

## Mobile telephony and taxation in Bangladesh.

A report for the GSM Association

18 January 2012

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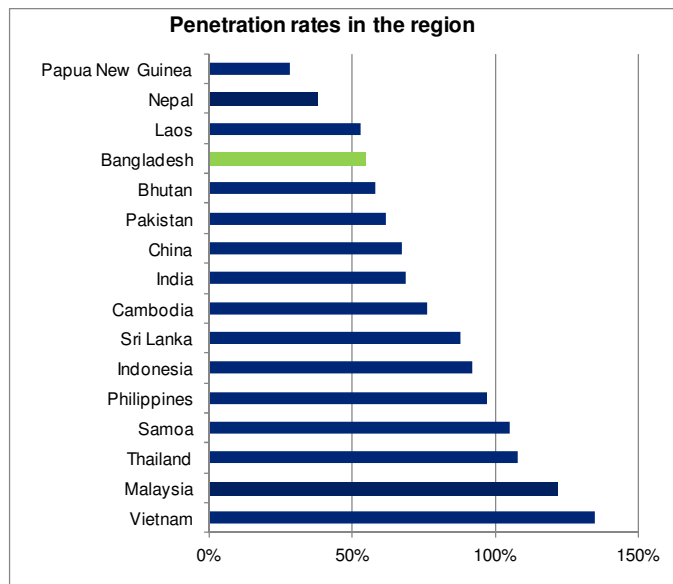
## Executive Summary

Mobile telephony in Bangladesh has grown significantly in recent years. MNOs' networks now cover more than 99% of the population and the number of connections is estimated to be above 80 million in 2011. This is particularly important as less than 2% of the population have access to fixed line services, making mobile telephony the de facto provider of universal service to consumers. Bangladesh's mobile market is highly competitive, with consumers now having a choice between six MNOs.

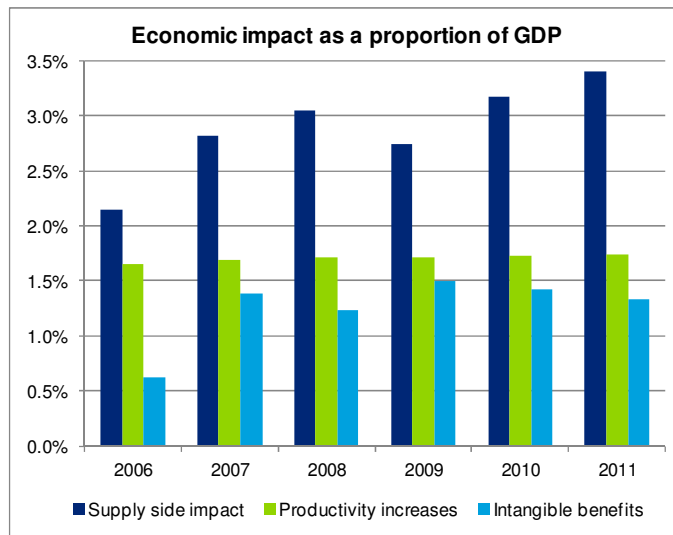
*“Subscriber numbers have almost doubled in the last 3 years but, at 54%, penetration levels are still amongst the lowest in the region”*

Bangladesh is one of the poorest countries in the world, with forty per cent of the population living below the poverty line (\$1.25US per day). As such, the cost of mobile ownership represents a significant proportion of the average income, and mobile telephony remains out of reach for many Bangladeshis.

In 2011 mobile penetration remains low by regional standards, with an estimated 54% of the population currently having a mobile phone connection.



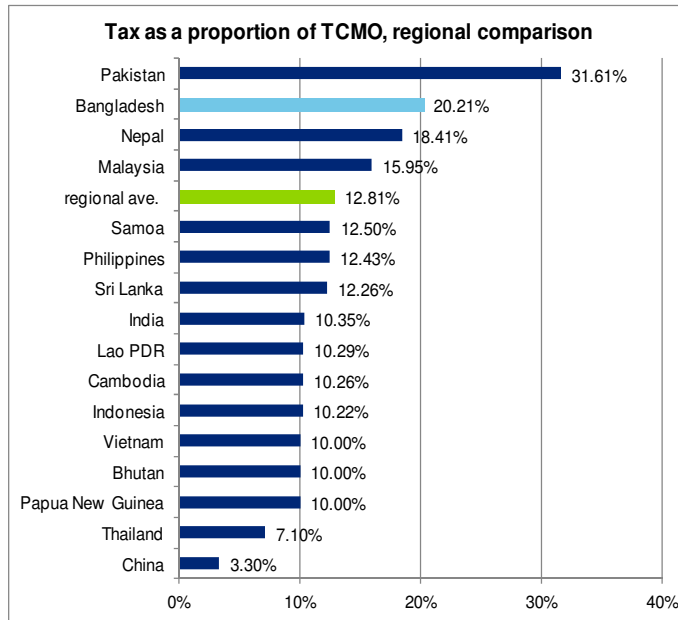
*“The contribution of the mobile sector to the Bangladeshi economy has represented over 2.5% of GDP in each of the last five years, in addition to a contribution of over 1.5% from productivity impacts, and a further 1% from intangible benefits”*



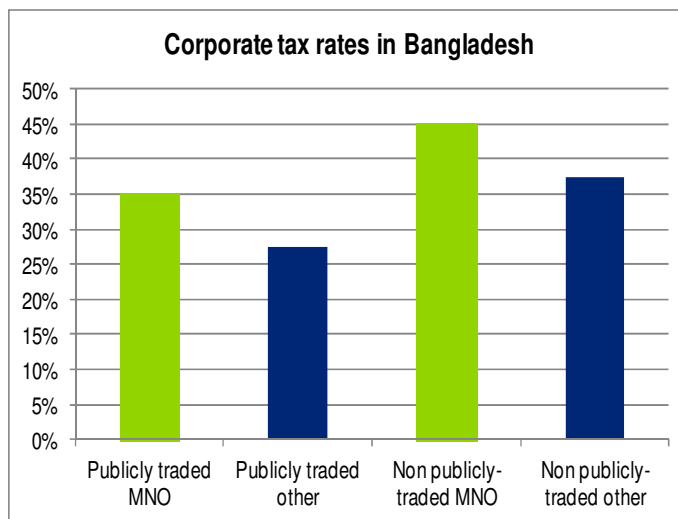
In 2011 it is estimated that the mobile communications industry will contribute in the region of BDT 526 billion to the economy. This is made up of direct supply side impacts, which represent 3.4% of GDP, and productivity increases, which represent 1.7% of GDP, as well as intangible benefits to consumers estimated to be in the region of 1.3% of GDP. Additionally, in 2011 the whole industry employs almost 90,000 people in Bangladesh. This growth in mobile telephony in Bangladesh has had a positive impact on the economy in terms of aggregate investment, Foreign Direct Investment and productivity levels.

*“In Bangladesh, mobile specific taxation on consumers and MNOs applies, contributing to raise the total cost of providing mobile services”*

In addition to a 15% VAT rate on all goods and services, mobile consumers in Bangladesh are subject to mobile specific taxation in the form of a BDT 800 tax on SIM cards and a BDT 300 tax on handset imports, significantly increasing the cost of entering the mobile market for the first time. In 2011, tax on mobile telephony is estimated to make up 21% of the total cost of mobile ownership in Bangladesh. This increased in the last five years from 18.8%, as prices decreased, and is significantly above the regional average of 12.81%.



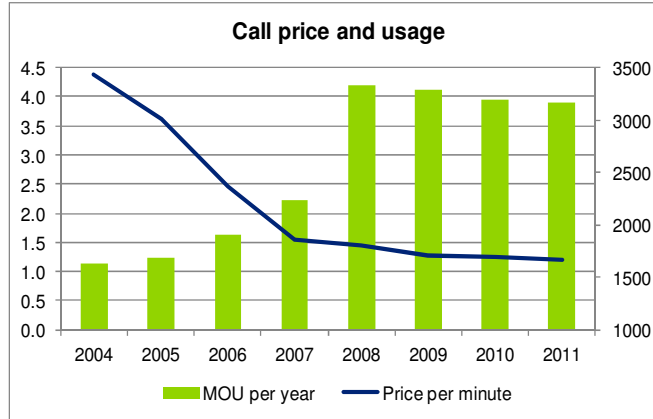
MNOs also face a higher level of corporation tax than other businesses across the economy, at 35% and 45% for similar publicly traded and non-publicly traded MNOs respectively.



Consumer related taxes are often subsidised by MNOs, who also contribute 5.5% of their revenue for a 'revenue share tax', which is used by the regulator to fund the lease of Bangladesh railways' fibre optic network.

*“Mobile specific taxation contributes to placing mobile ownership out of reach for many of Bangladesh’s price sensitive consumers”*

The total cost of mobile ownership in Bangladesh is estimated to be US\$48.5 (BDT 3,558). This amount is significant compared to the incomes of consumers, making up approximately 7% of Gross National Income per capita. For those living under the poverty line, the cost of mobile ownership represents more than 11% of income.

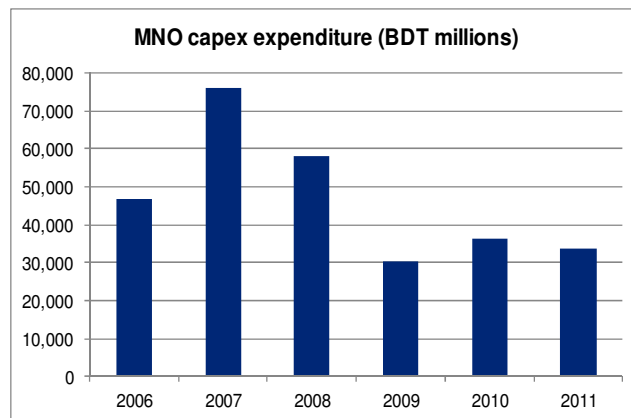


**Evidence from consumers**

behaviour in this market shows that, as mobile prices fell 67% between 2004 and 2008, average minutes of use doubled over that period. This indicates that mobile users in Bangladesh are very sensitive to changes in price. As such the benefits to penetration levels of reducing the cost of entry to the market, e.g. through reduction in mobile specific taxation allowing mobile to be taxed similarly to other goods, are likely to be significant.

*“High and uncertain taxation of MNO’s in Bangladesh has contributed to reductions in investment. In 2011, MNOs’ investment in network capex is expected to be half 2007 levels.”*

The MNOs report that the high taxation rates they face, when allied to unexpected changes in taxation (for example the amount of the handset excise has increased and decreased numerous times in the last 5 years) and a falling ARPU, create instability and uncertainty in the sector and promote a reluctance to commit to large investment programmes.



**The mobile telecommunications**

sector, being largely foreign owned, has been the highest contributor to FDI inflows in recent years and is now one of the largest contributions to current total FDI stocks. Therefore, if MNOs continue the trend of decreasing network expenditure, there could be significant consequences for the level of FDI in Bangladesh.

# 1 Introduction

This paper was commissioned by the GSM Association (“the GSMA”). This report is part of a wider Deloitte/GSMA study on global mobile taxation trends<sup>1</sup> and follows a previous study on the economic impact of mobile telephony and taxation in Bangladesh, carried out by Deloitte on behalf of Telenor ASA (hereafter the “Telenor study”).<sup>2</sup>

The Telenor study described the significant economic impact generated by mobile telephony in Bangladesh through effects on the supply side of the economy, employment, increases in productivity and benefits gained by Bangladeshi consumers.

This report updates this analysis of the beneficial impact of mobile telephony for Bangladeshi people and for the Bangladeshi economy in the last three years. It also describes the mobile taxation for consumers and MNOs applying in Bangladesh. The report is structured as follows:

- Section 2 describes the mobile telephony market in Bangladesh.
- Section 3 presents the impact of mobile telephony in Bangladesh on Gross Domestic Product (“GDP”), productivity, employment and consumer benefits.
- Section 4 describes the taxes and regulatory requirements faced by the mobile industry and their impact on consumers and mobile network operators (“MNOs”) in Bangladesh.

Appendix A sets out in more detail the methodology used to calculate the economic impact of mobile telephony and mobile-specific taxation, and the data and assumptions employed in this study.

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<sup>1</sup> Separate Deloitte/GSMA reports on the Global Mobile Tax Review 2011, Surcharge on International Inbound Termination and on Croatia and Kenya will be published in parallel to this report.

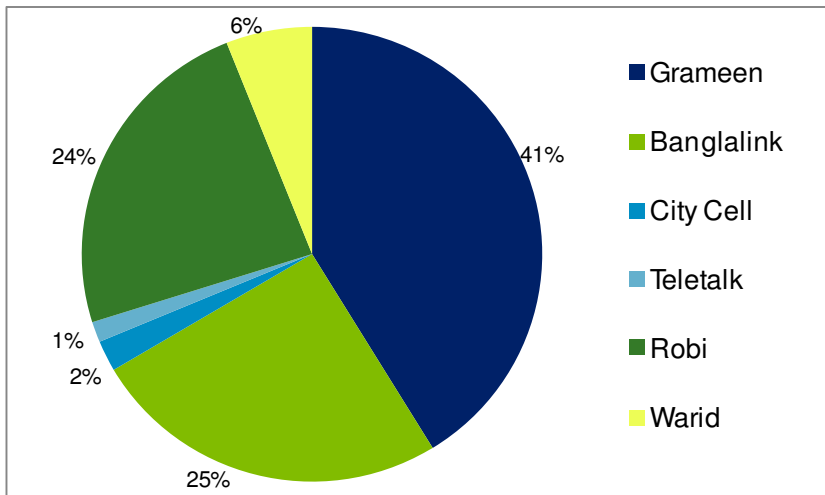
<sup>2</sup> Telenor ASA, “The economic impact of mobile telecommunications in Serbia, Ukraine, Malaysia, Thailand, Bangladesh and Pakistan”, A report prepared for Telenor ASA January 2008.



## 2 The mobile market in Bangladesh

Mobile telephony in Bangladesh has grown significantly in recent years. MNOs' networks now cover more than 99% of the population and the number of connections has almost doubled in the last three years. Bangladesh's mobile market is highly competitive, with consumers now having a choice between six MNOs. While market share has begun to even out in recent years, Grameenphone still has a significantly higher market share than its nearest rivals Banglalink and Robi as illustrated in Figure 1.

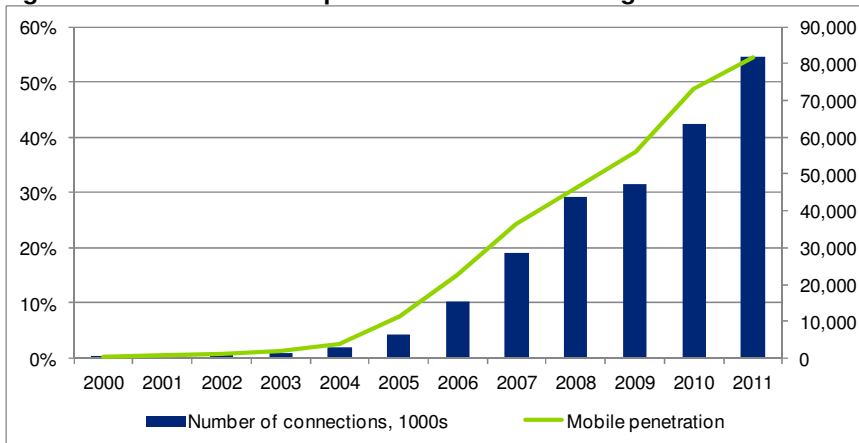
**Figure 1: Estimated MNO market shares in Bangladesh, 2011**



Source: Wireless intelligence

The number of mobile connections in Bangladesh has increased from 1.3 million in 2003 to an estimated 80 million at the end of 2011, representing a penetration level of 54%, as shown in Figure 2. Growth in connections slowed from 2008 to 2009, and according to MNOs this is likely to be as a result of the compulsory SIM registration programme. This policy was introduced in Bangladesh in 2007, and as a result millions of non-registered SIM cards were removed in 2008.

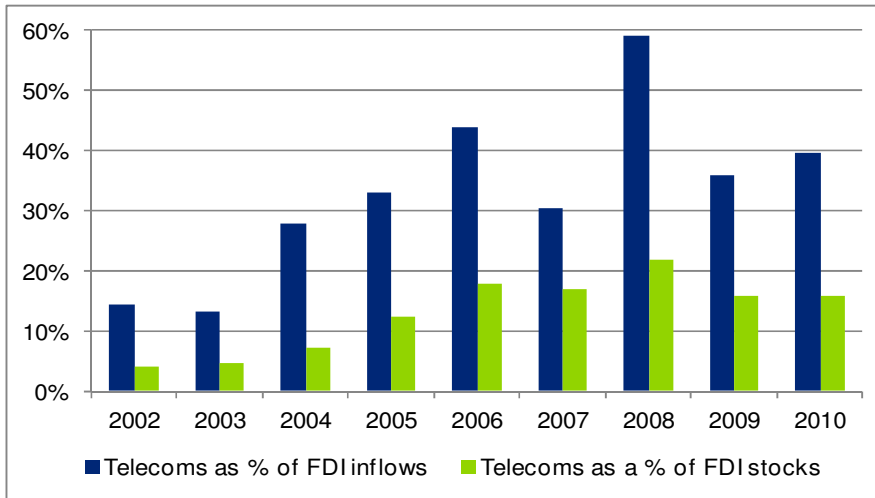
**Figure 2: Connections and penetration levels in Bangladesh**



Source: Wireless Intelligence

This growth in mobile telephony has had a positive impact on the economy in terms of aggregate investment, Foreign Direct Investment (“FDI”) and productivity levels. The mobile telecommunications sector, being largely foreign owned,<sup>3</sup> has been the highest contributor to FDI inflows in recent years and is now one of the largest contributions to current total FDI stocks. As shown in Figure 3 the contribution made by the mobile sector to total FDI levels in Bangladesh has grown significantly in the last eight years.

**Figure 3: Contribution of telecommunications to FDI inflows and stock**



Source: Bangladesh Bank; FDI Survey Report 2010

Despite these positive market developments, Bangladesh presents a challenging economic environment, being one of the poorest countries in the world. Forty per cent of the population, almost 60 million,<sup>4</sup> live below the poverty line, of less than \$1.25 \$US per day. Therefore, despite a high level of competition and low prices, mobile phone ownership remains out of reach for many Bangladeshis.

In addition to low income levels, Bangladeshi consumers are subject to a SIM tax and handset excise as well as the compulsory SIM registration programme, which all potentially contribute to the barrier to entry into the mobile market. MNOs have reported that they generally subsidise a high proportion of the SIM and handset taxes in order to facilitate continued growth in the sector.<sup>5</sup>

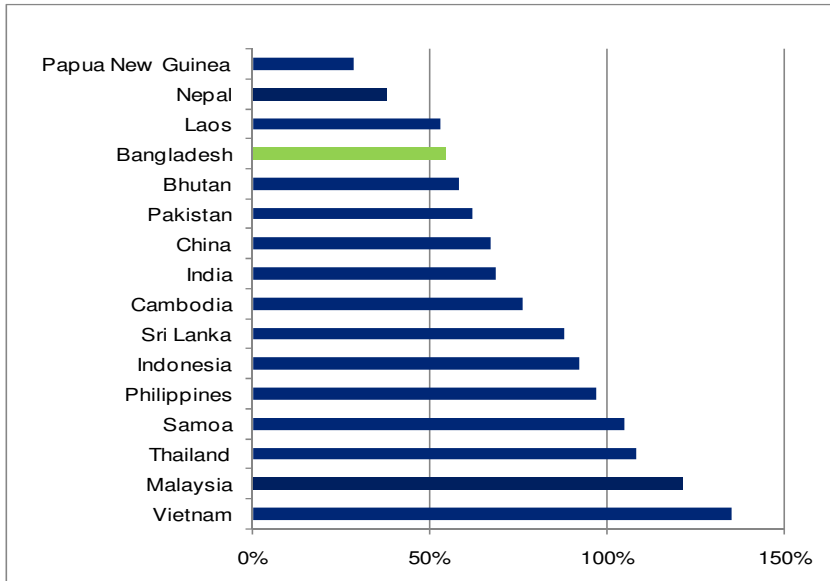
<sup>3</sup> Ownership of Grameenphone consists of Telenor (55.8%), Grameen Telecom (34.2%), and 10% ownership which has been floated on the Bangladesh stock market. Banglalink (Orascom Telecom Bangladesh Limited) is a 100% owned subsidiary of Orascom Telecom Holding S.A.E., Egypt. Ownership of Warid consists of Abu Dhabi Group (30%) and Bharti Airtel (70%). Robi (Axiata Bangladesh Limited) ownership consists of Telkom Malaysia (70%) and NTT DoCoMo (30%). Ownership of Citycell consists of Singtel (45%), Pacific Group (31%) and Far East Telecom (24%). The Bangladesh Government has 100% ownership of Teletalk

<sup>4</sup> Based on World Bank population estimates for 2010.

<sup>5</sup> Taxes and regulation are discussed in more detail in section 4.

Although penetration has grown significantly in cities, where it has reached saturation point in some areas, progress in rural areas is slow due to low income levels, high rollout costs and high consumer taxes. As such, in 2011 penetration remains low by regional standards, with an estimated 54% of the population currently having a mobile phone connection, less than 2% having a fixed line connection and less than 2% having access to broadband. As shown in Figure 4 the mobile penetration level in Bangladesh is amongst the lowest in the region.

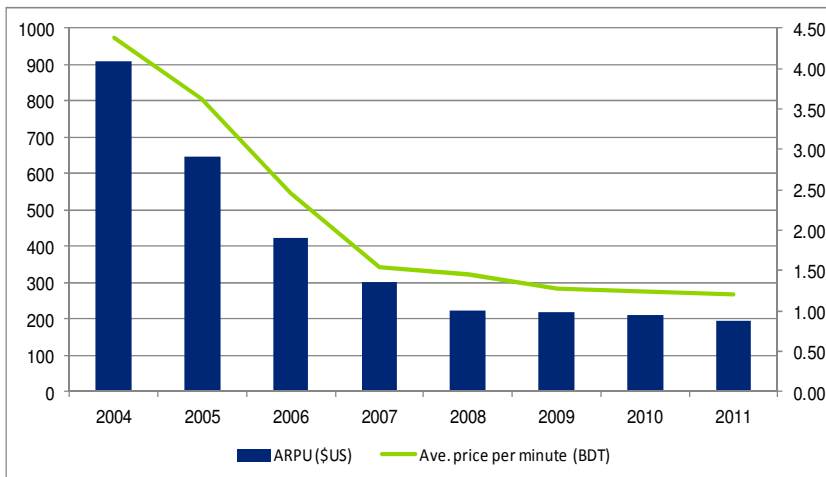
**Figure 4: Penetration rates in the region, % of the population**



Source: Wireless intelligence

Price competition saw prices fall by 50% in the last 5 years. However, price decreases have slowed in recent years as MNOs face high taxes, difficult operating conditions and falling ARPU levels, which can be seen in Figure 5.

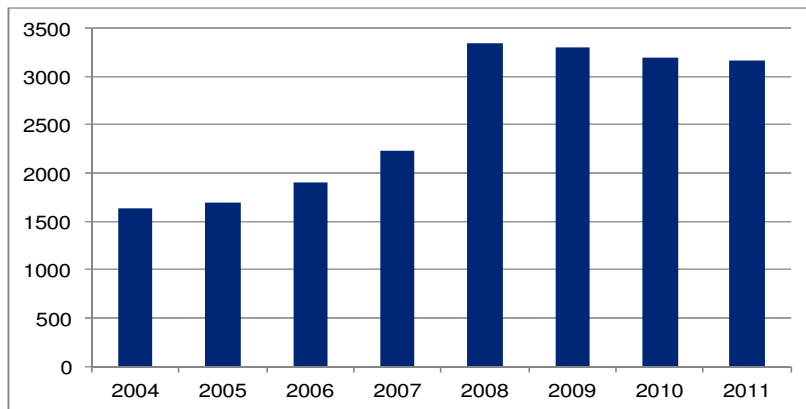
**Figure 5: ARPU levels, BDT 2002-2011**



Source: Wireless intelligence

As shown in Figure 6 below average minutes of use increased significantly between 2004 and 2008. Operators have reported that in recent years the expansion into rural sectors has contributed to marginally lower average usage levels, as new rural subscribers are more likely to have lower incomes, lower usage levels and multiple SIMs, i.e. to allow them to take advantage of the lowest prices.

**Figure 6: Average minutes of use per annum, 2001-2011**



Source: Deloitte analysis based on operator data

The mobile market in Bangladesh suffers from higher taxation than other sectors in the economy. In addition to the 800BDT SIM registration tax and the 300BDT handset tax imposed on consumers discussed earlier, MNOs in Bangladesh also suffer from levels of corporate taxation which are 7.5% higher than other businesses of a similar size in Bangladesh. These taxes and their impacts are discussed in more detail in section 4.

### 3 The economic impact of mobile telephony in Bangladesh

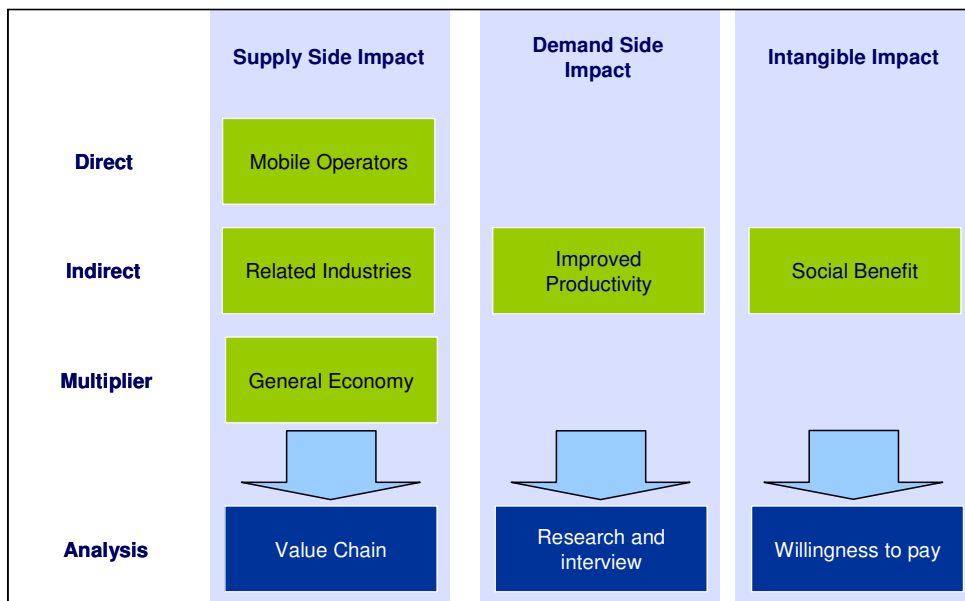
Mobile telephony in Bangladesh generates significant economic impact through effects on the supply side of the economy: employment, increases in productivity and benefits gained by Bangladeshi consumers. This section estimates the size of these impacts in the last four years.

#### 3.1 Approach to estimating the economic impact

The economic impact of mobile telephony in Bangladesh is estimated by quantifying both the supply and demand side impacts:

- For the supply side impact, the analysis focuses on the flow of funds across the mobile supply chain to estimate the value add created by the MNOs and other participants in the mobile supply chain. An economic multiplier was added to this to capture the ‘knock-on’ impact to the wider economy.
- For the demand side impact, the increase in productivity that occurred through the use of mobile telephony for business purposes is estimated.
- An additional estimate is also made of the intangible and social benefits. This reflects the potential consumer value of the service above the price they pay.

**Figure 7: Structure of the analysis of economic impact on GDP and employment**



Source: Deloitte analysis

This analysis was undertaken using publicly available statistics, company accounts and interviews with Grameenphone. By combining supply side and demand side analysis, it is possible to estimate

the GDP contribution, employment created and taxation paid in Bangladesh over the period 2008 to 2011.<sup>6</sup>

### 3.2 Impact on the supply side of the economy

To calculate the benefits to the supply side of the economy, we have estimated the value add created by the mobile communications industry. We have also estimated the 'leakages' from the system, i.e. what percentage of any amount spent will remain within the national economy to be spent in the next round and used this to isolate the impact on the Bangladeshi economy from the total international impact of the mobile communications industry.

The value add of the MNOs in Bangladesh is estimated to provide a direct contribution of BDT 152 billion in 2011 to the Bangladeshi economy. The breakdown by category is provided in Table 1 below.

**Table 1: Value add of MNOs (excluding multiplier effect), BDT millions**

Value add	2004	2005	2006	2007	2008	2009	2010	2011
Employee wages and benefits	892	1,665	3,407	5,338	5,000	8,158	12,291	12,972
Contractors	98	163	1,063	1,806	1,332	356	152	103
Taxes and regulatory fees	10,747	19,697	30,503	47,685	63,041	68,169	88,158	114,439
CSR	18	34	55	60	138	159	169	171
Dividends	1,911	924	1,108	1,368	10,717	7,569	13,615	24,503
<b>Total</b>	<b>13,667</b>	<b>22,482</b>	<b>36,136</b>	<b>56,257</b>	<b>80,229</b>	<b>84,411</b>	<b>114,385</b>	<b>152,189</b>

Source: Deloitte analysis

Tax and regulatory fees are by far the biggest element of the value add generated by the industry. In 2011, MNOs in Bangladesh will pay an estimated BDT 114 billion to the government in taxes and regulatory fees: this is an increase of over 80% from the BDT 63 billion paid by MNOs in 2008. Taxation is discussed in more detail in Section 4.

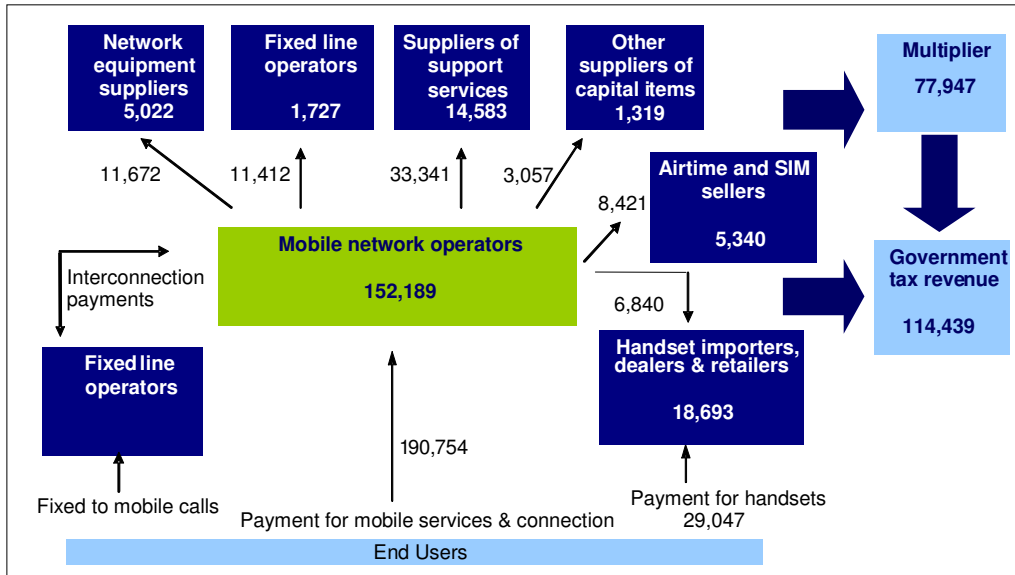
Revenue flows from MNOs to other players in the industry were then analysed, and the quantity translated into further value add<sup>7</sup>. The estimates of value add include the multiplier effect on the wider economy which is assumed to be 40% of value add<sup>8</sup>. The result of this calculation is shown in Figure 8.

<sup>6</sup> Data relating to previous years was taken from the Telenor study. Data relating to 2011 includes further assumptions, detailed in the annex to this report, grossing up figures to the full year.

<sup>7</sup> Details on value add margins, percentage of revenue translated into value add, are contained in the assumptions description at Appendix A.1.1

<sup>8</sup> The value of multiplier chosen for Bangladesh is discussed at Appendix A.1.1.3.

**Figure 8: Mobile value chain in Bangladesh in 2011, BDT millions**



Source: Deloitte analysis

The figures next to the arrows represent the flow of money from one group to another. The figures inside the boxes represent the value retained by each group. The amounts shown relate solely to domestic flows and domestic value add. Table 2 shows the calculation of value add.

**Table 2: Calculation of value add from mobile communications in Bangladesh in 2011, BDT millions**

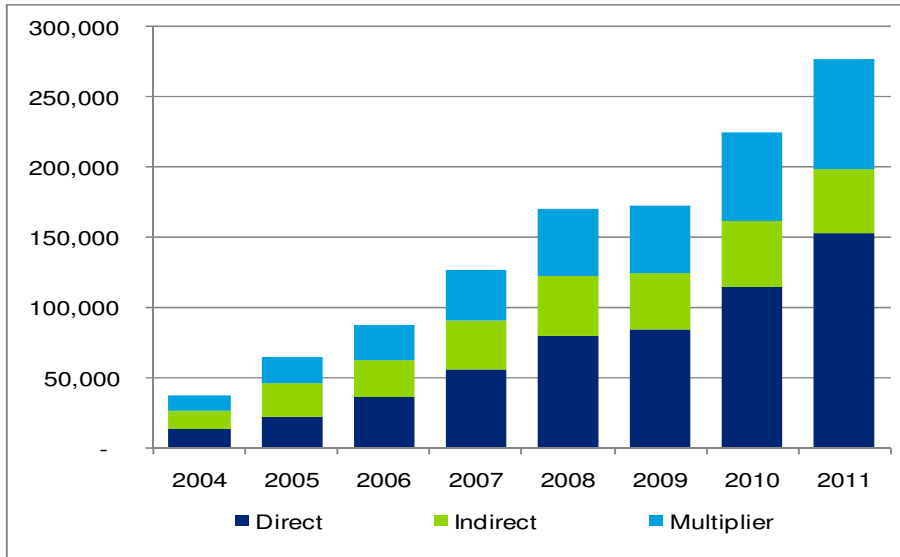
Domestic value add	Total revenue	Domestic revenue	Domestic cost	Domestic value add	Value add with multiplier
MNOs	210,776	210,776	58,588	152,189	213,064
Fixed telecom operators	12,202	11,412	9,685	1,727	2,418
Network equipment suppliers	29,858	11,672	6,650	5,022	7,031
Handset designers, dealers and retailers	39,875	35,887	17,194	18,693	26,171
Other suppliers of capital items	3,821	3,057	1,737	1,319	1,847
Suppliers of support services	43,534	33,341	18,758	14,583	20,416
Airtime & payphone commission	12,138	8,421	3,082	5,340	5,874
<b>Total</b>	<b>352,204</b>	<b>314,567</b>	<b>115,694</b>	<b>198,873</b>	<b>276,821</b>

Source: Deloitte analysis

Based on the data provided by MNOs, 89% of the revenue flows from the MNOs are estimated to remain in Bangladesh. Of this, a large portion relates to network and non-network support services and commission paid to handset and airtime dealers.

The contribution of mobile telephony to the supply side of the economy in Bangladesh in years 2004 to 2011 is summarised in Figure 9. The notable increase of 30% in 2010 and 24% in 2011 is due mainly to increases in tax payments and dividends.

**Figure 9: Supply side value add from mobile communications 2004 to 2011**



Source: Deloitte analysis

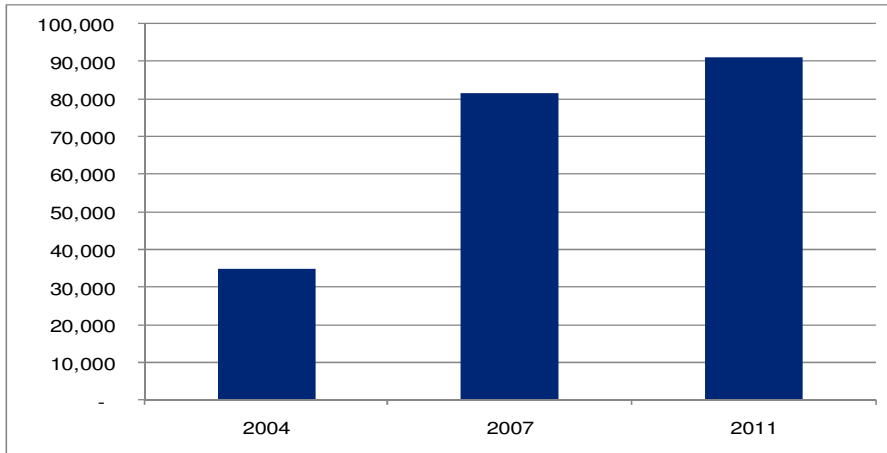
### 3.3 Impact on employment

Mobile services contribute to employment in numerous ways, including direct employment of the industry and related industries, employment in support services created by outsourced work, taxes that the government subsequently spends on employment generating activities, and induced employment resulting from the above employees and beneficiaries spending their earnings, creating more employment<sup>9</sup>.

As shown in Figure 10, the mobile telephony industry’s contribution to employment in Bangladesh has grown considerably over time. It is estimated that in 2011 the mobile communication industry will employ over 90,000 people in Bangladesh, which is 12% higher than the estimated 81,000 FTE employed in 2007 and more than double the estimated 35,000 FTE employed by the industry in 2004.

<sup>9</sup> The first effect is obtained directly from MNOs. The support employment is based on interviews and expenditure data from MNOs. The induced employment is estimated using a multiplier of 1.4. For MNOs no multiplier was applied as the majority of induced employment will be captured by the first round flows.



**Figure 10: Industry contribution over time to employment, without multiplier**

Source: Deloitte analysis

Of the estimated 90,000 FTEs in 2011, the largest category of employment is airtime, SIM and handset sellers, as shown in Table 3. These FTEs are employed in points of sale for reload, SIMs, and handsets including dedicated telecoms outlets and retail shops, as well as handset repair outlets. There are over 160,000 points of sale for reload in Bangladesh. Suppliers of support services and network equipment providers also employ a significant number of people.

**Table 3: Contribution to employment from the mobile value chain in 2011**

Employment Impact	Number of employees	Number of employees including multiplier
MNOs	10,489	10,489
Fixed telecommunications operators	4,389	6,145
Network equipment suppliers	15,276	21,386
Handset designers, retailers and dealers	5,394	7,552
Other suppliers of capital items	2,164	3,029
Suppliers of support services	17,248	24,147
Airtime, SIM and handset commission	35,977	39,575
<b>Total</b>	<b>90,937</b>	<b>112,323</b>

Source: Operator data, interviews and Deloitte analysis on average wage rates. Note this is employment directly created by revenue flows from the MNOs and does not represent total employment in the businesses.

### 3.4 Impact on Bangladeshi productivity

There are numerous ways in which mobile services have led to productivity increases. In addition to the well-established effects described in previous studies<sup>10</sup>, mobile services have been reported to increase productivity in Bangladesh in the following ways:

- Reduced travel times and costs: particularly in rural areas where previously traders would have travelled to urban areas to check for demand and agree prices, this business is now conducted via mobile calls, text messages or interactive services. Traders are able to ensure demand exists for their products before setting out on a journey and are more likely to ensure they achieve the best price for their products rather than taking prices set by middlemen.
- Increasing efficiency in agriculture: in addition to saving travel time, mobile services are increasingly being used to disseminate agricultural information services to rural subscribers including crop advisory information, weather updates and market price information. Workers are now quickly notified about changes in demand or prices so that they can amend their growing and harvest plans accordingly. This is particularly beneficial in Bangladesh where agriculture accounts for over 50% of employment and farms are often extremely small.
- Potential for improvements in access to banking services: the advent of mobile technology can enable banks to have a presence in rural areas instead of a traditional branch-based environment. As the proportion of Bangladeshis that own a mobile phone is far greater than the proportion that has a bank account, mobile banking has the potential to significantly improve access to banking services. Although some forms of mobile payment such as utility bill payments have been adopted, MNOs have reported that legal barriers have slowed down the availability of m-banking services to date. Progress is being made with the government to overcome legal issues, and m-banking might be a significant growth area going forward.<sup>11</sup>
- Encouraging entrepreneurialism: mobile generally encourages the growth of small businesses and increases efficiency. It provides affordable access to relevant information and knowledge services and expands market for businesses through e-commerce developments such as Cellbazaar. Cellbazaar may be used by individuals or businesses to buy or sell goods and services using their mobile phones; acts as a platform for buyers and sellers to locate each other; and provides regular market information on the price, availability and supplier options of essential goods.
- Flow on benefits of investment: the infrastructure built by MNOs for network and coverage expansion, such as electricity stations and access roads, is often shared and thus benefits other businesses and communities.

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<sup>10</sup> These are discussed in more detail in Appendix B.1.3

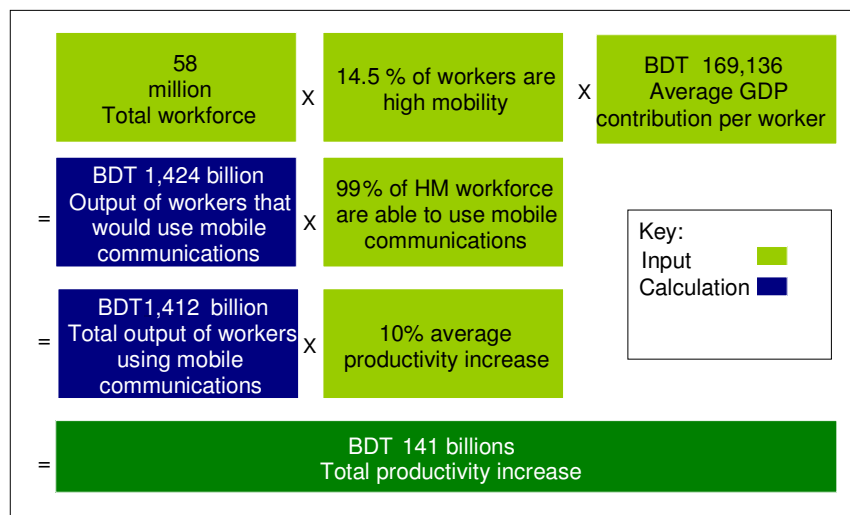
<sup>11</sup> ATC Capital research, 2010 '*Bangladesh telecoms sector – challenges and opportunities*'

- Increased access to education and health: mobile services are being used to access and disseminate educational and health information for those in the most remote and resource-poor environments. For example, Grameenphone provides '789 Healthline Services' through which consultations are available over the phone for medical advice, emergency advice, information on drugs and lab test advice. Grameenphone also works closely with the health sector to raise awareness of immunisation campaigns by sending out SMS messages to subscribers.

To calculate the impact on productivity, in line with previous findings, it was assumed that a productivity gain of 10% has been experienced by high mobility workers who own a mobile phone. It is also noted that this gain may increase as a result of network effects in the economy, whereby the higher the number of consumers that have access to mobile telephony, the more the positive effects will be amplified in the economy.

Using the economic value concept set out in Figure 11, the incremental impact on the economy was estimated to be BDT 141 billion in 2011. This calculation is set out below; no impact on low mobility workers has been considered.

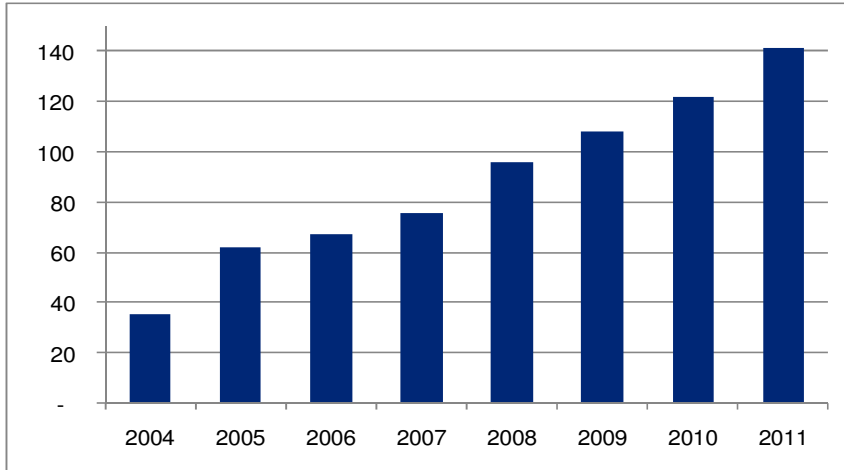
**Figure 11: Economic impact in 2011 of increased productivity of high mobility workers**



Source: Deloitte analysis based on Deloitte assumptions, interviews and Bangladesh Bureau of Statistics

The calculations show large increases in productivity between 2004 and 2011, as shown in Figure 12. These are driven by both by the increase in population coverage which has allowed a greater proportion of high mobility workers to access mobile technology and the increase in value add services provided by MNOs such as 3G data services (e.g. emails).

As a result, the productivity impact of mobile telephony on the Bangladeshi economy has more than doubled in the last five years. This highlights the increasing importance of the mobile sector to the productivity of the economy as a whole as it has expanded.

**Figure 12: Economic value from increases in productivity, BDT billions, 2004 to 2011**

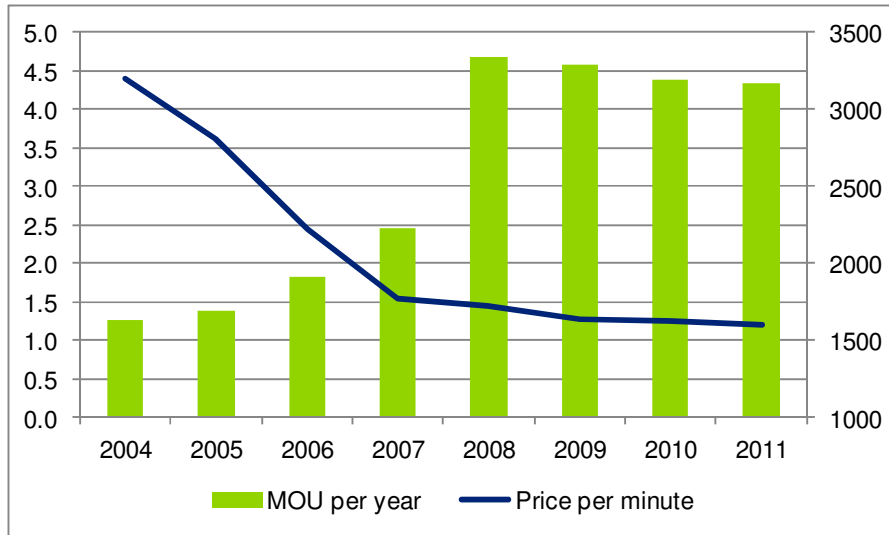
Source: Deloitte analysis

### 3.5 Benefits to consumers

Consumer benefits of mobile telephony are widely recognised in social and economic papers and have been highlighted in previous economic impact studies on Bangladesh.<sup>12</sup> Price competition between the six MNOs saw prices fall by 50% in the last 5 years. However, price decreases have slowed in recent years as MNOs are facing high taxes, falling ARPU levels and difficult operating conditions.

As illustrated in Figure 13 below, minutes of use doubled as prices fell almost 70% between 2004 and 2008. As discussed in section 2, operators have reported that lower than average usage by new entrants to the market is likely to have contributed to the marginal fall in average usage in recent years.

<sup>12</sup> Typical positive impacts of mobile telephony in developing markets are reported in Appendix A.1.4 to this paper.

**Figure 13: Price decreases slowing and decreased average usage**

Source: Deloitte Analysis based on operator data

This figure suggests a strong relationship between price and usage of mobile services, indicating that the demand for mobile services by Bangladeshi consumers is likely to be highly price elastic. This is consistent with the low income levels in Bangladesh discussed in section 2. For a given level of competition in the market, countries with lower average income levels are likely to display a higher price elasticity of demand for mobile services compared to relatively higher income countries.

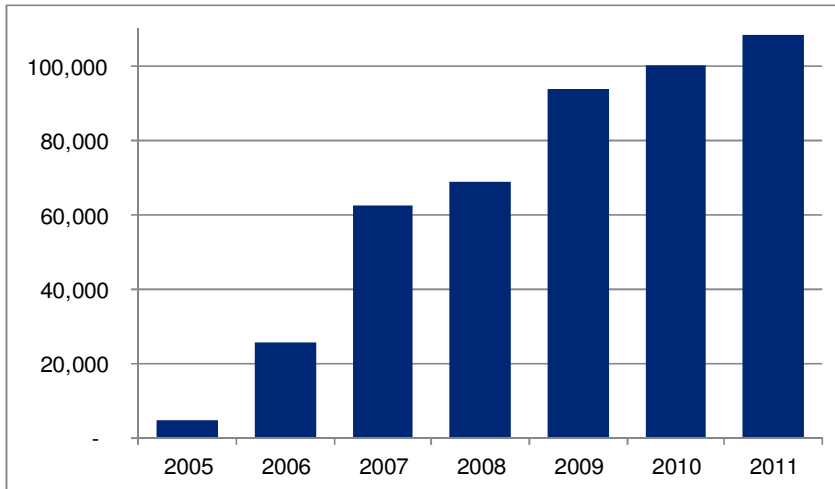
A significant sensitivity to changes in price for usage indicates that a reduction in prices for access would be likely to have large impact on the number of new entrants into the mobile market. Thus, removal of the SIM registration tax and handset excise could reasonably be expected to lead to significant increases in penetration.

### 3.5.1 Estimation of intangible benefits

The 'willingness-to-pay' methodology, described in more detail in Appendix A.1.4, seeks to quantify the intangible benefits to consumers described above. In particular, this methodology allows estimation of the beneficial impact of the penetration increases, of the price reductions and of usage increases experienced in Bangladesh over the last seven years.

Applying this methodology, it was estimated that consumers enjoyed the equivalent of BDT 108 million in intangible benefits in 2011.<sup>13</sup> As shown in Figure 14, these benefits have increased significantly in the last six years due to price decreases and increasing penetration.

<sup>13</sup> There are numerous reasons why these estimates could underestimate or overestimate the true value of intangible benefits. For example, this methodology assumes that all subscribers joined the network in 2004 and does not account for the increased or decreased willingness to pay that would have resulted from the ARPU changes in early years. We have not been able to quantify the impact of these effects.

**Figure 14: Intangible benefits using willingness to pay concept, BDT millions**

Source: Deloitte analysis

### 3.6 Overall impact on the economy

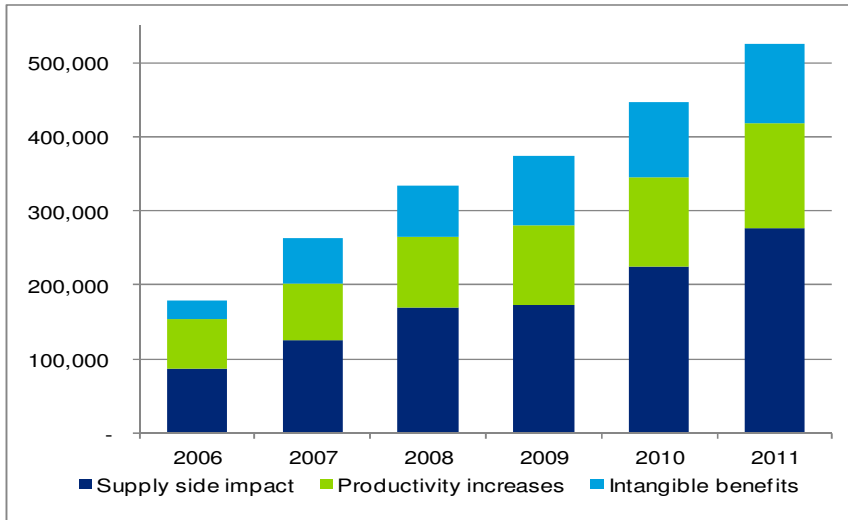
The impact of mobile telephony on the economy is particularly important in Bangladesh given that less than 2% of the population have access to fixed line services, making mobile the de facto provider of universal service to consumers. The high contribution of the sector to Bangladesh's FDI levels and the provision of employment opportunities at higher wage levels than traditional sectors such as agriculture and manufacturing, also add to mobile telephony's economic importance in Bangladesh.<sup>14</sup>

Against this background, the mobile sector in Bangladesh is estimated to contribute BDT 276,820 million in 2011, plus an estimated BDT 141,016 million from the productivity impact, and a further BDT 108,210 million relating to intangible consumer benefits. This impact has increased significantly in the last 5 years, from BDT 87,307 million, plus an additional BDT 66,991 million in productivity increases and BDT 25,406 million for intangibles, in 2006.

Figure 15 shows the economic impact of mobile telephony in Bangladesh, separated into supply side impact, productivity increases and intangible benefits, for years 2006 to 2011. Over the last five years, the contribution of mobile telephony to the Bangladeshi economy has more than doubled, while mobile-related employment has increased by over 40%. As a result of improved coverage, quality of service and affordability, the productivity impact of mobile telephony on the Bangladeshi economy is estimated to have increased by over 100% in the last five years.

<sup>14</sup> [http://www.ilo.org/wcmsp5/groups/public/---ed\\_emp/documents/publication/wcms\\_125317.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_125317.pdf)

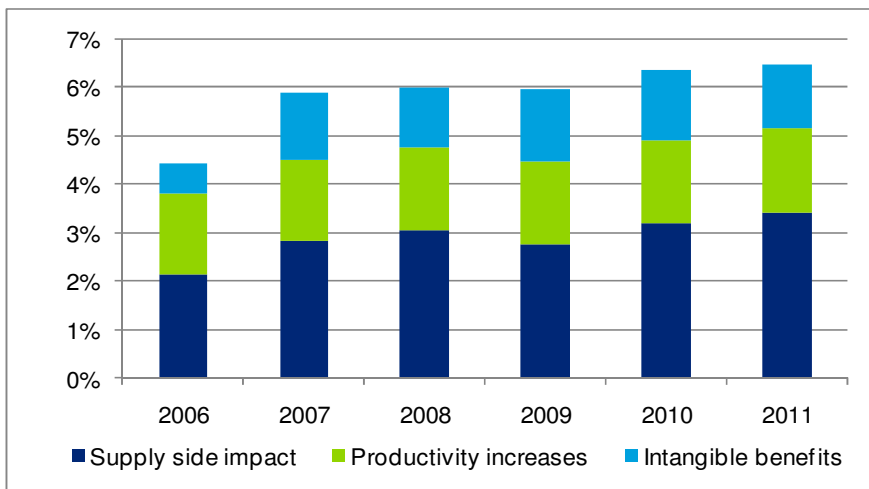
**Figure 15: Economic impact of mobile telephony in Bangladesh, BDT millions**



Source: Deloitte analysis

As illustrated in Figure 16, relative to GDP the supply side contribution represents 3.4%, with 1.7% in productivity increases and a further 1.3% from intangibles. In total, this contribution has increased significantly in the last five years, from 2.1% with 1.6% in productivity increases and a further 0.6% from intangibles. This analysis also highlights the importance of the mobile sector to the productivity of the economy as a whole as it has expanded.

**Figure 16: Economic impact as a percentage of GDP**



Source: Deloitte analysis

From 2008 to 2009 the supply side impact increased only 2% in absolute terms and fell from 3.1% to 2.7% as a proportion of GDP. This was largely due to a decrease in expenditure on network equipment by MNOs.

## 4 Taxation on MNOs and consumers in Bangladesh

The previous section highlighted that tax is the biggest element of the value add generated by MNOs in Bangladesh, making up 75% of the total value add generated by the industry. This taxation burden has implications for both consumers and MNOs in Bangladesh.

This section discusses in more detail the taxation of consumers and MNOs, and regulation of mobile telephony, in Bangladesh.

### 4.1 Value add from taxation

In 2011, it is estimated that MNOs in Bangladesh will pay approximately BDT 114,439 billion to the government in taxes and regulatory fees. This represents a notable increase of 275% from the BDT 31 billion paid by MNOs in 2006. The total amount of corporation tax, sales and mobile specific taxes, income tax paid by employees and regulatory fees paid by the industry since 2006 is shown in Table 4.

**Table 4: Tax and regulatory payments in Bangladesh from MNOs, BDT millions**

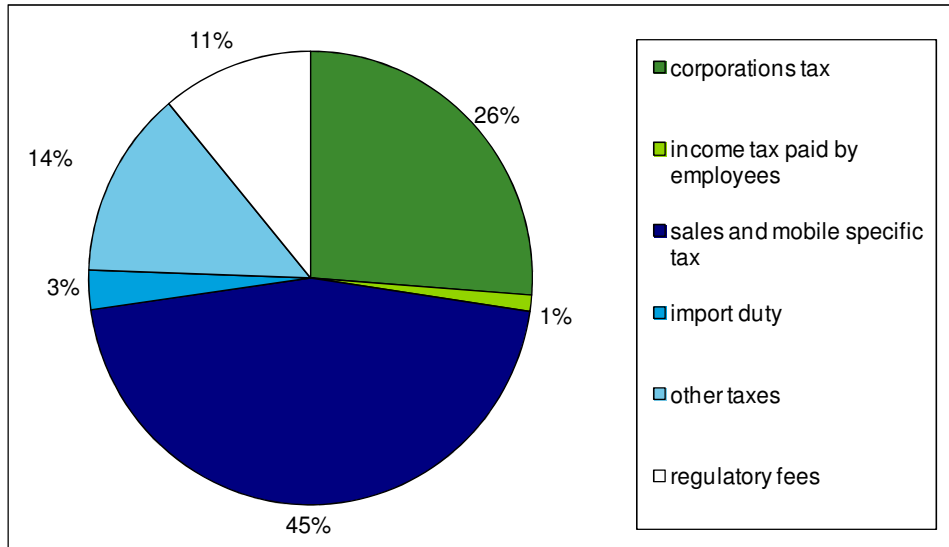
Taxes from MNOs	2006	2007	2008	2009	2010	2011
Corporation tax	3,433	5,375	10,505	14,807	21,715	29,985
Income tax paid by employees	195	305	417	672	769	1,321
Sales and mobile specific taxes	21,877	34,256	39,225	43,406	54,770	70,513
Regulatory fees	4,998	7,749	12,894	9,283	10,903	12,620
<b>Total taxes and fees</b>	<b>30,503</b>	<b>47,685</b>	<b>63,041</b>	<b>68,169</b>	<b>88,158</b>	<b>114,439</b>

Source: Deloitte analysis based on operator data

Tax and regulatory fees represented 54% of company revenues for Bangladeshi MNOs in 2011. This high rate is likely to be due, in part, to the subsidisation of SIM card taxes by MNOs in order to promote take up of mobile. The largest proportion of tax revenue is raised through sales and mobile specific taxes, including the SIM card tax and the 300 BDT excise on handsets. Together these accounted for 62% of taxes and regulatory fees paid in 2011. The breakdown of taxes paid to the government by the mobile industry for 2011 is illustrated in Figure 17.



**Figure 17: Breakdown of 2011 tax revenues from MNOs by source**



Source: Deloitte analysis based on operator data

In addition to the direct tax revenue received from MNOs, when considering the tax revenue received from other players in the value chain, the mobile industry value chain generates another BDT 188 billion for the government in 2011, including the multiplier effect.

**Table 5: Total tax revenues from the mobile value chain in 2011, BDT millions**

Tax Revenue	Tax revenue	Tax revenue with multiplier
MNOs	114,439	160,215
Fixed telecommunications operators	299	418
Network equipment suppliers	1,433	2,006
Handset designers and dealers	14,142	19,799
Other suppliers of capital items	552	773
Suppliers of support services	3,121	4,369
Airtime commission, payphone commission	887	976
<b>Total</b>	<b>134,873</b>	<b>187,579</b>

Source: Deloitte analysis based on Deloitte tax data, company accounts and interviews.

The largest payers of tax in the mobile supply chain, aside from the MNOs, are handset designers and dealers. A fixed import tax of 300 BDT is levied on each imported handset.<sup>15</sup> Sales taxes of

<sup>15</sup> This has varied between 100-400 since the initial year captured by this study.

15% are applied to the retail price and those within the handset value chain pay taxes on profits and employee wages.

The tax payments in the tables represent tax revenues created by revenue flows from mobile services and not total tax revenues from the businesses as a whole. For example, the taxes paid by the fixed operators represent the proportion of tax paid for terminating MNO traffic and for providing leased line services and not total taxes paid. Similarly, the taxes paid by the equipment providers represent only a proportion of total taxes paid by these entities.

## 4.2 Taxation on mobile consumers

In addition to a 15% VAT rate on all goods and services, consumers in Bangladesh are subject to a BDT 800 tax on SIM cards and a BDT 300 tax on handset imports which together significantly increase the cost of entering the mobile market for the first time. This tax contributes to increasing the average annual cost of mobile ownership (“TCMO”)<sup>16</sup> to US\$48.50 (BDT 3,558).<sup>17</sup>

In addition to high taxes, the government’s registration programme which was introduced in 2007 may also act as a barrier to entry for poorer consumers. This policy requires MNOs to formally register details of all mobile phone subscribers, which can be difficult for subscribers on low income or in rural areas who are less likely to be literate and to possess the necessary forms of identification than their urban counterparts.

In 2011 tax on mobile telephony is estimated to make up 21% of the total cost of mobile ownership in Bangladesh<sup>18</sup>. This has increased in the last five years from 18.8% as prices have decreased, and is above the regional average of 12.81% and the global average level of 18% as shown in Figure 18.

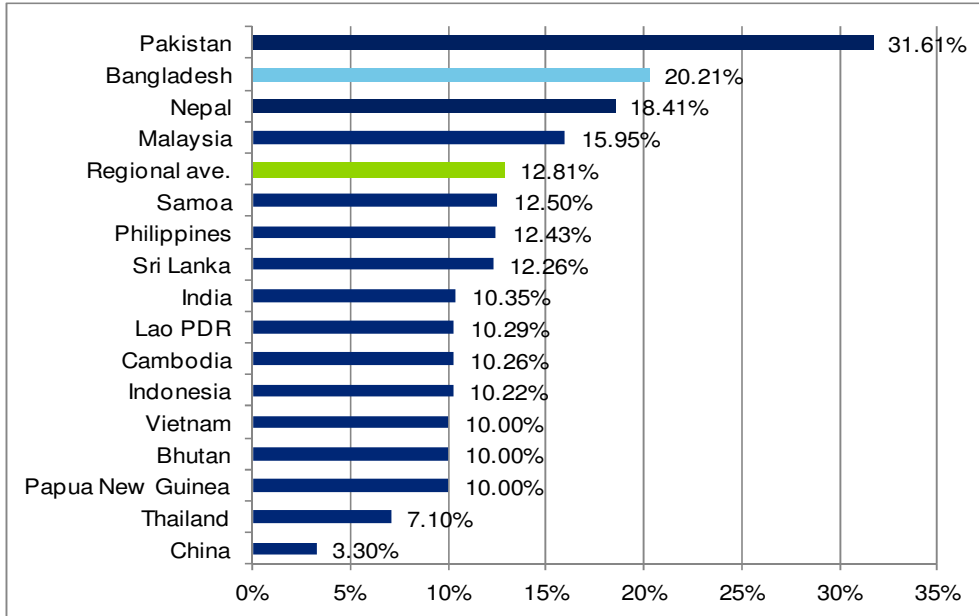
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<sup>16</sup> TCMO is a measure of the average annual total cost of mobile ownership which takes account of the cost of connection, handset purchase and usage.

<sup>17</sup> Deloitte and GSMA Global Mobile Tax Review 2011 (forthcoming)

<sup>18</sup> Deloitte Global Mobile Tax Review 2011 (forthcoming)

**Figure 18: Tax as a % of TCMO in the region**



Source: Deloitte/GSMA Global Mobile tax review 2011 (forthcoming)

A US\$48.5 (BDT 3,558) TCMO is significant compared to the incomes of Bangladeshi consumers. Table 6 below compares the income levels in Bangladesh with the cost of mobile ownership and the taxation paid by mobile consumers. It shows that when compared to the Bangladeshi Gross National Income per capita, mobile ownership costs represent approximately 7% of income. For the 40% of Bangladeshis living under the poverty line, the cost of mobile ownership represents more than 11% of income, placing mobile ownership out of reach for a significant portion of the population.

**Table 6: Cost of mobile ownership and income levels in Bangladesh**

	Below poverty line (\$US1.25 per day)	Average income (GNI per capita)	Employed: unskilled wage	Employed: average wage	Employed: professional wage
<b>Annual income (BDT)</b>	<33,457	49,964	73,370	161,414	513,590
<b>TCMO as a % of income</b>	>11%	7%	5%	2%	1%
<b>Tax on TCMO as a % of income</b>	>1.79%	1.20%	0.82%	0.37%	0.12%

Source: <http://data.worldbank.org/country/bangladesh>; Deloitte/GSMA Global Mobile tax review 2011 (forthcoming)

The aim of the Deloitte/GSMA Global mobile tax review, the results of which are shown in Figure 18, is to measure the amount of tax currently faced by consumers. Therefore the subsidies which MNOs currently offer to mitigate the impact of the handset excise and the SIM connection tax are removed from these results. Hence, should MNOs withdraw their subsidies, tax as a percentage of

TCMO in Figure 18 and as a percentage of income in Table 6 would increase, further increasing barriers in access to mobile telephony. As discussed further in section 4.3 below, financial conditions and falling prices due to high levels of competition may lead MNOs to reduce subsidies with further negative consequences.

Other than Pakistan, Bangladesh is the only country in the region to impose a tax on handsets and is one of only three countries in the region (in addition to Pakistan and Sri Lanka) to impose a connection tax.

These forms of mobile specific taxation may have negative consequences for Bangladeshi consumers as the resulting large upfront payment acts as a barrier to entry for the mobile market. As discussed in section 3.5, in Bangladesh, average income levels are low, leading Bangladeshi consumers to be particularly price sensitive. For this reason, as discussed above, MNOs have generally tended to offer a subsidy in order to allow growth of the sector.

However, MNOs have recently reported a need to reduce this subsidy in recent times as increasing competition and falling ARPU levels require operational cost controls. This is partly driven by expansion into the rural market as additional investment is often needed to expand infrastructure in these areas, making new subscriber acquisition more expensive even without the subsidy.<sup>19</sup>

This type of taxation can also discriminate against mobile telephony in favour of fixed telephony, despite mobile services being recognised as providers of universal telecom services. This is particularly the case in Bangladesh where fixed line penetration is less than 2% of population.<sup>20</sup>

Finally, taxing entry into the mobile market higher than other goods and services could signal that the government may wish discourage usage in mobile services, as governments sometimes increase the consumption tax on goods for which they wish to discourage consumption. In contrast to this, governments in other countries recognising the benefits of mobile telephony for consumers and the economy choose to tax mobile at a lower level than other goods and services. For example, in 2009 the Kenyan government exempted handsets from VAT, resulting in a significant improvement in penetration rates.<sup>21</sup>

Therefore, if the government wants to encourage the use of mobile telephony and allow all consumers access to the associated benefits, it could consider removing or lowering the handset and SIM taxes.

### 4.3 Taxation on MNOs in Bangladesh

Each year MNOs deliver increasingly significant benefits to the Bangladeshi economy. However, they operate in a challenging investment environment and are subject to a number of market and regulatory pressures:

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<sup>19</sup> <http://telecomnewsbd.wordpress.com/2009/04/06/sim-sales-drop-as-operators-cut-subsidy-in-bangladesh/>

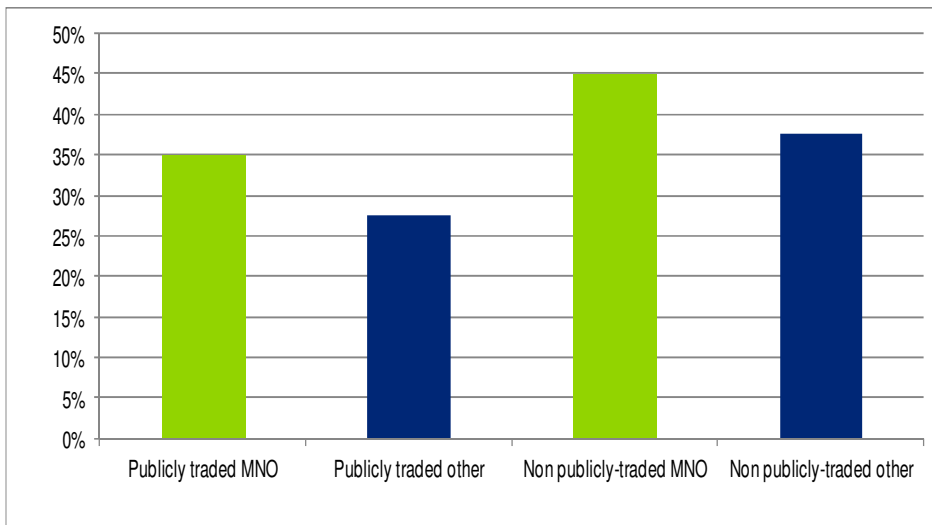
<sup>20</sup> Business report, Bangladesh telecommunications report Q2 2010.

<sup>21</sup> Deloitte/GSMA report on 'Mobile telephony and taxation in Kenya' 2011.

- Competition has increased significantly, contributing to a price drop of over 50% in the last five years. However, these falling prices have also led to decreasing ARPU levels for MNOs.
- An expensive geographic costing environment, whereby the costs involved in expanding their network into rural areas or adding more capacity can include building access roads and installing generators. Although this is a positive outcome for communities, expansion of mobile services in Bangladesh is more expensive than in other countries.
- Unequal treatment compared to other industries with regards to input costs: for example, the mobile specific handset and SIM connection taxes discussed in section 4.2.

In addition to these high costs, in Bangladesh, MNOs face a higher level of corporation tax to other businesses as shown in Figure 19. In addition to paying higher levels of corporation tax, MNOs are excluded from a policy which allows other publicly traded companies a 10% rebate on their tax if they declare a dividend of more than 20%.<sup>22</sup> This differential treatment leads to Bangladesh having the highest MNO corporation tax rates in the region, as shown in Figure 20.

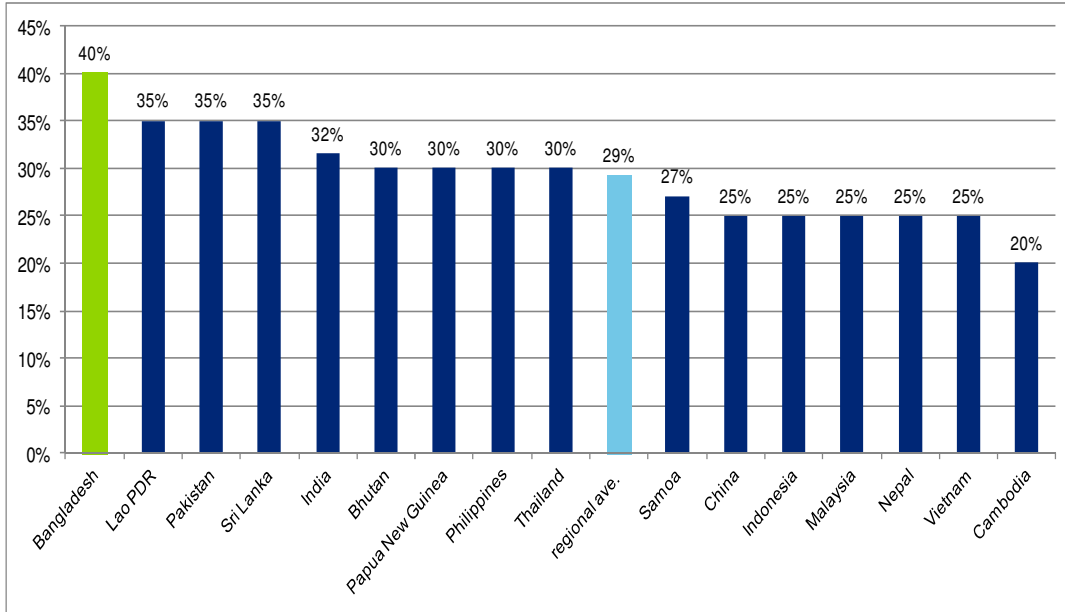
**Figure 19: Corporation tax in Bangladesh**



Source: <http://www.taxrates.cc/html/bangladesh-tax-rates.html>

<sup>22</sup> <http://www.taxrates.cc/html/bangladesh-tax-rates.html>

**Figure 20: Corporate tax rates in the region**

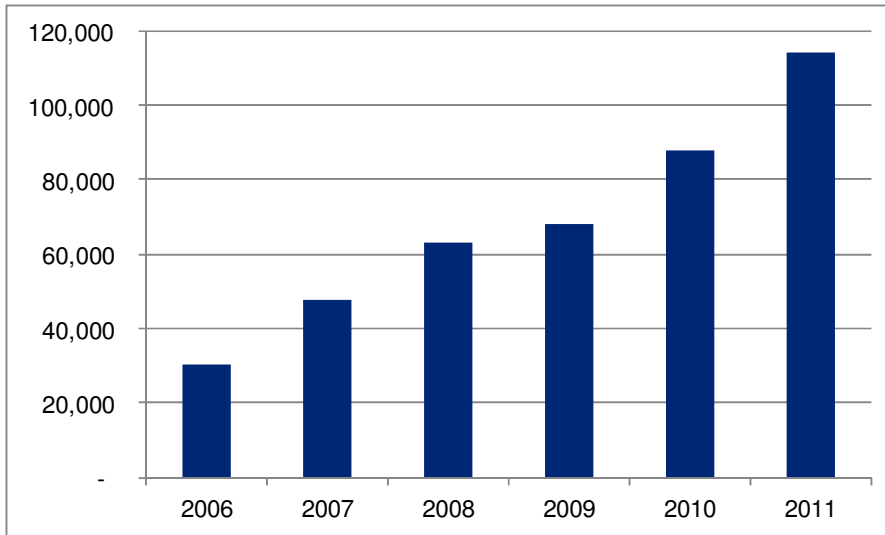


Source: Deloitte analysis. The rate shown for Bangladesh in this figure is the average of the publicly traded and non publicly traded MNO rates.

MNOs are also subject to a tax of 5.5% on their revenue, called ‘revenue share tax’, used by the regulator to pay for the lease of Bangladesh railways’ fibre optic network.

MNOs have also reported that a number of unpredictable tax authority policies increase the difficulties of operating in Bangladesh. For example, MNOs have reported that bona fide business expenses are often disallowed on an arbitrary basis. In addition, the government cut off all unregistered subscribers in the second half of 2008. Not only did this result in a large drop in subscriber numbers at the time, but compulsory registration can slow down adoption of mobile services for poorer Bangladeshis who might not have the required identification documents.

Together these taxes and fees have contributed to a significant growth in government revenues from MNOs in the last six years, as shown in Figure 21 below.

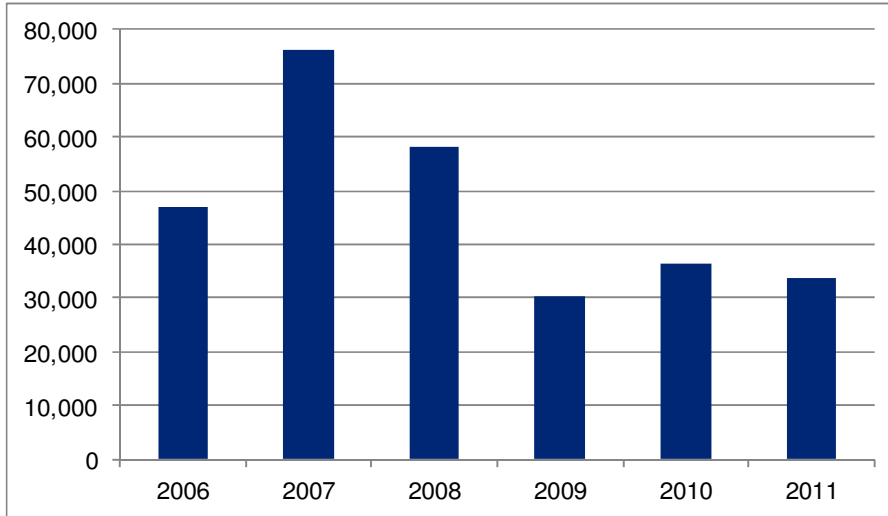
**Figure 21: Taxes paid by MNOs, BDT millions 2006-2011**

Source: Deloitte analysis based on operator data

These tax and regulatory costs impact the ability of MNOs to provide services to Bangladesh's poor and rural communities. Such costs may be ultimately passed onto end-users and impact take-up or alternatively act to limit the finances available for MNOs to invest in infrastructure and new service developments. Additionally, unexpected changes in taxation (for example the amount of the handset excise has increased and decreased numerous times in the last 5 years) create instability and uncertainty in the sector thus promoting additional reluctance to committing to large investment programmes.

As discussed in section 3.6, MNOs' spending on investment has decreased significantly in recent years. High levels of corporate taxation, subsidisation of consumer taxes and decreasing ARPUs are likely to have contributed to this outcome. This large decrease in expenditure on equipment can be seen in Figure 22 below, which shows MNO's capex expenditure in Bangladesh from 2006 to 2011.

Any further reductions in capex expenditure could have significant consequences for the level of FDI in Bangladesh. This reduction in network investment is likely to have contributed to the reduction in telecommunications as a % of FDI inflows from a peak of almost 60% in 2008.

**Figure 22: MNO capex expenditure in Bangladesh, 2006-2011, BDT millions**

Source: *Wireless intelligence*

### 4.3.1 Conclusions

Competition between the six MNOs in Bangladesh has reduced prices to a quarter of what they were in 2004 and increased service offerings and coverage. However, consumers are subject to a BDT 800 SIM card tax and a BDT 300 handset excise tax, which is approximately 1.6% of the average income in Bangladesh and acts as a barrier to entry and slows down growth in penetration. The high price sensitivity of Bangladeshi consumers indicates that reduction in the price of access, through removal of these mobile specific consumer taxes, could reasonably be expected to have a positive impact on penetration levels.

MNOs in Bangladesh are currently subject to a number of market and regulatory pressures, including a regionally high level of taxation. MNOs make a significant contribution to the government tax receipts and to FDI in Bangladesh, despite the challenging cost conditions and uncertainty under which they operate. The current tax burden could have negative impacts on investment, product development, the financial contribution made by MNOs to community projects and, potentially, on the ability of MNOs to retain or increase current levels of employment.



## Appendix A Methodology and assumptions

This section outlines the approach taken in estimating the impacts of the economic contribution of the mobile industry in Bangladesh.

### A.1 Static Analysis, including intangible benefits

Static analysis refers to the impact of mobile services for a particular period of time and does not seek to estimate the longer term impacts on economic welfare. However, static analysis is extremely useful due to the greater availability of disaggregated data relative to dynamic analysis where a greater number of assumptions are typically required.

Publicly available and operator data was employed together with interviews and assumptions based on economic literature to estimate the value of the mobile communications to the economy in terms of employment and GDP, both direct and indirect. The total economic impact is defined as consisting of the following elements:<sup>23</sup>

- The direct impact from the MNOs.
- The indirect impact from other industries related to mobile services.
- The indirect impact due to the surplus enjoyed by end users in terms of productivity improvements.
- The indirect impact due to more qualitative social benefits enjoyed by the population, defined as 'intangible benefits'.

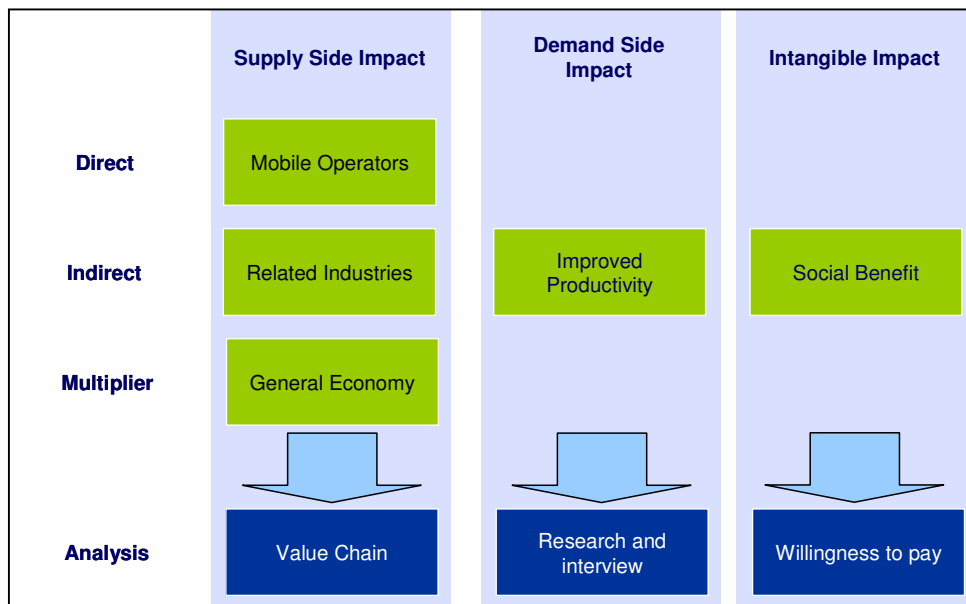
The static analysis has been structured as illustrated by the following figure. The different impacts are summed together to give the total economic impact<sup>24</sup>.

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<sup>23</sup> The approach adopted is consistent with that adopted across the economic literature, see for example: McKinsey & Co. Wireless Unbound. September 2006. *The surprising economic value and untapped potential of the mobile phone*.

<sup>24</sup> To obtain the total economic impact, it is necessary to sum together the supply side, demand side and intangible impacts. Whilst these are intended to capture different impacts of mobile telephony, there is a potential for limited double counting.

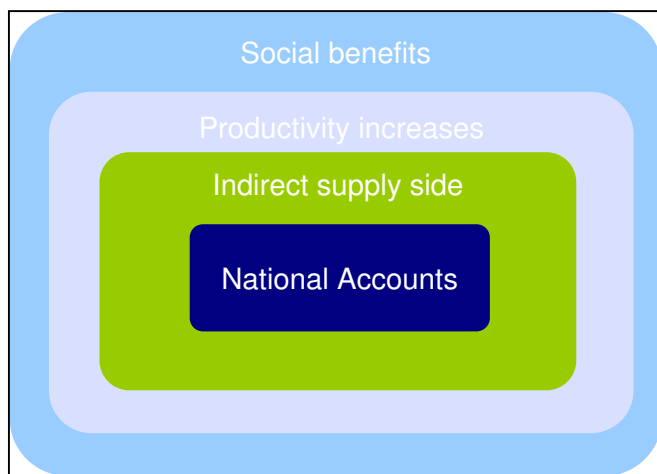
**Figure 23: Structure of the analysis of economic impact on GDP and employment**



Source: Deloitte

The methodology estimates the contribution of the sector on the basis of a wider definition than that commonly cited in national accounts. The adopted definition captures the ‘economic footprint’ of the mobile sector.

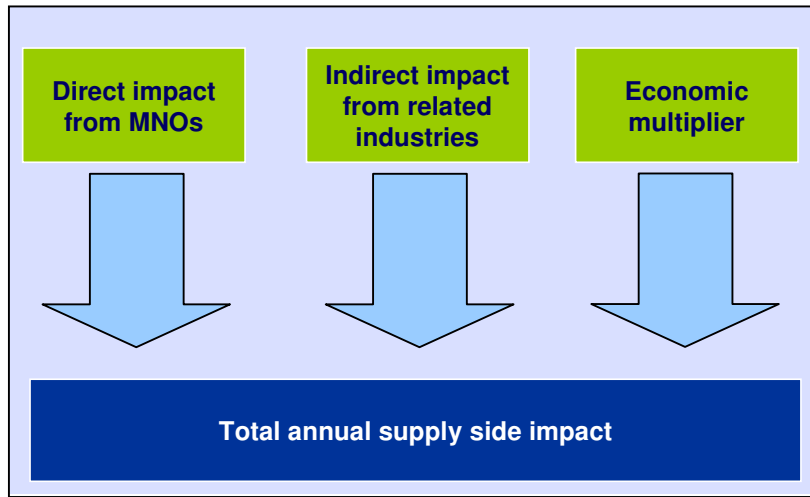
**Figure 24: This methodology and national accounts**



Source: Deloitte

### A.1.1 Supply side impact

The contribution of the mobile industry to the economy was quantified, covering the industry and its adjacent sectors. This is calculated by aggregating the direct, indirect and economy wide (multiplier) effects that have occurred in each year.

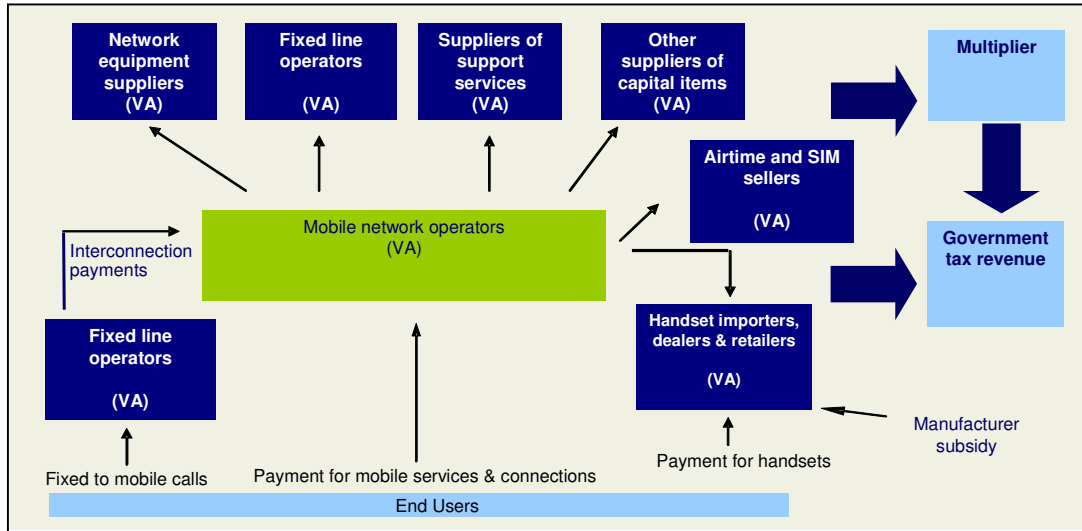
**Figure 25: Structure of the supply side analysis**

Source: Deloitte

This gives a snapshot view but does not take into account the future benefits to the economy resulting from growth. A customer's spend on mobile services flows along the value chain to the players within the industry: MNOs, suppliers, distributors and others. Money flows between these economic agents and the amounts retained are used to pay wages, taxes, buy inputs and other costs. Finally, the government collects tax revenues from all MNOs within its jurisdiction. In this assessment, the focus is limited to the economy of the country in question and ignores international impacts.

Each of the main stakeholders in the industry has been identified and assigned flows of value between them. These flows are shown in the diagram below.

**Figure 26: Mobile value chain**



Source: Deloitte

Estimates of the flows are based on:

- Interviews with MNOs.
- Discussions with other stakeholders.
- Analysis of government statistics.
- Analysis of accounts and billing information.

Following the identification of the revenue flows, the proportion of these flows that remain within the domestic economy was estimated and are translated into a positive economic benefit, referred to in this report as value add.

#### A.1.1.1 Direct value add from MNOs

Five categories of economic value which are directly created by the MNOs have been determined:

- Wages and employee benefits.
- Contractor costs.
- Taxes and regulatory fees.
- Corporate social responsibility.
- Dividends.

For each of these categories, the proportion of value add which relates to the domestic economy was identified. This analysis is based upon operator management accounts interviewing which identify the final destination of monetary flows.

#### A.1.1.2 Indirect value add

The revenues that flow directly from the MNOs to other domestic industry players have been identified. The proportion of revenues that are value add was then estimated, using the five categories of value add used in the mobile network operator analysis above. These proportions for each country are outlined in A.2.

#### A.1.1.3 The multiplier

The value add created by the mobile communications industry will have a subsequent positive impact on the economy. These effects are generated by further rounds of expenditure. For example, the indirect domestic industry players will additionally incur operating expenses paid to additional players. These players will then create value as they pay wages, taxes etc. The economic literature quantifies these effects by applying an 'economic multiplier' to the initial rounds of value generated. The table below shows the values of multipliers that have been calculated in other studies.

**Figure 27: Multiplier benchmarks**

Title of study	Multiplier
The contribution of mobile phones to the UK economy, 02 for ONS	1.13
Ovum studies on economic impact of mobile telephony in Bangladesh and USA based on review of various other studies*	1.6
Association Française des Opérateurs Mobiles *	1.7
Economic impact of spectrum use in the UK, Europe economics, based on ONS	1.1
Sicrana, R., and de Bonis, R. 'The Multiplier Effects of Telecommunications Investments on Economic Growth and Restructuring'.**	1.5
Radio authority UK. 1995. 'Economic impact of radio'.	1.4
Deloitte for Telenor. 2008. 'Economic Impact of mobile telephony in Serbia, Ukraine, Malaysia, Thailand, Ukraine and Pakistan'.	1.2 - 1.4
Deloitte for Telenor. 2008. 'Economic Impact of mobile telephony in Bangladesh'.	1.4
Zain/Ericsson 2009. 'Economic impact of Mobile Communications in Sudan'	1.2
Aloyce R. Kaliba et al 2004 multiplier estimates 'Multipliers for Tanzania: implications on developing poverty reduction programs' (transport and communication multiplier estimate)	1.63

Based on a review of the above studies, a multiplier value of 1.4 was assumed.

#### A.1.1.4 Calculating tax revenues

Tax revenues to the government are raised through taxes specific to mobile services, corporation tax, income tax and regulatory fees. Tax revenues are collected from the government from all components in the value chain. However, based on interviews with parties, a degree of leakage from the informal sector has been assumed.<sup>25</sup>

Information on revenues for various taxes was collected as follows:

- Economy wide taxes: value added (sales) taxes, corporate taxes and income tax paid by employees.
- Mobile taxes: licence and spectrum fees, import duties, SIM registration fees, and other mobile specific taxes.

Tax revenues were calculated directly from the MNOs and also from other entities in the value chain.

#### A.1.2 Calculating the impact on employment

Mobile services contribute to employment in several ways:

- Direct employment of the industry and related industries.
- Support employment created by outsourced work and taxes that the government subsequently spends on employment generating activities.
- Induced employment resulting from the above employees and beneficiaries spending their earnings, and creating more employment.

The first impact is estimated directly by collecting data from the MNOs and, for the related industries, dividing the proportion of revenue spent on wages by the average wage rate in each sector. Typically, support and induced employment is estimated using a multiplier and other studies have used a ratio of 1.1 to 1.7 for induced employment. Extensive discussions with stakeholders were conducted on this issue and it was chosen to apply a multiplier of 1.4 on all value add including employment due.

#### A.1.3 Increases in productivity

Significant economic and social research was undertaken in the recent years on the numerous ways in which mobile services can improve productivity, particularly in developing countries where mobile services have 'leap-frogged' fixed line services and are the provider of universal service. In section 3.4 of the main paper the key effects identified in the last four years in Bangladesh were

<sup>25</sup> Assumptions are made on the percentage of money flows that are subject to the national tax regime. For example, it is assumed that legitimate registered businesses pay sales, import, employee and corporate taxes whilst it is assumed that only a small proportion of streetside airtime sellers and handset dealers pay taxes. Therefore not all flows are assumed to be subject to taxation.

identified, discussed and estimated. Several important effects have been identified in the recent research<sup>26</sup>. These include:

- Improving information flows: mobile services allow certain occupations (such as commodities and agriculture, both prominent in developing countries) to cut out the middle-man as traders can obtain information on prices, quality and quantities directly. This improves the incomes of producers, and helps reduce wastage.
- Reducing travel time and costs: similarly, mobile services allow workers to trade and share information without travelling. The Vodafone paper on Africa (2006) contains analysis on Tanzania and South Africa that concluded 67% of users found mobiles greatly reduce travel time in Tanzania<sup>27</sup>.
- Deloitte's study on the 'Impact of mobile Communications in Bangladesh' (2008) identified significant benefits arising from improved information flows within companies and between buyers and sellers from the introduction of value add services such as Cellbazaar, which allows users to buy and sell goods and services using their mobile phones either by SMS, WAP or web.
- Improving efficiency of mobile workers: mobile services improve the efficiency of all workers in the economy. This effect will particularly be felt by workers with unpredictable schedules, for example those involved in repair and maintenance, or collection and delivery. Mobiles will give them greater accessibility and better knowledge of demand.
- Improving job search: mobile services improve the chances of the unemployed finding employment through enabling people to call for opportunities rather than relying on word of mouth. Further to this, owning a mobile phone makes workers more employable as they are contactable while absent from their place of work.
- Encouraging entrepreneurialism: mobile has encouraged the growth of small business and has increased its efficiency.

No established economic methodology exists to estimate the GDP and employment effects of such productivity improvements across the economy. As such, available evidence from the literature in the area was considered and interviews with stakeholders (including business and government representatives) have been undertaken in order to provide an indication of the demand side impact of mobile communications. Of particular relevance to developing economies, Zain commissioned in 2008 a survey in Sudan trying to identify how average business revenue has increased with mobile usage.<sup>28</sup> Across the 800 people interviewed, average business revenue increases were found to be just below 11%. The survey also asked the degree to which people agreed with the following statement:

<sup>26</sup> See, for example: Deloitte for Telenor. January 2008. *Economic impact of mobile Communications in Serbia, Ukraine, Malaysia, Thailand, Bangladesh and Pakistan*.

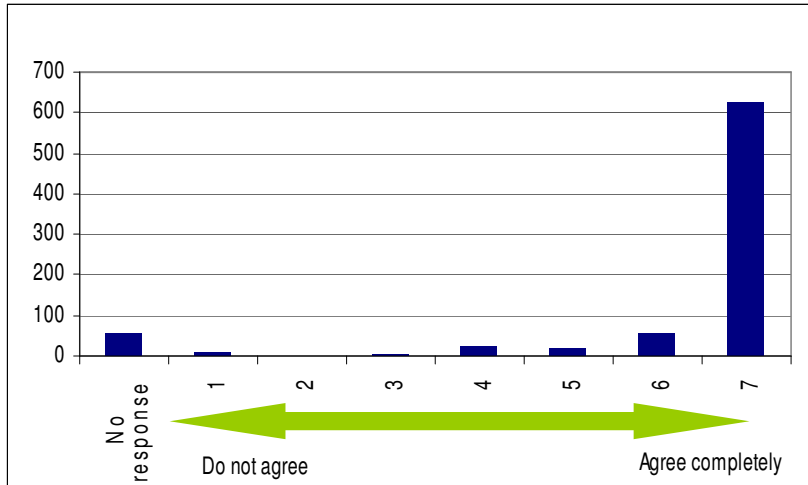
<sup>27</sup> Vodafone. March 2005. *Africa: The Impact of Mobile Phones*. Vodafone Policy Paper Series, No.3.

<sup>28</sup> Referenced in: Deloitte, 2008. *Economic Impact of Mobile Communications in Sudan*.

*'Mobile phone is a business enabler. It allows business to be more efficient and build, keep and maintain customer relations.'*

Of the 744 respondents, 84% stated that they 'completely agreed' with the statement.<sup>29</sup>

**Figure 28: Are mobile phones business enablers? (Number of people)**



Source: Zain survey data

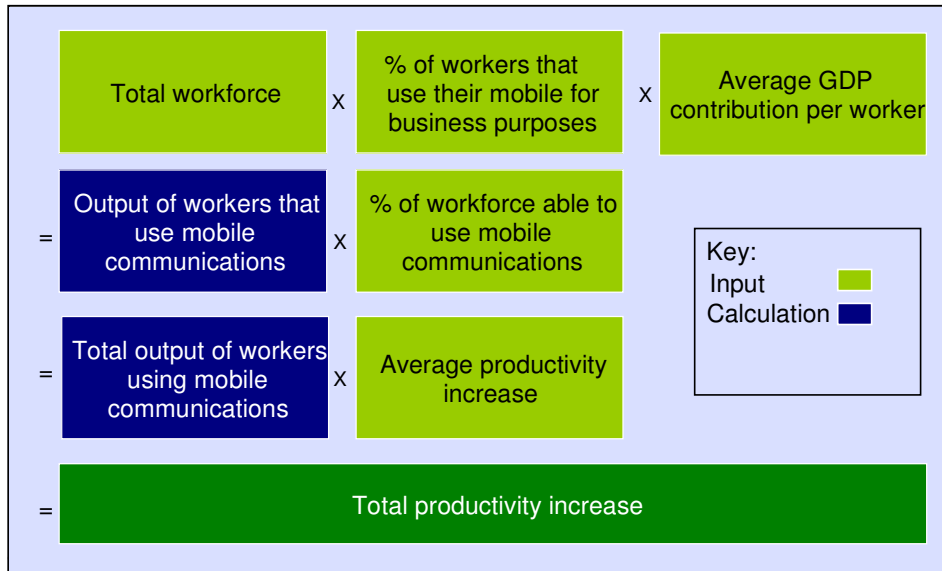
The impact of the productivity improvements on the overall economy is estimated by assuming that the productivity improvement will be experienced by high mobility employees within the economy. In line with similar studies,<sup>30</sup> high mobility workers are defined as those workers who undertake a moderate to high degree of travel in the course of their employment e.g. taxi drivers, agricultural workers selling produce in town, salesmen and transport workers. The proportion of high mobility workers was calculated by reference to data from the National bureau of statistics and international labour databases. The productivity gain of high mobility workers with access to a mobile phone was estimated by undertaking interviews to identify the impacts seen in each country and by reference to previous studies.

The process for calculating the impact of the productivity improvements on the economy is set out in the figure below.

<sup>29</sup> Based on a sample of 800 people across a broad section of Sudan geographically and socially.

<sup>30</sup> Aside from Zain's survey other examples include: McKinsey & Co. Wireless Unbound. September 2006. *The surprising economic value and untapped potential of the mobile phone.*



**Figure 29: Calculation of economic impact of productivity improvements**

#### A.1.4 Intangible impacts

Finally, the intangible impact of the mobile industry was identified. Information provided during interviews with MNOs, governments and regulators in Bangladesh was utilised and additionally findings from other economic impact reports were drawn upon and extended.

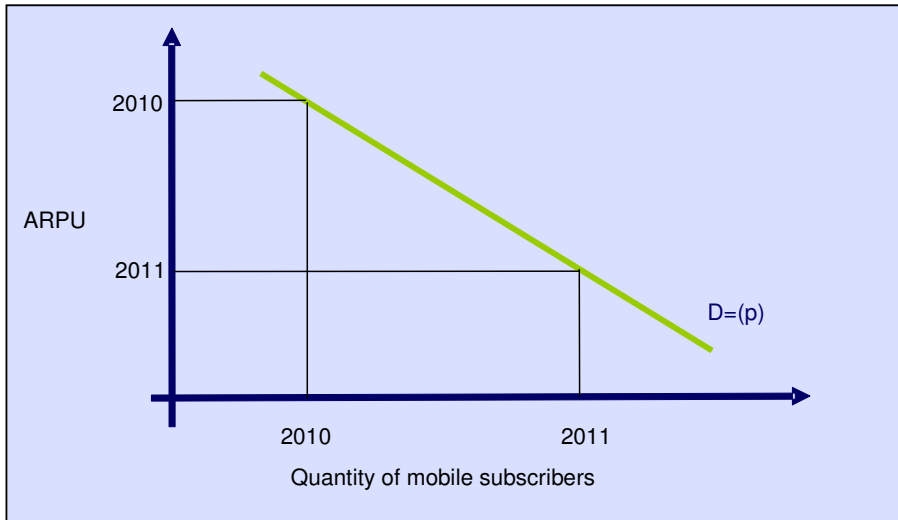
As with productivity, economic and social research was undertaken in the last ten years on the numerous ways in which mobile services can promote intangible benefits. In section 3.5.1 of the main paper the key effects identified in the last four years in Bangladesh were identified, discussed and measured. Several important effects have been identified in the research in the last years. These are presented here for general review and include:

- Promoting social cohesion: through enabling contact with family members or friends who have moved away, and building trust through sharing of handsets (which has been found to be common in developing countries). In addition, a number of studies found a statistically robust relationship between mobile ownership and willingness to help others in the community.
- Extension of communications: especially to users with low education and literacy.
- Stimulating local content: this can be particularly useful for allowing users to learn about local services such as healthcare or education.
- Assisting in disaster relief: mobile services allow families and friends to stay in touch in the event of a natural disaster, which can also ensure that they obtain more rapid relief.

Whilst it is difficult to assign a specific value to these benefits in terms of contribution to GDP or employment, it is clear that many of these social and educational benefits could make people happier, healthier and more motivated; hence more employable and able to contribute to GDP.

One method for estimating a value using actual data is the willingness to pay concept<sup>31</sup>. This seeks to calculate the increase in consumer surplus that has resulted from a change in the price of a good.

**Figure 30: Increase in consumer surplus following a reduction in price**



Source: Deloitte

The willingness to pay concept was used to calculate the value of the intangible benefits of mobile phones in this study.<sup>32</sup> Historical minutes of use (MOU) per user and average price per minute show how much customers are willing to pay for mobile services. If it is assumed that these intangible benefits of owning a mobile are unchanged over time, then the value for this form of consumer surplus can be considered to be the difference between price per minute at the time of subscription, less price per minute today (which is likely to be less due to increased competition and other factors). Total consumer surplus is then the difference in price per minute multiplied by the total minutes of use at the old price.

There are numerous reasons why these estimates may either underestimate or overestimate the true value of intangible benefits. For example, this methodology assumes that all subscribers joined the network in 2003 and does not account for the increased or decreased willingness to pay that would have resulted from price changes in early years. The calculation also assumes that the number of subscribers in each year is a function of price. However, subscriber levels during the period are highly influenced by the level of network coverage and therefore, had mobile coverage been greater, then it is likely more subscribers would have been signed up at higher prices in the early years.

<sup>31</sup> See: McKinsey & Co. Wireless Unbound. September 2006. *The surprising economic value and untapped potential of the mobile phone.*

<sup>32</sup> There is a potential for double counting between the productivity improvement and the intangible impact.

## A.2 Data limitations and detailed assumptions

### A.2.1 Bangladesh specific assumptions

#### Assumptions used in the economic impact assessment

Assumption	Value																								
Employment levels	<p><u>Direct employment by MNOs</u></p> <p>Data was obtained directly from Grameenphone and estimates for other MNOs were based on publicly available information or estimated based on market shares.</p> <p><u>Indirect employment</u></p> <p>Employment figures for most segments of the value chain were estimated based on discussions with MNOs and other business. However, employment figures for some segments were estimated as revenue inflow multiplied by wages as percentage of revenue divided by average wage. Wages as percentage of revenue were estimated based on discussions with MNOs and other businesses. Average wage was estimated by using assumptions on operator wage and average wage in Bangladesh.</p> <p>For airtime employment, interviews with airtime dealers and operator staff identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>Network equipment employment was estimated on the basis of information provided by MNOs. The information provided was an estimate of the total market.</p> <p>A multiplier of 1.4 was applied to indirect levels to gauge the total employment effect in the economy. No multiplier was applied to direct employment, as a large amount of employment will already be captured by the first round flows.</p>																								
Value add margins for each segment of the value chain	<p>Value add margins are the total % of revenue spent domestically on (i) sales, import, income, corporate and regulatory taxes; (ii) wages; (iii) CSR; and (iv) profit.</p> <p><u>Direct value add of MNOs</u></p> <p>All data was obtained directly from MNOs</p> <p><u>Indirect value add</u></p> <p>These percentages are estimated based on interviews with MNOs and external parties (such as airtime dealers) and a review of accounts of companies in Bangladesh. From 2008 different margins were applied from those used pre 2008 (in the previous studies) to reflect the changing market conditions and improved data availability.</p> <table border="1"> <thead> <tr> <th></th> <th>% value add margin 2007</th> <th>% value add margin 2011</th> </tr> </thead> <tbody> <tr> <td><b>Margin on domestic revenues</b></td> <td></td> <td></td> </tr> <tr> <td>Fixed telecommunications operators</td> <td>15%</td> <td>15%</td> </tr> <tr> <td>Network equipment suppliers</td> <td>40%</td> <td>43%</td> </tr> <tr> <td>Handset designers and dealers</td> <td>66%</td> <td>66%</td> </tr> <tr> <td>Other suppliers of capital items</td> <td>21%-49%</td> <td>21%-49%</td> </tr> <tr> <td>Suppliers of support services</td> <td>30%-49%</td> <td>15%-49%</td> </tr> <tr> <td>Airtime commission, payphone commission</td> <td>62%</td> <td>63%</td> </tr> </tbody> </table>		% value add margin 2007	% value add margin 2011	<b>Margin on domestic revenues</b>			Fixed telecommunications operators	15%	15%	Network equipment suppliers	40%	43%	Handset designers and dealers	66%	66%	Other suppliers of capital items	21%-49%	21%-49%	Suppliers of support services	30%-49%	15%-49%	Airtime commission, payphone commission	62%	63%
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Airtime commission	Commissions pre 2008 were estimated based on 99% of airtime revenues assumed to be sold through third parties with an average commission based on weighted average of figures																								

Assumption	Value																																																																																																						
Handsets	<p>provided by MNOs. For 2008 onwards however commission data was provided by the MNOs.</p> <p>Handset prices and percentage of handsets sold by MNOs, legal imports and the black market were estimated b interviews with handset dealers, and estimates from MNOs.</p>																																																																																																						
Productivity improvement	<p>An annual productivity improvement of 10% for high mobility workers was assumed based on interviews and a review of similar studies.</p> <p>High mobility workers were estimated as 18% of the total workforce. The estimate of the percentage of high mobility workers in each employment activity is provided below.</p> <table border="1"> <thead> <tr> <th>Employment by sector</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>% high mobility</th> </tr> </thead> <tbody> <tr> <td>Agriculture, Forestry.</td> <td>26,406,492</td> <td>26,674,386</td> <td>27,003,699</td> <td>27,457,493</td> <td>15%</td> </tr> <tr> <td>Fisheries</td> <td>1,259,635</td> <td>1,272,414</td> <td>1,288,123</td> <td>1,309,770</td> <td>6%</td> </tr> <tr> <td>Mining &amp; Quarrying</td> <td>97,730</td> <td>98,722</td> <td>99,941</td> <td>101,620</td> <td>5%</td> </tr> <tr> <td>Manufacturing</td> <td>5,240,035</td> <td>5,293,195</td> <td>5,358,543</td> <td>5,448,592</td> <td>15%</td> </tr> <tr> <td>Electricity, Gas, Water</td> <td>118,242</td> <td>119,441</td> <td>120,916</td> <td>122,948</td> <td>10%</td> </tr> <tr> <td>Construction</td> <td>1,859,289</td> <td>1,878,152</td> <td>1,901,339</td> <td>1,933,291</td> <td>30%</td> </tr> <tr> <td>Trade, Hotel, Restaurant</td> <td>8,048,876</td> <td>8,130,532</td> <td>8,230,909</td> <td>8,369,228</td> <td>20%</td> </tr> <tr> <td>Transport, Storage and Communication</td> <td>3,637,740</td> <td>3,674,645</td> <td>3,720,011</td> <td>3,782,525</td> <td>35%</td> </tr> <tr> <td>Bank, Insurance &amp; Finance</td> <td>269,060</td> <td>271,790</td> <td>275,145</td> <td>279,769</td> <td>30%</td> </tr> <tr> <td>Real Estate, Rent, Business Activities</td> <td>232,864</td> <td>235,226</td> <td>238,130</td> <td>242,132</td> <td>30%</td> </tr> <tr> <td>Public Administration</td> <td>1,192,069</td> <td>1,204,162</td> <td>1,219,028</td> <td>1,239,514</td> <td>15%</td> </tr> <tr> <td>Education Service</td> <td>1,429,758</td> <td>1,444,263</td> <td>1,462,094</td> <td>1,486,664</td> <td>20%</td> </tr> <tr> <td>Health &amp; Social Work</td> <td>608,100</td> <td>614,269</td> <td>621,853</td> <td>632,303</td> <td>20%</td> </tr> <tr> <td>Community Personal Service and others</td> <td>3,075,489</td> <td>3,106,690</td> <td>3,145,044</td> <td>3,197,896</td> <td>20%</td> </tr> <tr> <td>Informal</td> <td>2,387,757</td> <td>2,411,981</td> <td>2,441,758</td> <td>2,482,792</td> <td>10%</td> </tr> <tr> <td>weighted average high mobility</td> <td></td> <td></td> <td></td> <td></td> <td>18%</td> </tr> </tbody> </table> <p>Employment information for 2008-2009 is obtained from the national statistics office. Post 2009 employment is estimated on the basis of the labour force growth rate. Percentage of workers who are high mobility are Deloitte assumptions based on benchmarks from previous studies and experience. Average high mobility is a weighted average.</p> <p>The GDP contribution of these workers was estimated by calculating the total GDP relating to high mobility sectors and dividing by the total number of high mobility workers.</p>	Employment by sector	2008	2009	2010	2011	% high mobility	Agriculture, Forestry.	26,406,492	26,674,386	27,003,699	27,457,493	15%	Fisheries	1,259,635	1,272,414	1,288,123	1,309,770	6%	Mining & Quarrying	97,730	98,722	99,941	101,620	5%	Manufacturing	5,240,035	5,293,195	5,358,543	5,448,592	15%	Electricity, Gas, Water	118,242	119,441	120,916	122,948	10%	Construction	1,859,289	1,878,152	1,901,339	1,933,291	30%	Trade, Hotel, Restaurant	8,048,876	8,130,532	8,230,909	8,369,228	20%	Transport, Storage and Communication	3,637,740	3,674,645	3,720,011	3,782,525	35%	Bank, Insurance & Finance	269,060	271,790	275,145	279,769	30%	Real Estate, Rent, Business Activities	232,864	235,226	238,130	242,132	30%	Public Administration	1,192,069	1,204,162	1,219,028	1,239,514	15%	Education Service	1,429,758	1,444,263	1,462,094	1,486,664	20%	Health & Social Work	608,100	614,269	621,853	632,303	20%	Community Personal Service and others	3,075,489	3,106,690	3,145,044	3,197,896	20%	Informal	2,387,757	2,411,981	2,441,758	2,482,792	10%	weighted average high mobility					18%
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Multiplier	<p>A multiplier of 1.4 was applied to supply side direct and indirect value add in order to capture the full impact on the Bangladesh economy.</p> <p>A multiplier of 1.4 was assumed following a literature review and interviews with Bangladeshi officials.</p>																																																																																																						



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