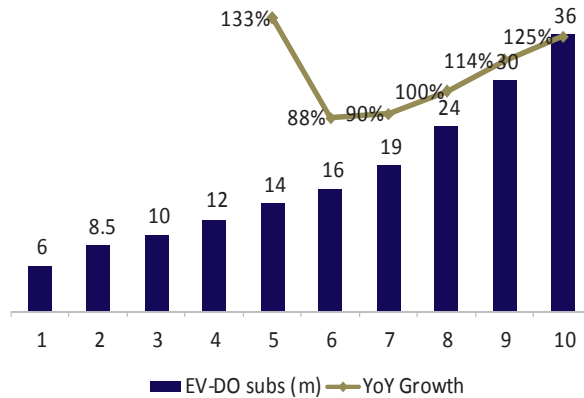
Indeed in September 2006, the CDMA Development Group (CDG) announced that the total CDMA mobile subscriber base (including cdmaOne, CDMA2000 and EV-DO) crossed the 335m mark at the end of 2Q06, registering a growth of 24% YoY. The total CDMA2000 subs base reached 275m, up by 48% YoY. EV-DO subscriber base continued its strong growth, reaching 36m (+123% YoY). The CDG counts 169 commercial CDMA operators in 75 countries, of which 163 have commercially deployed CDMA 1x networks and 47 commercial EV-DO networks, with a further 30 CDMA 1x networks and 41 EV-DO networks under deployment.

Exhibit 149: CDMA2000 subs (m) & YoY growth (%)



Source: CDG

Exhibit 150: EV-DO subs (m) & YoY Growth (%)



Source: CDG

The code division principle allows multiple signals to be transmitted in the same bandwidth, but in different codes, with each channel listening to its specific code; hence fitting multiple channels into the one portion of bandwidth. This technology requires significant processing.

An upgrade to W-CDMA, known as High-Speed Downlink Packet Access (HSDPA), offers download speeds up to 10Mbps (faster than some home broadband). This technology is being rolled out as many 3G base stations will be software-upgradeable to offer HSDPA.

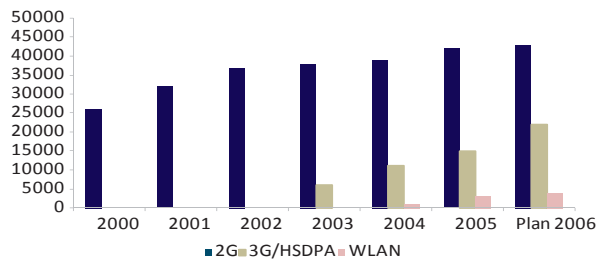
The 3G idea is based on higher data speeds and advances in mobile computing allowing for a much richer mobile experience than 2G. One early application has been in providing mobile internet access for laptop users, with the speed of the 3G network allowing business users to access office networks and the internet at close to office speeds. On the consumer side, mobile phones themselves have been greatly enhanced for 3G. The new handsets usually offer high-resolution colour screens and built-in digital cameras, as well as greatly increased processing power. This technology will enable service providers to offer enhanced inter-user services such as video-messaging and video-calls, priced at a premium to voice calls. It is also hoped that users will pay to access multimedia content, for which revenues will be shared with content providers. Content thus far has included more sophisticated games (including 3D graphics and online gaming); and video clips, such as music videos and short segments of news, comedy, or weather reports.

3G networks are still being built. Coverage is being rolled out first in high-density population areas, but is by no means universal, although most licenses require provision of a certain level of coverage. 3G phones



will use the GSM network for 2G services where there is no 3G available, but can only offer 3G services when connected to the 3G network. 3G phones are spreading, and growth should continue, as the value of a 3G phone to the consumer will increase as their contacts add 3G capability (e.g. so they can make video calls).

Exhibit 151: T-Mobile Europe-cell sites by technology



Source: Deutsche Telekom

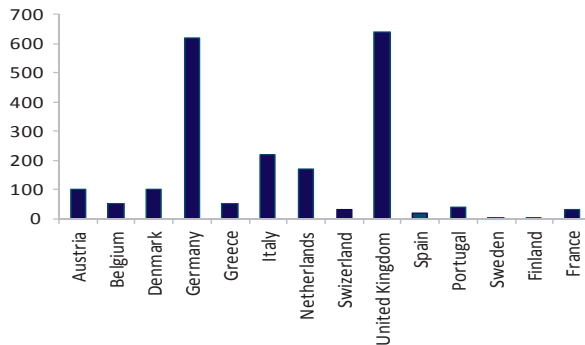
3G is a more expensive technology for service providers. The enhanced technology in 3Genabled handsets can mean prices in hundreds of Euros and have historically been comparable with premium 2G handsets. As most consumers are unwilling to pay such prices, much cost has been borne by service providers hoping to recoup the cost in higher spending on the new services offered. Tariffs on 3G may be higher and contracts (rather than pre-paid) are more stringently required by operators as part of this effect.

Installing the new networks is expensive, as were some of the licenses, with prices varying massively due to the auction structure (see Paul Klemperer, "How (Not) to Run Auctions: the European 3G Telecom Auctions", 2002), and peaking at Euro 650 per head of population in the UK. Also high are costs to introduce customers to new services through extensive and complicated marketing, as products need not just advertising but also explaining. The latter can take the form of fairly straight education, with representatives employed in mobile phone outlets to train customers in how to use 3G phones.

What is new to 3G pricing, apart from the increase in focus on selling content, is that users may be charged by bandwidth rather than call duration. Since the network is packet switched, the opportunity cost of each connection is in terms not of other connections, but in terms of the data it displaces, so there is logic to a data-based pricing model. This could simplify things for the service provider, who then need not have extensive relationships with content providers in order to charge appropriately for delivering content. The downside to bandwidth pricing is that the consumer loses control over the potential cost of

the download as it is not always possible to assess/calculate the time/bandwidth/cost equation prior to initiating the download. As such, and for simplicity, many operators are charging for events/downloads rather than bandwidth.

Exhibit 152: UMTS costs per pop (EURO)

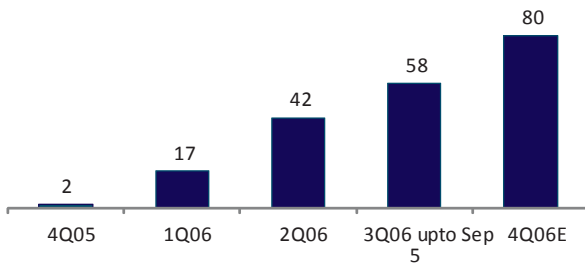


Source: European Commission, CIA

High Speed Packet Access (HSDPA/HSUPA)

HSDPA is a standardized mobile telephone protocol which sits over WCDMA networks and enhances downlink speeds with various modulation and coding techniques. Theoretically, with release 5, which will be launched commercially in 2006, speeds of up to 3.8MB/s are possible. In reality, according to Vodafone, the effective rates will be 75% lower than theoretical rates and most likely a level around 1MB/s is possible over mobile, although operators continue to talk about 10MB/s speeds. Most operators expect to launch some kind of HSDPA service in 2006 and there will be varying paces of roll-out.

Exhibit 153: Cumulative HSDPA Commercial Launches

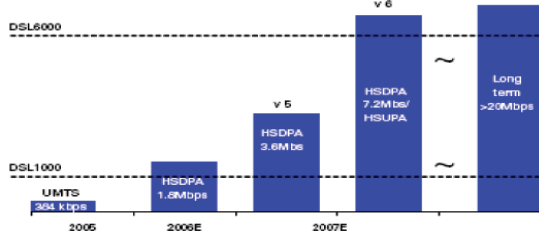


Source: GSA

The benefits of HSDPA to the operators are dramatically increased speeds for limited capex (c. Euro 300m/network), thereby lowering the cost/bit further.

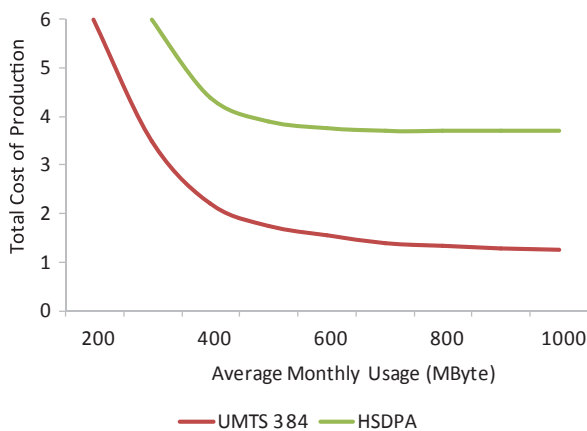


Exhibit 154: HSDPA/HUSPA Evolution



Source: T-Mobile

Exhibit 155: HSDPA Cost/ Mb VS UMTS



Source: Deutsche Bank

While we are encouraged by the increased handset speeds, we believe that there are limited applications announced to date which the operators will be able to monetize sufficiently to offset voice revenue pressure. We do believe in applications developing long term like mobile TV (see next section), but believe this is better suited to broadcast technologies such as DVBH.

In addition, we do not see a single application which will replace voice as a key revenue driver.

Technology: Bandwidth

Internet access

The internet comprises several core offerings, most importantly e-mail and web-browsing, but includes the distribution of data such as video and music via the web. It is an entirely packet-switched network, the largest in history and like the universe we live in, is expanding every day. It enables any device that accesses it to connect to any other.

Internet access is generally categorized according to bandwidth. Following Exhibit demonstrates one

such categorization, although 512Kbps is often considered the threshold for broadband (rather than narrowband). Speed makes a crucial difference to what can be offered via the internet as functionality increases with bandwidth.

Internet access can be free, such as in a public Wi-Fi hotspot; metered by time, as with a dialup internet connection; metered by data, as with some 3G technologies; or un-metered, as with most residential broadband connections (though overall use is often capped). Bandwidth is the crucial issue in each offering.

The internet is growing both in size and in functionality, taking up ever-increasing roles, e.g. through RFID technology. As services migrate online, owners of superseded technology lose out (as fixed-line telecoms may lose out to VoIP), whilst those selling bandwidth benefit from increased demand. Telecoms service providers may come to provide new online services themselves, leveraging their client-relationships to become the default provider to their customers (e.g. shopping through their portals). Mobile service providers come to offer these services with mobility, as mobile catches up to much of the functionality of home computers.

Exhibit 156: Typical-Download Speed of Consumer Internet Access

Technology	Typical Download Speed	Fixed/Wireless
2G	9.6Kbps	Wireless
PSTN	56Kbps	Fixed
Cable	2Mbps	Fixed
ADSL	2Mbps	Fixed
3G	500Kbps	Wireless
Satellite	2Mbps	Fixed
ADSL2+	>8Mbps	Fixed
3.5G (HSDPA)	10Mbps	Wireless
VDSL2	25 to 50Mbps	Fixed
Wi-Fi	54Mbps	Fixed/Wireless
Wi-Max	70Mbps	Wireless
VDSL2	100Mbps	Fixed

Source: Deutsche Bank

Exhibit 157: Wireline Bandwidth

Wireline Bandwidth	
Narrowband	- Up to 64 Kbps
Wideband	- 64 Kbps up to 2 Mbps
Broadband	- 2Mbps Upwards

Source: Deutsche Bank



Appendix 1 – An overview of non-Mobile Telecoms sector

WiMAX

- WiMax licenses were awarded to two companies. The license holders are:
 - Augere Communications Bangladesh Limited
 - BanglaLion Communications limited
- The license acquisition fee was USD 31mn, which was determined through open bidding.
- The license also requires USD 440K annual licensing fee, 4% gross revenue sharing with the government for first two years and 5% gross revenue sharing for consecutive years.
- Augere is a newly formed company focusing on emerging economies broadband market. The Augere management team consists of global experts of telecom and broadband industry. Many of them are from France Telecom. But they also seem lacking about local knowledge about the market.
- WiMax license will provide the licensee the right to provide both data & IP based voice service.
- Each license holding company was allocated 35MHz of frequency.
- WiMAX has several distinct advantages over incumbent (e.g. fixed-line copper wire, coaxial cable, GPRS / EDGE) and soon-to-be-deployed (e.g. W-CDMA) technologies
 - Faster speed and lower infrastructure build out cost vs. 3G wireless esp. in a high population density region such as Bangladesh
- While Mobile WiMAX technology continues to evolve, Fixed WiMAX is currently well-positioned vs. 3G Wireless in the following areas:
 - Broadband Internet
 - Internet-based Fixed Telephony
- Wireless carriers, on the other hand, have the following advantages:

- Mobile WiMax technology is still evolving; WiMax-based wireless providers are unlikely to pose a threat to the incumbent wireless carriers over wireless voice service
- WiMax handsets are less widely available and tentially more expensive

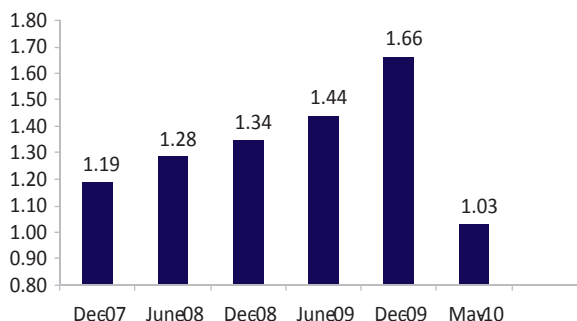
- Next Battle: WiMax vs. HSPA
- Can HSPA and WiMax coexist- HSPA catering to mobile internet users while WiMAX catering to fixed internet users?
 - However, this battle would not be over wireless voice – the home turf for wireless carriers
 - Rather it will be over:
 - Broadband Internet penetration
 - Market share gains from fixed-line operators through competing offerings (in case of wireless carriers: wireless voice; in case of WiMAX-based providers, Internet telephony)

Wireline Company Profiles

Fixed Line Operators

Operators	Subscribers	Market Share (%)
BTCL	872.4	84.8%
Telebarta Ltd.	56.4	5.5%
Jalalabad Telecom Ltd.	10.9	1.1%
Onetel Communication Ltd.	39.6	3.8%
Westec Ltd.	17.0	1.7%
Sheba Phone Ltd. (ISL)	11.6	1.1%
S. A. Telecom System Ltd.	18.0	1.8%
Banglaphone Ltd.	2.2	0.2%
Total	1,028.2	

Source: BTRC and AT Capital Research



Source: BTRC



- Total 9 companies have the license (though not all have a nationwide license) to provide fixed line service in the country, out of which 8 are currently operating.
 - Among them, 1 is state owned and others are privately owned.
 - Only the state owned operator used wire line technology to provide fixed line service. Others provide the service with wireless technology (CDMA).
 - Industry subscriber base is 1.03mn with a growth rate of around 15% up to December 2009. Then Industry experienced negative growth rate of 38.7% in 5 months of 2010 due to license cancellation of some of the operators.
 - Bangladesh telecommunication Company Limited (BTCL), the state owned operator is the market leader with 84.8% of market share
 - In addition to Voice Service, operators provide internet service in limited scale
 - The industry is struggling to compete with the mobile phone operators. Size of the market seems no way support 16 operators.
 - Fixed line operators are mainly competing for PCO market
 - Enterprise market is mostly occupied by BTCL
 - Government is planning to sell 100% of the BTCL's stake to the private ownership. (that's the main motive behind its corporatization)
 - BTCL is not only a fixed line operator, it also provide internet service, point to point data connectivity & submarine cable bandwidth. The latter is handled by its subsidiary BSCCL.
- Internet Service Providers**
- Total 106 ISP national licenses were awarded to different companies, 82 ISP Central Zone licenses and 55 ISP Zonal Services. Besides, total 113 ISP Licenses awarded in the category A, 22 licenses in the Category B, and 8 licenses in the Category C.
 - Global Online, Agni Systems Limited, Bdcom Online, Bangladesh Online are some of the leading player in the market.
 - 7 of the ISPs are also listed in stock market.
 - Around 3mn subscriber base has access to internet. However, a small percentage of these subscribers are actually regular users.
 - The major reasons for this low interest in internet is as follows:
 - High bandwidth cost
 - Very few local content
 - Lack of quality internet service
 - Last mile is mainly dial up
 - Lack of redundancy in submarine cable
 - Dependency on high cost VSAT
 - Small market size & too many ISPs does not allow the ISPs to focus on quality service.
 - Lack of electronic payment system
 - Low level of literacy
 - Major revenue comes from Enterprise market.
 - Retail market is mainly based on dialup connection.
 - Last mile solution for enterprise market is mainly based on radio link
 - Wi-Fi hotspot is very limited in the country
 - WiMax has already been launched in Bangladesh in 2009.
 - Mobile Internet service is one of the major competitors in the retail market. Arrival of 3G in 2011 will provide an interesting market scenario between 3G & WiMax



Interconnection Exchanges

- Interconnection exchanges (ICX) started their operation in Aug 2008
- 3 ICX licenses were awarded to 3 companies (all three get a guaranteed 30% of traffic). 1 is for state owned operator BTCL & other two are 2 private operators.
- These operators will provide interconnection services to both the wireless and fixed line operators by routing inter operator traffic. It will also work as gateway between operators and VoIP traffic gateway
- Approximate investment of each of these companies is USD 15mn
- Approximate industry revenue is USD 20mn per annum
- These companies have 65.75% revenue sharing agreement with BTRC.

International Gateway

- International gateways, also known as IGW has started operation in Aug 2008
- It is voice gateway and can use both TDM and VoIP technologies
- These companies will handle international VoIP traffic from & to the operators
- Bangladesh and rest of world understand VoIP differently. Prior to their operation, VoIP was illegal in the country. International traffic was handled only by state owned BTCL.
- 4 companies were given IGW license. 1 of them is state owned operator BTCL; others are private operators. All get a guaranteed traffic of 20% each for the international outgoing voice calls.
- Private operators are Mir Telecom, Novotel & Bangla Trac Communications Ltd.
- Approximate investment of each of these operators USD 14.5mn
- Approximate USD 230mn revenue per annum

according to current available information. But legalization of VoIP is expected to bring back the lost air time through the illegal channel to the legal channel. And revenue might much higher than estimated.

- These companies have to share 51.75% of their revenue to BTRC.

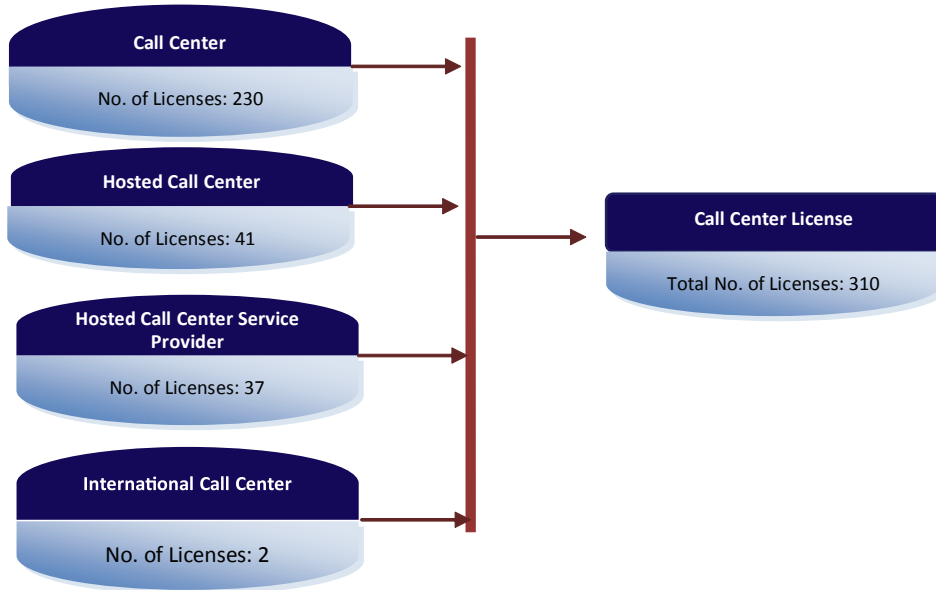
International Internet Gateway

- International Internet Gateway (IIG) has started their operation in Aug 2008
- They will route Internet traffic from all the ISPs. It will work as gateway between ISPs and Submarine cable & VSATs.
- Mango Teleservices was given the license to operate IIG.
- They have to share 10% revenue with BTRC

BTRC has already floated an RFP for to establish another submarine cable with private investment on Build, maintain & operate basis. It is built keeping the future demand for bandwidth in mind.

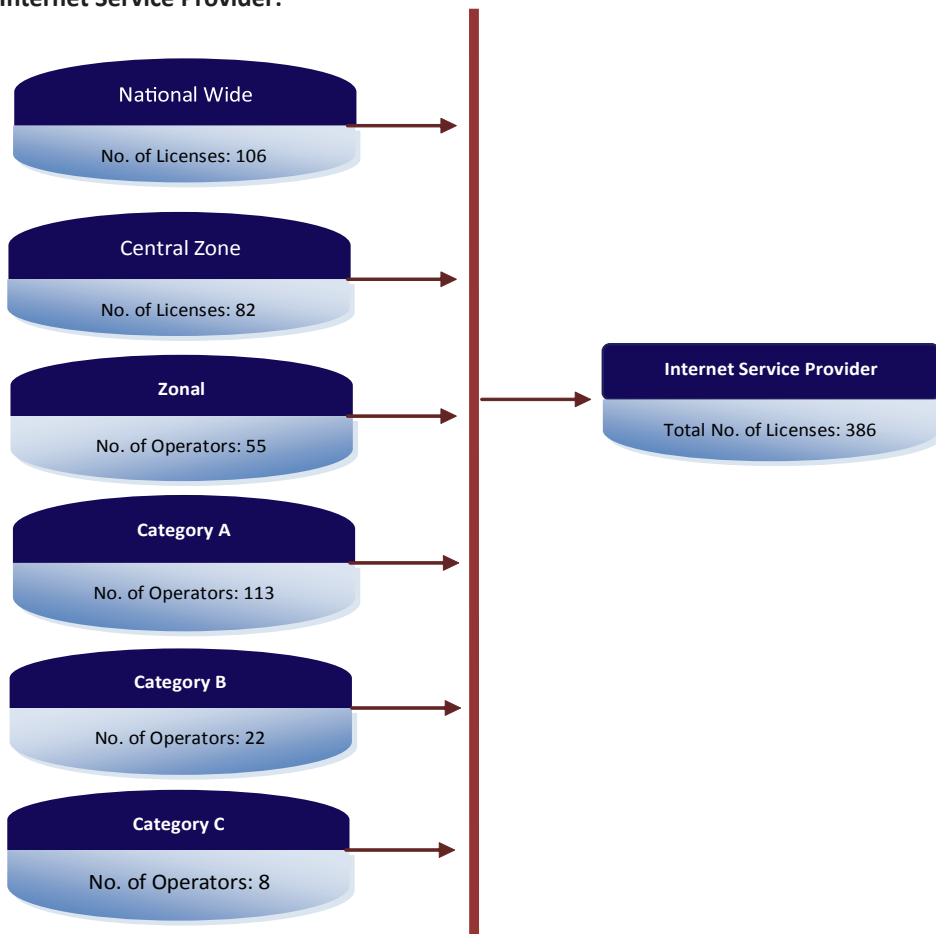


Call Centers:



Source: BTRC and AT Capital Research

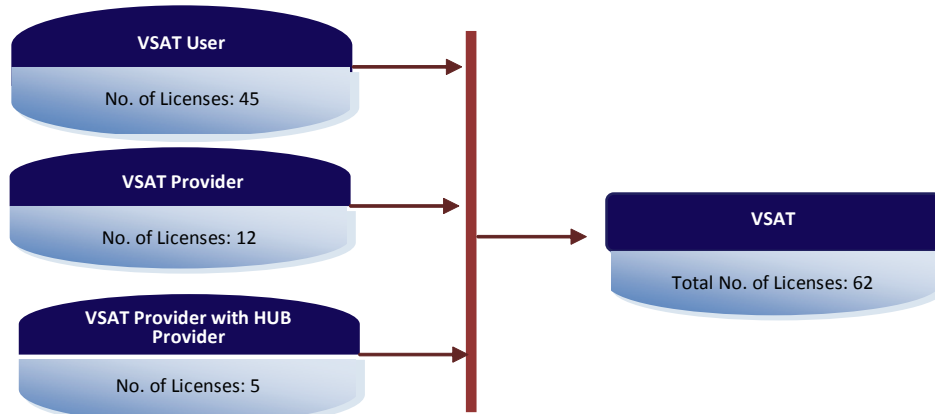
Details of Internet Service Provider:



Source: BTRC and AT Capital Research

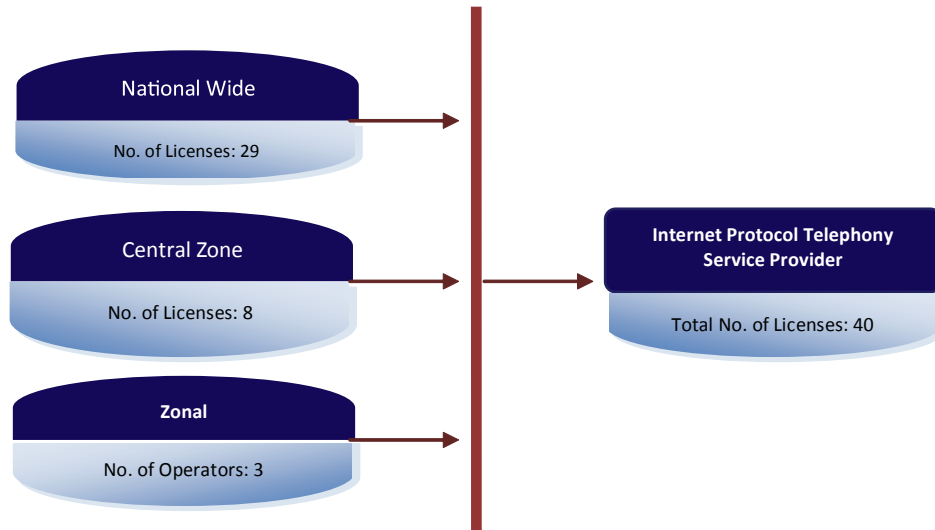


Details of VSAT:



Source: BTRC and AT Capital Research

Details of IP telephony Service provider:



Source: BTRC and AT Capital Research



Appendix 2 - Telco Database

Appendix 2.1: Merrill Lynch Database and AT Capital Research

1. Bangladesh telecom matrix
2. 4Q09 industry snapshot by region – Emerging markets
3. Mobile market scorecard – emerging markets
4. Penetration, 4Q2009– Emerging markets
5. Annualized Service Revenue (USD bn) 4Q09
6. ARPU(USD) - 4Q09, Emerging Market
7. Monthly churn - Emerging Market
8. RPM (USD) - Emerging Market
9. Wireless capex (US\$bn, annualized)
10. Average EBITDA Service margin by region
11. Mobile spend/GDP in 2009 - Market Potential
12. Minutes of usage-Market Potential
13. EBITDA Service Margins by Region
14. Mobile Data as % of Revenue by Region
15. Service Margin Expansion (Contraction) by Region (YoY, Basis Points)
16. Year-End Subscribers (Millions)
17. YoY Subscriber Growth
18. YoY Net Additions (Millions)
19. Wireless Service Revenues (US\$ bn)
20. EBITDA Service Margin
21. YoY Service Revenue Growth
22. YoY% Change in MOU per Subscriber
23. Estimated Annualized Mobile Data Revenues (US\$ bn) & Percentage of Service Revenue from Data of India
24. Change in Current Year Revenue & EBITDA Consensus for Top 40 Global Telecoms VS 3 Months Ago
25. Net monthly churn year by year
26. Wireless penetration year by year
27. Average Monthly revenue per user year by year
28. Monthly minutes of use per subscriber year by year
29. YOY ARPU growth year by year

Appendix 2.2: AT Kearney Database

30. Market size and growth rates by subscribers, 2008
31. Prepaid and Post paid Connections in AP5, 2008
32. Average Revenue per minutes for selected markets, 2008
33. Direct contribution of mobile operators to GDP, 2008
34. Mobile vs. Fixed Lines Penetration 2008 with population size (bubble)
35. Tax as proportion of Total cost Mobile Ownership (TCMO) (in %)
36. WEF Network Readiness Index: Political and Regulatory (Environment Sub-Index) Ranking, 2008
37. Examples of Telecom-specific Taxes in Asia Pacific, 2008

Appendix 2.3: Mobile Benchmarks, LIRNE Database

38. Mobile basket (High, medium and low users in

Post paid and prepaid)

Appendix 2.4: OVUM, GSMA, AMTOB and NBR

39. Mobile service industry value chain
40. Split of industry specific and generic taxes
41. Internet Penetration in the region
42. Telecom Investment over the years (In Crore) - Bangladesh
43. Contribution to National Revenue - Bangladesh

Appendix 2.5: ITU

44. Tele Penetration and Start up Cost in the region
45. Mobile tariff in USD (ITU ICT Index 2009)
46. International Internet bandwidth per Internet user
47. Internet users (%)
48. Mobile cellular - price of 3 minute local call (off-peak) (US\$)
49. Monthly subscription for residential telephone service (US\$)
50. Mobile cellular postpaid connection charge (US\$)
51. Mobile cellular prepaid – price of SMS (on-net) (US\$)
52. Mobile cellular telephone subscriptions (post-paid + prepaid) (in thousands)
53. Mobile cellular subscriptions per 100 inhabitants
54. Monthly subscription for business telephone service (US\$)
55. Price of a 3-minute fixed telephone local call (peak rate) (US\$)
56. Cost of a local 3-minute call (off-peak rate) (US\$)
57. Proportion of households with Internet access at home
58. Installation fee for residential telephone service (US\$)
59. Fixed telephone lines (in thousands)
60. Imports - telecommunication equipment (US\$) (in mn)
61. Fixed broadband subscriptions per 100 inhabitants
62. Fixed telephone lines per 100 inhabitants
63. Estimated Internet users (in thousands)
64. Installation fee for business telephone service US\$
65. Fixed Broadband Internet Subscriptions (in thousands), 2009
66. Fixed Broadband Internet Subscriptions by region (In thousands), 2009
67. Fixed Broadband Internet Subscriptions by region, CAGR (%) 2005-09
68. Fixed Telephone Lines of South Asian countries (In thousands), 2009
69. Fixed Telephone Lines by region (In thousands), 2009
70. Fixed Telephone Lines CAGR of south Asian countries (%) (2005-09)
71. Fixed Telephone Lines CAGR (%) by region (2005-09)
72. Fixed Telephone Lines per 100 inhabitants of South Asian Countries
73. Fixed Telephone Lines per 100 inhabitants CAGR (%) of SA countries (2005-09)



74. Fixed Telephone Lines per 100 inhabitants CAGR (%) by region (2005-09)
 75. Outgoing fixed telephone traffic of South Asian Countries, Total minutes (M), 2008
 76. Outgoing fixed telephone traffic by region, Total minutes (M), 2008
 77. Outgoing fixed telephone traffic, CAGR (%) of South Asian Countries 2003-2008
 78. Outgoing fixed telephone traffic, CAGR (%) by region 2003-2008
 79. Outgoing fixed telephone traffic of South Asian Countries, Minutes per subscriptions. 2008
 80. Outgoing fixed telephone traffic by region, Minutes per inhabitants. 2008
 81. Outgoing fixed telephone traffic by region, Minutes per subscriptions. 2008
 82. International Internet bandwidth of South Asian Countries (Mbps), 2009
 83. International Internet bandwidth by region (Mbps), 2009
 84. International Internet bandwidth, CAGR (%) by region 2005-09
 85. International Internet bandwidth, CAGR (%) of South Asian Countries 2005-09
 86. International Internet bandwidth of South Asian Countries, Bit/s per internet users, 2009
 87. International Internet bandwidth by region, Bit/s per internet users
 88. International Internet bandwidth of South Asian Countries, Bit/s per internet users, CAGR % 2005-09
 89. International Internet bandwidth by region, Bit/s per internet users, CAGR % 2005-09
 90. Internet Users of South Asian Countries (In thousands), 2009
 91. Internet Users by region (In thousands), 2009
 92. Internet Users of South Asian Countries, CAGR (%), 2005-09
 93. Internet Users by region, CAGR (%), 2005-09
 94. Internet users per 100 inhabitants of South Asian Countries, 2009
 95. Internet users per 100 inhabitants by region, 2009
 96. Internet users per 100 inhabitants of South Asian Countries, CAGR % 2005-09
 97. Internet users per 100 inhabitants by region, CAGR % 2005-09
 98. Mobile cellular subscriptions of South Asian Countries (In thousands), 2009
 99. Mobile cellular subscriptions by region (In thousands), 2009
 100. Mobile cellular subscriptions, CAGR % of South Asian Countries 2005-09
 101. Mobile cellular subscriptions, CAGR % by region 2005-09
 102. Mobile cellular subscriptions per 100 inhabitants of South Asian Countries
 103. Mobile cellular subscriptions per 100 inhabitants by region
 104. Mobile cellular subscriptions per 100 inhabitants, CAGR % of South Asian Countries 2005-09
 105. Mobile cellular subscriptions per 100 inhabitants, CAGR % by region 2005-09
 106. Telecommunication investment by region, Total US\$ (M) 2008
 107. Telecommunication investment by region, as a % of revenue 2008
 108. Telecommunication Revenue of south Asian countries Total US\$ (M) 2008
 109. Telecommunication Revenue by region Total US\$ (M) 2008
 110. Telecommunication Revenue, per inhabitant (US\$) of South Asian Countries 2008
 111. Telecommunication Revenue, per inhabitant (US\$) by region 2008
 112. Telecommunication Revenue of South Asian Countries, As a % of GDP 2008
 113. Telecommunication Revenue by region, as a % of GDP 2008
 114. Total telecommunication staff by region (in thousands), 2008
 115. Total telecommunication staff by region, CAGR (%) 2003-2008
 116. Total telecommunication staff by region, Subscriptions per employee, 2008
 117. Total telecommunication staff by region, Subscriptions per employee, 2008
 118. Mobile staff, Subscriptions per employee by region, 2008
 119. Internet, Subscriptions of South Asian Countries (In thousands), 2009
 120. Internet Subscriptions by region (In thousands), 2009
 121. Internet subscriptions per 100 inhabitants by region 2009
 122. Internet subscriptions per 100 inhabitants of South Asian Countries 2009
 123. Internet Users of South Asian Countries (In thousands), 2009
 124. Internet Users by region (In thousands), 2009
- Appendix-2.6
125. Summary of BTRC Licenses



BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Wireless penetration	2.6%	6.8%	12.8%	21.6%	27.6%	31.8%	41.1%	49.8%
Increase		4.2%	6.0%	8.8%	6.0%	4.2%	9.3%	8.7%
Fixed line penetration	n/a	n/a	n/a	0.7%	0.8%	1.0%	0.6%	0.6%
Increase					0.1%	0.2%	-0.4%	0.0%
Subscribers (mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)	0.3	1.2	3.3	7.1	10.3	13.9	18.8	22.3
GrameenPhone (Telenor)	2.4	5.5	10.6	16.5	21.0	23.3	30.4	37.4
TM Int'l (Telekom Malaysia)	1.1	3.1	4.8	6.4	8.2	9.3	12.6	14.7
PBTL (SingTel)	0.3	0.5	0.9	1.4	1.8	2.0	2.2	2.8
Warid				2.2	2.3	3.0	3.7	6.2
BTTB		0.2	0.4	0.9	1.0	1.1	1.3	1.6
Total	4.0	10.5	20.0	34.4	44.6	52.4	69.0	85.0
YoY growth		162.6%	90.5%	72.1%	29.9%	17.5%	31.6%	23.2%
Subscriber market share (%)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)	6.4%	11.7%	16.4%	20.6%	23.2%	26.5%	27.2%	26.2%
GrameenPhone (Telenor)	59.8%	52.9%	53.2%	47.9%	47.0%	44.3%	44.1%	44.0%
TM Int'l (Telekom Malaysia)	26.3%	29.1%	24.0%	18.6%	18.4%	17.7%	18.3%	17.3%
PBTL (SingTel)	7.4%	4.4%	4.3%	4.1%	4.1%	3.7%	3.2%	3.3%
Warid				6.3%	5.2%	5.7%	5.3%	7.3%
BTTB		1.9%	2.1%	2.5%	2.2%	2.0%	1.9%	1.9%
Net subscriber adds (mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)		1.0	2.1	3.8	3.3	3.6	4.9	3.5
GrameenPhone (Telenor)		3.2	5.1	5.8	4.5	2.3	7.2	7.0
TM Int'l (Telekom Malaysia)		2.0	1.7	1.6	1.8	1.1	3.3	2.1
PBTL (SingTel)		0.2	0.4	0.6	0.4	0.1	0.3	0.6
Warid		-	-	2.2	0.2	0.7	0.7	2.5
BTTB		0.2	0.2	0.4	0.1	0.1	0.2	0.3
Total		6.5	9.5	14.4	10.3	7.8	16.6	16.0
YoY growth			46.1%	51.8%	-28.7%	-24.1%	112.2%	-3.3%
Market share of net adds (%)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)		15%	22%	26%	32%	46%	29%	22%
GrameenPhone (Telenor)		49%	54%	41%	44%	29%	43%	44%
TM Int'l (Telekom Malaysia)		31%	18%	11%	18%	14%	20%	13%
PBTL (SingTel)		3%	4%	4%	4%	2%	2%	4%
Warid		0%	0%	15%	2%	8%	4%	16%
BTTB		3%	2%	3%	1%	1%	1%	2%
MOU per sub (minutes/month)-Decembor								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)				246	245	271		
GrameenPhone (Telenor)				261	332	292		
Monthly ARPU - USD								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)		4.4	3.1	2.9	3.0	2.4	2.2	2.1
GrameenPhone (Telenor)	16.5	10.8	7.1	5.2	3.8	3.5	3.8	3.7



Post-paid subscribers (mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)			0.20	0.51	0.67	0.87	1.01	1.10
GrameenPhone (Telenor)			0.21	0.33	0.39	0.40	0.42	0.44
Warid			0.14	0.22	0.25	0.30	0.31	0.33
Total			0.55	1.23	1.51	1.72	1.92	2.08
Revenue (USD mn)								
BANGLADESH	CY04	CY05	CY06	CY07	CY08	CY09	CY10E	CY11E
Bangalink/Sheba (Orascom Tel)	11.0	39.0	91.0	193.0	288.1	351.0	405.0	427.0
GrameenPhone (Telenor)	340.0	445.3	639.9	791.9	899.9	942.8	1,106.2	1,258.0
TM Int'l (Telekom Malaysia)		139.0	167.0	210.0	214.0	287.0	358.8	412.6
PBTL (SingTel)		21.0	44.0	39.0	56.0	81.0	90.0	98.0
BTTB			5.0	9.0	12.0	18.0	20.0	22.0

Source: BofAML Global Research estimates & AT Capital Research

Note: CY stands for Calendar Year

4Q09 industry snapshot by region – Emerging markets											
Emerging markets	GDP per Capita (\$)	Pop (mn)	YOY Pop growth	Penetration		Mob % of GDP	Subscribers			Annualized svc. Rev. (US\$bn)	
				Mobile	Fixed		(mn)	YoY	Prepaid	YoY	YoY
Bangladesh	690	165	1.8%	32%	1%	2.2%	52.4	17.5%	97%	2.1	15.1%
India	1,016	1,203	1.4%	44%	3%	2.1%	525.1	51.4%	95%	25.5	3.2%
Pakistan	956	164	0.9%	60%	4%	1.8%	97.6	8.5%	98%	2.8	3.4%
Indonesia	2,494	232	1.3%	70%	9%	1.4%	162.5	15.0%	98%	8.3	11.9%
Thailand	3,974	67	2.0%	97%	11%	1.8%	65.4	5.6%	90%	4.8	4.6%
Malaysia	7,605	28	1.7%	109%	15%	2.8%	30.2	11.5%	78%	5.9	5.0%
Philippines	1,764	92	2.0%	78%	4%	2.0%	72.1	9.8%	98%	3.2	-3.5%
Emerging ASIA	2,504	3,333	1.0%	54%	13%	1.9%	1,799.9	24.9%	83%	161.4	10.5%

Source: BofA ML Global Research estimates, AT Capital Research

4Q09 industry snapshot by region – Emerging markets											
Emerging markets	ARPU (US\$)		MOU (Min)		RPM (US\$)		Data % of ARPU	Monthly churn	EBITDA YoY(%)	SVC Mgn YoY	No of players
	YoY	YoY	YoY	YoY	YoY	YoY					
Bangladesh	3.1	-8.9%	284	-6.3%	0.01	-2.5%	N.A.	1.6%	42.3%	(409)	6
India	4.3	-31.5%	375	-12.8%	0.01	-20.6%	11.1%	5.4%	29.6%	(266)	6
Pakistan	2.3	-2.3%	187	10.0%	0.01	-13.8%	N.A.	5.2%	35.5%	230	5
Indonesia	4.6	-1.8%	164	4.2%	0.03	2.4%	34.3%	11.0%	59.8%	(255)	4
Thailand	6.3	-1.1%	278	5.9%	0.02	-7.6%	16.5%	4.9%	47.4%	394	5
Malaysia	16.0	-6.0%	203	1.6%	0.08	-3.0%	19.7%	N.A.	46.3%	(59.00)	3
Philippines	4.0	-9.3%	27	68.3%	0.14	10.1%	46.5%	4.6%	63.0%	20	3
Emerging ASIA	11.7	-7.5%	350	1.6%	0.03	-9.3%	25.3%	4.9%	41.2%	(192)	

Source: BofA ML Global Research estimates, AT Capital Research

Note: Bangladesh churn rate is calculated by taking market share weighted churn rate of GP and Banglalink as of 2Q 10. Others as of 4Q 09



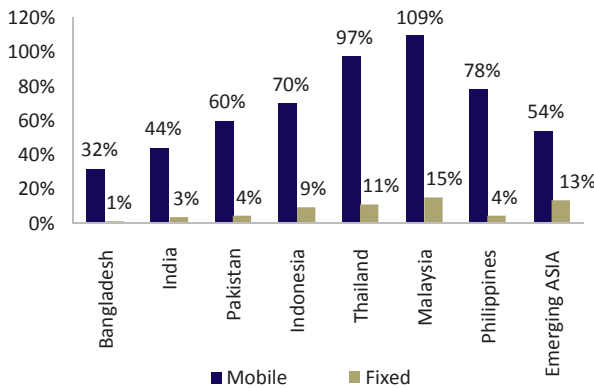
Mobile market scorecard – emerging markets									
Emerging markets	Market Potential				Market Growth		Revenue Growth		RPM YoY
	Mobile penetration	Wireline penetration	MOU per capita	Mobile spend/GDP	Real GDP Growth'10	Pop. Growth '04-09' CAGR	Service Revenue	Service revenue acceleration	
Bangladesh	32%	1%	89	2.2%	4.7%	1.8%	15.1%	-8%	-3%
India	44%	3%	163	2.1%	7.6%	1.5%	3.2%	-11%	-21%
Pakistan	60%	4%	112	1.8%	4.0%	1.8%	3.4%	-9%	-14%
Indonesia	70%	9%	115	1.4%	5.5%	1.4%	11.9%	3%	2%
Thailand	97%	11%	271	1.8%	3.8%	0.6%	4.6%	7%	-8%
Malaysia	109%	15%	220	2.8%	5.2%	1.7%	5.0%	0%	-3%
Philippines	78%	4%	21	2.0%	2.5%	2.0%	-3.5%	-5%	10%

Source: BofA ML Global Research estimates, AT Capital Research

Mobile market scorecard – emerging markets								
Emerging markets	Service Margins		Competition			Summary		
	Average EBITDA	YoY (bps)	No of networks 2009	2010	HHI Index	HHI YoY change	Summary score	Momentum score
Bangladesh	42.3%	-409	6	Same	0.312	0.017	63%	33%
India	29.6%	-266	6	More	0.176	-0.001	37%	17%
Pakistan	35.5%	230	5	Fewer	0.231	-0.001	63%	50%
Indonesia	59.8%	255	4	Same	0.341	0.019	83%	100%
Thailand	47.4%	394	5	Same	0.343	0	57%	83%
Malaysia	46.3%	-59	3	Same	0.345	-0.001	67%	50%
Philippines	63.0%	20	3	Same	0.444	0.007	67%	33%

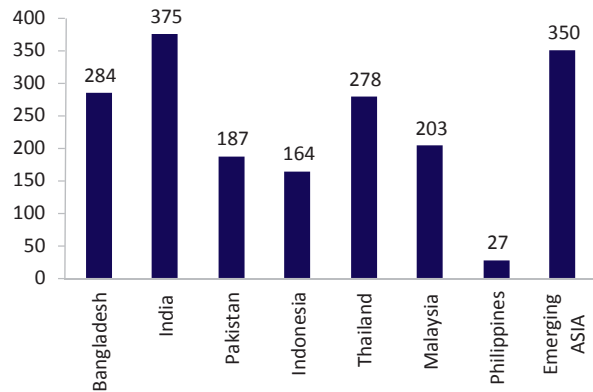
Source: BofA ML Global Research estimates, AT Capital Research

Penetration-4Q2009, Emerging Market



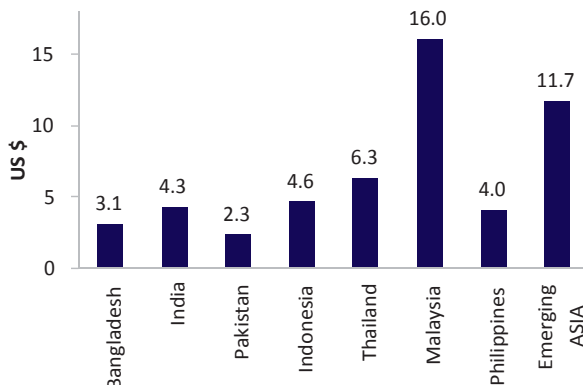
Source: BofAML Global Research estimates & AT Capital Research

MOU (Min)-4Q09-Emerging Market



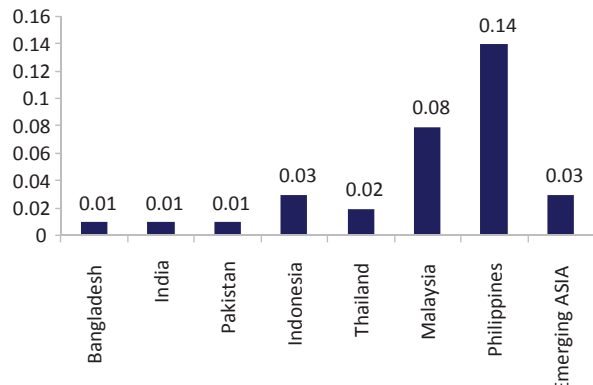
Source: BofAML Global Research estimates & AT Capital Research

ARPU(USD) - 4Q09, Emerging Market



Source: BofAML Global Research estimates & AT Capital Research

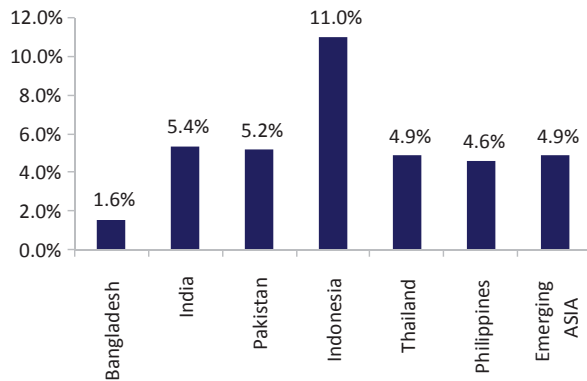
RPM (USD) - Emerging Market



Source: BofAML Global Research estimates & AT Capital Research

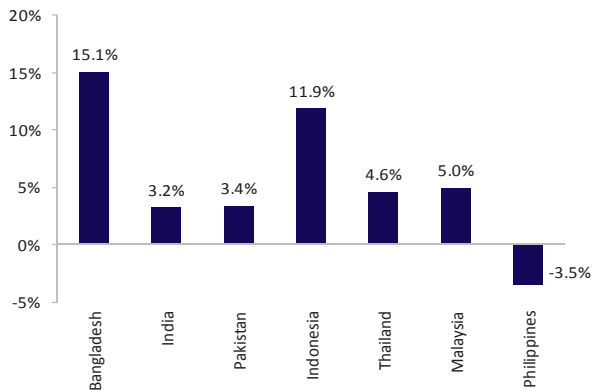


Monthly churn - Emerging Market



Source: BofAML Global Research estimates & AT Capital Research

Annualized Service Revenue YoY Ch-4Q09 ange



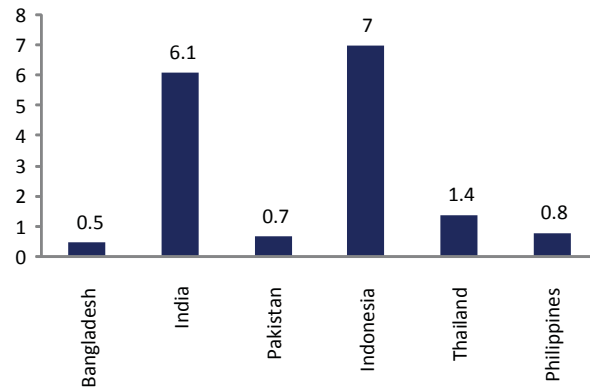
Source: BofAML Global Research estimates & AT Capital Research

Wireless capex (US\$bn, annualized)

Emerging markets	Wireless capex (US\$bn, annualized)							
	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	0.1	0.2	0.2	0.5	0.5	0.5	0.4	0.4
India	1.6	2.3	2.9	7	8.4	6.1	5.5	5.9
Pakistan	0.2	0.3	0.5	0.9	1	0.7	0.6	0.6
Indonesia	0.8	0.9	1.3	2.4	2.9	7	8.4	6.1
Thailand	1	1	1.1	2.3	2.2	1.4	1.2	1.2
Philippines	0.6	0.6	0.6	1.1	1.2	0.8	0.7	0.7
Emerging ASIA	18.6	21	25.1	46.3	50.2	38.5	34.7	36

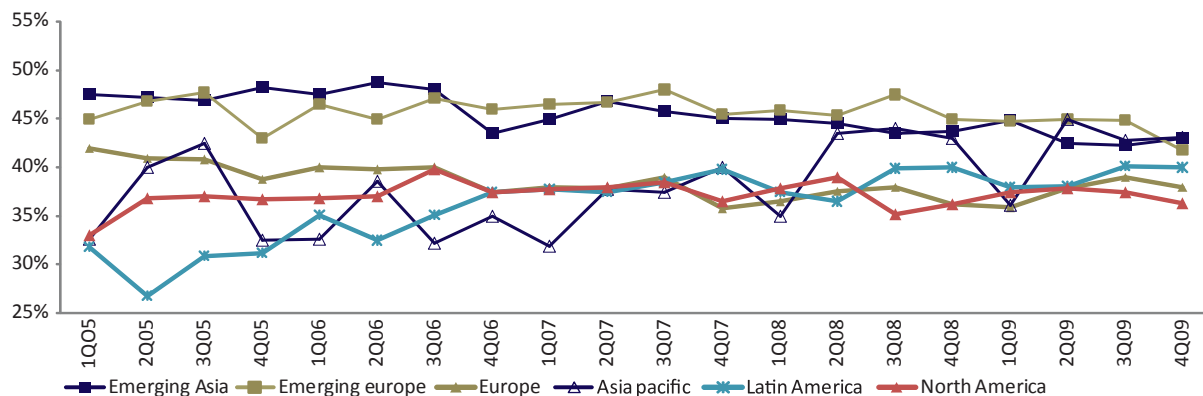
Source: BofAML Global Research estimates & AT Capital Research

Wireless capex (USD bn, annualized), 2009



Source: BofAML Global Research estimates & AT Capital Research

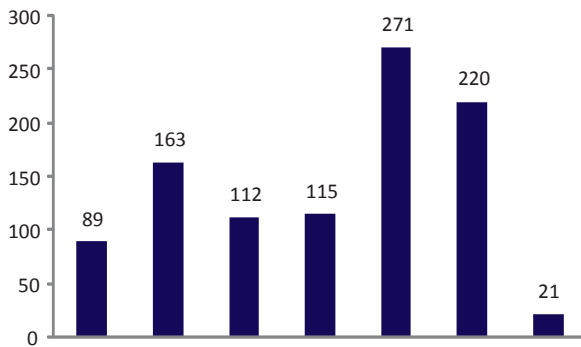
Average EBITDA Service margin by region



Source: BofAML Global Research estimates & AT Capital Research



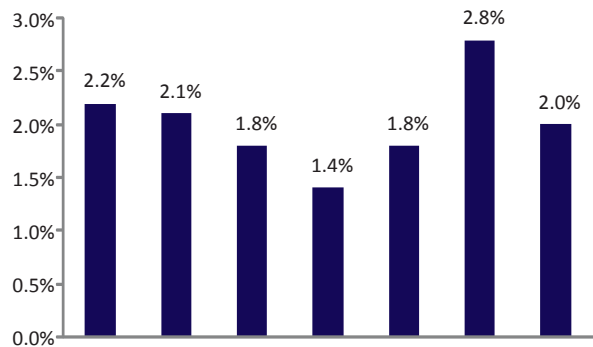
Minutes of Usage - Market Potential 2009



Bangladesh India Pakistan Indonesia Thailand Malaysia Philippines

Source: BofAML Global Research estimates & AT Capital Research

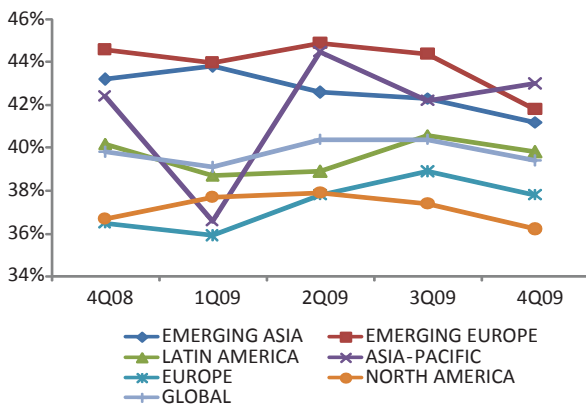
Mobile spend/GDP in 2009 - Market Potential



Bangladesh India Pakistan Indonesia Thailand Malaysia Philippines

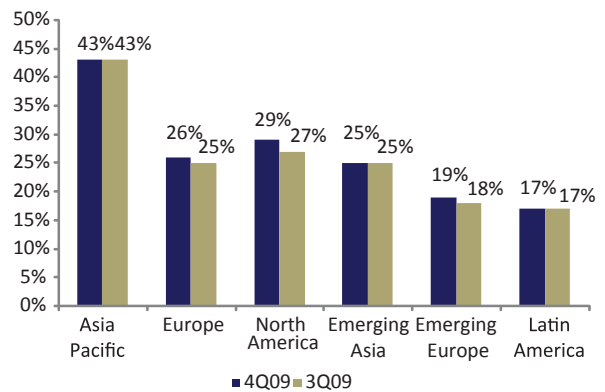
Source: BofAML Global Research estimates & AT Capital Research

EBITDA Service Margins by Region



Source: BofAML Global Research estimates & AT Capital Research

Mobile Data as % of Revenue by Region: 4Q09 vs 3Q09



Source: BofAML Global Research estimates & AT Capital Research

Service Margin Expansion (Contraction) by Region (YoY, Basis Points)

Region	4Q08	1Q09	2Q09	3Q09	4Q09
Emerging Market Average	(130)	(102)	(41)	(88)	(192)
Emerging Asia	(226)	(116)	(120)	(44)	(192)
Emerging Europe	(129)	(213)	(85)	(259)	(279)
Latin America	92	96	226	115	(37)
Developed Country Average	86	(29)	5	77	55
Asia-Pacific	233	94	159	(110)	60
Europe	92	(62)	7	69	128
North America	(24)	(71)	(106)	165	(41)
Global	9	(60)	(14)	8	(39)

Source: BofAML Global Research estimates & AT Capital Research

Year-End Subscribers (Millions)

	Year-End Subscribers (Millions)							
	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	4	10	20	34	45	52	69	85
India	50	82	147	234	347	525	704	870
Pakistan	8	22	48	77	90	98	106	114
Indonesia	31	50	66	95	141	162	178	194
Thailand	27	30	40	53	62	66	69	70
Malaysia	15	20	19	23	27	30	33	36
Philippines	33	35	42	54	66	72	76	79
Emerging Asia	540	681	885	1,162	1,466	1,801	2,129	2,421

Source: BofAML Global Research estimates & AT Capital Research



Service Margin Expansion (Contraction) by Region (YoY, Basis Points)

YoY Subscriber Growth									
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	n/a	n/a	162.6%	90.5%	72.1%	29.9%	17.5%	31.6%	23.2%
India	157.7%	57.3%	62.5%	79.2%	59.2%	48.3%	51.4%	34.1%	23.5%
Pakistan	n/a	n/a	170.3%	122.7%	59.5%	16.9%	8.5%	8.6%	8.0%
Indonesia	62.2%	69.4%	59.9%	32.5%	43.0%	48.9%	15.0%	9.5%	9.0%
Thailand	26.9%	22.1%	12.1%	32.0%	32.1%	16.8%	6.8%	4.2%	2.3%
Malaysia	74.9%	32.6%	33.7%	-0.3%	20.0%	15.9%	11.5%	10.0%	7.4%
Philippines	48.6%	46.1%	5.3%	22.0%	27.3%	21.9%	9.8%	5.5%	4.4%
Emerging Asia	41.4%	30.7%	32.0%	36.0%	33.9%	27.8%	25.0%	19.2%	14.2%

Source: BofAML Global Research estimates & AT Capital Research

Year-End Subscribers (Millions)

YoY Net Additions (Millions)									
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	n/a	n/a	6.5	9.5	14.4	10.3	7.8	16.6	16.0
India	19.6	18.4	31.5	65.0	87.0	112.9	178.2	179.3	165.5
Pakistan	n/a	6.0	13.6	26.6	28.7	13.0	7.7	8.4	8.5
Indonesia	7.1	12.8	18.8	16.3	28.5	46.4	21.2	15.4	16.0
Thailand	4.7	4.9	3.3	9.7	12.9	8.9	4.2	2.8	1.6
Malaysia	4.7	3.6	4.9	(0.1)	3.9	3.7	3.1	3.0	2.5
Philippines	7.4	10.4	1.8	7.6	11.6	11.8	6.4	4.0	3.4
Emerging Asia	106.8	131.2	140.7	204.1	277.2	304.0	334.7	328.0	291.9

Source: BofAML Global Research estimates & AT Capital Research

Wireless Service Revenues (US\$ bn)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	n/a	n/a	0.5	0.7	1.0	1.3	1.6	1.9	2.2	2.3
India	n/a	2.9	5.8	9.2	11.8	19.5	24.6	24.5	28.1	31.0
Pakistan	n/a	n/a	0.6	1.1	1.8	2.6	2.9	2.7	2.8	3.1
Indonesia	1.4	2.2	2.8	3.5	5.0	6.5	6.8	6.9	8.8	9.6
Thailand	2.0	2.6	3.2	3.5	3.8	4.7	4.7	4.5	4.8	5.0
Malaysia	1.7	2.6	3.2	3.6	4.1	4.9	5.5	5.5	6.1	6.5
Philippines	n/a	1.8	2.1	2.2	2.5	3.1	3.3	3.1	3.3	3.4
Emerging Asia	37.7	51.9	64.6	80.7	97.8	123.0	140.9	147.3	170.0	183.7

Source: BofAML Global Research estimates & AT Capital Research

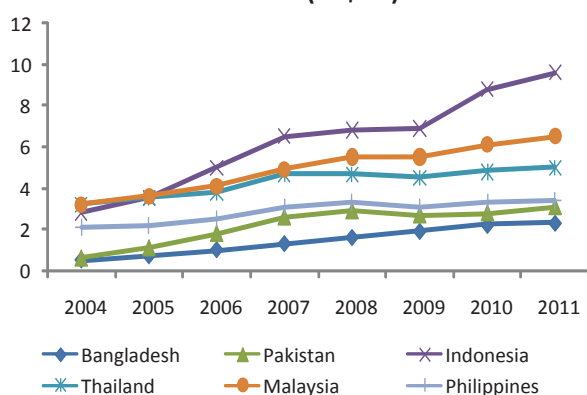
EBITDA Service Margin

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	n/a	n/a	47.3%	40.0%	42.1%	34.6%	33.9%	49.0%	49.1%	49.4%
India	n/a	30.6%	33.3%	35.7%	39.4%	38.4%	33.8%	31.9%	29.4%	29.8%
Pakistan	n/a	n/a	48.7%	27.8%	25.7%	36.0%	32.1%	31.9%	32.3%	32.7%
Indonesia	96.5%	85.5%	76.8%	73.2%	70.0%	63.3%	57.8%	58.6%	59.5%	58.9%
Thailand	44.0%	53.4%	52.8%	49.0%	44.8%	46.2%	46.5%	46.2%	46.4%	45.8%
Malaysia	47.7%	47.2%	49.4%	50.1%	48.6%	46.4%	48.1%	46.6%	46.4%	46.0%
Philippines	n/a	62.6%	63.7%	63.6%	64.9%	65.6%	64.8%	63.0%	65.5%	65.3%
Emerging Asia	51.9%	50.7%	47.6%	47.1%	46.6%	45.5%	43.7%	42.6%	39.7%	38.0%

Source: BofAML Global Research estimates & AT Capital Research

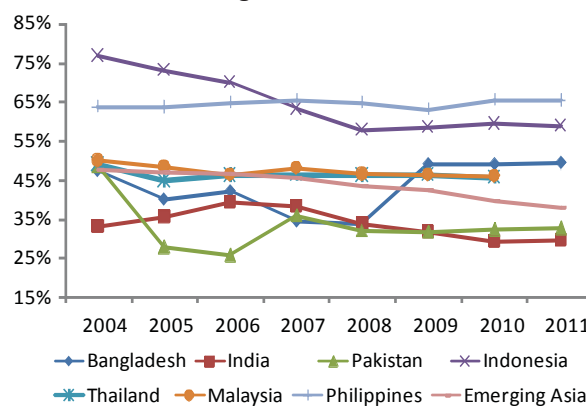


Wireless Service Revenues(US\$ bn)



Source: BofAML Global Research estimates & AT Capital Research

EBITDA Service Margin



Source: BofAML Global Research estimates & AT Capital Research

YoY Service Revenue Growth (in Reporting Currency Terms)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	n/a	n/a	n/a	43.2%	38.7%	28.9%	24.6%	20.6%	14.0%	4.9%
India	n/a	n/a	94.6%	39.8%	46.9%	50.6%	32.5%	10.9%	9.4%	10.4%
Pakistan	n/a	n/a	n/a	74.3%	68.5%	43.9%	27.9%	9.9%	8.0%	7.2%
Indonesia	38.4%	42.6%	34.0%	38.2%	33.2%	30.3%	10.1%	9.5%	15.0%	8.5%
Thailand	3.2%	24.0%	19.8%	9.0%	1.9%	4.4%	3.6%	-1.5%	3.6%	3.7%
Malaysia	26.2%	50.5%	21.9%	13.0%	8.9%	11.4%	9.5%	5.2%	7.4%	6.3%
Philippines	n/a	n/a	19.4%	6.1%	4.8%	10.7%	1.3%	0.1%	2.4%	4.2%
Emerging Asia	33.8%	23.9%	23.9%	21.2%	19.9%	21.0%	14.6%	8.8%	9.3%	8.1%

Source: BofAML Global Research estimates & AT Capital Research

YoY% Change in MOU per Subscriber

	1Q07	2Q07	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09
Bangladesh	24.2%	22.8%	22.6%	17.8%	11.3%	19.7%	21.0%	18.3%	21.2%	-3.0%	-2.0%	-6.3%
India	8.8%	9.0%	1.4%	-3.2%	-6.3%	-3.5%	2.9%	0.5%	-8.6%	-11.3%	-16.0%	-12.8%
Pakistan	-1.7%	7.3%	10.5%	25.2%	15.3%	10.9%	4.9%	3.1%	5.8%	6.7%	12.4%	10.0%
Indonesia	7.0%	5.5%	6.2%	25.9%	133.8%	126.4%	183.0%	146.3%	40.2%	40.5%	5.4%	4.2%
Thailand	13.7%	-15.3%	-6.2%	-1.1%	-1.3%	1.5%	1.9%	-6.4%	-9.0%	-8.5%	-6.3%	5.9%
Malaysia	12.8%	17.8%	23.0%	11.6%	7.7%	9.2%	8.3%	8.6%	-2.9%	0.8%	1.1%	1.6%
Philippines	n/a	n/a	n/a	n/a	-14.9%	-14.5%	-19.2%	-20.0%	-10.1%	-8.9%	-6.4%	68.3%
Emerging Asia	11.1%	12.1%	9.4%	11.1%	16.4%	16.0%	20.9%	15.7%	2.5%	0.4%	-2.3%	1.6%

Source: BofAML Global Research estimates & AT Capital Research

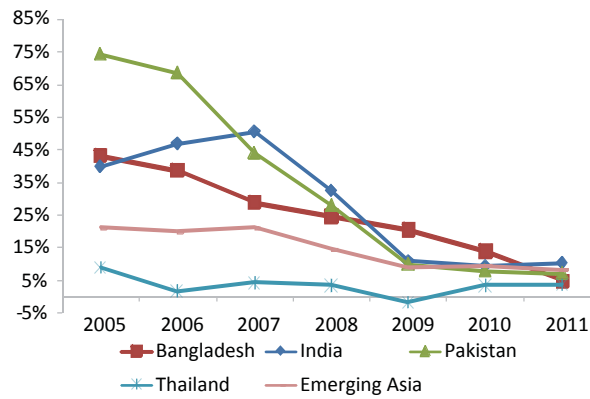
Estimated Annualized Mobile Data Revenues (US\$ bn) & Percentage of Service Revenue from Data of India

	1Q07	2Q07	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09
Estimated Annualized mobile data revenues (US\$ bn)	1.4	1.5	1.7	1.8	2.1	2.2	2.2	2.1	2.2	2.4	2.4	2.8
Percentage of Service Revenue From Data	8.60%	8.20%	8.30%	8.10%	8.30%	8.80%	9.00%	8.80%	9.40%	9.60%	10.10%	11.10%

Source: BofAML Global Research estimates & AT Capital Research

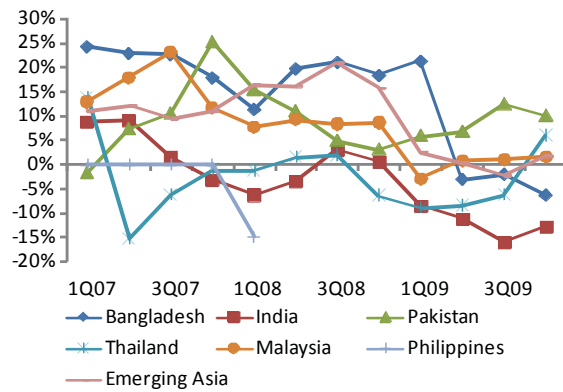


YoY Service Revenue Growth



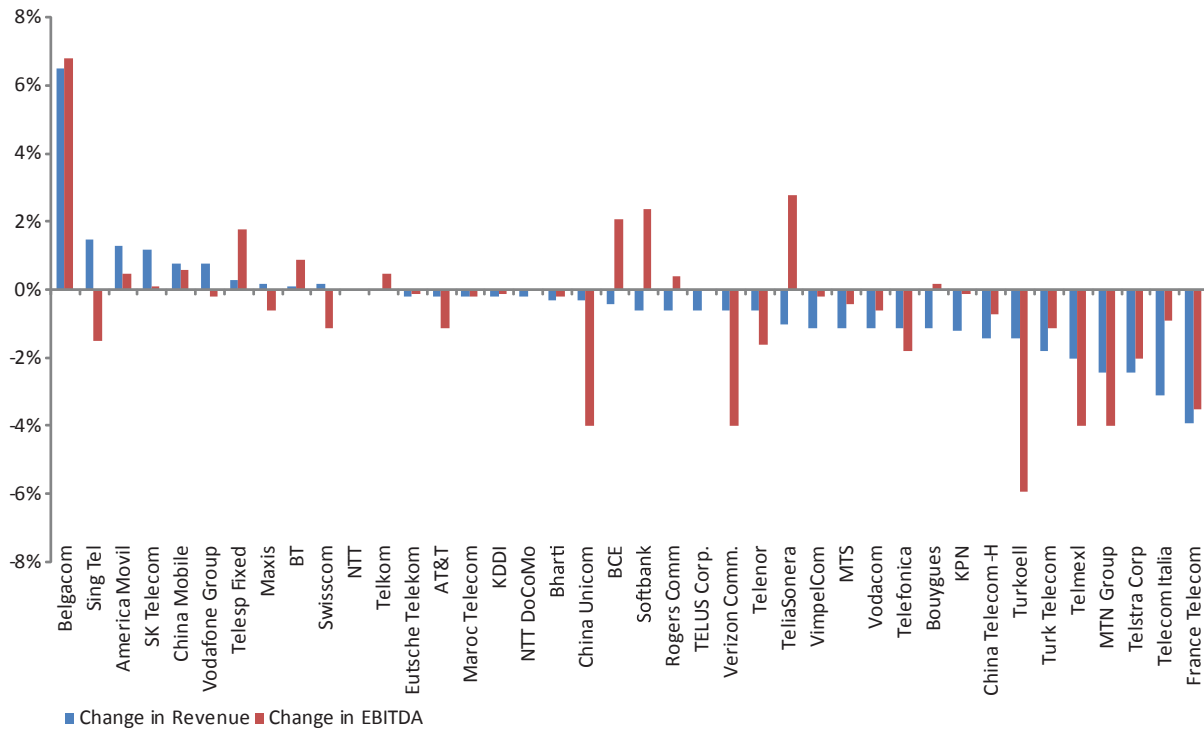
Source: BofAML Global Research estimates & AT Capital Research

YoY% Change in MOU per Subscriber



Source: BofA ML Global Research estimates & AT Capital Research

Change in Current Year Revenue & EBITDA Consensus for Top 40 Global Telecoms VS 3 Months Ago



Net monthly churn %

	2007				2008				2009			
	1Q 07	2Q 07	3Q 07	4Q 07	1Q 08	2Q 08	3Q 08	4Q 08	1Q 09	2Q 09	3Q 09	4Q 09
Bangladesh	2.1%	2.1%	2.2%	1.4%	1.8%	1.9%	2.4%	0.6%	n/a	n/a	n/a	n/a
India	3.9%	3.8%	3.1%	3.1%	3.3%	3.0%	2.7%	2.5%	2.8%	3.4%	3.9%	5.4%
Pakistan	4.1%	8.9%	8.9%	5.2%	4.8%	9.2%	9.5%	11.8%	5.7%	5.1%	5.2%	5.2%
Indonesia	12.4%	12.4%	12.3%	11.7%	10.3%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
Thailand	2.9%	2.8%	4.0%	4.0%	4.2%	4.3%	4.5%	4.9%	4.8%	4.6%	4.7%	4.9%
Malaysia	3.7%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Phillippines	3.2%	3.4%	3.6%	4.7%	4.5%	4.7%	4.7%	5.2%	5.1%	4.8%	5.1%	4.6%
Emerging Asia	3.7%	4.1%	4.0%	3.8%	3.9%	4.2%	4.1%	4.3%	4.1%	4.2%	4.5%	4.9%

Source: BofAML Global Research estimates & AT Capital Research



Monthly minutes of use per subscriber

	2007				2008				2009			
	1Q 07	2Q 07	3Q 07	4Q 07	1Q 08	2Q 08	3Q 08	4Q 08	1Q 09	2Q 09	3Q 09	4Q 09
Bangladesh	230	245	243	256	256	293	294	303	310	284	288	284
India	474	472	436	427	444	455	449	430	406	404	377	375
Pakistan	142	154	153	165	164	171	160	170	173	182	180	187
Indonesia	50	53	55	64	116	119	155	157	163	168	164	164
Thailand	293	277	269	281	289	281	274	263	263	257	257	278
Malaysia	185	187	190	198	196	195	202	200	190	197	204	203
Phillippines	20	20	20	20	17	17	16	16	15	16	15	27
Emerging Asia	318	333	326	333	340	356	348	349	342	353	344	350

Source: BofAML Global Research estimates & AT Capital Research

Wireless penetration %

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	n/a	n/a	3%	7%	13%	22%	28%	32%	41%	50%
India	1%	3%	5%	7%	13%	20%	29%	44%	58%	70%
Pakistan	n/a	n/a	5%	14%	31%	49%	56%	60%	64%	68%
Indonesia	5%	9%	14%	23%	30%	42%	62%	70%	76%	82%
Thailand	28%	35%	42%	47%	62%	81%	93%	99%	102%	103%
Malaysia	26%	44%	57%	75%	74%	87%	99%	106%	118%	124%
Phillippines	19%	28%	39%	41%	49%	61%	73%	78%	81%	83%
Emerging Asia	10%	13%	17%	21%	27%	36%	44%	54%	63%	71%

Source: BofAML Global Research estimates & AT Capital Research

Average Monthly Revenue Per User USD

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	n/a	n/a	16.51	9.6	6.12	4.51	3.54	3.09	3.16	3.02
India	n/a	12.02	11.41	10.76	9.03	8.3	6.93	4.66	3.81	3.28
Pakistan	n/a	n/a	8.9	6.03	4.31	3.47	2.71	2.4	2.33	2.31
Indonesia	13.9	13.04	10.35	7.72	7.68	7.1	4.96	3.86	4.39	4.34
Thailand	13.11	11.56	11.52	10.45	9.07	8.26	7	5.95	6.08	6.11
Malaysia	24.12	22.74	19.49	17.02	15.03	18.23	17.5	15.66	15.65	15.31
Phillippines	n/a	7.98	6.26	5.46	5.55	5.45	4.74	3.95	3.88	3.84
Emerging Asia	19.08	17.57	16.32	16.44	16.3	15.65	13.03	11.01	11.21	10.78

Source: BofAML Global Research estimates & AT Capital Research

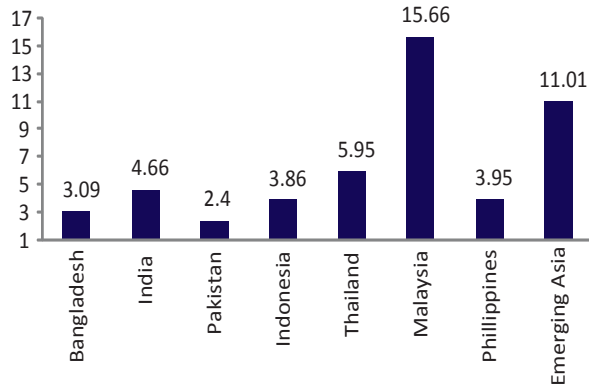
YoY ARPU Growth %

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh				-41.80%	-36.20%	-26.30%	-21.60%	-12.50%	2.20%	-4.60%
India			-7.80%	-8.20%	-22.20%	-6.90%	-12.10%	-25.20%	-22.10%	-13.70%
Pakistan				-30.80%	-27.60%	-19%	-9.10%	2.30%	0.90%	-1
Indonesia		-13.70%	-17.20%	-19%	-6.10%	-7.80%	-26.20%	-16.40%	2%	-1%
Thailand	-36.50%	-14.90%	-3.40%	-9.30%	-18.30%	-21.90%	-13.90%	-11.60%	-1.40%	0.50%
Malaysia	-10.10%	-5.70%	-14.30%	-13%	-14.50%	13.60%	-6.90%	-5.40%	-3.60%	-2.20%
Phillippines			-18.90%	-14.30%	-5.30%	-11.80%	-16%	-10.70%	-4.70%	-1.10%
Emerging Asia	-15.70%	-6.20%	-8.50%	-6.90%	-5.20%	-3.60%	-7.40%	-9.90%	-6.60%	-4.40%

Source: BofAML Global Research estimates & AT Capital Research

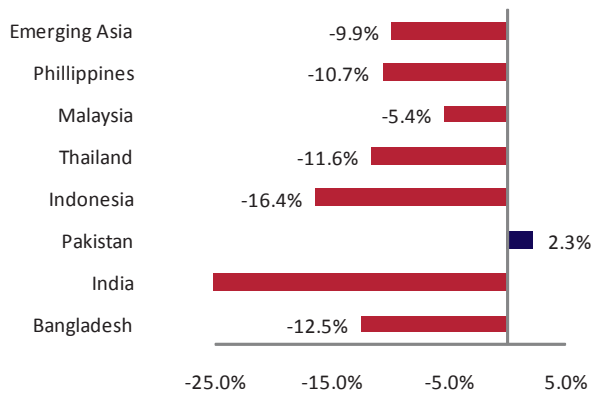


Average Monthly Revenue Per User (USD) - 2009



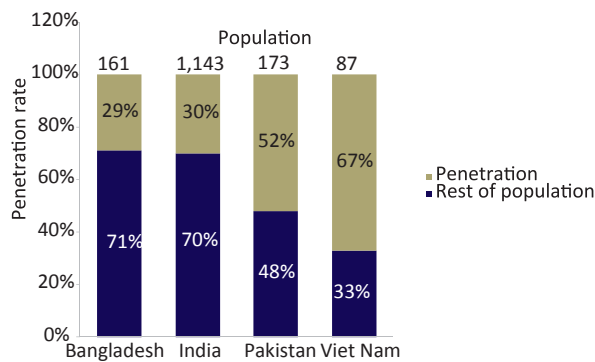
Source: BofAML Global Research estimates & AT Capital Research

YoY ARPU Growth % - 2009



Source: BofAML Global Research estimates & AT Capital Research

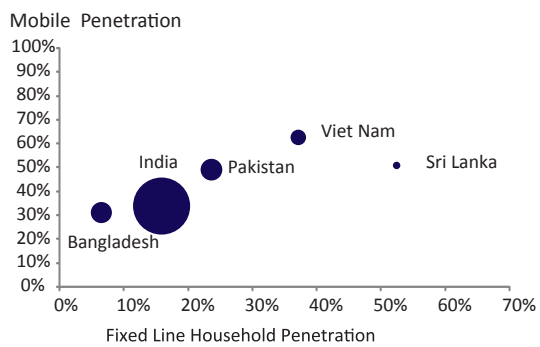
Market size and growth rates by subscribers, 2008



CAGR: 2000 - 08 81%

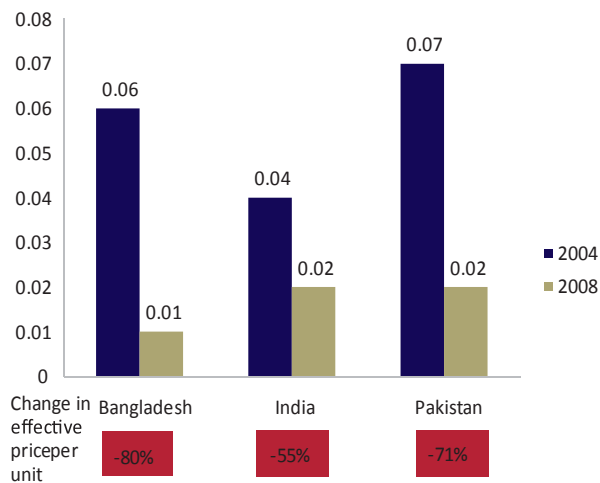
Source: Wireless Intelligence, Euromonitor, A.T. Kearney

Mobile vs. Fixed Lines Penetration, 2008



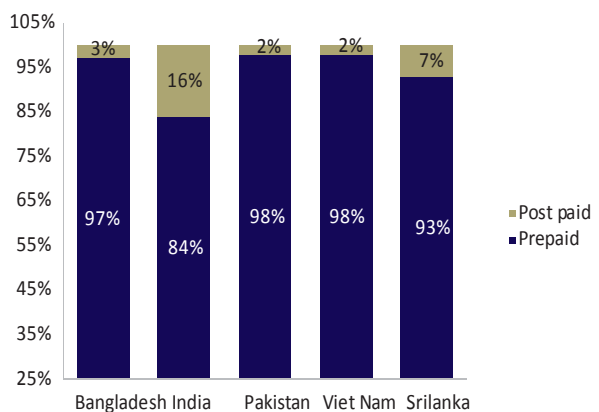
Source: Wireless Intelligence, Euromonitor, Ovum, A.T. Kearney Analysis
Note: Size of the bubble denotes population size

Average Revenue per minute for selected markets, 2008



Source: Wireless Intelligence, Euromonitor, A.T. Kearney

Prepaid and Post paid Connections in AP5, 2008



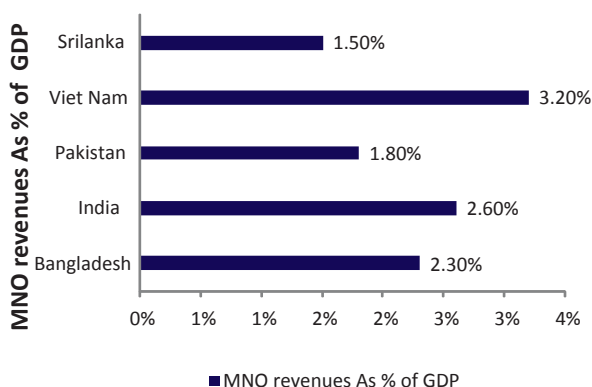
Source: Wireless Intelligence, Euromonitor, A.T. Kearney



Direct contribution of mobile operators to GDP, 2008

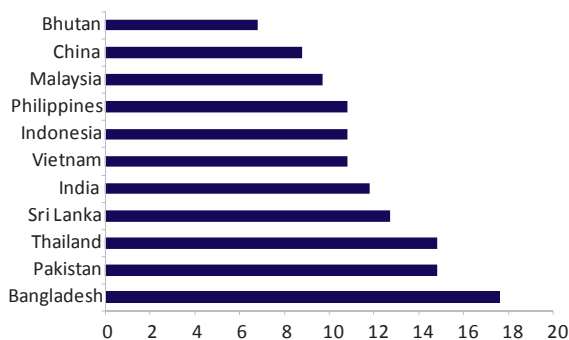
	MNO revenues As % of GDP	Potential increase to GDP
Bangladesh	2.30%	5.80%
India	2.60%	5.80%
Pakistan	1.80%	4.10%
Viet Nam	3.20%	3.30%
Srilanka	1.50%	4.10%

Source: Wireless Intelligence, Euromonitor, A.T. Kearney



Source: BofAML Global Research estimates & AT Capital Research

Tax as proportion of Total cost Mobile Ownership (TCMO) (in %)



Source: "Global tax review 2006-07 by Deloitte

WEF Network Readiness Index: Political and Regulatory (Environment Sub-Index) Ranking, 2008

Country	Asia Specific rank (6 countries)	Global rank (134 countries)
Bangladesh	21	130
India	12	57
Pakistan	18	107
Viet Nam	11	53
Srilanka	13	71
Nepal	19	115

Source: Global Information Technology Report 2008-2009: Mobility in a Networked World. World Economic Forum

Examples of Telecom-specific Taxes in Asia Pacific, 2008

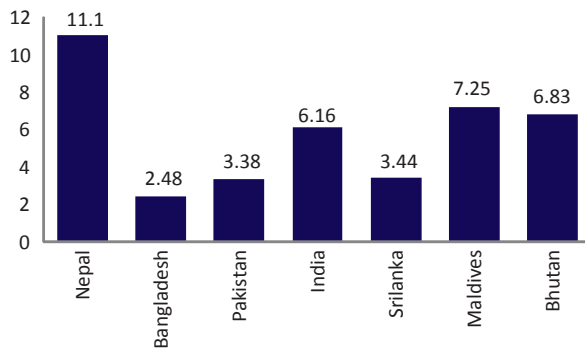
Country	Examples of Telecom-Specific Taxes (not exhaustive)
Bangladesh	12% duty on handsets (decreased from 25% in 2009/10 budget)
	\$11.63 tax on SIMs
	12.24% tax on usage charges
India	13% tax on handset imports
	\$1.36 tax on SIMs
	10.3% tax on usage charges (reduced from 12.5% in Feb 2009)
Pakistan	\$3 tax on handset imports
	\$3 tax for activation
	\$0.10 tax on usage
	\$0.002 per SMS (introduced in 2009-10 Budget)
Srilanka	33% tax on handset imports
	10% tax for Mobile Subscriber Levy
	Additional taxes like Environment Conservation Levy (2%), Nation Building Tax (3%)

Source: Interviews with regulatory bodies, regulator websites, A.T. Kearney analysis



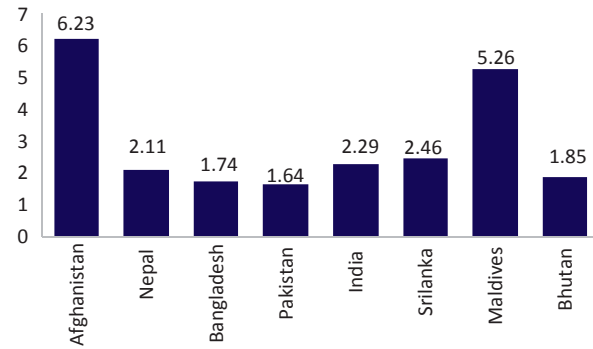
Appendix 2.3:

Average monthly postpaid mobile cost for a Low User, USD



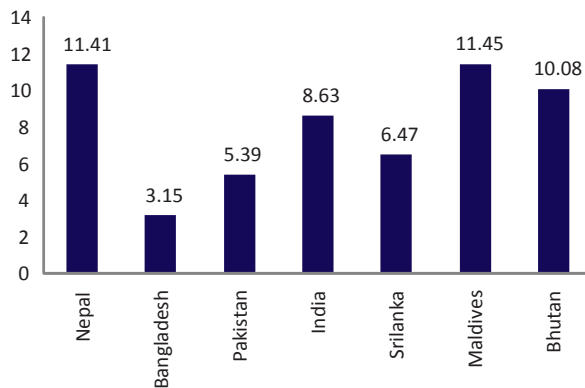
Source: Mobile Benchmarks, LIRNE

Average monthly prepaid mobile cost for a low user, USD



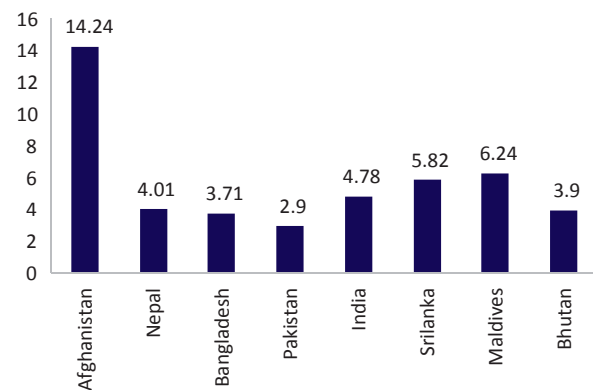
Source: Mobile Benchmarks, LIRNE

Average monthly postpaid mobile cost for a Medium User, USD



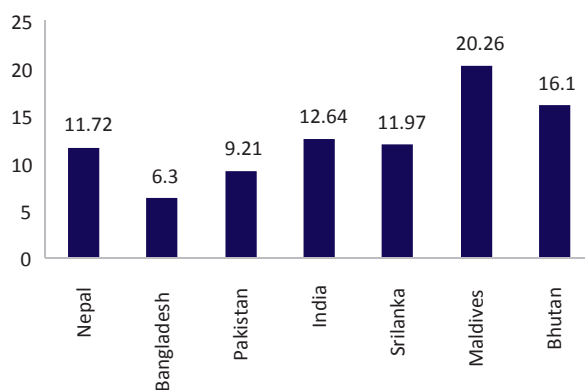
Source: Mobile Benchmarks, LIRNE

Average monthly prepaid mobile cost for a Medium User, USD



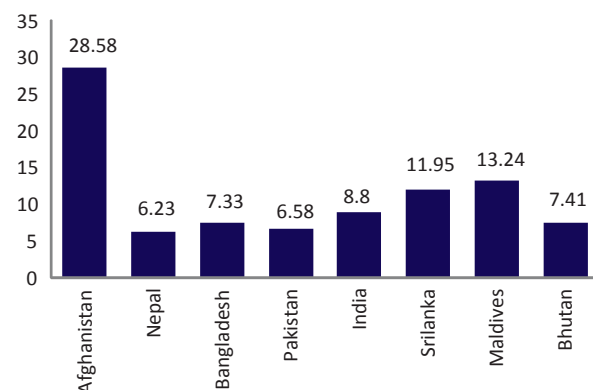
Source: Mobile Benchmarks, LIRNE

Average monthly postpaid mobile cost for a High User, USD



Source: Mobile Benchmarks, LIRNE

Average monthly prepaid mobile cost for a High User, USD

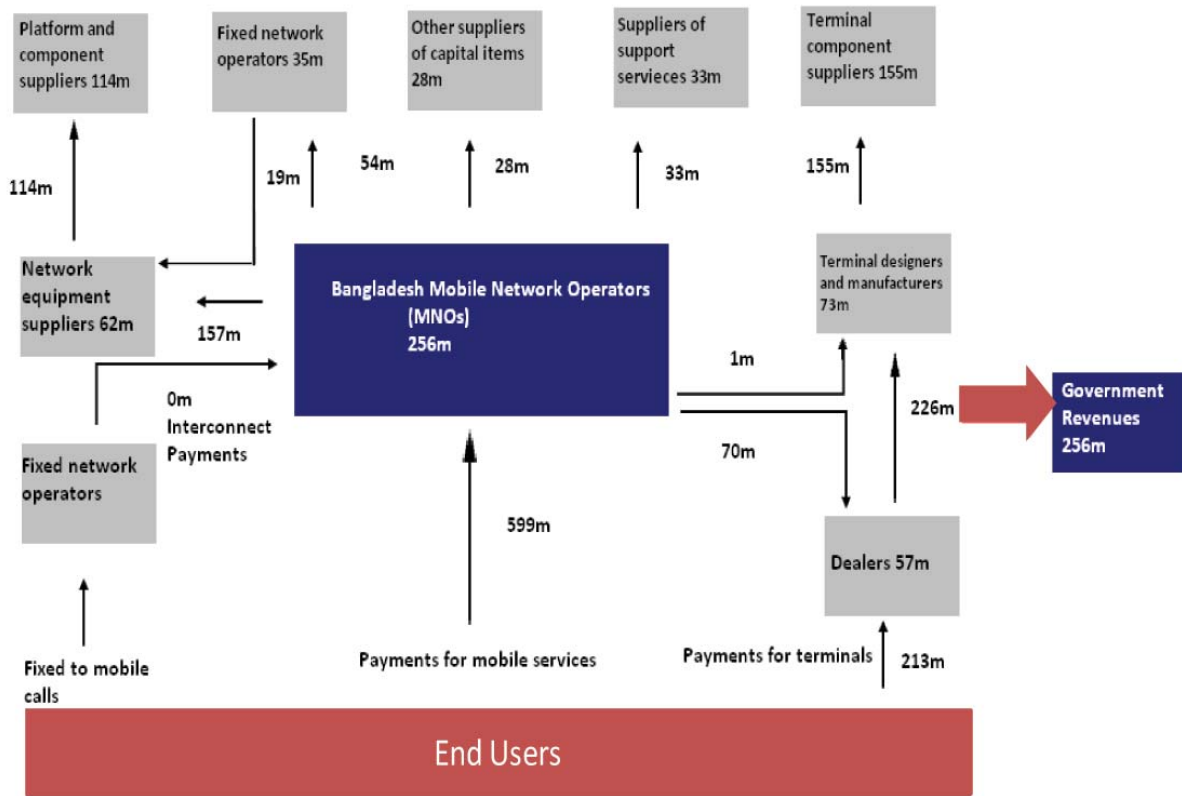


Source: Mobile Benchmarks, LIRNE



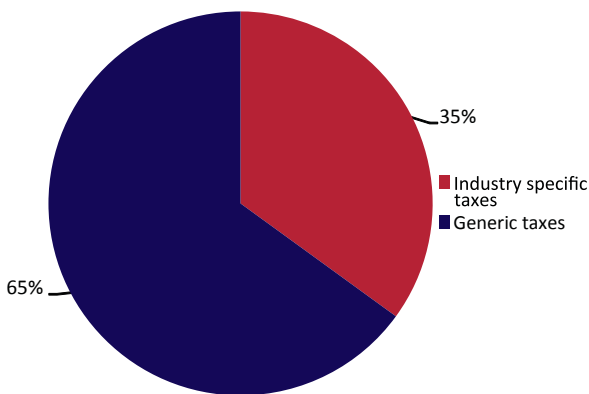
Appendix 2.4

Mobile service industry value chain



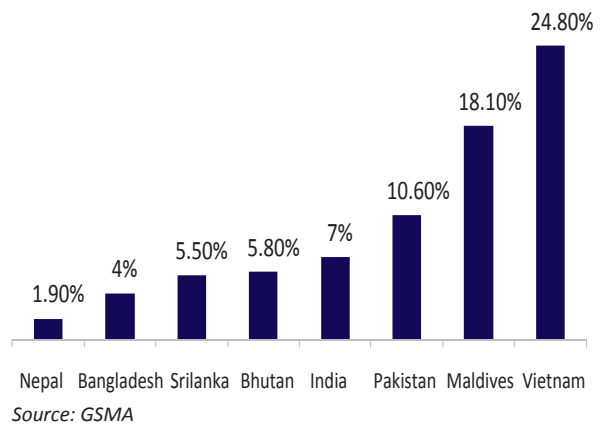
Source: Ovum, April 2006

Split of industry specific and generic taxes



Source: Ovum, April 2006

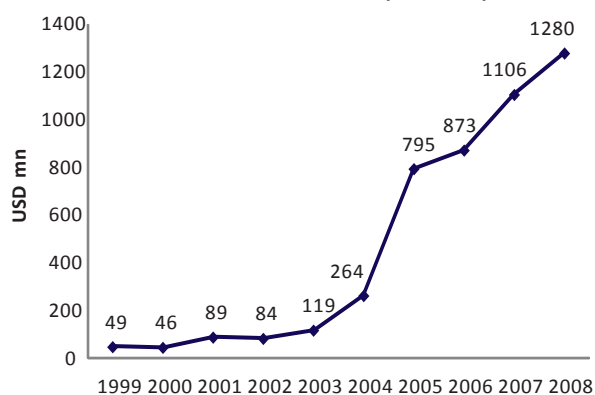
Internet Penetration in the region



Source: GSMA

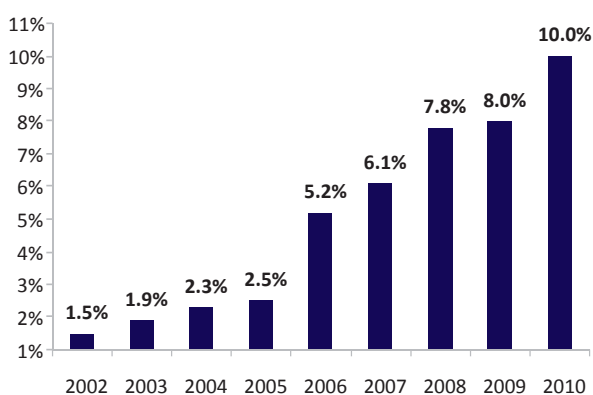


Telecommunication Investment (USD mn)



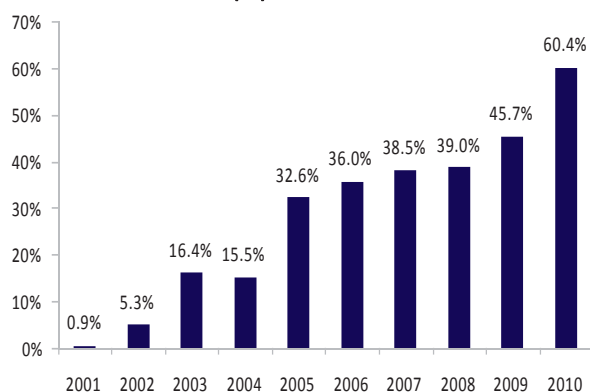
Source: AMTOB & AT Capital Research
Note: Investment in 2008 is annualized based on 3Q

% of total revenue of NBR



Source: AMTOB and NBR

Contribution to FDI (%)

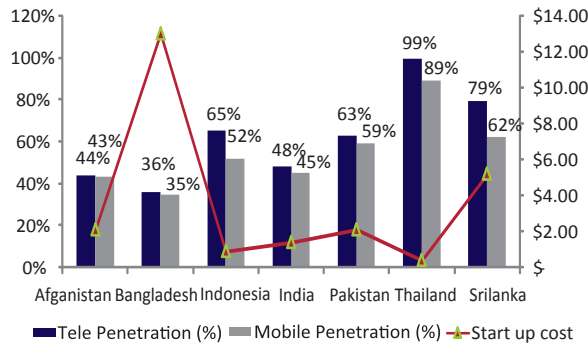


Source: Bangladesh Bank; Figure for 2010 provisional, only for 9 months



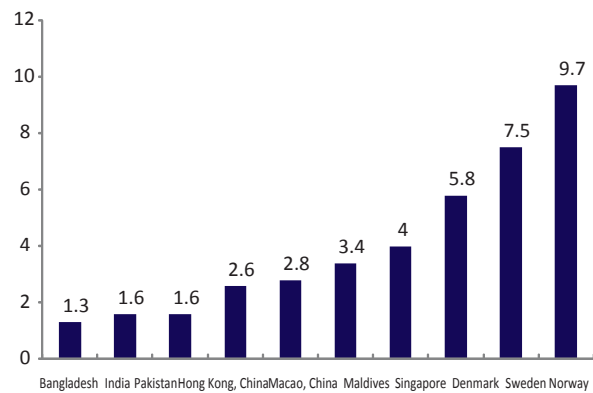
Appendix 2.5

Tele Penetration and Start up Cost in the Region



Source: ITU

Country specific mobile baskets



Source: ITU

International Internet bandwidth per Internet user

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	160	215	211	206	200	162	773	1284	n/a
Pakistan	n/a	113	103	47	41	69	213	404	n/a
India	153	211	113	162	559	741	839	777	n/a
Sri Lanka	82	167	463	330	1107	1426	1864	3072	3291
Nepal	n/a	167	247	237	249	210	300	350	n/a
Viet Nam	120	34	95	335	298	338	482	704	2403

Source: ITU

Mobile cellular - price of 3 minute local call (off-peak) (US\$)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	0.19	0.18	0.31	0.31	0.15	0.14	0.02	n/a	0.07
Pakistan		0.16	0.29	0.30	0.30	0.26	0.12	n/a	0.06
India		0.13	0.12	0.13	0.07	0.07	0.12	n/a	0.07
Sri Lanka	0.16	0.13	0.22	0.22	0.21	0.21	0.20	n/a	0.19
Nepal	0.13	0.12	0.12	0.07	0.06	0.06	0.06	n/a	0.09
Viet Nam	0.24	0.23	0.25	0.16	0.32	0.31	0.30	n/a	0.22

Source: ITU

Mobile cellular postpaid connection charge (US\$)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	28.8	26.9	9.9	9.9	25.2	23.3	13.1	n/a	2.2
Pakistan	37.3	32.3	33.5	17.3	8.6	2.5	2.5	n/a	7.1
India	26.7	25.4	10.3	10.7	2.2	2.2	2.2	n/a	2.3
Sri Lanka	64.9	55.9	10.5	10.4	14.8	10.0	7.7	n/a	5.5
Nepal	42.2	40.0	38.5	13.1	13.6	14.0	n/a	n/a	7.2
Viet Nam	76.9	55.6	39.3	35.2	n/a	3.2	3.1	n/a	n/a

Source: ITU



Internet users (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	0.07	0.13	0.14	0.16	0.20	0.24	0.29	0.32	0.35	0.38
Pakistan		1.32	2.58	5.04	6.16	6.33	7.08	10.11	10.45	11.26
India	0.53	0.66	1.54	1.69	1.98	2.39	2.81	3.95	4.38	5.12
Sri Lanka	0.65	0.79	1.05	1.46	1.45	1.79	2.54	3.88	5.80	8.78
Nepal	0.20	0.24	0.31	0.38	0.45	0.83	1.14	1.41	1.73	2.13
Viet Nam	0.25	1.27	1.85	3.78	7.64	12.74	17.25	20.76	23.92	27.25

Source: ITU

Monthly subscription for residential telephone service (US\$)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	2.88	2.69	2.59	2.58	2.52	2.33	2.18	1.16	1.17
Pakistan	4.57	3.96	4.37	3.01	2.99	2.92	2.89	2.86	2.47
India	5.56	5.30	5.14	2.58	2.65	2.72	2.65	2.90	2.76
Sri Lanka	2.60	2.24	2.09	5.13	4.89	4.93	4.76	3.12	3.18
Nepal	2.11	2.00	2.57	2.63	2.71	2.80	2.75	3.01	2.87
Viet Nam	1.91	1.83	1.77	1.74	1.72	1.70	1.69		1.66

Source: ITU

Mobile cellular prepaid – price of SMS (on-net) (US\$)

	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	n/a	n/a	n/a	n/a	0.03	0.01	n/a	0.01
Pakistan	n/a	0.03	0.03	0.03	0.03	0.02	n/a	0.02
India	n/a	n/a	0.02	n/a	0.03	0.03	n/a	0.02
Sri Lanka	0.03	0.03	0.02	0.02	0.02	0.02	n/a	0.01
Nepal	n/a	n/a	0.01	0.01	0.01	0.01	n/a	0.02
Viet Nam	n/a	n/a	0.03	n/a	0.03	0.03	n/a	0.02

Source: ITU

Mobile cellular telephone subscriptions in thousand (post-paid + prepaid)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	279	520	1075	1365	2782	9000	19131	34370	44640	50400
Pakistan	306	743	1699	2404	5023	12771	34507	62961	88020	102980
India	3577	6540	13000	33690	52220	90140	166050	233620	346890	525090
Sri Lanka	430	668	931	1393	2211	3362	5412	7983	11082	14095
Nepal	10	17	22	82	117	227	1157	3269	4200	7618
Viet Nam	789	1251	1902	2742	4960	9593	15505	23730	70000	88566

Source: ITU

Monthly subscription for business telephone service (US\$)

	2000	2001	2002	2003	2004	2005	2006	2007
Bangladesh	2.88	2.69	2.59	2.58	2.52	2.33	2.18	1.16
Pakistan	4.57	3.96	4.37	3.01	2.99	2.92	2.89	2.86
India	5.56	5.30	5.14	3.86	3.97	4.54	n/a	2.90
Sri Lanka	3.90	4.03	4.70	12.95	12.35	12.44	12.03	8.59
Nepal	2.11	2.00	2.57	2.63	2.71	2.80	2.75	3.01
Viet Nam	1.91	1.83	1.77	1.74	1.72	1.70	1.69	n/a

Source: ITU



Cost of a local 3-minute call (off-peak rate) (US\$)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.00
Pakistan	n/a	n/a	0.03	0.03	0.03	0.03	0.03	0.03	0.03
India	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Sri Lanka	0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Nepal	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Viet Nam	0.03	0.02	0.02	0.02	0.02	0.02	0.02	n/a	0.02

Source: ITU

Installation fee for residential telephone service (US\$)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	352.90	329.69	177.92	171.97	168.04	155.45	72.53	85.08	29.16
Pakistan	81.83	70.89	30.98	23.38	12.87	12.60	12.44	12.35	10.65
India	17.80	16.95	16.46	17.17	17.65	22.68	22.07	7.26	6.90
Sri Lanka	175.31	151.04	156.81	204.62	195.18	196.52	190.06	178.53	129.23
Nepal	28.13	26.68	23.11	23.64	24.43	25.22	24.74	27.10	25.80
Viet Nam	115.47	111.10	65.45	51.58	50.99	37.83	25.01	n/a	n/a

Source: ITU

Mobile cellular subscriptions per 100 inhabitants

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	0.2	0.4	0.7	0.9	1.8	5.9	12.3	21.8	27.9	31.1
Pakistan	0.2	0.5	1.1	1.5	3.1	7.7	20.4	36.4	49.7	57.0
India	0.3	0.6	1.2	3.1	4.7	8.0	14.5	20.1	29.4	43.8
Sri Lanka	2.3	3.5	4.9	7.3	11.4	17.2	27.5	40.2	55.2	69.6
Nepal	0.0	0.1	0.1	0.3	0.4	0.8	4.2	11.6	14.6	26.0
Viet Nam	1.0	1.6	2.4	3.3	6.0	11.4	18.2	27.6	80.4	100.6

Source: ITU

Price of a 3-minute fixed telephone local call (peak rate) (US\$)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.01
Pakistan	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
India	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Sri Lanka	0.04	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08
Nepal	0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.03	0.02
Viet Nam	0.03	0.02	0.02	0.02	0.02	0.02	0.02	n/a	0.02

Source: ITU



Proportion of households with Internet access at home

	2002	2003	2004	2005	2006	2007	2008
Bangladesh	0.08	0.10	0.15	0.20	0.79	1.25	1.91
Pakistan	0.00	1.00	1.00	1.00		1.13	1.15
India	0.22	0.74	1.38	1.63	2.90	2.96	3.39
Sri Lanka	0.00	0.50	0.70	1.10	1.60	2.40	3.01
Nepal	0.00	0.30	0.60	0.70	0.80	0.90	0.97
Viet Nam	0.59	1.00	1.26	2.00	3.17	5.04	6.52

Source: ITU

Fixed telephone lines in thousand

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	491.30	564.88	605.93	742.05	830.95	1070.00	1134.00	1186.92	1344.46	1522.90
Pakistan	3053.46	3252.00	3655.47	4047.42	4502.23	5227.83	5240.01	4806.21	4416.42	4058.20
India	32436.13	38536.19	41420.00	42000.00	46198.02	50176.51	40770.00	39413.00	37900.00	37060.00
Sri Lanka	767.41	827.20	883.11	939.01	991.24	1243.99	1884.08	2742.06	3446.41	3435.96
Nepal	266.89	298.06	327.67	371.82	417.94	484.64	611.54	701.13	805.06	820.53
Viet Nam	2542.72	3049.93	3929.14	4402.00	10124.90	15845.00	27505.38	28529.28	29591.00	30692.80

Source: ITU

Imports - telecommunication equipment (US\$ mn)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bangladesh	102.32	151.55	86.69	97.70	243.22	543.91	750.87	612.37	n/a
Pakistan	82.05	76.56	153.27	210.56	437.20	1636.59	1966.53	1657.97	632.78
India	413.71	493.49	1191.18	2445.28	3294.01	4576.01	5992.73	7770.81	5372.02
Sri Lanka	n/a	38.93	51.67	88.16	101.99	154.67	236.72	190.57	176.72
Nepal	15.37	n/a	n/a	33.92	n/a	n/a	n/a	n/a	n/a
Viet Nam	146.68	210.62	237.22	324.88	424.44	624.76	959.80	1659.82	n/a

Source: ITU

Fixed telephone lines per 100 inhabitants

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.8	0.8	0.9
Pakistan	2.1	2.1	2.4	2.6	2.8	3.2	3.1	2.8	2.5	2.2
India	3.1	3.6	3.8	3.8	4.1	4.4	3.6	3.4	3.2	3.1
Sri Lanka	4.1	4.4	4.6	4.9	5.1	6.4	9.6	13.8	17.2	17.0
Nepal	1.1	1.2	1.3	1.4	1.6	1.8	2.2	2.5	2.8	2.8
Viet Nam	3.2	3.8	4.9	5.4	12.2	18.8	32.3	33.1	34.0	34.9

Source: ITU



Installation fee for business telephone service US\$

	2000	2001	2002	2003	2004	2005	2006	2007
Bangladesh	352.90	329.69	177.92	171.97	168.04	155.45	145.07	85.08
Pakistan	81.83	70.89	30.98	23.38	12.87	12.60	12.44	12.35
India	17.80	16.95	16.46	17.17	17.65	22.68	22.07	7.26
Sri Lanka	175.31	151.04	156.81	204.62	195.18	196.52	190.06	178.53
Nepal	28.13	26.68	23.11	23.64	24.43	25.22	24.74	27.10
Viet Nam	115.47	111.10	65.45	51.58	50.99	37.83	25.01	n/a

Source: ITU

Fixed broadband subscriptions per 100 inhabitants

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	n/a	n/a	n/a	n/a	n/a	n/a	0.028	0.031	0.031
Pakistan	n/a	n/a	n/a	0.014	n/a	0.016	0.026	0.095	0.346
India	0.005	0.008	0.013	0.016	0.119	0.200	0.269	0.447	0.647
Sri Lanka	0.002	0.003	0.018	0.106	n/a	0.116	0.318	0.508	0.838
Nepal	n/a	n/a	n/a	n/a	n/a	n/a	0.039	n/a	0.256
Viet Nam	n/a	0.001	0.011	0.063	0.250	0.607	1.503	2.353	3.008

Source: ITU

Estimated Internet users in thousand

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Bangladesh	100.0	186.0	204.0	243.0	300.0	370.0	450.0	500.0	556.0	617.3
Pakistan	0.0	2,000.0	4,000.0	8,000.0	10,000.0	10,500.0	12,000.0	17,500.0	18,500.0	20,350.0
India	5,500.0	7,000.0	16,580.0	18,480.0	22,000.0	27,000.0	32,200.0	46,000.0	51,750.0	61,300.0
Sri Lanka	121.5	150.0	200.0	280.0	280.0	350.0	500.0	771.7	1,163.5	1,776.2
Nepal	50.0	60.0	80.0	100.0	120.0	225.0	316.8	397.5	499.0	625.8
Viet Nam	200.0	1,009.5	1,500.0	3,098.0	6,345.0	10,711.0	14,683.8	17,872.0	20,834.0	24,000.0

Source: ITU

Fixed Broadband Internet Subscriptions (in thousand) 2009

Country	Fixed Broadband Internet Subscriptions
Bangladesh	50
Sri Lanka	169.60
Pakistan	626.00
Nepal	75.10
Maldives	17.90
India	7,745.70
Bhutan	3.10

Source: ITU World Telecommunication/ICT Indicators Database.

Fixed Broadband Internet Subscriptions (in thousand) 2009

	Fixed Broadband Internet Subscriptions (In thousands), 2009
Africa	907.00
The Americas	132,219.10
Arab States	5,782.40
Asia & Pacific	177,151.40
Europe	137,892.00
CIS	17,811.10

Source: ITU World Telecommunication/ICT Indicators Database.

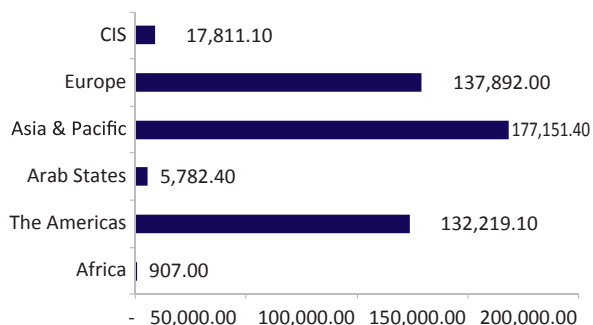


Fixed Broadband Internet Subscriptions by region, CAGR (%) 2005-09

Fixed Broadband Internet Subscriptions	
	CAGR (%)
2005-09	
Africa	39.40
The Americas	18.90
Arab States	52.80
Asia & Pacific	21.00
Europe	19.80
CIS	78.80

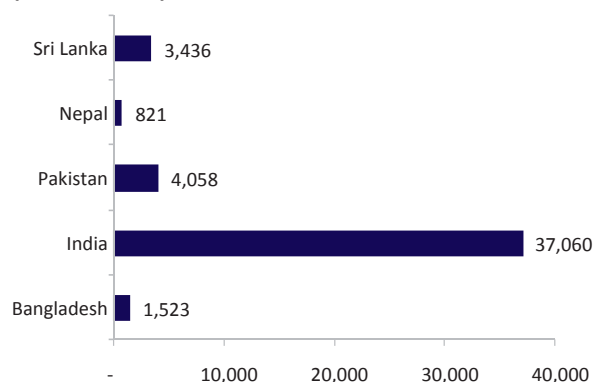
Source: ITU World Telecommunication/ICT Indicators Database.

Fixed Broadband Internet Subscriptions (In thousands), 2009



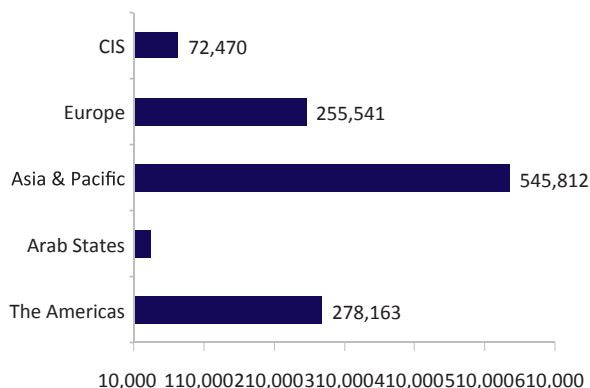
Source: ITU World Telecommunication/ICT Indicators Database.

Fixed Telephone Lines of South Asian Countries (in thousands), 2009



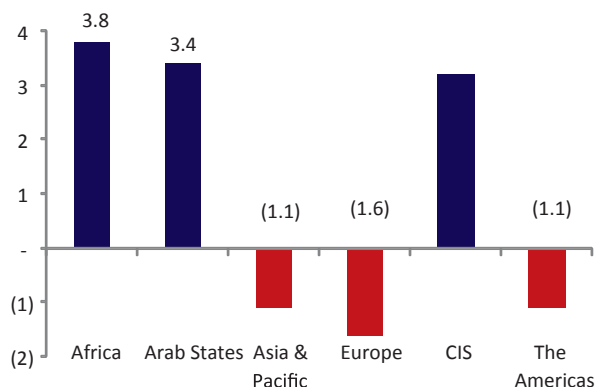
Source: ITU World Telecommunication/ICT Indicators Database.

Fixed Telephone Lines (in thousands), 2009



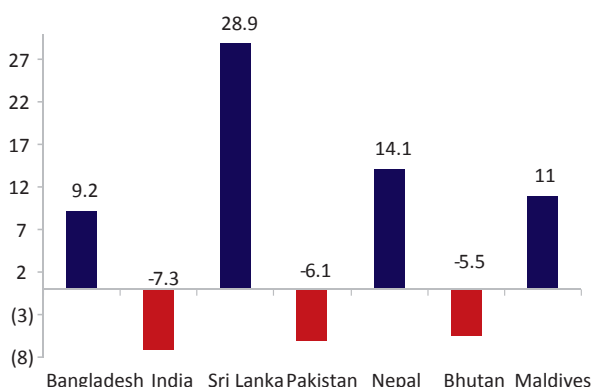
Source: ITU World Telecommunication/ICT Indicators Database.

Fixed Telephone Lines (In thousands) CAGR (%) (2005-09)



Source: ITU World Telecommunication/ICT Indicators Database.

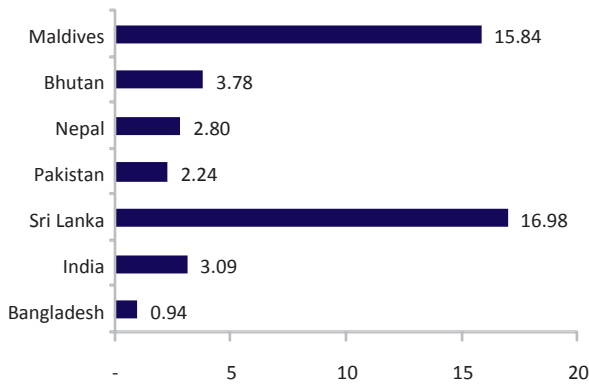
Fixed Telephone Lines (In thousands) CAGR (%) (2005-09)



Source: ITU World Telecommunication/ICT Indicators Database.

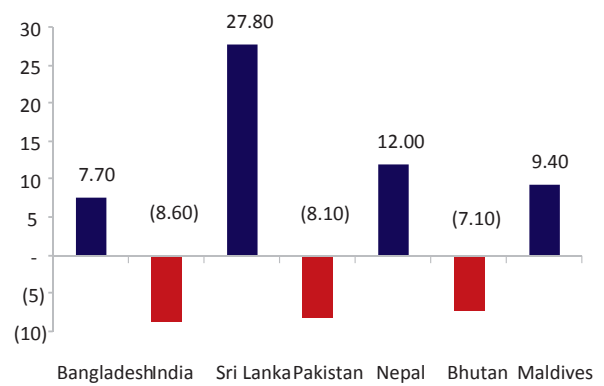


Fixed Telephone Lines per 100 inhabitants of South Asian Countries in 2009



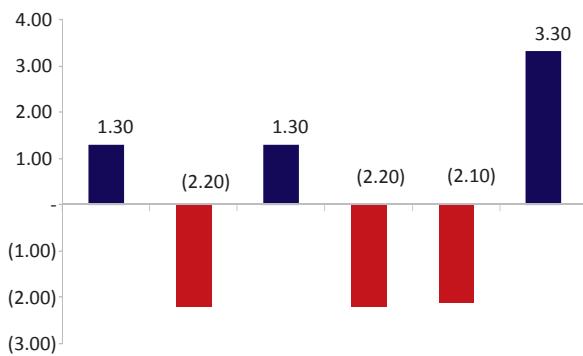
Source: ITU World Telecommunication/ICT Indicators Database.

Fixed Telephone Lines per 100 inhabitants CAGR (%) of South Asian Countries (2005-2009)



Source: ITU World Telecommunication/ICT Indicators Database.

Fixed Telephone Lines per 100 inhabitants CAGR (%) (2005-09)



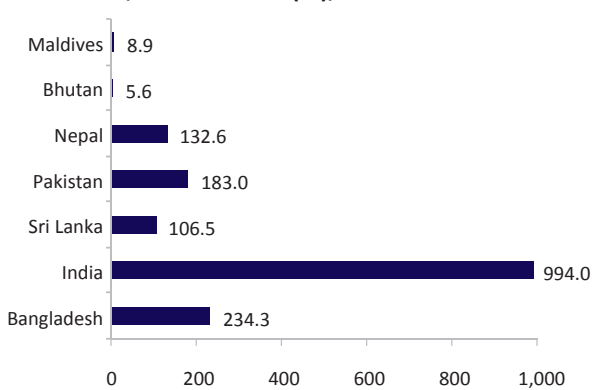
Source: ITU World Telecommunication/ICT Indicators Database

Outgoing Fixed Telephone traffic, CAGR (%) of South Asian Countries 2003-2008

Country	CAGR (%)
Bangladesh	45.2
India	13.5
Sri Lanka	9.1
Pakistan	12.0
Nepal	64.9
Bhutan	(2.4)
Maldives	11.5

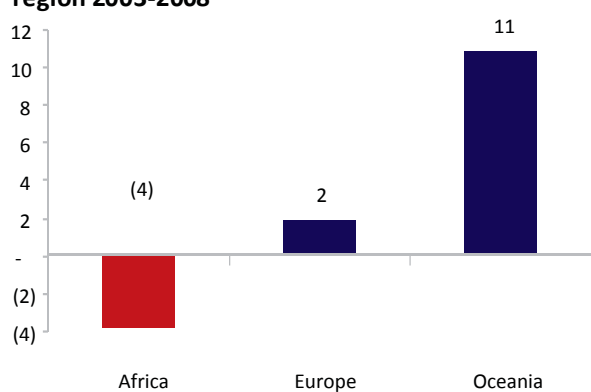
Source: ITU World Telecommunication/ICT Indicators Database.

Outgoing Fixed Telephone Traffic of South Asian Countries, Total minutes (M), 2008



Source: ITU World Telecommunication/ICT Indicators Database.

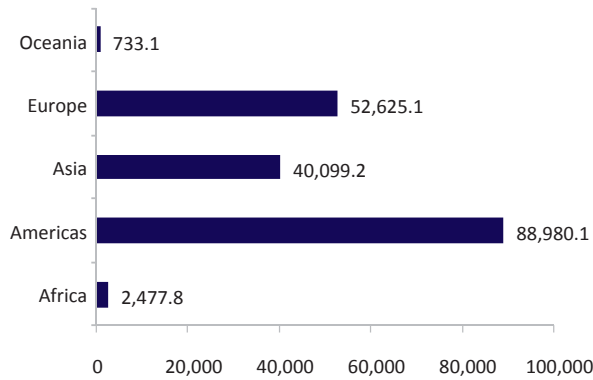
Outgoing fixed telephone traffic, CAGR (%) by region 2003-2008



Source: ITU World Telecommunication/ICT Indicators Database.

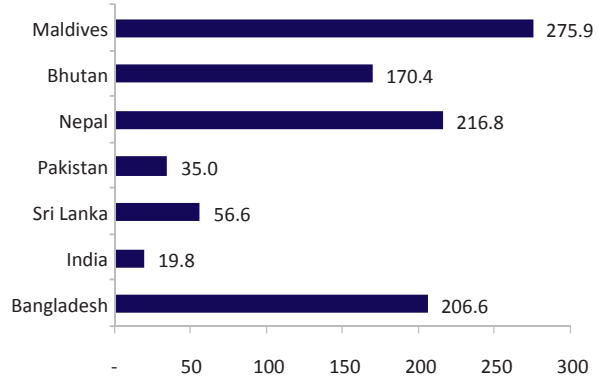


Outgoing fixed telephone traffic by region, Total minutes (M), 2008



Source: ITU World Telecommunication/ICT Indicators Database.

Outgoing fixed telephone traffic of South Asian Countries, Minutes per subscriptions in 2008



Source: ITU World Telecommunication/ICT Indicators Database.

International Internet Bandwidth of South Asian Countries (Mbps), 2009

Country	International Internet bandwidth (Mbps), 2009
Bangladesh	642
India	35,747
Sri Lanka	3,829
Pakistan	7,070
Nepal	139
Bhutan	155
Maldives	937

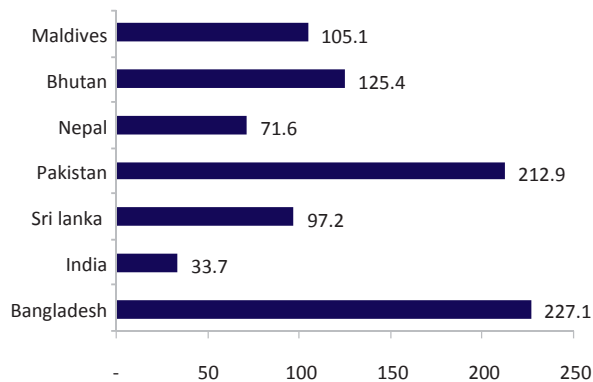
Source: ITU World Telecommunication/ICT Indicators Database

International Internet Bandwidth of South Asian Countries (Mbps), 2009

Country	International Internet bandwidth (Mbps), 2009
Africa	38,536
The Americas	4,889,491
Arab States	324,575
Asia & Pacific	2,504,479
Europe	15,676,560
CIS	176,167

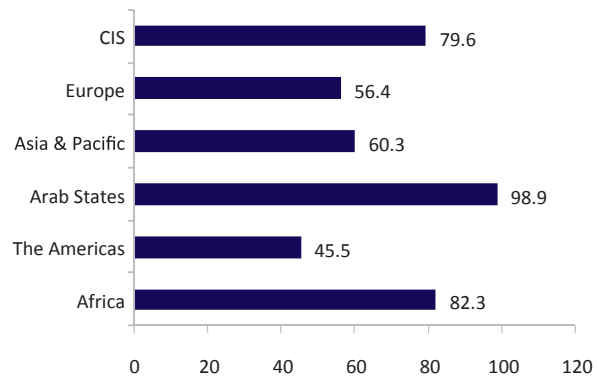
Source: ITU World Telecommunication/ICT Indicators Database

International Internet bandwidth, CAGR (%) of South Asian Countries 2005-2009



Source: ITU World Telecommunication/ICT Indicators Database

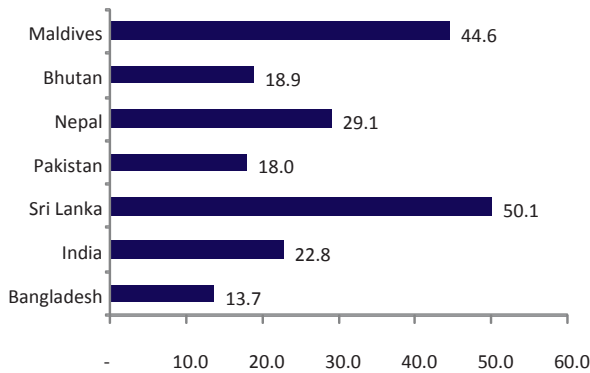
International Internet bandwidth Mbps, CAGR(%) by region 2005-09



Source: ITU World Telecommunication/ICT Indicators Database

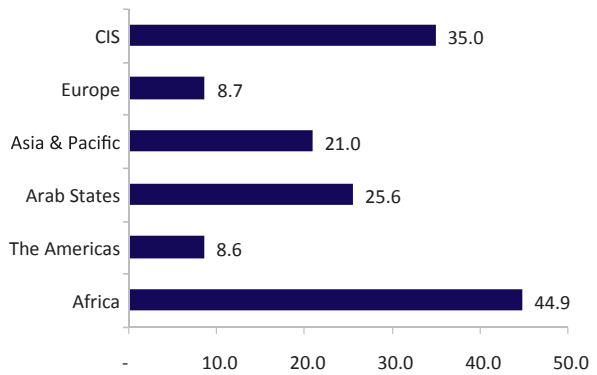


International Internet bandwidth of South Asian Countries, Internet Users (in thousands), CAGR (%), 2005-09



Source: ITU World Telecommunication/ICT Indicators Database

International Internet bandwidth by region, Bit/s per Internet Users by region, CAGR (%), 2005-09



Source: ITU World Telecommunication/ICT Indicators Database

International Internet bandwidth of South Asian Countries, Internet Users per 100 inhabitants in 2009

Country	Internet User per 100 inhabitants
Bangladesh	0.38
India	5.12
Sri Lanka	8.78
Pakistan	11.26
Nepal	2.13
Bhutan	7.17
Maldives	28.39

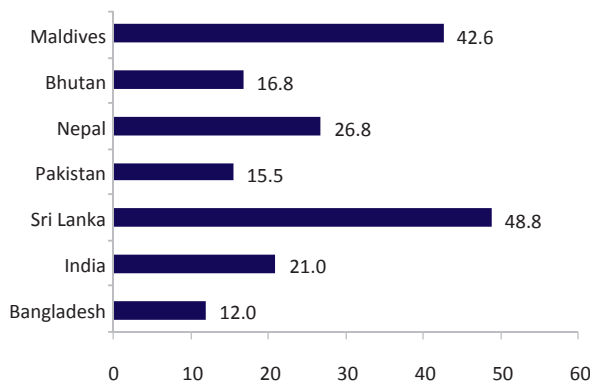
Source: ITU World Telecommunication/ICT Indicators Database

Internet User per 100 inhabitants by region, 2009

Country	Internet User per 100 inhabitants
Africa	8.80
The Americas	48.35
Arab States	18.48
Asia & Pacific	19.29
Europe	62.89
CIS	35.74
Total	26.59

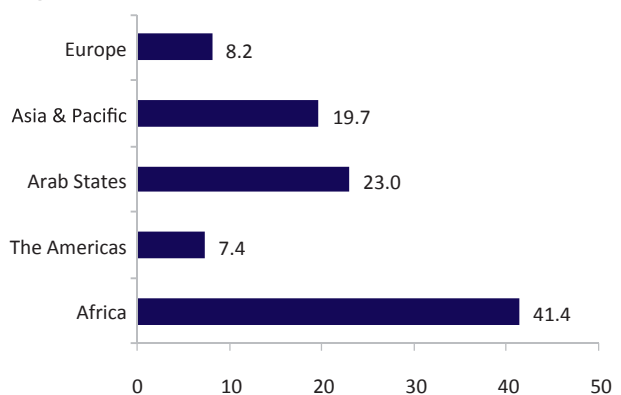
Source: ITU World Telecommunication/ICT Indicators Database

Internet Users per 100 inhabitants of South Asian Countries, CAGR % 2005-2009



Source: ITU World Telecommunication/ICT Indicators Database

Internet Users per 100 inhabitants by region, CAGR % 2005-2009



Source: ITU World Telecommunication/ICT Indicators Database



Mobile cellular subscriptions of South Asian Countries (in thousands), 2009

Country	Mobile cellular subscriptions
Bangladesh	50,400.00
India	525,090.00
Sri Lanka	14,095.00
Pakistan	102,980.00
Nepal	7,618.00
Bhutan	327.00
Maldives	458.00

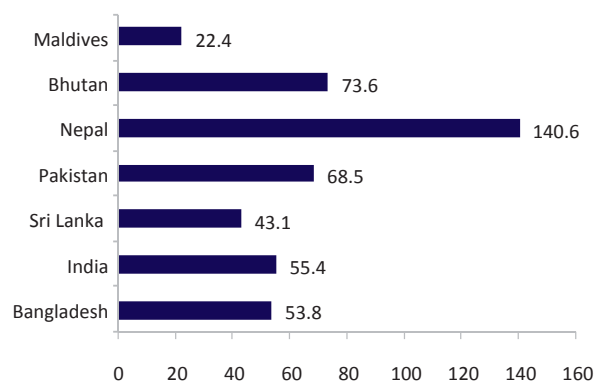
Source: ITU World Telecommunication/ICT Indicators Database

Mobile cellular subscriptions by region (in thousands), 2009

Region	Mobile cellular subscriptions
Africa	295,355.00
The Americas	836,170.00
Arab States	253,808.00
Asia & Pacific	2,160,657.00
Europe	730,962.00
CIS	353,819.00
Total	4,630,772.00

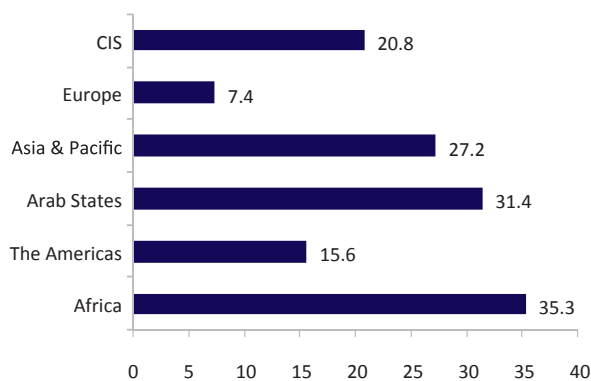
Source: ITU World Telecommunication/ICT Indicators Database

Mobile Cellular Subscriptions, CAGR % of South Asian Countries 2005-2009



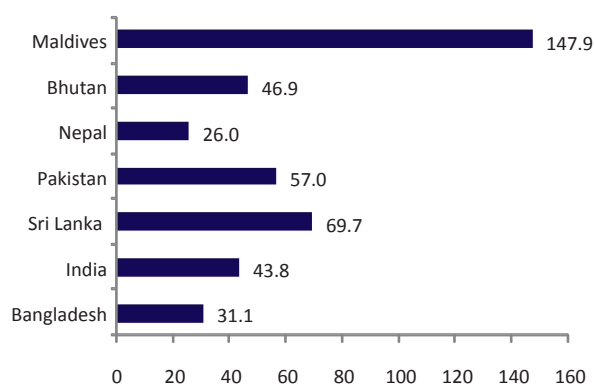
Source: ITU World Telecommunication/ICT Indicators Database

Mobile Cellular Subscriptions, CAGR % by region 2005-2009



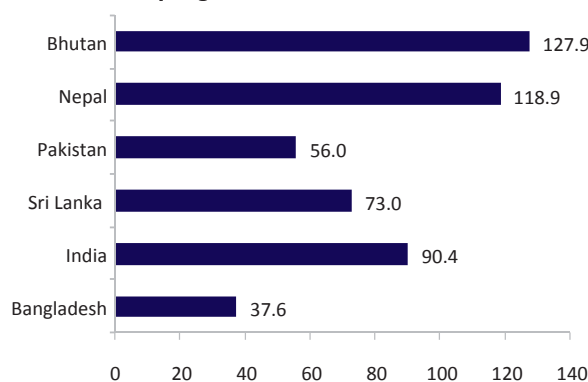
Source: ITU World Telecommunication/ICT Indicators Database

Mobile Cellular Subscriptions, per 100 inhabitants of South Asian Countries in 2009



Source: ITU World Telecommunication/ICT Indicators Database

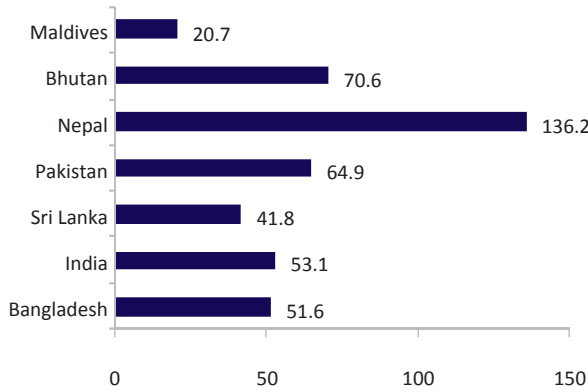
Mobile Cellular Subscriptions, per 100 inhabitants by region in 2009



Source: ITU World Telecommunication/ICT Indicators Database

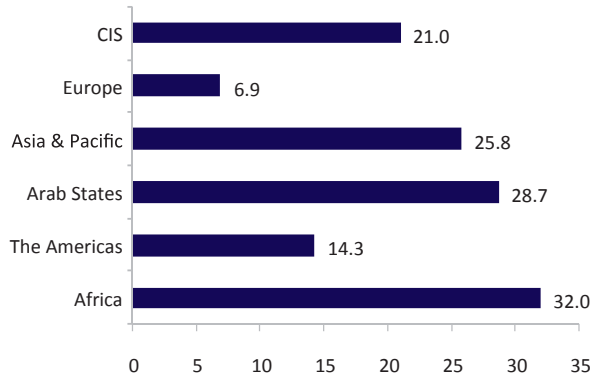


Mobile Cellular Subscriptions per 100 inhabitants, CAGR % of South Asian Countries in 2009



Source: ITU World Telecommunication/ICT Indicators Database

Mobile Cellular Subscriptions per 100 inhabitants, CAGR % by region in 2009



Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication Investment by Region, Total US\$ (M) 2008

Region	Total US\$ (M) 2008
Africa	5,256.50
The Americas	87,821.80
Arab States	26,096.60
Asia & Pacific	73,454.40
Europe	61,174.50
CIS	3,265.30

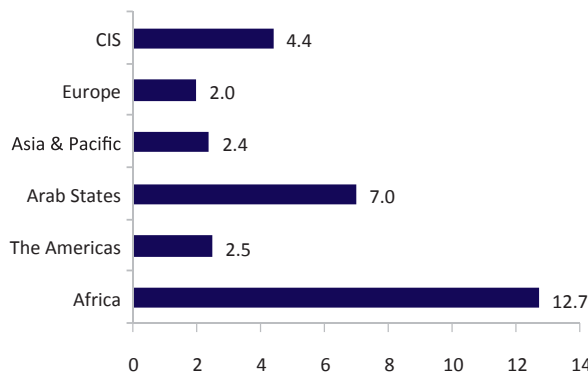
Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication Investment by Region, as a % of Revenue 2008

Region	As a % of revenue 2008
Africa	32.40
The Americas	16.20
Arab States	61.90
Asia & Pacific	19.60
Europe	13.70
CIS	27.80

Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication Investment by Region, as a % of GFCF 2008



Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication Investment by Region, as a % of GFCF 2008

Region	As a % of GFCF 2008
Africa	12.7
The Americas	2.5
Arab States	7.0
Asia & Pacific	2.4
Europe	2.0
CIS	4.4

Source: ITU World Telecommunication/ICT Indicators Database



Telecommunication Revenue of South Asian Countries Total US\$ (M) 2008

Country	Revenue US\$ (M)
Bangladesh	840.2
India	18,387.0
Sri Lanka	619.0
Pakistan	3,879.1
Nepal	91.9
Bhutan	26.8
Maldives	95.5

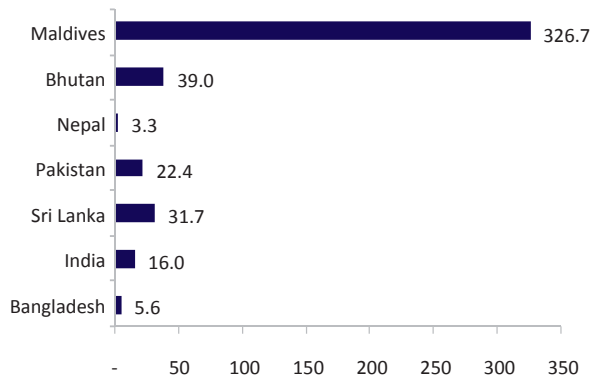
Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication Revenue by region Total US\$ (M) 2008

Region	Revenue Total US\$ (M)
Africa	36,498.3
The Americas	562,993.6
Arab States	49,506.3
Asia & Pacific	404,456.9
Europe	587,933.7
CIS	46,987.5
Maldives	95.5

Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication revenue per inhabitant (US\$) of South Asian Countries 2008



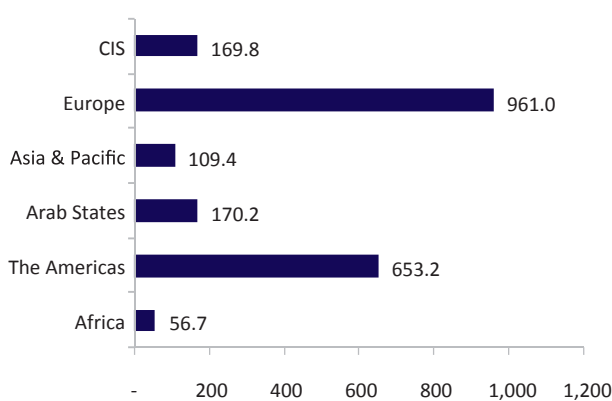
Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication Revenue by region Total US\$ (M) 2008

Country	Mobile %
Africa	78.6
The Americas	45.1
Arab States	67.8
Asia & Pacific	44.2
Europe	42.4
CIS	56.4

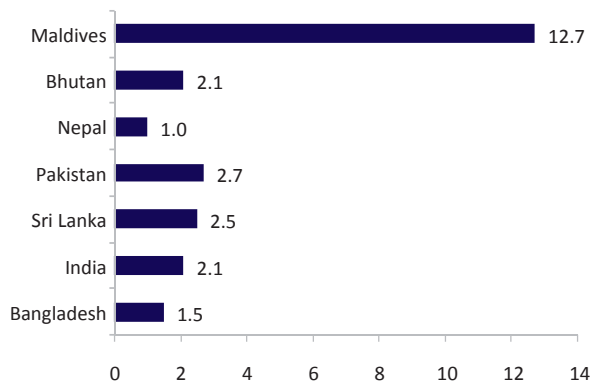
Source: ITU World Telecommunication/ICT Indicators Database

Telecommunication revenue per inhabitant (US\$) by region 2008



Source: ITU World Telecommunication/ICT Indicators Database

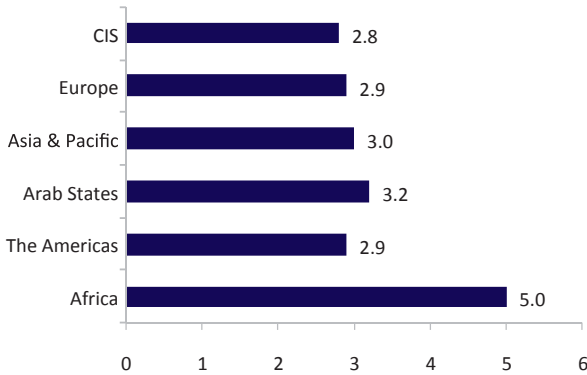
Telecommunication revenue of South Asian Countries, as a % of GDP 2008



Source: ITU World Telecommunication/ICT Indicators Database



Telecommunication revenue by region, as a % of GDP 2008



Source: ITU World Telecommunication/ICT Indicators Database

Total Telecommunication Staff by Region (in thousand), 2008

Region	Total Telecommunication Staff
Africa	109.8
The Americas	1,852.6
Arab States	301.0
Asia & Pacific	15,716.4
Europe	1,021.4
CIS	666.9

Source: ITU World Telecommunication/ICT Indicators Database

Total Telecommunication Staff by Region, Subscriptions per employees, 2008

Region	Total Telecommunication Staff
Africa	1,131
The Americas	465
Arab States	723
Asia & Pacific	94
Europe	810
CIS	367

Source: ITU World Telecommunication/ICT Indicators Database

Total Telecommunication Staff by Region, CAGR (%) 2003-2008

Region	CAGR (%)
Africa	(1.7)
The Americas	4.8
Arab States	10.3
Asia & Pacific	64.5
Europe	(2.8)
CIS	0.4

Source: ITU World Telecommunication/ICT Indicators Database

Total Telecommunication Staff by Region, Subscriptions per employees, 2008

Region	Mobile Staff
Africa	32.05
The Americas	448.04
Arab States	37.68
Asia & Pacific	772.93
Europe	120.79
CIS	8.36

Source: ITU World Telecommunication/ICT Indicators Database

Mobile Staff by Region, Subscriptions per employee, 2008

Region	Subscription per employee
Africa	5,316
The Americas	1,193
Arab States	3,587
Asia & Pacific	884
Europe	3,945
CIS	3,090

Source: ITU World Telecommunication/ICT Indicators Database

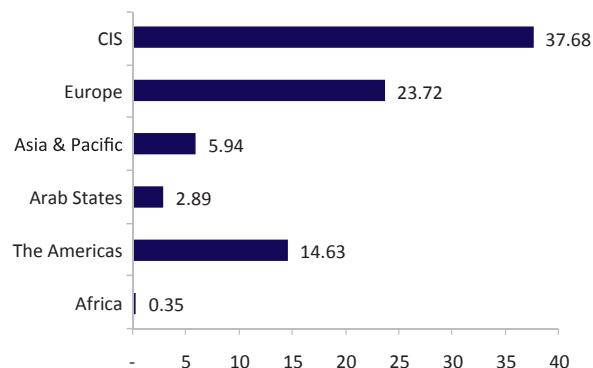


Internet Subscriptions of South Asian Countries (in thousand), 2009

Country	Subscriptions
Bangladesh	150.0
India	15,240.0
Sri Lanka	249.8
Pakistan	3,700.0
Nepal	103.5
Bhutan	6.7
Maldives	20.1

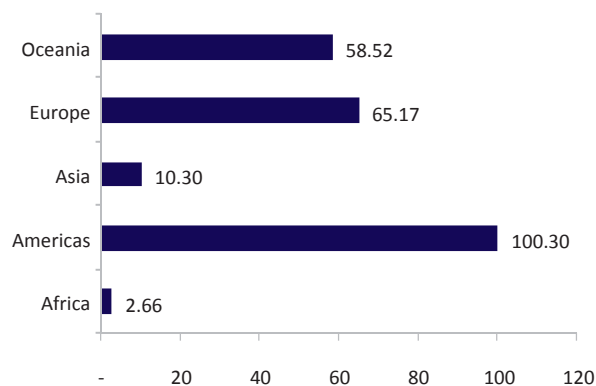
Source: ITU World Telecommunication/ICT Indicators Database

Internet Subscriptions per 100 inhabitants by region 2009



Source: ITU World Telecommunication/ICT Indicators Database

Outgoing fixed telephone traffic by region, Minutes per inhabitants, 2008



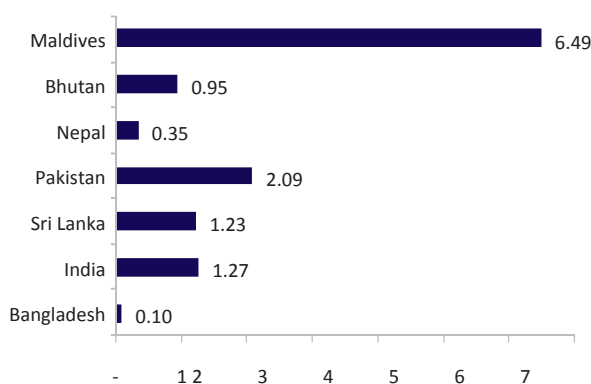
Source: ITU World Telecommunication/ICT Indicators Database

Internet Subscriptions by region (in thousand), 2009

Region	Subscriptions
Africa	2,298.4
The Americas	132,951.1
Arab States	9,588.3
Asia & Pacific	210,663.3
Europe	144,431.4
CIS	98,562.1

Source: ITU World Telecommunication/ICT Indicators Database

Internet Subscriptions per 100 inhabitants of South Asian Countries 2009



Source: ITU World Telecommunication/ICT Indicators Database

Internet Users of South Asian Countries (in thousand), 2009

Country	Internet Users
Bangladesh	617.3
India	61,300.0
Sri Lanka	1,776.2
Pakistan	20,350.0
Nepal	625.8
Bhutan	50.0
Maldives	87.9

Source: ITU World Telecommunication/ICT Indicators Database

Internet Users of South Asian Countries (in thousand), 2009

Region	Internet Users
Africa	69,163.7
The Americas	447,285.0
Arab States	64,305.6
Asia & Pacific	744,051.8
Europe	386,725.5
CIS	98,892.7

Source: ITU World Telecommunication/ICT Indicators Database



Appendix 2.6:

Total Telecommunication Staff by Region, Subscriptions per employees, 2008

BTRC Licenses		
	Category Of License	Licenses
1	International gateway (IGW) services (Including BTCL)	4
2	Interconnection exchange (ICX) Services (Including BTCL)	3
3	International Internet Gateway (IIG) Services (Including BTCL)	2
4	Broadband Wireless Access (BWA) (Including Teletalk)	2
5	Cellular Mobile Telecom Operator	6
6	Public switched Telephone Network (PSTN) Operator (National: 02, Zonal:06, Rural:01) (Including BTCL)	9
7	Nationwide Telecommunication Transmission Network (NTTN) Service provider	2
8	Nationwide Optical Fiber Telecommunication Transmission Network (NTTN) Service provider	1
9	Prepaid Card Service operator	2
10	Vehicle Taking Services (Service License: 08, Service approval:01)	9
11	Internet Protocol Telephony Service provider-Nationwide	29
12	Internet Protocol Telephony Service provider-Central Zone	8
13	Internet Protocol Telephony Service provider-Zonal (South-East: 03, South-West:00, North-East:00, North-West:00)	3
14	Internet service Provider- Nationwide (Including BTCL)	106
15	Internet service Provider- Central Zone	82
16	Internet service Provider- Zonal (South-East: 24, South-West:06, North-East:11, North-West:14)	55
17	Internet Service provider-Category A	113
18	Internet Service provider-Category B	22
19	Internet Service provider-Category C	8
20	VSAT User	45
21	VSAT Provider	12
22	VSAT Provider with HUB	5
23	Call Centre	230
24	Hosted Call Centre	41
25	Hosted Call Centre Service Provider	37
26	International call centre	2
	Total Number of present Licenses	838

Source: BTRC



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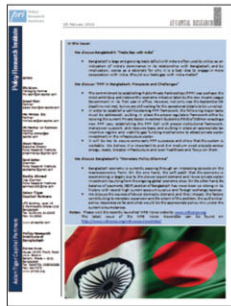
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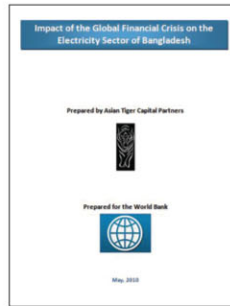
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Growth, Investment,
Opportunity



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Bangladesh



WB Project on
Energy Financing
Strategy



Maximizing
Growth for
Bangladesh



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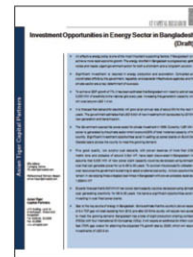
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