



# THE POTENTIAL ECONOMIC IMPACT OF MOBILE COMMUNICATIONS IN MYANMAR

In collaboration with:

**Deloitte.**

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# FOREWORD BY ERICSSON

Today, it is estimated that 60 percent of the world's population has a mobile subscription, with more than six billion subscriptions globally. Ericsson estimates that by 2017, 85 percent of world's population will have 3G coverage, and that global data traffic will grow 15 times by the end of 2017. For many, the mobile phone will be the only means of accessing the internet. Globally we have witnessed the economic benefits of broadband – a ten percent increase in penetration leads on average to one percent sustainable GDP growth. And doubling Internet speed can improve GDP by 0.3 percent<sup>1</sup>.

Myanmar is perhaps the country least touched by the tremendous developments in telecommunications of the last two decades. In Myanmar, with an estimated population of over 60 million, only around one million people today enjoy the benefits of a mobile telephone, and it is estimated that less than 400,000 have internet access.

Since the late 1990s, investment in Myanmar was restricted due to concerns for human rights violations and international sanctions. However, international observers including the United Nations consider that there are real opportunities for positive and meaningful developments to improve the human rights situation and deepen the transition to democracy in Myanmar. The recent suspension of sanctions by the European Union and the lifting of prohibitions on U.S. investment in Burma, marks the recognition of these positive developments. According to a recent report by Maplecroft<sup>2</sup>, Myanmar could become the next focus area for investment with the support of the governmental reform program. The growth will be dependent on investments in the infrastructure such as health, education, communications and transport.

In recent years many developing nations such as those in Africa and Asia have seen mobile communications deliver benefits in accessibility of health services, education,

provision of electricity, improved access to trade and employment and more. These are the benefits that could add to the positive momentum observed in Myanmar.

Human Rights considerations need to be carefully considered when conducting business in Myanmar. Ericsson supports The Institute for Human Rights and Business (IHRB) and The Danish Institute for Human Rights (DIHR) initiative for applying human rights principles and standards within business activities in Myanmar based on a multi-stakeholder engagement process. We have joined their initiative, which is based on the United Nations Guiding Principles on Business and Human Rights.

At the same time, access to mobile communication could also play an important role in enabling basic human rights, and in driving increased transparency in society. Mobile communications can also help to reduce banking and financial challenges through applications such as mobile commerce, it can enhance access to education and health services, it can create jobs, and support business and social development more generally. Ericsson has published three recent reports on the triple bottom line impacts of broadband in the Networked Society<sup>3</sup>.

Ericsson strongly believes that access to telecommunications would be beneficial to the people, economy and society of Myanmar. Befitting the Ericsson values, in conjunction with re-establishing presence in Myanmar, Ericsson will collaborate with respected human rights stakeholders both to assess the human rights situation, and the socioeconomic impact that telecommunications brings. This report is intended to highlight the potential economic impact that access to telecommunications can bring to Myanmar.



1. <http://www.ericsson.com/traffic-market-report>.  
2. Maplecroft Myanmar Country Risk Report Q2-2012.

3. First City index: [http://www.ericsson.com/networkedsociety/media/hosting/City\\_Index\\_Report.pdf](http://www.ericsson.com/networkedsociety/media/hosting/City_Index_Report.pdf), released May 2011. Second City index "Life of Citizen", [http://www.ericsson.com/networkedsociety/media/hosting/city\\_index\\_report\\_part\\_2\\_REV.pdf](http://www.ericsson.com/networkedsociety/media/hosting/city_index_report_part_2_REV.pdf), released Nov 2011. Third City index "Life of Business", <http://www.ericsson.com/networkedsociety/lab/research/city-index/>



# EXECUTIVE SUMMARY

Mobile communications in Myanmar is underdeveloped compared to other countries in the region and in the world. Current penetration is estimated at less than four percent, 96 percent lower than the average penetration of countries in South Eastern Asia. In order to facilitate growth and development in this market, Myanmar's Post and Telecommunications Department has announced a new telecommunications law, which creates four new telecommunications licences in Myanmar. It is anticipated that the introduction of a new licensing process will have a significant impact on mobile communications in the country, in terms of coverage, penetration, affordability and the use of technology for commercial and social development.

At the time of publication, it was not decided whether there would be three or four licences. For the purpose of this report, the following assumption was made (it should be noted that this could change): It is expected that the Post and Telecommunications Department will be divided into two units, each with their own licence, the third licence will be owned by the military and the final licence will be available to a privately owned operator. All licensees will be able to partner with foreign investors and licences will include coverage and penetration requirements in lieu of licence fees.

The limited existing mobile infrastructure will require mobile

operators to build out new networks, increasing competition in the mobile market, as well as foreign direct investment and employment. The availability of four service providers will also empower consumers with greater choice through competition. Additionally widespread mobile coverage is expected to lead to falling mobile prices.

Significant network investments will be required in order to launch nationwide services. It is estimated that in the three years after licences are issued, mobile network operators will make a direct contribution of USD 0.96 billion to the country's economy under an assumed

penetration scenario level of three percent. Much of these investments will be spent on network technology which will be provided by a range of network equipment providers.

It should be noted that in the scenarios presented in this report are in line with earlier findings and experience of both Ericsson and Deloitte. However, a caveat should be added that consumer uptake is heavily dependent on a) network coverage build out, and, b) pricing strategies deployed by operators. As is the case in other markets, regulators may choose to implement directives concerning both prices and coverage areas.



## Economic benefit of mobile communications in Myanmar

The value of the mobile communications industry to the Myanmar economy during the three years' post licensing is estimated in terms of contribution to gross domestic product (GDP) and employment. Both the direct and indirect impact of the mobile operators is considered. The economic impact of the mobile industry on GDP includes

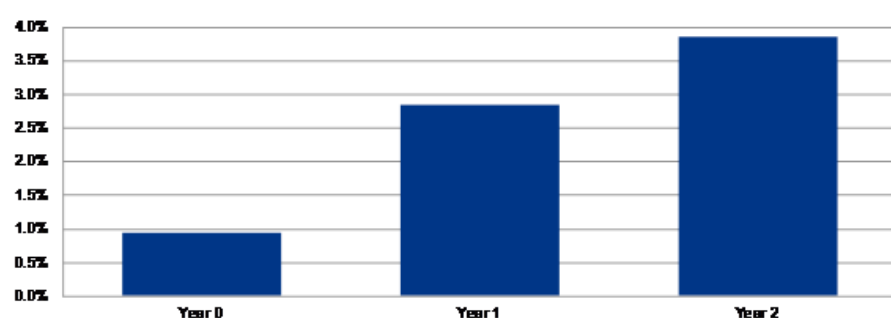
- **Supply side effects:** these are the value-add, the additional value created at a particular stage of production, generated by domestic spend and employment from direct and indirect firms in the value chain. In order to calculate domestic spend we identify the money flows that remain in Myanmar and exclude money flowing out of Myanmar;
- **Demand side effects:** the productivity increases resulting from people using their phones for business purposes; and
- **Intangible benefits:** the social benefits enjoyed by consumers.

This measurement approach seeks to estimate the unique and important role of mobile communications in generating economic growth and promoting social development, including the broader effects associated with those transformations such as the productivity of workers. The measurements therefore show a broader impact than which would be found in the national accounts of Myanmar.

The total economic impact of the mobile sector in Myanmar is estimated to be 1.5-7.4 percent of gross domestic product (GDP) over the first three years after licences are issued<sup>4</sup>. Figure 1 summarises the impact of the supply side value add as a proportion of GDP.

The potential impact of mobile communications on employment has also been calculated. It is estimated that the mobile communications industry will employ approximately 66,000 full time equivalent employees (FTEs) in Myanmar. A further 24,000 full time jobs are es-

Figure 1: Supply side value add as a proportion of GDP



Source: Deloitte

Figure 2: Contribution to employment from the mobile value chain in Year 2

Employment Impact	Number of employees	Number of employees including multiplier
Mobile network operators	5,700	5,700
Fixed telecommunications operators	16,480	23,072
Network equipment suppliers	300	420
Handset dealer	170	238
Other suppliers of capital items	5,560	7,784
Suppliers of support services Network OPEX	1,740	2,436
Airtime and SIM commission – Wholesalers	1,720	2,408
Airtime and SIM commission – Retailers	34,340	48,076
<b>Total</b>	<b>66,010</b>	<b>90,134</b>

Source: Operator data and Deloitte analysis on average wage rates, based on a medium penetration scenario<sup>5</sup>. Differences are due to rounding.

timated to be created in the wider economy as a result of the interactions with the MNOs.

Figure 2 illustrates both direct and indirect employment throughout the end to end value chain associated with mobile services. An economic multiplier of 1.4 is used in order to capture the 'knock-on' impact to the wider economy.

### Supply side impact of mobile communications

The supply side impact of mobile communications consists of:

- **Direct effects:** the value add and employment created by the MNOs themselves;
- **Indirect effects:** the value add and employment created by other parties in the value chain; and

- **Multiplier effects:** the knock-on impact of the direct and indirect effects on the rest of the economy.

It is estimated that the supply-side value-add impact of the mobile communications industry in Myanmar will be USD 2.24 billion in Year 2<sup>6</sup>. This is initially from MNOs investment in network deployment. Figure 3, page 7, shows a breakdown of the supply side impact.

Figure 4, page 7, illustrates the value add chain associated with mobile services in Myanmar in Year 2. This figure includes expected revenues directly generated by mobile customers for mobile services and handsets and the value-add

4. This is under the medium penetration scenario identified in the market overview.

5. These figures represent only employment directly created by revenue flows from the MNOs and do not represent total employment in the whole industry for each section of the value chain.

6. This is under the medium penetration scenario identified in the market overview.





created at each of the point of the value chain.

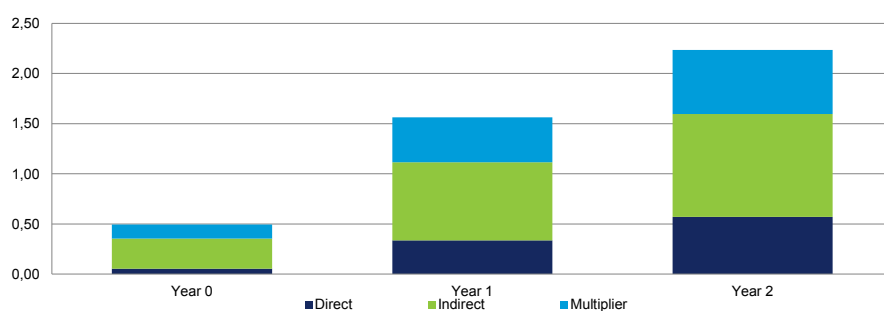
**Demand-side impact:**

## INCREASES IN PRODUCTIVITY

The mobile market in Myanmar is unique in comparison with mobile markets internationally as there is little network development, very low levels of penetration, and no competition. With the introduction of competition into the market, productivity improvements are expected to be made as a result of access to mobile communications by workers.

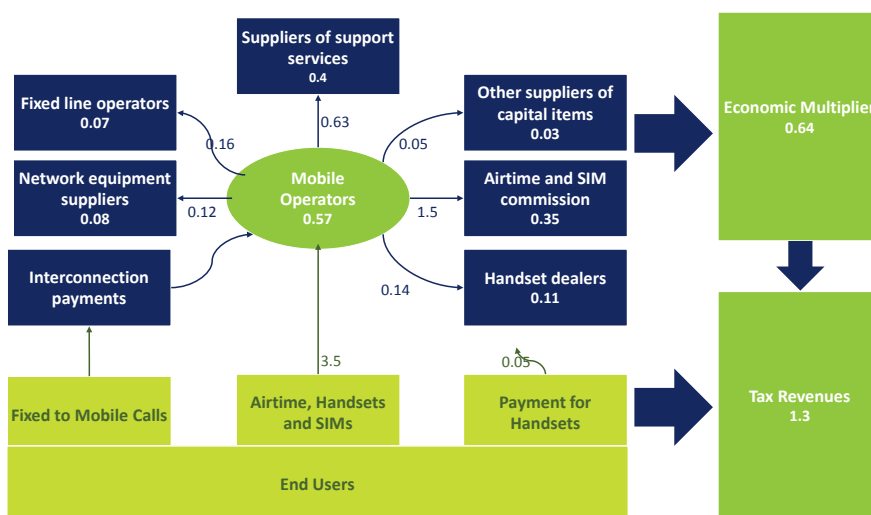
The impact of mobile communications on the productivity of workers is envisaged to occur through a number of channels. A review of available literature suggests, that the most important effects are usually improvements in the information flows between buyers and sellers, reductions in travelling time, and more flexible work and accessibility to areas of the country. For example, in the agriculture sector, workers can be quickly notified about changes in demand or prices, so that they can amend their growing and harvest plans accordingly. Mobile phones also encourage the growth of small business and increase

**Figure 3: Supply side value add from mobile communications by component, USD billions**



Source: Deloitte analysis of medium penetration scenario

**Figure 4: Mobile value chain and value add in Myanmar, in Years 0-3, USD billions**



Source: Deloitte analysis, values in brackets represent medium penetration scenario value add.



their efficiency. International studies have shown that the use of mobile communications increases entrepreneur activities in the market and provides the foundation for new businesses to develop<sup>7</sup>.

The effects described above contribute to enhance general economic productivity and therefore have an impact on the economic performance of a country.

To quantify these effects, the proportion of workers that use mobile phones for business purposes has been estimated. The economic value concept indicates that, if mobile workers in Myanmar achieved a ten percent increase on their productivity as a result of using mobile phones, the potential productivity impact of mobile services on the economy in Year 2 could be USD 1.3 billion.

### Demand side impact:

#### INTANGIBLE BENEFITS

Mobile communications provide a number of intangible benefits to consumers. These include:

- Strengthened social engagement and connection;
- Extension of communications to users with low education, literacy and income;

- Stimulation of local healthcare and education content; and
- Assistance in disaster relief.

The intangible consumer benefits are estimated using a willingness to pay analysis. This combines data on usage increases and price decreases over the years. While intangible consumer benefits cannot be accurately quantified, a willingness to pay analysis that combines estimated usage increases and price decreases over the three years, can be applied to estimate how consumer benefits will increase over time.

If it is assumed that the intangible benefits of owning a mobilephone are unchanged over time, then the value for this form of consumer surplus can be considered to be

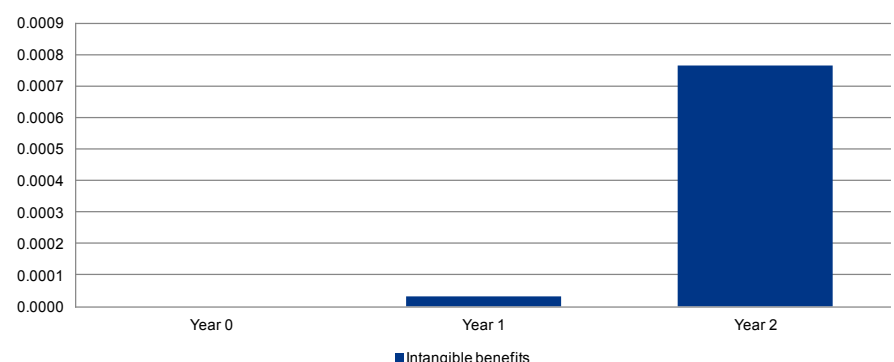
the difference between ARPU at the time of subscription and ARPU today (which is likely to be less due to increased competition and other factors). Results are shown in Figure 5.

### Mobile and future economic growth

Academic research suggests that, over the longer term, mobile communications has a significant impact on economic growth rates. It has been suggested that this effect is particularly strong in developing countries. Ericsson studies show that on average a ten percent increase in penetration rate results in a one percent increase in GDP<sup>8</sup>.

8. Ericsson, Arthur D. Little and Chalmers University of Technology, 2011, "Need for speed".

Figure 5: Intangible benefits using willingness to pay concept, USD billions



Source: Deloitte analysis based on a 35% mobile penetration level in year 2.

7. For example Public Call Offices (PCOs) were established in Bangladesh to provide mobile, particularly smartphone, access to business and individuals who could not afford to own a mobile phone.







## The Report:

# THE POTENTIAL ECONOMIC IMPACT OF MOBILE COMMUNICATIONS IN MYANMAR

Deloitte and GSMA studies have shown that mobile communications have been proven to contribute to positive economic development in numerous countries, ranging from 2.3 percent to 7.5 percent increase in GDP. Ericsson studies also show that on average a ten percent increase in penetration rate results in a one percent increase in GDP<sup>9</sup>. See Figure 7 on page 10.

### This Report

- was commissioned by Ericsson to examine the potential for mobile communications to contribute to economic growth and development in Myanmar. It considers the potential social and economic impacts for Myanmar in light of the innovation power and development opportunities mobile communications presents.
- provides an analysis of the impact that mobile communication may have in Myanmar following the issuance of additional mobile licences.
- summarises the detailed analysis contained in a series of annexes and is based on discussions and data provided by Ericsson and on discussions undertaken with other stakeholders. Additional data has been taken from publicly available sources that are referenced in this Report or annexes.

### Mobile communications in Myanmar

In 2012 Myanmar's Post and Telecommunications Department announced the introduction of a telecommunications law, which creates four new telecommunications licences in Myanmar<sup>10</sup>. It is expected that the Post and

Telecommunications Department will be divided into two units, each with their own licence, with one of these licensees taking over the operation of the existing network. It is also expected the third licence will be owned by the military and the final licence will be available to a privately owned operator. All licensees will be able to partner with foreign investors, in a move away from previous legislation.

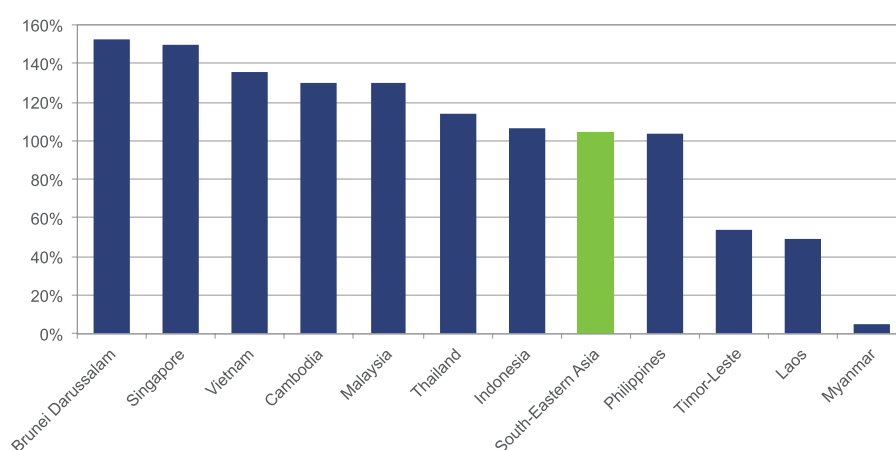
The license issuance structure is key to future development of mobile communications in Myanmar and the related growth of the economy. It is not anticipated that telecommunications operators who acquire these licences will be charged a licence fee, however, it is expected that network coverage and penetration conditions will apply. According to government

sources, it is predicted that government network coverage requirements for 2G will be 75 percent of Myanmar's population by 2014 and 40 percent of the population for 3G over the same period. It is also expected the government will require, through licence conditions, market penetration of 50 percent by 2014.

Ericsson also predicts that the government will focus on 3G deployment and LTE in the future, as this will become a replacement for fixed communications. As a result smartphone use will grow rapidly once these networks are deployed.

The introduction of new licences and the subsequent investment required by mobile operators to reach coverage targets will be the drivers behind penetration growth. Current penetration in Myanmar is

Figure 6: Mobile penetration levels in South Eastern Asia, Q2, 2012

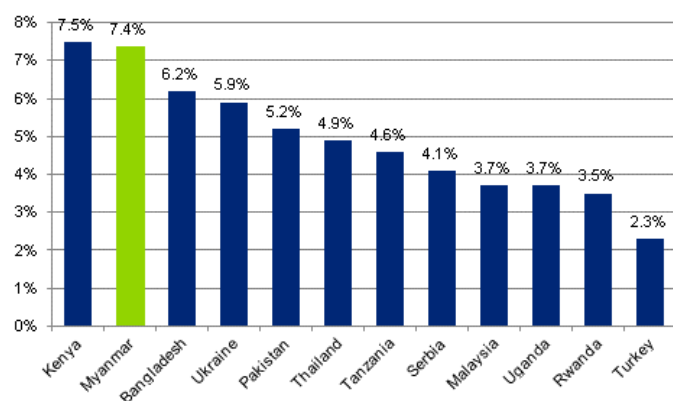


Source: Wireless intelligence

9. Ericsson, Arthur D. Little and Chalmers University of Technology, 2011, "Need for speed".

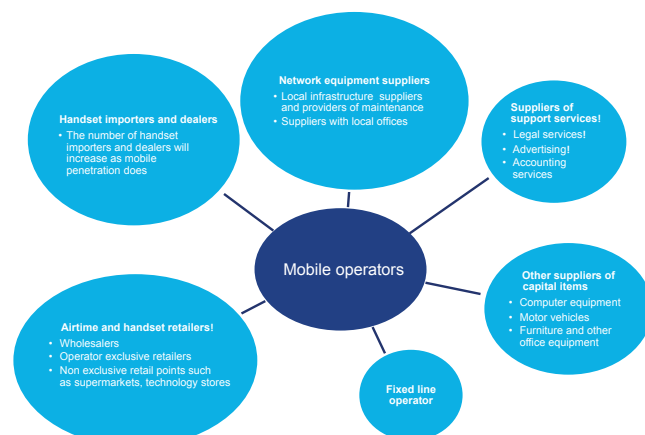
10. Note that at the time of printing, this scenario could be subject to change.

Figure 7: Benefit of mobile communications as a percent of GDP



Source: Deloitte

Figure 8: Mobile communications ecosystem in Myanmar



Source: Deloitte

less than four percent, 96 percent lower than the average penetration of countries in South Eastern Asia. Figure 6, page 9, shows the mobile penetration levels in South Eastern Asia as of Quarter 2, 2012.

Under a medium penetration scenario it is estimated that penetration levels will rise to 35 percent within three years of licences being issued. Within this scenario minutes of use are assumed to rise 20 percent from 3,4 in Year 0 to 4,1 in Year 1 and 30 percent to 5,3 in Year 2 as prices fall 20 percent from USD 0.10 to USD 0.08 in Year 1 and 40 percent to USD 0.05<sup>11</sup> in Year 2.

This report suggests, that as the mobile networks are rolled out, this will bring about increased employment, taxation revenues and social benefits to those that now have access to mobile communications, similar to the mobile revolution that has transpired in numerous other countries, see Figure 7. These significant benefits of mobile communications are discussed in the remainder of this report.

### The economic contribution of mobile communications to the economy

Mobile communication in Myanmar is expected to generate significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits gained by consumers in Myanmar.

In addition to the Mobile network

operators (MNOs), the mobile communications ecosystem in Myanmar is expected to be formed by players such as equipment providers, typically international equipment manufacturers with offices in Myanmar, such as Ericsson, and providers of other network services such as installation and maintenance; handset importers and distributors; airtime distributors and sellers, which include a host of retail points throughout the country; and suppliers of other services to MNOs such as advertising, accounting and other support services. See Figure 8, above.

This report uses three penetration scenarios to inform forecasts of the economic impact of the mobile industry. Both in terms of the direct and indirect effects on the supply side of the Myanmar economy by the MNOs and by players in the wider mobile ecosystem, and of direct and indirect employment from companies in the ecosystem.

Each scenario models the impact of various penetration rates on mobile communication in Myanmar. Scenario 1 shows the impact of low penetration (4<sup>12</sup>-20 percent over the three years since licences were introduced), scenario 2 models medium penetration (4-35 percent over the three years) and scenario 3 shows the impact

of high penetration ((3-4)-50 percent).

This report also discusses the potential productivity increases, for each scenario, resulting from mobile workers using their phones for business purposes and the social benefits enjoyed by consumers as a result of access to mobile services.

### SUPPLY SIDE IMPACT

It is expected that MNOs provide numerous benefits to the supply side of the Myanmar economy through the direct effect of their expenditure. These benefits are then transmitted to related industries in the mobile ecosystem and more widely across the economy.

It is envisaged that in the first three years of new licences being granted and under the medium penetration scenario, the supply side impact to the Myanmar economy<sup>13</sup> will be USD 2.24 billion in Year 2, see Figure 9, page 11. This is initially from network investment to construct modern mobile networks. As mobile penetration is currently less than 4 percent in Myanmar, it is assumed that very limited network infrastructure exists. Therefore significant capital investments will be required in order for MNOs to reach government network and penetration targets. As a result of the required investment, non-network CAPEX will also be significant as MNOs procure accommodation and facilities. Over the first three years the supply side

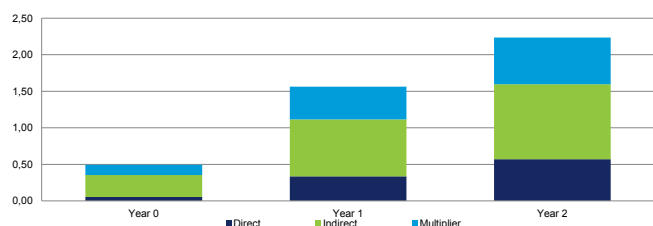
11. These figures are based on an exchange rate of USD1 to K 875.

12. 4 percent penetration is assumed based on industry reports (including the Nomura Asia Telecoms report, Myanmar – an untapped telco market, 14 march 2012) and discussions with Ericsson.

13. K 875 is equal to USD1.

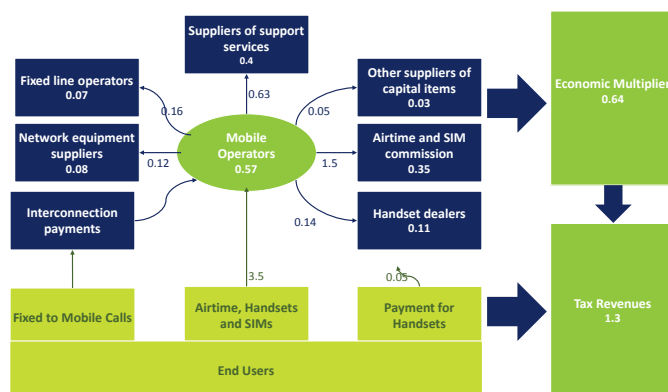


**Figure 3: Supply side value add from mobile communications by component, USD billions**



Source: Deloitte analysis of medium penetration scenario

**Figure 4: Mobile value chain and value add in Myanmar, in Years 0-3, USD billions**



Source: Deloitte analysis, values in brackets represent medium penetration scenario value add.

impacts of mobile communications on the Myanmar economy are expected to be significant. Then, as networks launch, benefits also accrue from expenditure on wages and utility companies.

To calculate the value add that could be generated by the industry, the value add created by the mobile communications industry was estimated. This consists of the value created by MNOs' expenditure on wages, dividends paid by MNOs and taxes recovered as a result of the MNOs' operations and corporate and social responsibility ('CSR') programmes<sup>14</sup>.

In addition, the indirect impacts from MNOs expenditure to parties in the wider mobile ecosystem have been estimated, i.e. what percentage of any amount spent by the end users remains within the national boundaries to be spent in the next round. Finally, a spend multiplier was applied to capture the effects on the wider economy.

In the three years from licences being issued, MNOs in Myanmar are estimated to provide a total direct contribution of USD 0.96 billion to the country's economy under a medium penetration scenario, while the indirect impacts are forecast to amount to USD 2.11 billion, with a multiplier effect of USD 1.23 billion, see Figure 3, above.

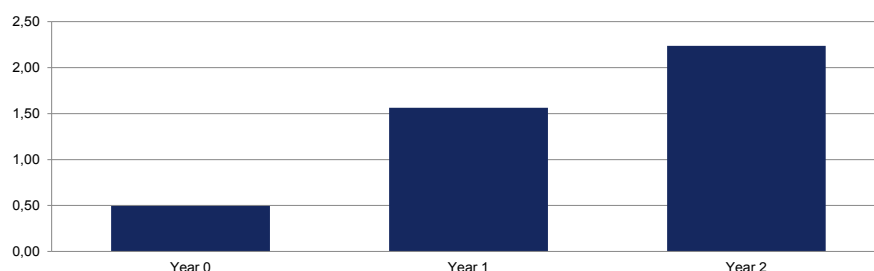
The value add relationship between the MNOs and related industries in

**Figure 12: Benefit of mobile communications as a % of GDP**

Scenario	Year 0	Year 1	Year 2
Low penetration	1.55%	3.79%	5.81%
Medium penetration	1.55%	4.39%	7.38%
High penetration	1.55%	5.15%	9.06%

Source: Deloitte

**Figure 9: Supply side value add of mobile communications in Myanmar, USD billions**



Source: Deloitte analysis of medium penetration scenario.

the ecosystem is shown in Figure 4, above. The estimates of value add include the multiplier effect on the wider economy which is assumed to be 40 percent of the revenues generated directly by the MNOs and the related supply chain, see Figure 4, above.

The overall estimated impact generated by the mobile communication ecosystem is estimated to be 1.5-7.4 percent of gross domestic product (GDP) over the first three years of operations under a medium penetration scenario<sup>15</sup>. See Figure 12, above.

14. CSR include expenditure on charitable donations as well as operator run programmes in areas such as education and health.

15. This figure represents the impact of mobile Communication as a percentage of the current GDP in Myanmar in Year 0 and the forecasted GDP for Years 1 and 2..



### IMPACT ON EMPLOYMENT

Mobile services in Myanmar will contribute to employment in several ways, including; direct employment of the MNOs, the employment in the related industries described above, the support employment created by outsourced work and taxes that the government subsequently spends on employment generating activities. Additional induced employment is created by employees and beneficiaries spending their earnings, thereby creating more employment.

While many services related to mobile communications (such as radio and network equipment, handsets and smartphones) are designed and produced abroad. Interna-

tional providers are beginning to recognise the importance of the Myanmar market and are establishing offices and operations in the country, including Ericsson, who has had a local office in Myanmar as of June 1, 2012.

It is estimated that the mobile communication industry will employ approximately 66,000 full time employees (FTEs) in Myanmar. A further 24,000 FTEs are estimated to be generated in the wider economy as a result of the interactions with the MNOs. See Figure 13, below.

While MNO employment is expected to be significant, the wider mobile ecosystem employed

almost 60,000 additional FTEs. Of these, it is expected that over 30,000 will be airtime dealers and retailers operating from supermarkets, technology stores and smaller independent points of sale.

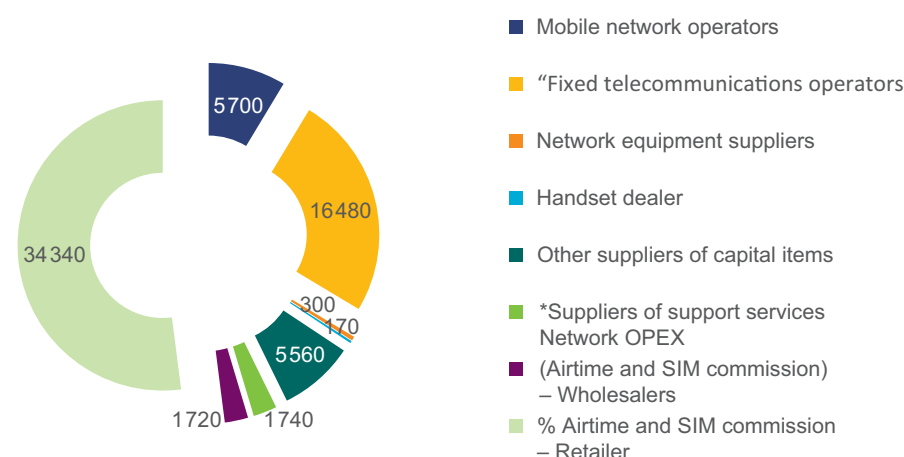
### DEMAND SIDE IMPACTS

In addition to benefits of the supply side of the economy, mobile communications generates potential productivity increases through the use of mobile communications for business purposes.

Based on analysis from other countries, the following potential business possibilities for mobile communications have been identified:

- Improved efficiency of agricultural production and distribution of food supplies. See case study, page 14.
- Underserved groups like refugees present an opportunity to reach new users, See case study page 14.
- The ability of individuals and businesses to make payments<sup>16</sup> easily, the removal of requirements for large sums of cash and decreasing the need for travelling to urban banking centres. See case study, page 14.

Figure 13: Employment generated by the mobile communications ecosystem, FTEs



Source: Deloitte analysis of medium penetration scenario

16. Ericsson ConsumerLab report 2012 "m-commerce Sub Saharan Africa"



While these productivity impacts cannot be accurately quantified, an economic value approach can be employed to provide a high level estimation of potential productivity benefits. This indicates that, if mobile workers in Myanmar achieved a ten percent increase on their productivity as a result of using mobile phones, the potential productivity impact of mobile services on the economy could be up to USD 1.3 billion in Year 2. See Figure 14.

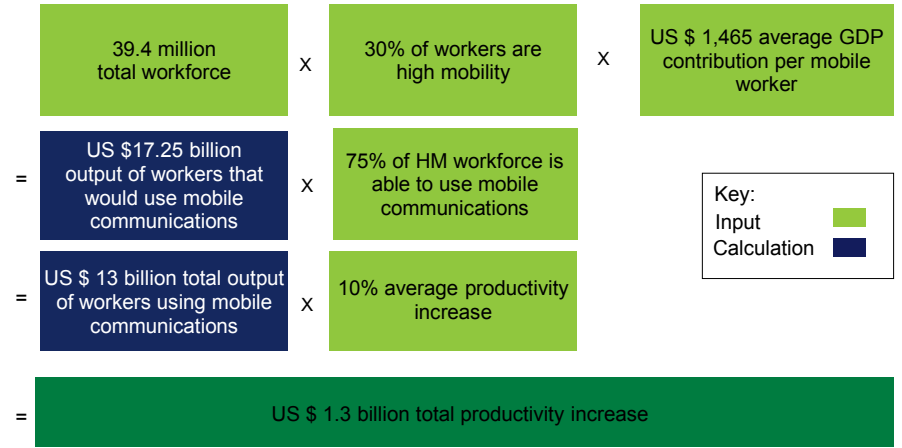
### SOCIAL IMPACTS

Mobile communications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion, a reduction in isolation for those in rural areas, the increase in the use of social networks and support services, the extension of communications to those on low incomes and assistance in disaster relief.

Society also benefit through programmes undertaken by the MNOs, which include health and education programmes.

- mHealth enables greater access to specialists and targeted training for health workers in remote areas, faster emergency response times, and more access follow up consultation and care. See case study, page 14.

Figure 14: Potential economic impact in Year 2 of increased productivity amongst high mobility workers



Source: Deloitte analysis based on Deloitte assumptions and Ericsson interview. Based on a medium penetration scenario.

- Mobile education programmes benefit communities, as they are a usable low cost alternative to education systems, which may not extend to rural areas. mEducation allows community teachers to adapt curriculums to suit each class, enables information to be sent via mobile broadband to students and allows students to access training content anywhere, anytime. See case study, page 14.

While such intangible consumer benefits cannot be accurately quantified, a willingness to pay analysis that combines data on usage increases and price decreases over the years can be employed to estimate how consumer benefits may increase over the three years since licences were issued. This approach suggests that consumers will potentially enjoy the equivalent of up to USD 0.74 billion in intangible benefits in Year 2.





# MOBILE IMPACT CASE STUDIES

## CASE STUDY: See App. B Connect To Learn

Connect To Learn is a collaborative effort between Ericsson, the Earth Institute at Columbia University and Millennium Promise that leverages the power of ICT to bring a high quality education to students everywhere. The initiative is based on the use of connectivity to implement low-cost and user-friendly ICT for schools through mobile broadband and cloud computing, enable access for students and teachers to world-class information and educational resources, and connect schools to other schools around the world to foster collaborative learning, cross-cultural understanding, and global awareness.

## CASE STUDY: See App. A Refugees United

Refugees United's refugee reconnection program aims to help people that have been forcibly displaced worldwide and struggle to learn the whereabouts of separated family members and loved ones. Ericsson joined NGO Refugees United, the UNHCR and African mobile operators MTN and Safaricom to develop and deploy a mobile phone application to help refugees anonymously find missing family. The mobile service uses SMS messaging WAP browsing and Android to suit both low and high bandwidth users and currently available in Arabic, English, French, Somali and Swahili. By end of 2012 180.000 users of more than 80 nationalities were registered and approximately 100 families reconnected. Together we aim to register some 1 million refugees on the platform by 2015.

## CASE STUDY: See App. A Mobile Information Project, Chile,

This programme delivers targeted agricultural information, sourced from the internet, directly to farmers via mobile phones. This programme organises content into news feeds and then sends that information to farmers via SMS. Training sessions are held for farmers to teach them how to use mobile devices and once signed onto the programme farmers receive weather, pricing, news and marketing information which informs farming decisions.

## CASE STUDY: See App. B ChildCount+

ChildCount+ is a mHealth platform developed by the Millennium Villages Project aimed at empowering communities to improve child survival and maternal health. ChildCount+ uses SMS text messages to facilitate and coordinate the activities of community based health care providers, usually community health care workers (CHWs). Using any standard phone, CHWs are able to use text messages to register patients and report their health status to a central web dashboard that provides a real-time view of the health of a community. Powerful messaging features help facilitate communications between the members of the health system and an automated alert system helps reduce gaps in treatment.

## CASE STUDY: See App. A M-Pesa, Kenya

This is a mobile banking platform where users' phone numbers are linked to an individual electronic money account and accessed via a SIM card-resident application installed on the phone.

### M-Pesa allows users to:

- deposit and withdraw money from a network of licensed providers, including airtime resellers and ATMs;
- transfers can also be made between registered users and non-users of M-PESA;
- purchase goods;
- receive salaries and government aid;
- pay bills; and
- purchase mobile airtime.

Mobile payments will enable access to credit for people who have never had that. These types of solutions could be highly relevant in Myanmar, a predominantly cash based economy. This will enable small business development to prosper, etc. Ericsson aims to deploy its m-commerce solution in Myanmar.



## Appendix A

# METHODOLOGY TO DETERMINE THE ECONOMIC IMPACT OF MOBILE COMMUNICATIONS IN MYANMAR

Mobile communications in Myanmar has the potential to generate significant economic activity through effects on the supply side of the economy, employment, increases in productivity and benefits gained by consumers. This section describes the methodology for forecasting these impacts.

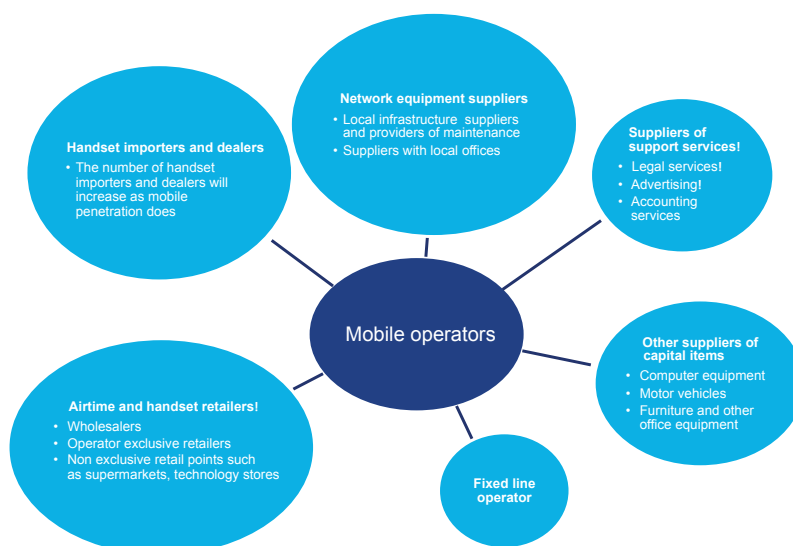
### Forecasting the growth of the mobile sector in Myanmar

As licences have not yet been issued in Myanmar, and information on the limited existing network is scarce, forecasts are required to inform the potential impact of mobile in Myanmar. These forecasts take into account information provided by Ericsson, including likely network investments and employment, international benchmarks and assumptions based on previous studies in similar countries. These forecasts, made over the three years from licences are being issued, provided the basis from which the economic impact can be assessed. As information becomes available this analysis can be updated to reflect the new environment.

The report assumes that four telecommunications licensees will provide mobile services in Myanmar. As noted earlier, the scenarios presented in this report are in line with earlier findings and experience of both Ericsson and Deloitte. However, a caveat should be added that consumer uptake is heavily dependent on a) network coverage build out, and, b) pricing strategies deployed by operators. As is the case in other markets, regulators may choose to implement directives concerning both prices and coverage areas.

According to government sources, the government will require all li-

Figure 8: Mobile communications ecosystem in Myanmar



Source: Deloitte

censees to provide 2G coverage to 75 percent of Myanmar's population by 2014 and 3G coverage to 40 percent over the same period, as part of licence terms and conditions. These conditions are also likely to include a market penetration target of 50 percent by 2014.

The limited existing infrastructure will require mobile operators to build out extensive individual networks, thereby considerably increasing competition in the mobile market. Greater consumer choice and far more widespread mobile coverage will lead to falling mobile prices and a rise in minutes of use per subscriber per year.

As this analysis provides a forward looking view of the mobile market in Myanmar assumptions have been made where information is not yet available. These include penetration rates, prices and usage. This analysis have used three penetration scenarios. Current penetration rates have been used in Year 0 for each scenario. The official government target of 50 percent penetration is used for Year 2 in the high penetration scenario. Low and medium penetration scenarios sit between existing penetration and the government objective. Public information on current minutes of use and tariffs is limited; therefore these have been

based on Cambodia, a neighbouring country with publically available information. As the mobile market in Cambodia has been competitive for a number of years the price per minute used in this analysis has been reduced to USD 0.10 in Year 0 and USD 0.08 in Year 1 but is in line with current prices in Cambodia by Year 2 (USD 0.05).

The price of a text is related to the price per minute, in that it represents three quarters of the price per minute, USD 0.08 in Year 0. As a result the price per text also decreases over time to reach a rate which reflects the impacts of competition in the market, USD 0.06 in Year 1 and USD 0.04 in Year 2.

The decrease in price year on year causes an increase in the demand for minutes of use and text messages, due to the elasticity of demand effect. As a result of this the average minutes of use of texts per subscriber per year will increase from 3,4 in Year 0 to 4,1 and 5,3 in Years 1 and 2 respectively. In addition, the number of texts per subscriber per year, will increase across the three years since licences are introduced at the same rate; from 50 in Year 0 to 60 and 78 in Years 1 and 2 respectively.

Typical network investments forecasts have been provided by Ericsson, however estimates of site and network sharing are limited and may only become relevant as the networks extend to low density areas.

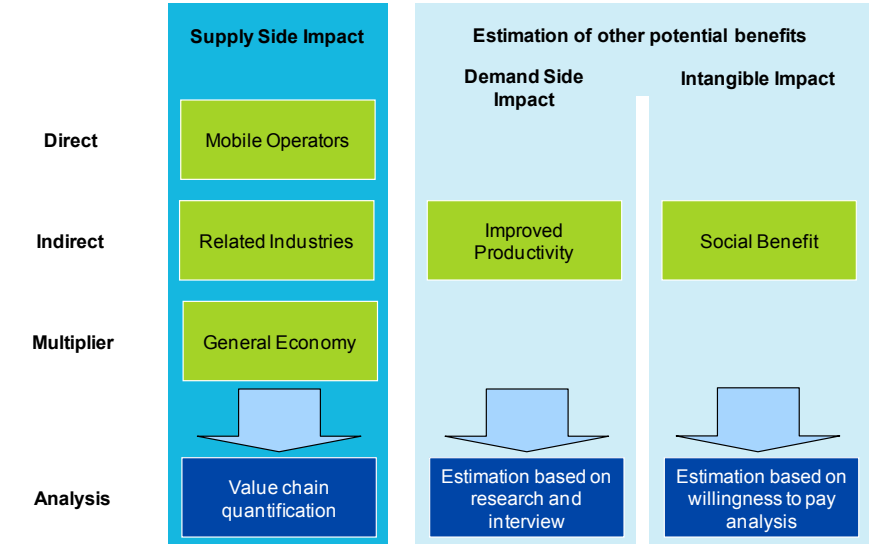
Once these forecasts have been validated, to the extent to which they can be, they are used to inform the following analysis.

### Approach to forecasting the economic impact

Once forecasts had been developed around the growth of the mobile sector in Myanmar over the 3 year period following new licensing, it was possible to use these forecasts to estimate the potential economic impact of this sector growth.

The economic impact of mobile communications in Myanmar was forecasted by accounting for the impact of the wider mobile eco-

Figure 15: Structure of the analysis of economic impact on GDP and employment



Source: Deloitte analysis

system on the supply side of the Myanmar economy. The analysis focussed on the flow of funds across the mobile supply chain, by estimating the value add that could be created by the MNOs and their major stakeholders. An economic multiplier was used in order to capture the ‘knock-on’ impact to the wider economy. Impacts on direct and indirect employment from companies in the value chain were also estimated.

In addition, other potential benefits were identified by analysing the benefits that accrued in countries similar to Myanmar. These benefits included the potential productivity increase that might occur through the use of mobile communications for business purposes, as well as the intangible and social benefits potentially enjoyed by consumers

in Myanmar, see Figure 15. The deployment of mobile networks in Myanmar, may also encourage foreign direct investments in infrastructure such as airports and roads, as investors feel more secure in the economy and an increase in regional and international tourism. However, these have not been quantified in the report.

This analysis was undertaken using publicly available statistics, data provided from Ericsson and a review of benchmarks, see Figures 34-35, page 32. By combining supply side and demand side analyses, it is possible to estimate the GDP contribution; employment created and tax revenues that might be generated in Myanmar in the first three following the launch of new network years operators.





## Benefits to the supply side of the economy

MNOs are expected to provide numerous benefits to the supply side of the economy in Myanmar through the direct effect of their expenditure, and these benefits are indirectly carried through to the related industries MNOs operate with and, more widely, to the Myanmar economy.

As shown in Figure 8, page 16, in addition to MNOs, the mobile communication market ecosystem is expected to be formed by players such as equipment providers, typically international equipment producers with offices in Myanmar, and providers of other network services such as installation and maintenance; handset importers and distributors; airtime distributors and sellers, which include a host of retail points throughout the country; and suppliers of other services to MNOs such as advertising, accounting and other support services.

To calculate the potential value add generated by the industry, firstly the value add created by the mobile communications industry was estimated. This consists of the value created by MNOs' expenditure on wages, dividends paid by MNOs and taxes recovered as a result of the MNOs' operations and corporate and social responsibility ('CSR') programmes<sup>17</sup>.

In addition, the 'leakages' from the system have been estimated, i.e. what percentage of any amount spent by the end users remains within the national boundaries to be spent in the next round. This was used to isolate the impact on the Myanmar economy from the total international impact of the Myanmar mobile communications industry.

In the first year of operations, under each penetration scenario, it is estimated that MNOs in Myanmar could provide a direct contribution of USD 0.05 billion. The breakdown by category is provided in Figures 16-18.

Figure 16: Domestic value add of MNOs (excluding multiplier effect), based on low penetration scenario USD billions

	Year 1	Year 2	Year 3
Employee wages and benefits	0.009	0.014	0.014
Contractors wages	0	0	0
Taxes and regulatory fees	0.04	0.19	0.31
CSR	0.001	0.009	0.015
Dividends	0	0	0
Total	0.05	0.21	0.34

Figure 17: Domestic value add of MNOs (excluding multiplier effect), based on medium penetration scenario, USD billions

	Year 1	Year 2	Year 3
Employee wages and benefits	0.009	0.014	0.014
Contractors wages	0	0	0
Taxes and regulatory fees	0.04	0.31	0.53
CSR	0.001	0.014	0.025
Dividends	0	0	0
Total	0.05	0.34	0.57

Figure 18: Domestic value add of MNOs (excluding multiplier effect), based on high penetration scenario, USD billions

	Year 1	Year 2	Year 3
Employee wages and benefits	0.009	0.014	0.014
Contractors wages	0	0	0
Taxes and regulatory fees	0.04	0.45	0.75
CSR	0.001	0.022	0.036
Dividends	0	0	0
Total	0.05	0.49	0.80

Source: Deloitte analysis

The domestic value add of the MNOs will be high in the first three years as this is the period where network investments will be most significant. As it is assumed, very little network infrastructure exists in Myanmar. MNOs will need to build a considerable amount of their network quickly in order to meet penetration targets issued by the government. As a result, MNO value add in these three years, will be higher than what is seen in similar studies where the networks are operational.

In conjunction with the network investment required, MNOs will also require a sizeable investment in non network capital, for example the procurement of office and

site premises, office equipment such as computers and furniture and company vehicles. This initial outlay will also increase the level of domestic value add provided by MNOs above, which is seen from established operators.

As these networks are built benefits will also accumulate over time from MNO expenditure on employee wages and payments made to service providers, such as utility providers and IT specialists.

The value add relationship that is expected to be created between the MNOs and the players in the mobile ecosystem, such as equipment importers, producers and providers of network support

17. CSR include expenditure on charitable donations as well as operator run programmes in areas such as education and health.





Figure 19: Calculation of value add from mobile communications in Myanmar in Year 2, USD billions.  
Analysis based on low penetration scenario.

Domestic value add in Year 2	Total revenue	Domestic revenue	Domestic cost	Domestic value add	Domestic value add with multiplier
<b>MNOs</b>	2.9	2.9	2.6	0.3	0.5
Fixed telecom operators	0.09	0.09	0.05	0.04	0.05
Network equipment and network services suppliers	0.40	0.12	0.05	0.08	0.11
Handset importers and dealers	0.09	0.08	0.02	0.06	0.08
Other suppliers of capital items	0.10	0.05	0.03	0.03	0.04
Suppliers of support services	0.6	0.6	0.2	0.4	0.6
Airtime wholesalers and retailers	0.5	0.5	0.3	0.2	0.3
<b>Total</b>	<b>4.7</b>	<b>4.3</b>	<b>3.2</b>	<b>1.1</b>	<b>1.6</b>

Figure 20: Calculation of value add from mobile communications in Myanmar in Year 2, USD billions.  
Analysis of medium penetration scenario. Differences are due to rounding.

Domestic value add in Year 2	Total revenue	Domestic revenue	Domestic cost	Domestic value add	Domestic value add with multiplier
<b>MNOs</b>	5.1	5.1	4.5	0.6	0.8
Fixed telecom operators	0.16	0.16	0.09	0.07	0.09
Network equipment and network services suppliers	0.40	0.12	0.05	0.08	0.11
Handset importers and dealers	0.16	0.14	0.04	0.11	0.15
Other suppliers of capital items	0.10	0.05	0.03	0.03	0.04
Suppliers of support services	0.63	0.63	0.23	0.4	0.56
Airtime wholesalers and retailers	0.82	0.82	0.46	0.35	0.5
<b>Total</b>	<b>7.3</b>	<b>7.0</b>	<b>5.4</b>	<b>1.6</b>	<b>2.2</b>

Figure 21: Calculation of value add from mobile communications in Myanmar in Year 2, USD billions.  
Analysis of high penetration scenario. Differences are due to rounding.

Domestic value add in Year 2	Total revenue	Domestic revenue	Domestic cost	Domestic value add	Domestic value add with multiplier
<b>MNOs</b>	7.3	7.3	6.5	0.8	1.1
Fixed telecom operators	0.22	0.22	0.13	0.09	0.13
Network equipment and network services suppliers	0.40	0.12	0.05	0.08	0.11
Handset importers and dealers	0.22	0.20	0.05	0.15	0.21
Other suppliers of capital items	0.10	0.05	0.03	0.03	0.04
Suppliers of support services	0.63	0.63	0.23	0.40	0.56
Airtime wholesalers and retailers	1.17	1.17	0.66	0.51	0.71
<b>Total</b>	<b>10</b>	<b>9.7</b>	<b>7.6</b>	<b>2.0</b>	<b>2.9</b>

Source: Deloitte

presence are limited, although Thai and Chinese equipment suppliers still maintain offices in Myanmar. Additional contributors to employment include non-MNO handset importers and dealers, wholesalers and retailers of airtime and other mobile services. Only value add and employment that can be attributed to mobile consumption in each scenario has been included in the estimations.

Under a medium penetration scenario it is estimated that in Year 2 the mobile communications indus-

try will employ nearly 66,000 FTEs in Myanmar, as shown in Figure 22, page 20. A further 24,000 FTEs will be generated in the wider economy as a result of the interactions with the MNOs.

While, under this scenario, MNOs will employ over 5,700 FTEs in Year 2, the wider mobile ecosystem on average will employ 60,000 additional FTEs. Of these, over 36,000 are the airtime dealers and retailers operating from supermarkets, technology stores and smaller independent points of sale. Overall,

in Myanmar, there are an estimated 41,000 independent points of sale for handsets and airtime, each employing 1 or 2 FTEs on average. In addition, handset and airtime products are sold in banks, post offices, kiosks, oil stations and online websites: FTEs for these categories that do not primarily deal with mobile market products have been very conservatively accounted for.

Another substantial contribution to total employment is brought by the suppliers of support services

Figure 22: Contribution to employment from the mobile value chain, Year 2

Employment Impact	Number of Employees	Number of employees including multiplier
Mobile network operators	5,700	5,700
Fixed telecommunications operators	16,480	23,072
Network equipment suppliers	300	420
Handset dealer	170	238
Other suppliers of capital items	5,560	7,784
Suppliers of support services Network OPEX	1,740	2,436
Airtime and SIM commission - Wholesalers	1,720	2,408
Airtime and SIM commission -Retailers	34,340	48,076
<b>Total</b>	<b>66,010</b>	<b>90,134</b>

Source: Operator data and Deloitte analysis on average wage rates, based on a medium penetration scenario<sup>23</sup>. Differences are due to rounding.

(e.g. consulting, advertising and legal services). Finally, almost 300 FTEs are expected to be involved in the provision of network equipment and other network services: this category includes all major international equipment providers with local offices in Myanmar (e.g. Ericsson, Motorola and Huawei) as well as the subcontractors involved in the equipment installation and maintenance.

#### Value add from taxation

Accurate and validated information on taxation in Myanmar is limited. As a result taxation rates used in this analysis are based on South East Asian benchmarks. These assumptions are provided in Appendix C.

In Year 2, MNOs in Myanmar will pay approximately USD 0.31 billion under scenario 1, USD 0.53 billion in scenario 2 and USD 0.75 billion in scenario 3 to the government in taxes and regulatory fees. The total amount of corporation tax, sales and mobile specific taxes, income tax paid by employees and regulatory fees to be paid by the industry are shown in the Figures 23-25, page 21.

In the low penetration scenario in Figure 23, page 21, tax and regulatory fees will represent 11 percent of domestic company revenues for MNOs in Year 2. The largest proportion of tax revenue is raised through VAT which accounts for 93 percent of tax in Year 2. As MNOs

are not expected to be profitable in the first three years no corporate tax is accounted for in Years 0-2.

Under the medium penetration scenario, see Figure 24, page 21, tax and regulatory fees will represent 10 percent of domestic company revenues for MNOs in Year 2. The largest proportion of tax revenue is raised through VAT, which accounts for 96 percent of tax in Year 2. As MNOs are not expected to be profitable in the first three years no corporate tax is accounted for in years 0-2.

In the high penetration scenario, see Figure 25, page 21, tax and regulatory fees will represent 10 percent of domestic company revenues for MNOs in Year 2. The largest proportion of tax revenue is raised through VAT, which accounts for 97 percent of tax in Year 2. As MNOs are not expected to be profitable in the first three years no corporate tax is accounted for in years 0-2.

The breakdown of taxes paid under the medium scenario is illustrated in Figure 26, page 21.

In addition to the direct tax revenue received from MNOs, other players in the mobile industry value chain will generate another USD 0.32 billion for the government in Year 2 under a medium penetration scenario. The largest payers of tax in the mobile supply chain, aside from

the MNOs, are the handset designers and dealers and the suppliers of support services. It is assumed that licence fees will not be payable and that corporation tax payments will not be made in the first three years of operations since there is assumed to be no operating profit during this period. The estimated tax revenue from each stage of the value chain is shown in Figure 27, page 22.

#### Overall benefits to the economy

The discussion above has illustrated the economic contribution of the mobile communications industry in Myanmar. In summary, this study of the economic impact of mobile communications in Myanmar finds that in Year 2 the mobile communications industry will contribute USD 1.6 billion in scenario 1, USD 2.2 billion in scenario 2 and USD 2.9 billion in scenario 3 from the supply side impact. This represents 2.75 percent, 3.87 percent and 4.97 percent of GDP respectively<sup>24</sup>. This is calculated as a percentage of current GDP for Year 0 and forecasted GDP for Years 1 and 2. This is higher than the impact that we have calculated in some other economies, due to

23. These figures represent only employment directly created by revenue flows from the MNOs and do not represent total employment in the whole industry for each section of the value chain.

24. This is the direct benefit to the economy through MNO expenditure and does not include productivity increases and intangible benefits.



Figure 23: Tax and regulatory payments in Myanmar from MNOs, USD billions.  
Analysis based on a low penetration scenario. Differences are due to rounding.

Taxes from MNOs	Rates	Year 0	Year 1	Year 2
Corporation tax	29%	0	0	0
Income tax paid by employees	20%	0.002	0.003	0.003
VAT	10%	0.03	0.17	0.29
Import Taxes	5%	0.01	0.02	0.02
Licence Fee		0	0	0
Total taxes and fees		0.04	0.19	0.31

Figure 24: Tax and regulatory payments in Myanmar from MNOs, USD billions.  
Analysis based on a medium penetration scenario. Differences are due to rounding.

Taxes from MNOs	Rates	Year 0	Year 1	Year 2
Corporation tax	29%	0	0	0
Income tax paid by employees	20%	0.002	0.003	0.003
VAT	10%	0.026	0.288	0.509
Import Taxes	5%	0.014	0.017	0.021
Licence Fee		0	0	0
Total taxes and fees		0.04	0.31	0.53

Figure 25: Tax and regulatory payments in Myanmar from MNOs, USD billions.  
Analysis based on a high penetration scenario. Differences are due to rounding.

Taxes from MNOs	Rates	Year 0	Year 1	Year 2
Corporation tax	29%	0	0	0
Income tax paid by employees	20%	0.002	0.003	0.003
VAT	10%	0.026	0.432	0.726
Import Taxes	5%	0.014	0.019	0.023
Licence Fee		0	0	0
Total taxes and fees		0.04	0.45	0.75

Source: Deloitte

the impact of the initial high levels of investments required to roll out network and to meet expected coverage targets.

### Other potential impacts

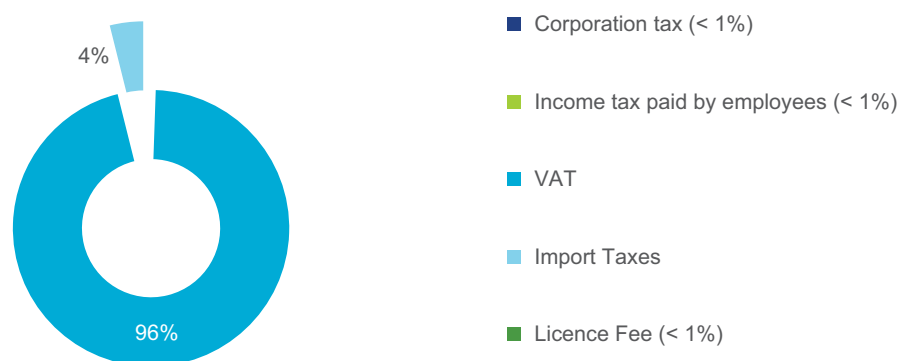
In addition to benefits to the supply of the economy, mobile communication generates potential productivity increases through the use of mobile communication for business purposes as well as intangible and social benefits to consumers.

### IMPACT ON PRODUCTIVITY IN MYANMAR

The mobile market in Myanmar is unique in comparison with mobile markets internationally as there is little network development and penetration and no competition. With the introduction of competition into the market productivity improvements will be made as a result of access to mobile communications by workers.

In developing countries mobile technology allows users' real time communications and information access at prices much lower than

Figure 26: Breakdown of Year 2 tax revenues from MNOs by source



Source: Deloitte analysis based a medium penetration scenario.

traditional ICT solutions. Traditional barriers to entry in the ICT market, such as literacy and connectivity, do not exist to the same extent in the mobile market and as a result the uptake of mobile use impacts significantly in the rural or underdeveloped business market.

International studies have shown

that the use of mobile communications increase entrepreneur activities in the market and provides the foundation for new businesses to develop. For example Public Call Offices (PCOs) were established in Bangladesh to provide mobile, particularly smartphone, access to business and individuals who could not afford to own a mobile phone.

Figure 27: Total tax revenues from the mobile value chain in Year 2, USD billions

Tax Revenue, billion, Y2	Tax revenue	Tax Revenue with multiplier
Mobile network operators	0.53	0.74
Fixed operators	0.02	0.02
Network equipment suppliers	0.01	0.02
Handset producers and dealers	0.09	0.13
Other suppliers of capital items	0.01	0.01
Suppliers of support services	0.08	0.12
Airtime commission	0.11	0.15
Multiplier effect	0.08	0.11
<b>Total</b>	<b>0.93</b>	<b>1.30</b>

Source: Deloitte analysis based on a medium penetration scenario.  
Note this represents tax revenues directly created by revenue flows from the MNOs and not total tax revenues from the sector.

These PCOs provided the mobile handset and a selection of different operator SIMs for consumers to utilise, SIMs are switched as consumers utilise the best on and off net rates available. These PCOs offer industry, employment and connectivity that would not otherwise exist without the use of mobile communications.

In addition to benefits that mobile services can provide to workers and businesses, there are numerous ways in which mobile services may lead to productivity increases in Myanmar. Analysis from other countries indicates that businesses can achieve improved efficiency in agricultural production through the adoption of mobile technology, either through income generated or in terms of better utilisation of resources. Mobile communications have demonstrated the potential for business to grow and develop through the awareness of new opportunities, the reduction in unnecessary costs and the ability to communicate with like organisations. The following positive impacts have been identified internationally:

- In Chile the Mobile Information Project (MIP) organises internet information, including price, weather and news information, into SMS messages for sub-

scribed farmers. This enables farmers to make decisions based on the most up-to-date relevant information available<sup>25</sup>. See case study, page 14.

- Refugees United<sup>26</sup> reconnection program gives refugees mobile access via WAP and Android to a platform where they can search for missing family members. See case study, page 14.
- M-Pesa, Kenya is a mobile banking platform where users phone numbers are linked to an individual electronic money account and access via a SIM card-resident application installed on the phone. This application uses mobile devices to allow users to:
  - deposit and withdraw money from a network of licensed providers, including airtime resellers and ATMs;
  - transfers can also be made between registered users and non-users of M-PESA;
  - purchase goods;
  - receive salaries and government aid;
  - pay bills; and
  - purchase mobile airtime<sup>27</sup>.
 See case study, page 14.

- The Vodafone Farmer's club provides farmers with local market price information which farmers use to improve efficiency of agricultural production and distribution of food supplies<sup>28</sup>.
- Weather forecasting via SMS in Turkey provides producers such as orchardists disaggregated weather information specific to local conditions. With localised weather forecasts provided daily via SMS producers are able to prevent frost damage, determine when to spray fruit with pesticides and increase pest control<sup>29</sup>.
- Nokia have developed Life Tools, available on a number of Nokia handsets, which provides agricultural content direct to the phone. There are four basic plans users can choose from that provide information to users including news, market prices and weather updates<sup>30</sup>.
- Smart Communications Inc developed an SMS tool which allows overseas Filipinos to make money transfers into the country at a much lower cost than using traditional banking<sup>31</sup>.

While these productivity impacts cannot be accurately quantified, an economic value approach can be employed to provide a high level estimation of potential productivity benefits. The economic value concept set out in Figures 14 and 28, page 23, indicates that, if mobile workers in Myanmar achieved a ten percent increase on their productivity as a result of using mobile phones, the potential productivity impact of mobile services on the economy in Year 2 could be USD 1.3 billion in each scenario.

25. <http://www.ictinagriculture.org/ictinag/sourcebook/module-3-mobile-devices-and-their-impact#chilean>

26. <http://www.refunite.org>

27. <http://www.economist.com/node/16319635>

28. <http://www.guardian.co.uk/sustainable-business/best-practice-exchange/vodafone-mobilising-support-for-farmers>

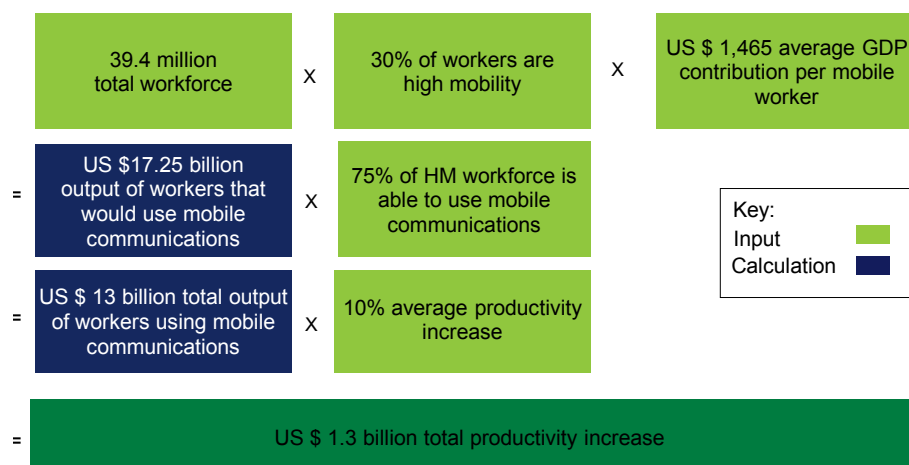
29. [http://www.ericsson.com/thecompany/sustainability\\_corporateresponsibility/technology\\_for\\_good/mobile\\_weather\\_alert](http://www.ericsson.com/thecompany/sustainability_corporateresponsibility/technology_for_good/mobile_weather_alert)

30. <http://www.ictinagriculture.org/ictinag/sourcebook/module-3-mobile-devices-and-their-impact#people>

31. <http://cases.growinginclusivemarkets.org/documents/74>



**Figure 14: Economic impact in Year 2 of increased productivity amongst high mobility workers**



Source: Deloitte analysis based on a medium penetration scenario.  
Differences are due to rounding.

**Figure 28: List of assumptions**

Area	Assumption
39.4 million total workforce	Based on 80 percent of the population being working age. Working age in neighbouring countries such as Cambodia is ten years old.
30 percent of workers are high mobility	Based on a weighted average of high mobility workers across each industry. The high mobility workers per industry is benchmarked from other economic impact assessment figures.
Average GDP contribution per mobile worker	Average GDP is based on CIA Factbook figures.
75 percent of workforce is able to use mobile communications	Based on population coverage.
Ten percent average productivity increase	Is benchmarked from other economic impact assessment figures.

## BENEFITS TO CONSUMERS

Consumer benefits of mobile communication are widely recognised in social and economic papers<sup>32</sup>.

Internationally mobile services promote social cohesion, contribute to extending communications (especially to users with low education and literacy), stimulate local content, contribute to providing technology knowledge to the less educated and assist in disaster relief. In addition, wireless data and broadband allow these benefits to be amplified and coupled with those given by fixed telecom services.

An Ericsson ConsumerLab study<sup>33</sup> indicates that in high growth markets apart from the need for faster and better internet access, applications are the one that are driving smartphone adoption. Smartphone usage across the day in these markets is starting to mirror usage seen in more developed markets. Users have a strong interest in using apps such as maps and navigation, shopping and barcode scanning, social media, weather updates and dictionaries that enable them to deal with daily challenges and interact with places, people and things in their urban surroundings.

In addition the introduction of competition in Myanmar may result in a reduction of prices and the development of a value added services market. Figure 29, page 24, shows, under the medium scenario, how usage per user per month will grow over the three years since licences are issued. This can be related to a decrease in prices over the same period.

While intangible consumer benefits cannot be accurately quantified, a willingness to pay analysis that combines estimated usage increases and price decreases over the three years can be applied to

32. Typical positive impacts of mobile communication are reported in Appendix B to this paper.

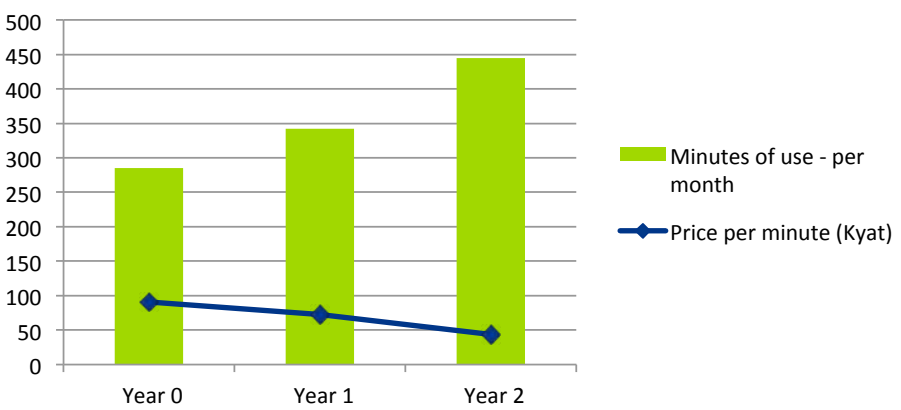
33. Ericsson Consumer Lab report 2012 "Emerging App Culture"

estimate how consumer benefits will increase over time. In particular, this approach, allows the estimation of the beneficial impact of these price reductions and usage increases.

The willingness to pay concept was used to calculate the value of the intangible benefits of mobile phones in this study<sup>34</sup>. 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 phone 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.

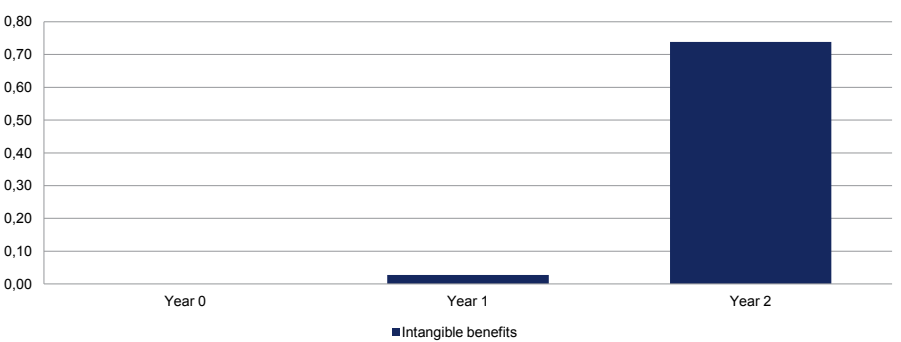
This approach suggests that consumers will enjoy up to the equivalent of USD 0.47 billion in scenario 1, USD 0.74 billion in scenario 2, see Figure 5, and USD 1.1billion in scenario 3 in intangible benefits in Year 2<sup>35</sup>.

Figure 29: Price per minute and minutes of use per user per month



Source: Wireless Intelligence data; Deloitte analysis based on a medium scenario.

Figure 5: Intangible benefits using willingness to pay concept, USD billions



Source: Deloitte analysis of a medium penetration scenario.

34. There is a potential for double counting between the productivity improvement and the intangible impact.

35. There are numerous reasons why these estimates could underestimate or overestimate the true value of intangible benefits. This methodology assumes that 4 percent of subscribers joined the network in Year 0: this allows estimation of only the consumer surplus enjoyed by customers that joined the network from Year 1 onward, leading to an underestimation of the true consumer surplus. On the other hand, the methodology does not account for potential changes in the willingness to pay of consumers over time. The effect of this on the overall calculation depends on whether the true willingness to pay has increased or decreased over time.





## Appendix B

# SOCIAL IMPACT OF MOBILE COMMUNICATIONS

In addition to the economic impacts mobile communications technology may have in Myanmar, mobile communications also provides a number of social benefits to consumers. These may be tangible benefits such as improvements in healthcare and education or unquantifiable benefits such as strengthened social engagement and connection. Studies show internationally that mobile services enable a reduction in transportation costs, strengthen social networks, help develop support networks and reduce levels of isolation and vulnerability. Overall mobile technology is considered to have a positive impact on the lives of users.

The introduction of mobile technology in developing countries dramatically changes the way people communicate with each other. Mobile communications, through internet connectivity, has provided rural users their first real time access to the outside world and consumers can now utilise functionality to complete everyday transactions such as money transfers. Access to mobile communications also provides entertainment and social networking possibilities and provides the tools for each market to develop specific functionality relevant to users' daily lives.

The way in which consumers utilise mobile communications differs between developed and developing countries. Consumers in many developing countries use their mobile phones to 'ping' other mobiles. This is where one party calls another for a specified number of rings; each ring intended to convey a message to the called party. One ring may mean anything from 'call me back' to 'I've arrived safely'. For consumers this allows users to develop codes between friends and family members while limiting the cost of mobile use. As the market develops it is expected the use of these codes will reduce to a basic 'call me back' function.

Around the world MNOs have identified a number of CSR projects and services that deliver significant tangible and intangible benefits to consumers and to businesses. These include:

- The Cherie Blair Foundation, which invests in promoting women in business through the Mobile Technology Programme. This programme identifies way in which mobile technology can improve the lives of female entrepreneurs internationally<sup>36</sup>.
- The 'Women Movement in Technology' project was launched by Turkey Vodafone Foundation, aiming to develop the social and economic integration of women through trainings on entrepreneurship, technology literacy and soft skill trainings<sup>37</sup>.
- Text to donate functionality is provided by MNOs for charitable organisations to raise funds or for post disaster relief fundraising.

### Mobile health initiatives

Mobile health initiatives have provided consumers in remote areas access to trained healthcare professionals, increased the ability of professionals to respond in emergencies and provided training facilities for healthcare workers in rural areas. In countries where access to healthcare is limited by poor infrastructure, large distances and few trained medical professionals, the use of mHealth technology provides access to healthcare initiatives consumers would not otherwise benefit from.

mHealth initiatives have improved the standard of and access to healthcare in remote areas and delivered significant benefits to consumers. These initiatives include:

- ChildCount+, a mHealth platform developed by the Millennium Villages Project aimed at empowering communities to improve child survival and maternal health. ChildCount+ uses SMS text messages to facilitate and coordinate the activities of community based health care providers, usually community health care workers (CHWs). Using any standard phone, CHWs are able to use text messages to register patients and report their health status to a central web dashboard that provides a real-time view of the health of a community. Powerful messaging features help facilitate commu-

36. <http://www.cherieblairfoundation.org/our-work/mobile-technology-programme/women-and-mobile-a-global-opportunity>

37. <http://www.turkiyevodafonevakfi.org.tr/Women-Movement-in-Technology.php>





nications between the members of the health system and an automated alert system helps reduce gaps in treatment<sup>38</sup>. See case study, page 14.

- TulaSalud is a Guatemalan NGO that uses mobile phones to improve the delivery of information and healthcare services in Alta Verapaz, a poor rural area of north central Guatemala. Mobile phone communications are used to share information between specialists based in city hospitals and community health workers in remote areas<sup>39</sup>.
- TRACnet was developed in 2005 to store and retrieve data and to manage drug distribution and patient care in relation to HIV/AIDS in Rwanda. Medical practitioners involved with treatment programmes are now able to report and access information within seconds<sup>40</sup>.
- Sana mobile health, India, provides end to end infrastructure technology designed to connect medical specialists to rural health workers in areas where specialists and primary care clinics are scarce. Sana enables the transmission of medical data between medical specialists and health workers in real

time, both to facilitate diagnosis and to ensure complete medical records for patients. Sana is built to enable data transfer over unreliable networks. The system is designed to bring healthcare to rural areas without adequate medical facilities or trained practitioners<sup>41</sup>.

- Maestros Mediline Systems, India, is a medical diagnostic equipment and supplies company that uses telemedicine solutions for diagnosis, research and patient data transfer. They have launched an application which allows physicians access to patient's ECG and heart rate performance report via BlackBerry or smartphones;<sup>42</sup> and
- Cell Life, South Africa which primarily uses SMS to deliver medical information, either by way of SMS broadcasts or interactive SMS with doctors. Service include:
  - Encouraging HIV testing via SMS alerts;
  - Using SMS to keep new mothers in the Prevention of Mother to Child Transmission of HIV programme; and
  - Use SMS to remind patients to maintain treatment programmes<sup>43</sup>.

### Mobile education initiatives

Mobile education programmes are designed to provide, those in rural areas where many teachers are untrained, access to online learning facilities. Mobile technology enables teachers and staff to establish contact with each other and share information including curriculum plans. mEducation initiatives are shown to increase attendance in the classroom, provide greater access to learning materials, encourage more efficient management practices and enable students to access information from any location.

mEducation programmes have delivered significant benefits to consumers. These programmes include:

- Bridge IT, which provides educational content to schools and aids teachers with curriculum development and teacher training. Using mobile technology teachers are able to:
  - Download educational video content on mobile phones which are then connected to TVs in classrooms; and
  - Download videos linked to user specific lesson plans<sup>44</sup>.

38. <http://www.childcount.org>

39. <http://www.tula.org/tulasalud.html>

40. [http://www.un.org/esa/sustdev/publications/africa\\_casestudies/tracnet.pdf](http://www.un.org/esa/sustdev/publications/africa_casestudies/tracnet.pdf)

41. <http://healthmarketinnovations.org/program/sana-mobile>

42. <http://maestros.net/>

43. <http://www.cell-life.org/>

44. <http://www.bridgeit.com/>



- English Seekho (Tata DoCoMo) allows users to take conversational English language lessons on their mobiles using an interactive voice response (IVR) application. Students then practice using mobile keys or speech recognition<sup>45</sup>.
- Mobilink SMS for literacy Pakistan uses mobile phones to increase literacy rates for adolescent girls in rural areas of Pakistan, where reading materials are often scarce. In particular Mobilink, partnered with UNESCO, piloted a project in a rural area of Punjab. This focused on 250 females, aged 15-24, who had recently completed a basic literacy programme. Each girl received a mobile and prepay connection. The girls received up to six SMS messages a day on a variety of topics including religion, health and nutrition, and were expected to practise reading and writing down the messages and responded to their teachers via SMS<sup>46</sup>.
- Students of the University of Botswana School of Medicine are trained on-site at hospitals and clinics (both in cities and remote areas) using smartphones enabled with medical information apps and a built in camera (in conjunction with internet and computer facilities)<sup>47</sup>.
- Project Yoza in South Africa provides access to literary works, including Shakespeare and poetry, on social networks, in English and Xhosa. This forum enables students to participate in online discussions, enter writing competitions and comment on aspects of the literary works<sup>48</sup>.
- Connect To Learn is a collaborative Ericsson, the Earth Institute at Columbia University and Millennium Promise project that uses ICT to provide education to students internationally, with a particular focus on improving secondary school access for girls. The initiative uses connectivity to:
  - Implement low-cost and user-friendly ICT for schools through mobile broadband and cloud computing
  - Enable access for students and teachers to world-class information and educational resources
  - Connect schools to other schools around the world to foster collaborative learning, cross-cultural understanding, and global awareness<sup>49</sup>. See case study, page 14.

45. <http://voicendata.ciol.com/content/news/110120104.asp>

46. <http://www.mobilinkgsm.com/about/PR/2010/UNESCO.php>

47. <http://www.irma-international.org/viewtitle/65083/>

48. <http://yozaproject.com/>

49. [http://www.ericsson.com/thecompany/sustainability\\_corporateresponsibility/enabling\\_communication\\_for\\_all/connect\\_to\\_learn](http://www.ericsson.com/thecompany/sustainability_corporateresponsibility/enabling_communication_for_all/connect_to_learn)



## Appendix C

# METHODOLOGY AND ASSUMPTIONS

This section outlines the approach taken in estimating the economic contributions of the mobile communications industry to the Myanmar economy.

### Estimation of the economic impact of mobile communications

#### STATIC ANALYSIS

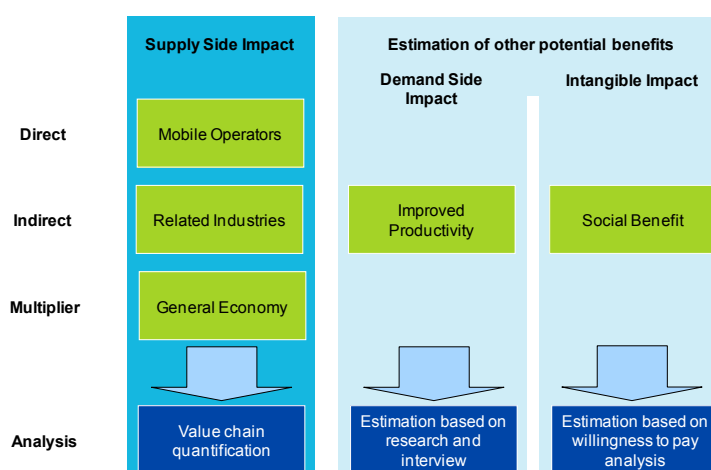
Static analysis refers to the impact of mobile communications services for a particular period of time and does not seek to estimate the longer term impacts on economic welfare. However, static analysis is extremely useful due to the greater availability of disaggregated data relative to dynamic analysis where a greater number of assumptions are typically required, see Figure 15.

Publicly available data and operator data were applied 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>50</sup>

- The direct impact from the MNOs.
- The indirect impact from other industries related to mobile communications services.
- The indirect impact due to the surplus enjoyed by end users in terms of productivity improvements.

50. 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.

Figure 15: Structure of the analysis of economic impact on GDP and employment



Source: Deloitte

- The indirect impact due to more qualitative social benefits enjoyed by the population, referred to 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>51</sup>.

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 communications sector. See Figure 30.

51. 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 communication, there is a potential for limited double counting.





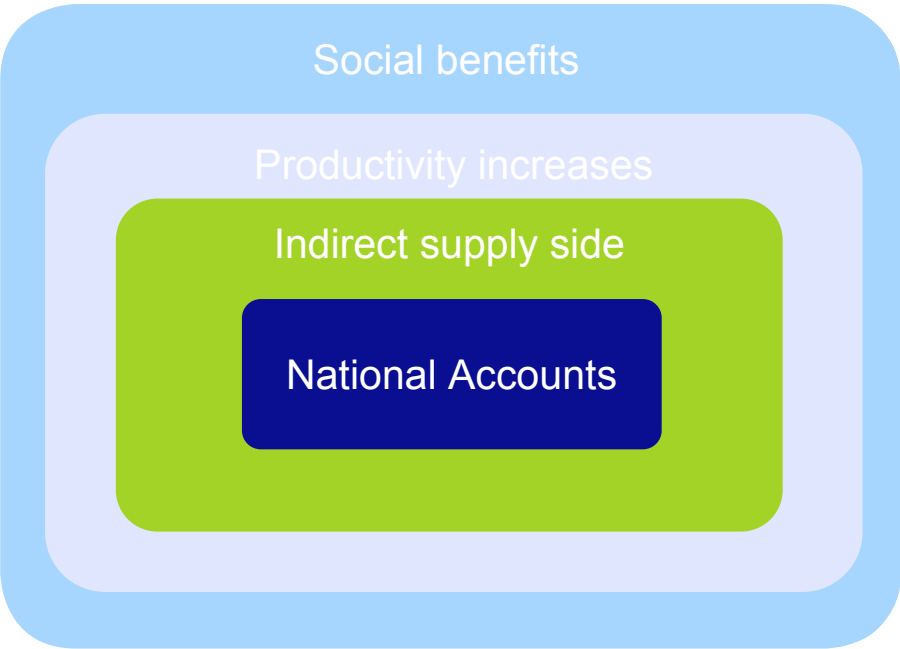
FORECASTING THE GROWTH OF THE MOBILE SECTOR

Data available on the mobile communications market in Myanmar indicates that penetration is currently less than four percent. The introduction of competition into the market is expected to increase network coverage, access to mobile communications technology, minutes of use and volume of texts per user while decreasing the cost of a mobile phone and the price of calls and texts. This analysis uses three penetration scenarios, based on low, medium and high penetration, to determine the impact of mobile communications in Myanmar. Year 0 figures, when networks are initially being deployed, are based on current penetration in Myanmar and the high penetration rate in Year 2 is based on the government objective of 50 percent penetration by 2015. All other penetration rates are estimated based on this information and discussions with Ericsson. Figure 31 shows the penetration forecasts used for each scenario.

The price per minute and minutes of use per subscriber assumption has been modelled on Cambodia. As the mobile communications market in Cambodia has been competitive for a number of years, the price per minute has been reduced for Years 0 and 1 but is in line with current prices by Year 2. The price of a text message is related to the price per minute in that it represents three quarters of the price per minute. As a result, the price per text also decreases over time to reach a rate which reflects the impacts of competition in the market.

Minutes of use and texts per user increase in line with international experience and benchmarks. As competition in the market increases the price per minute and per text decreases, as a result minutes of use and texts per user increase. For each scenario minutes of use increase 20 percent from Year 0 to Year 1 and 40 percent from Year 1 to Year 2 and texts per user increase 20 percent from Year 0 to Year 1 and 30 percent from Year 1 to Year 2.

Figure 30: This methodology and national accounts



Source: Deloitte

Figure 31: Penetration rates for each scenario

Scenario	Year 0	Year 1	Year 2
Low penetration	4%	12%	20%
Medium penetration	4%	20%	35%
High penetration	4%	30%	50%

Source: Deloitte analysis based on Ericsson forecasts



## SUPPLY SIDE IMPACT

The contribution of the mobile communications 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. See Figure 32.

This gives a snapshot view but does not take into account the future benefits to the economy resulting from growth. A customer's spending on mobile communications services flows along the value chain to the players within the telecom industry: MNOs, suppliers, distributors and others. Money flows between these economic agents and the amounts retained are used to pay for 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.

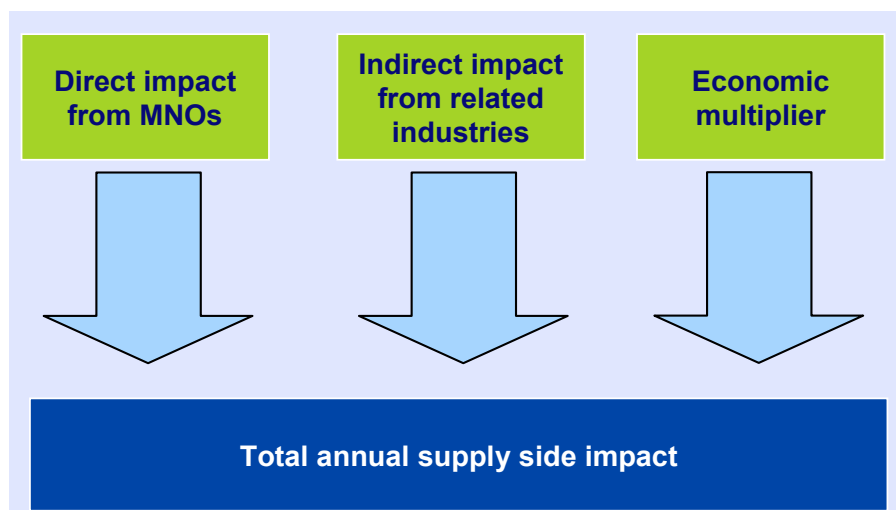
Each of the main stakeholders in the telecom industry has been identified. Flows of value between stakeholders are shown in Figure 33.

Estimates of the flows are based on:

- International benchmarks have been used as the mobile service has not been launched yet. These were then adjusted to reflect the lack of competition in Myanmar at Year 0.
  - price per minute;
  - price per text;
  - minutes of use per user;
  - numbers of texts per user;
  - the volume of mobile to fixed calls;
  - corporate social responsibility payments<sup>52</sup>;
  - the number of handsets and SIMs sold; and
  - the level of non network OPEX

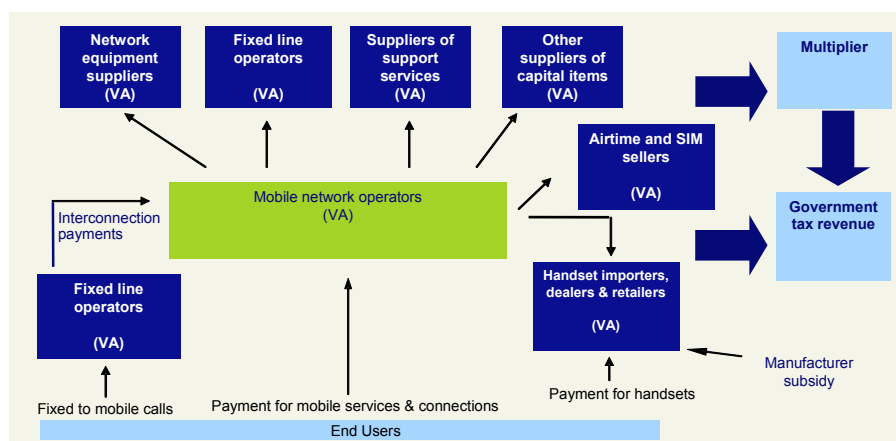
52. CSR include expenditure on charitable donations as well as operator run programmes in areas such as education and health.

Figure 32: Structure of the supply side analysis



Source: Deloitte

Figure 33: Mobile value chain



Source: Deloitte analysis, values in brackets represent medium penetration scenario value add.

- International benchmarks have been used for the following as publicly available information is limited and unverifiable:
  - tax rates; and
  - the level of foreign ownership of the operator.
- Discussions with MNOs;
- Interviews with local market experts, handset and airtime dealers;
- Analysis of accounts and billing information for operators internationally.

Following the identification of the revenue flows, the proportion of these flows that remains within the domestic economy was estimated and are translated into a positive

economic benefit, referred to in this report as 'value add'.

### 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<sup>53</sup>.
- Dividends.

For each of these categories, the proportion of value add which relates to the domestic economy was identified. This analysis is based

53. CSR include expenditure on charitable donations as well as operator run programmes in areas such as education and health.

upon MNO management accounts interviews which identify the final destination of monetary flows.

#### 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, see Figure 33. These proportions for each country are outlined in page 35.

#### 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, which are paid to additional players. These players will then create value as they pay wages and taxes etc. The economic literature quantifies these effects by applying an 'economic multiplier' to the initial rounds of value generated. The Figures 34-35 show the values of multipliers that have been calculated in other studies.

An economic multiplier of 1.4 was utilised to estimate the 'knock-on' impact on the rest of the economy of the direct and indirect effects of mobile communication on GDP and employment. This was assumed following a literature review, considering a benchmark, see Figures 34-35, used for countries in the region with similar characteristics for previous studies, and using the data provided by MNOs about the proportion of expenditure by key players which remains in Myanmar.

#### CALCULATING TAX REVENUES

Government tax revenues are raised through taxes specific to mobile communications services, corporation tax, income tax and regulatory fees. Tax revenues are collected from all components in the value chain. Based on South East Asian benchmarks, see Figures 34-35, assumptions were made on the percentage of money flows that are subject to the national tax regime<sup>54</sup>.

Figure 34: Regional multiplier benchmarks

Title of study	Multiplier
Ovum studies on economic impact of mobile telephony in Bangladesh and USA based on review of various other studies*.	1.6
Deloitte for Telenor 2008. 'Economic Impact of mobile telephony in Ukraine, Malaysia, Thailand, Ukraine and Pakistan'.	1.2-1.4
Deloitte/GSMA 2011. 'Mobile telephony and taxation in Bangladesh'.	1.4

Figure 35: International multiplier benchmarks

Title of study	Multiplier
The contribution of mobile phones to the UK economy (2002), O2 for ONS.	1.13
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 Ukraine, Malaysia, Thailand, Ukraine and Pakistan'.	1.2-1.4
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
Deloitte/GSMA 2011. 'Mobile telephony and taxation in Croatia'.	1.3
Deloitte/GSMA 2011. 'Mobile telephony and taxation in Kenya'.	1.2

Source: Deloitte

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, spectrum and other regulatory fees, plus all mobile communications specific taxes peculiar to the Myanmar tax system.

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

#### CALCULATING THE IMPACT ON EMPLOYMENT

Mobile communications services contribute to employment via several avenues:

- 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 was partly estimated directly by collecting data from the MNOs. For the related industries, a combination of two methods were applied: information from interviews with the MNOs was given priority. Whenever direct information was missing, employment in related industries was calculated by dividing the proportion of revenue spent on wages by the average wage rate in the sector. Finally, support and induced employment were estimated using a multiplier: other studies, see Figures 34-35, have used a ratio of 1.1 to 1.7 for induced employment. The use of such multipliers can often be criticised for the lack of consideration of the economic basis of the industry and country that are the object of the study. Discussions with stakeholders were conducted

54. Only a limited degree of leakage from the informal sector has been assumed.





on this issue and it was chosen to apply a multiplier of 1.4 on all value add including employment.

#### INCREASES IN PRODUCTIVITY

Significant economic and social research was undertaken in the last ten years on the numerous ways in which mobile services can improve productivity, including in less developed markets such as Myanmar. Several important effects have been identified in the research in the last years.

These are presented here for general review and include:

- Improving information flows: mobile communications services allow workers in certain occupa-

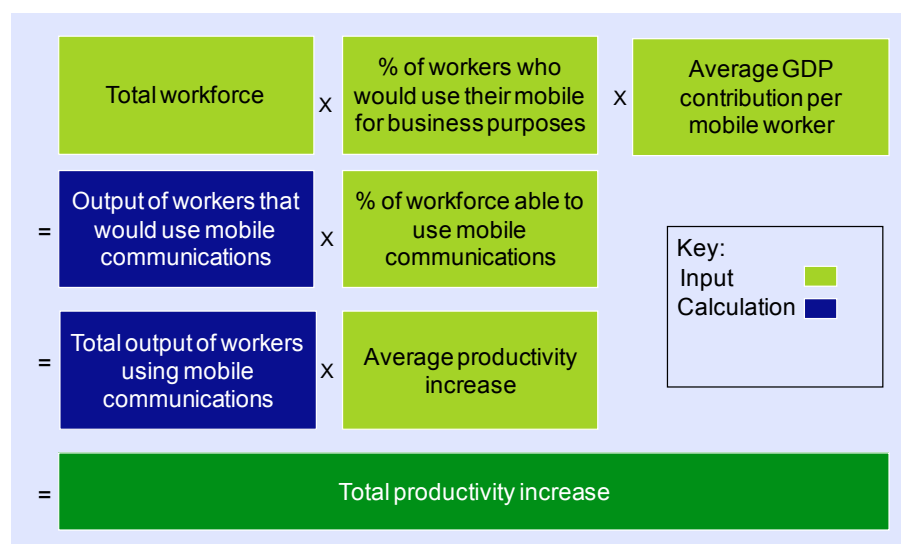
tions to cut out the middle-man, e.g. traders can obtain information on prices, quality, and quantities directly. This improves the incomes of producers, and helps reduce waste.

- Reducing travel time and costs: mobile communications services allow workers to trade and share information without travelling.
- Improving efficiency of mobile workers: mobile communications 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. Mobile phones will give them greater accessibility and better knowledge of demand.

- Improving job search: mobile services improve the chances of the unemployed finding employment by 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 phones have encouraged the growth of small business and have increased their efficiency.
- Data and smartphone proliferation amplifies these effects and gives access to applications and email.

Figure 36: Calculation of economic impact of productivity improvements



Source: Deloitte

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 this area was considered and interviews with stakeholders have been undertaken in order to provide an indication of the demand side impact of mobile communications.



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>55</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, salesmen and transport workers. In the medium scenario it is assumed that 30 percent of workers are high mobility whilst in the high scenario it is assumed that this rises to 75 percent.

The process for calculating the impact of the productivity improvements on the economy is set out in Figure 14, page 33.

#### INTANGIBLE BENEFITS

Finally, the intangible impact of the mobile communications industry was identified. Information provided during interviews with MNOs in Myanmar was utilised; additional findings from other economic impact reports<sup>56</sup> 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 communications services can promote intangible benefits. 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 hand-sets (which has been found to be common in developing countries). In addition, a number of studies<sup>57</sup> 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 healthier and more motivated and 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>57</sup>. See Figure 36.

The willingness to pay concept was used to calculate the value of the intangible benefits of mobile phones in this study<sup>58</sup>. Historical minutes of use ('MOU') per user and average price per minute show how much customers are willing to pay for mobile communications services. If it is assumed that these intangible benefits of owning a mobile phone 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.

55. Examples include: McKinsey & Co. Wireless Unbound. September 2006. The surprising economic value and untapped potential of the mobile phone.

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58. There is a potential for double counting between the productivity improvement and the intangible impact.



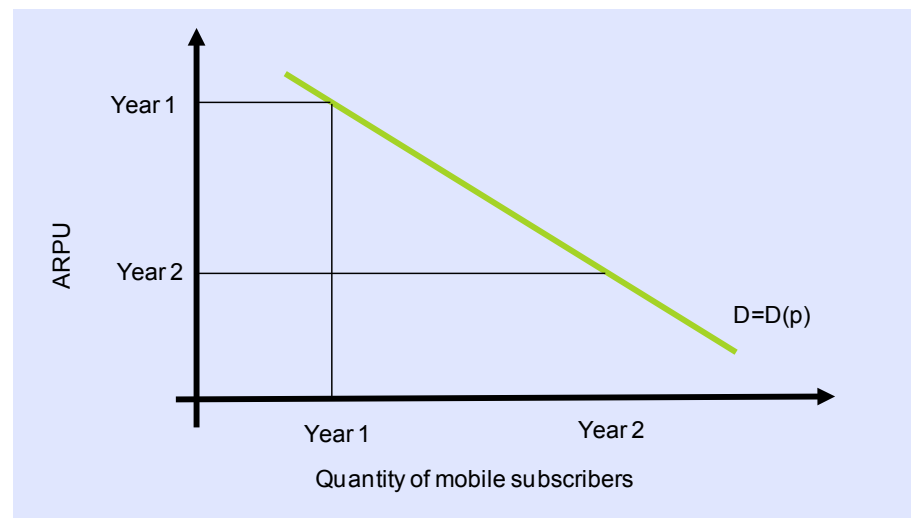


There are numerous reasons why these estimates could underestimate or overestimate the true value of intangible benefits. This methodology assumes that subscribers join the network over Years 0-2, leading to an underestimation of the true consumer surplus. On the other hand, the methodology does not account for potential changes in the willingness to pay of consumers over time. The effect of this on the overall calculation depends on whether the true willingness to pay has increased or decreased over time.

#### DATA LIMITATIONS AND DETAILED ASSUMPTIONS

Little information is available on the current economic situation in Myanmar therefore assumptions have been made, based on regional and international data. Sources for this information include CIA Factbook analysis, Ericsson's information, previous economic impact studies and experience in neighbouring countries such as Cambodia. See Figures 34-35, page 32.

Figure 37: Increase in consumer surplus following a reduction in price



Source: Deloitte



Assumption	Value																									
Employment levels	<p><b>Direct employment by MNOs</b></p> <p>Data was obtained directly from Ericsson as to the total number of MNO employees forecast.</p> <p><b>Indirect employment</b></p> <p>Employment figures for most segments of the value chain were estimated based on discussions with Ericsson. 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 was estimated based on discussions with Ericsson. Average wage was estimated by using assumptions on operator wage and average wage in Myanmar, both figures were provided by Ericsson.</p> <p>For airtime employment data was obtained directly from Ericsson.</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 MNO 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 percentage of revenue spent domestically on (i) sales, import, income, corporate and regulatory taxes; (ii) wages; (iii) CSR; and (iv) profit.</p> <p><b>Direct value add of MNOs</b></p> <p>All data was obtained directly from MNOs</p> <p><b>Indirect value add</b></p> <p>These percentages are estimated based on international benchmarks. The value add margins used for the supply chain are as follows:</p> <table><tr><th>Margin on domestic revenues</th><th>% value add margin</th></tr><tr><td>Fixed telecommunications operators</td><td>41%</td></tr><tr><td>Network equipment suppliers</td><td>62%</td></tr><tr><td>Handset dealers</td><td>75%</td></tr><tr><td>Other suppliers of capital items</td><td>50%</td></tr><tr><td>Suppliers of support services</td><td>63%</td></tr><tr><td>Airtime and SIM commission – Wholesalers</td><td>43%</td></tr><tr><td>Airtime and SIM commission – Retailers</td><td>49%</td></tr><tr><td>Multiplier effect</td><td>0.08</td></tr><tr><td>Total</td><td>0.93</td></tr></table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	41%	Network equipment suppliers	62%	Handset dealers	75%	Other suppliers of capital items	50%	Suppliers of support services	63%	Airtime and SIM commission – Wholesalers	43%	Airtime and SIM commission – Retailers	49%	Multiplier effect	0.08	Total	0.93					
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Other suppliers of capital items	50%																									
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Airtime and SIM commission – Wholesalers	43%																									
Airtime and SIM commission – Retailers	49%																									
Multiplier effect	0.08																									
Total	0.93																									
Airtime and SIM commission	<p>Data on commission rates was based on international benchmarks. A commission rate of three percent is assumed for both wholesalers and retailers.</p>																									
Handsets	<p>Handset prices (USD25), percentage of handsets sold by MNOs (five percent), proportion of illegal and second hand sales (zero percent) were estimated based on international benchmarks and estimates from Ericsson.</p>																									
Productivity improvement	<p>An annual productivity improvement of ten percent for high mobility workers is assumed based on a review of similar studies.</p> <p>The estimate of the percentage of high mobility workers in each employment activity is provided below.</p> <p>Employment information for Years 0-2 was obtained from the CIA Factbook.</p> <table><tr><th>Employment by sector</th><th>Year 0</th><th>Year 1</th><th>Year 2</th><th>% of high mobility</th></tr><tr><td>Agriculture</td><td>22,771,000</td><td>22,998,710</td><td>23,228,697</td><td>25%</td></tr><tr><td>Industry</td><td>2,277,100</td><td>2,299,871</td><td>2,322,870</td><td>25%</td></tr><tr><td>Services</td><td>7,481,900</td><td>7,556,719</td><td>7,632,286</td><td>50%</td></tr><tr><td>Total informal sector</td><td>6,139,410</td><td>6,200,805</td><td>6,262,813</td><td>25%</td></tr></table> <p>These figures were adjusted to account for the total informal sector of the workforce. The total informal sector was assumed to be 16 percent of the total workforce, based on previous Deloitte studies. Percentages of workers who are high mobility are Deloitte assumptions based on benchmarks from previous studies and experience.</p> <p>The GDP contribution of these workers is 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	Year 0	Year 1	Year 2	% of high mobility	Agriculture	22,771,000	22,998,710	23,228,697	25%	Industry	2,277,100	2,299,871	2,322,870	25%	Services	7,481,900	7,556,719	7,632,286	50%	Total informal sector	6,139,410	6,200,805	6,262,813	25%
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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 Myanmar economy.</p> <p>This multiplier was selected following a literature review. This choice is discussed in more detail in Appendix C.</p>																									

Assumption	Value								
<b>Foreign ownership of operator</b>	The foreign ownership of the MNO is estimated to be 49 percent based on similar studies.								
<b>Minutes of use and texts per user</b>	The average minutes of use (3,420 per subscriber per year in Year 0) are based on usage in Cambodia. Texts per user (50 per subscriber per year in Year 0) are based on previous Deloitte studies.								
<b>Average price per minute and per text</b>	<p>The average price per minute (K 91) is taken from Cambodia. The current price per minute in Cambodia is increased by 40 percent in Y2 and 20 percent in Y1 to reach a pre competition price for Y0. The price per minute in Y2 (the current price per minute in Cambodia) reflects a price after competition has been introduced in the market.</p> <p>The price per text is estimated to be three quarters of the price per minute (K68). This figure is a Deloitte assumption based on similar studies.</p>								
<b>Market penetration</b>	Each scenario models the impact of various penetration rates on mobile communication in Myanmar. Scenario 1 shows the impact of low penetration (4-20 percent over the three years since licences were introduced), scenario 2 models medium penetration (4-35 percent over the three years) and scenario 3 shows the impact of high penetration (4-50 percent).								
<b>Price and usage changes</b>	The price per minute and price per text decreases 20 percent Y0-Y1 as some competition enters the market. Then decreases 40 percent Y1-Y2 as the market becomes much more competitive. This figure is a Deloitte assumption based on similar studies. Demand and price forecasts are based on Ericsson's current assumptions of average annual wages (K 1,050,000) and may change as assumptions on average annual wages are adjusted.								
<b>Proportion of mobile calls to fixed lines</b>	Minutes of use and texts per user increase 20 percent Y0-Y1 due to a decrease in the price per minute and a further 30 percent Y1-Y2 as competition grows and the price per minute falls further. This figure is a Deloitte assumption based on similar studies.								
<b>Tax rates</b>	<p>Assumed 90 percent of calls in Y0 are mobile to fixed as there is little mobile penetration. After this the number of mobile to fixed calls falls proportionately to the rate of mobile growth. This figure is a Deloitte assumption based on similar studies.</p> <p>As little information is publically available on the tax rates in Myanmar South East Asian benchmarks have been used in the report. These are:</p> <table border="1"> <tr> <td><b>Corporation tax</b></td><td>29%</td></tr> <tr> <td><b>Income tax paid by employees</b></td><td>20%</td></tr> <tr> <td><b>VAT</b></td><td>10%</td></tr> <tr> <td><b>Import taxes</b></td><td>5%</td></tr> </table>	<b>Corporation tax</b>	29%	<b>Income tax paid by employees</b>	20%	<b>VAT</b>	10%	<b>Import taxes</b>	5%
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<b>Income tax paid by employees</b>	20%								
<b>VAT</b>	10%								
<b>Import taxes</b>	5%								
<b>Payments to fixed operators for interconnection</b>	This is estimated to be ten percent of interconnection revenues. This figure is a Deloitte assumption based on similar studies.								
<b>Handset discount for MNOs</b>	It is assumed MNOs receive a 20 percent discount on the purchase of handsets. This figure is a Deloitte assumption based on similar studies.								
<b>Corporate social responsibility payment</b>	It is assumed MNOs pay 0.5 percent of revenues to CSR programmes. This figure is a Deloitte assumption based on similar studies.								
<b>SIM to handset ratio</b>	It is assumed 75 percent of consumer who purchase a SIM will also purchase a handset. This is based on interviews with MNOs and international studies.								
<b>CAPEX and OPEX calculations</b>	These assumptions are based on similar studies:								
	Percent that is domestic spend for each network CAPEX item: Y0 – 75 percent, Y1 – 25 percent and Y2 – 25 percent. 50 percent of this is expected to be spent domestically.								
	Percent that is domestic spend for each network CAPEX item: Towers – 100 percent and Access Roads – 100 percent.								
	Non network OPEX: Is 125 percent of network OPEX.								
	Percent that is domestic spend: 100 percent each year.								
<b>Airtime and SIM commission calc</b>	Three percent of voice and text revenue (before VAT) is paid in commission to retailers and wholesalers. This figure is a Deloitte assumption based on similar studies.								
<b>Handset value add</b>	The margin made on the sale of handsets is ten percent. This figure is a Deloitte assumption based on similar studies.								

A photograph of a man in a straw hat and white shirt sitting on a bicycle, holding a pink patterned umbrella. He is looking off to the side. The background is slightly blurred, showing an outdoor setting with blue plastic chairs and other people.

## CONCLUSIONS

Mobile communications in Myanmar is expected to generate significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits gained by consumers in Myanmar.

- Under a medium penetration scenario it is expected that the impacts on the Myanmar economy will be:
  - price per minute;
  - USD 2.24 billion in Year 2 on the supply side
  - USD 0.96 billion in total direction contribution over three years
- USD 2.11 billion of indirect impact over three years and
- USD 1.23 billion of multiplier effect over three years
  - 1.5-7.4 percent of gross domestic product (GDP) over three years and
- There will be approximately 66,000 full time employees (FTEs) and a further 24,000 FTEs are estimated to be generated in the wider economy
- Mobile communications is expected to have significant social and productivity benefits based on international experience.



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## ERICSSON IN BRIEF

Ericsson is a world-leading provider of telecommunications equipment and services to mobile and fixed network operators. Over 1,000 networks in more than 180 countries use our network equipment, and more than 40 percent of the world's mobile traffic passes through Ericsson networks.

We are one of the few companies worldwide that can offer end-to-end solutions for all major mobile communication standards. Our networks, telecom services and multimedia solutions make it easier for people, across the world, to communicate.

And as communication changes the way we live and work, Ericsson is playing a key role in this evolution. Using innovation to empower people, business and society, we are working towards the Networked.