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# Mobile telephony and taxation in Latin America

December 2012



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## **Important Notice from Deloitte**

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The Report has been prepared solely for the purpose to study the economic impact of mobile telephony and of mobile taxation in nine Latin American countries (Colombia, Ecuador, Mexico, Peru, Chile, Uruguay, Brazil, Argentina and Panama), as set out in the Contract. It should not be used for any other purpose or in any other context, and Deloitte accepts no responsibility for its use in either regard.

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# Overview

This Report was commissioned by the GSM Association ('the GSMA') to examine the economic contribution of mobile telecommunications industry and the impacts of mobile specific taxation in nine Latin American countries.<sup>1</sup>

The Report discusses the key findings of the study, with Annexes providing the detailed work for each of the nine countries and details of the methodology employed.<sup>2,3</sup>



**Figure 1: Countries covered by this study and active mobile operators**

<sup>1</sup> References to "Latin America" in this Summary Report and Appendices refer to the nine countries covered by this study.

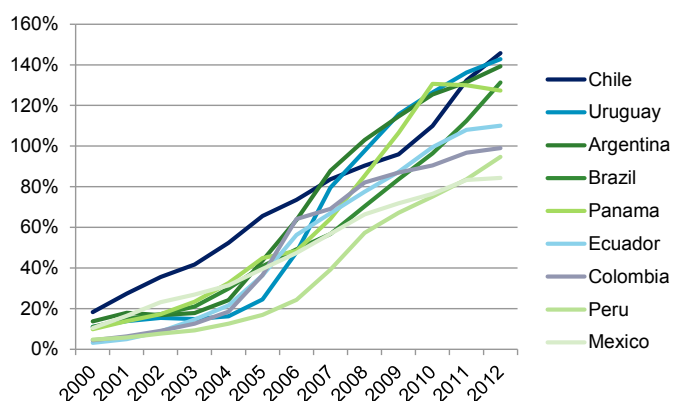
<sup>2</sup> This report is based on discussions and on data provided by the major mobile operators in the region: Telcel, America Movil, Personal and TIM have participated directly in the study. Additional data has been provided by the GSMA and taken from publicly available sources that are referenced in the Annexes to this Summary Report.

<sup>3</sup> Full references, sources and notes are provided in the Annexes to this Summary Report. All Figures within this Summary Report are sourced to Deloitte analysis unless otherwise noted.

# 1 An overview of mobile telecommunications in Latin America

Mobile penetration has increased rapidly in the last ten years across Latin America. In 2000, the nine countries had penetration of under 20%, which rapidly increased to a position today where the majority of the population in each country has access to mobile telephony.

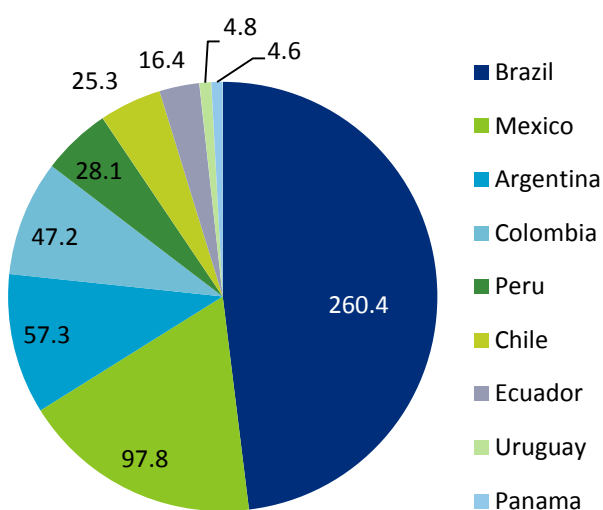
**Figure 2: Mobile penetration since 2000**



Source: Wireless Intelligence

By 2011, there were more than half a billion mobile subscribers in the nine countries included in this study.

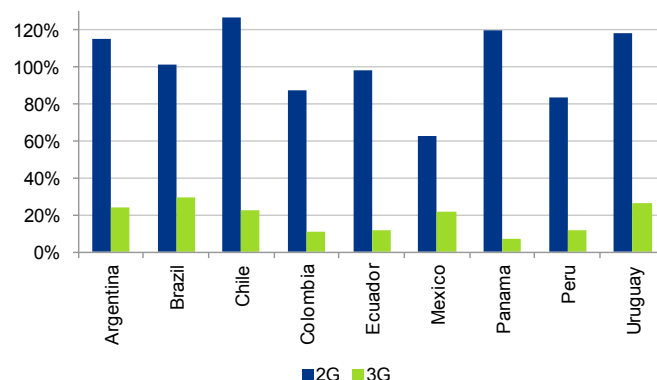
**Figure 3: Total subscribers by country in Q2 2012, millions**



Source: Wireless Intelligence

Across the countries considered in this study, 2G penetration is significant, 3G services present substantial scope for development, and 4G (Long Term Evolution) services have been launched in Colombia, Mexico and Uruguay.

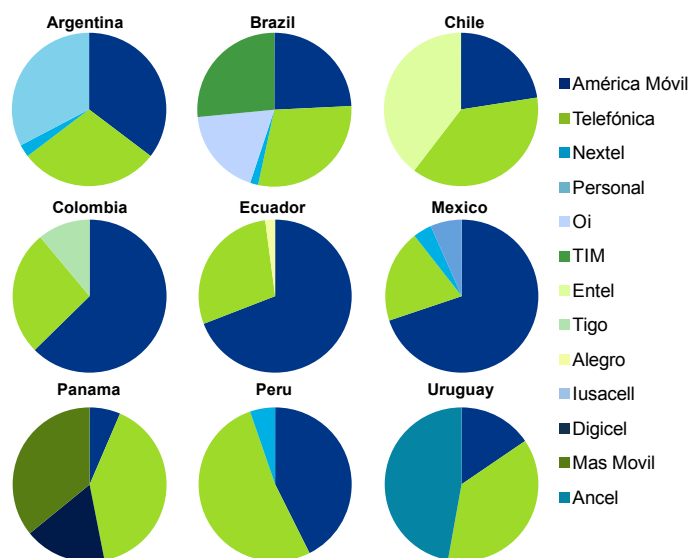
**Figure 4: 2G and 3G penetration levels, Q2 2012**



Source: Wireless Intelligence

Latin American mobile telecommunications markets are highly competitive, with a number of national and international operators offering services in the region.

**Figure 5: Market shares in sample countries<sup>4</sup>**



Source: Wireless Intelligence

<sup>4</sup> Operators with less than 0.5% market share are not represented in the figure.

## 2 The economic contribution of mobile telecommunications

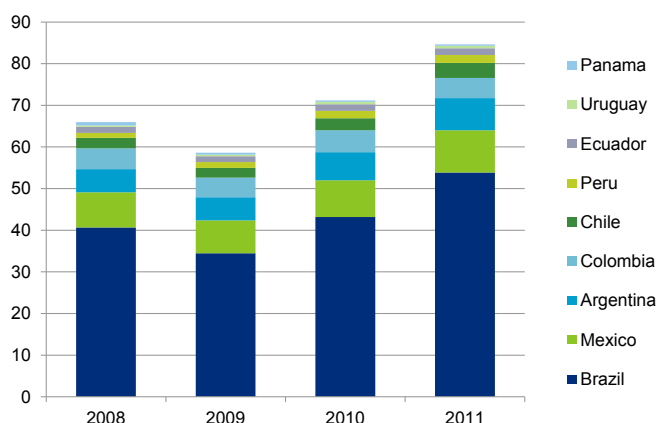
The mobile telecommunications industry in Latin America generates significant economic impacts. Measurement of economic impact is conducted at the national level, i.e. the contribution of the Brazilian mobile industry on the Brazilian economy, and focusing on:

- The value added<sup>5</sup> created by the activities of the mobile industry and its supporting ecosystem (referred to as supply side impacts); and
- The productivity improvements created through the use of mobile technology.

### 2.1 Supply side impact

In 2011, the mobile telecommunications industry was estimated to have contributed in the region of USD 85 billion to the economies of the nine countries through the activity of the industry and its impact on the wider market.

**Figure 6: Supply side value add of mobile telecommunications, USD billions**

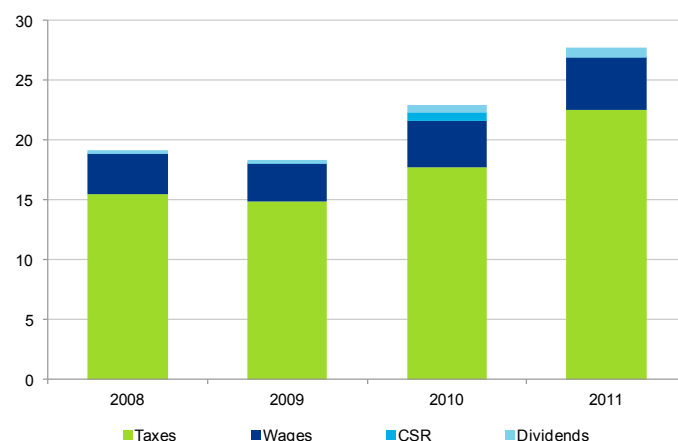


Whilst this estimated contribution fell in 2009 reflecting global macroeconomic conditions, it has increased each year since then, such that the economic impact is 35% higher in 2011 than 2008.

Mobile operators directly contribute to the economy through their expenditure on wages, corporate social responsibility ('CSR') programmes, dividends and taxes.

In 2011, mobile operators were estimated to have provided a direct contribution to the national economies of the nine countries of USD 27.7 billion overall.

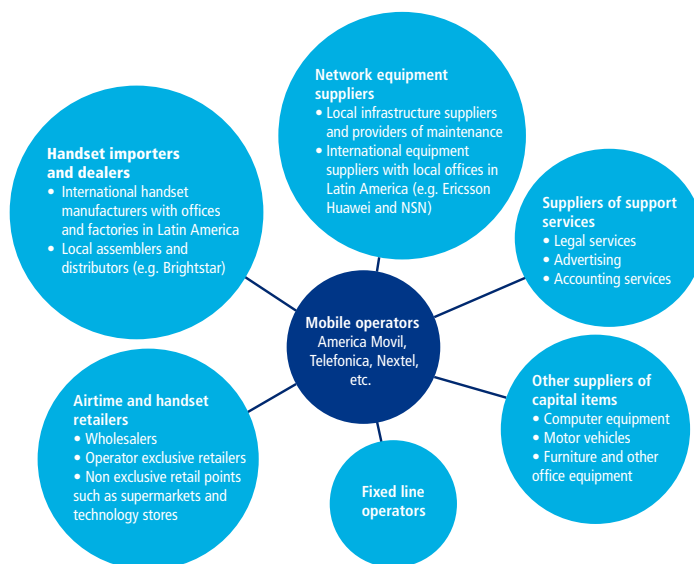
**Figure 7: Supply side value add from mobile operators by component in 2011, USD billions**



The largest constituent of this impact were taxes paid by mobile operators and wages paid to their employees, which are consistently amongst the higher paid jobs in each country.

The operations of the mobile operators lead to a broad ecosystem that runs both within national economies and internationally.

**Figure 8: Mobile telecommunications ecosystem**

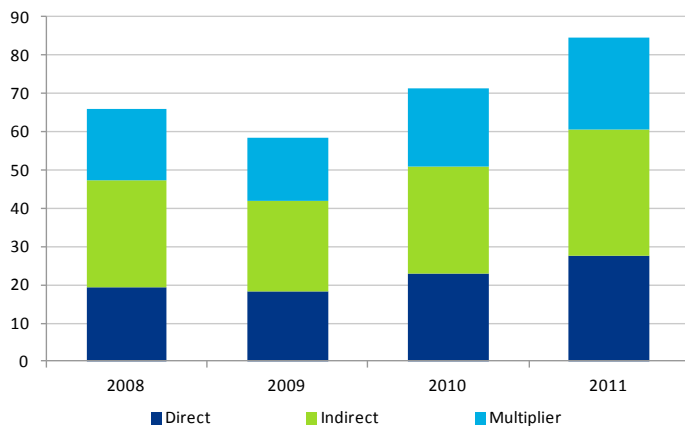


<sup>5</sup> Value added is a measure of the output produced by an organisation or industry. Its main components are wages, profits, and taxes paid to the government. The total value added created by the mobile ecosystem in a country is a measure of the total contribution that the mobile ecosystem provides to a country's GDP.

The economic impact of mobile operators' payments to parties in the mobile ecosystem was estimated to be USD 32.7 billion in 2011. This contribution reflects the percentage of mobile ecosystem players' revenues from mobile operators that remains within the national boundaries to be spent on taxes, wages and dividends.

The direct impact of the mobile ecosystem leads to further economic activity throughout the economy, commonly known as the multiplier effect. This was estimated to contribute a further USD 24.2 billion to the national economies of the nine countries in 2011.

**Figure 9: Supply side value add by component in Latin America, USD billions**



## 2.2 Impact on employment

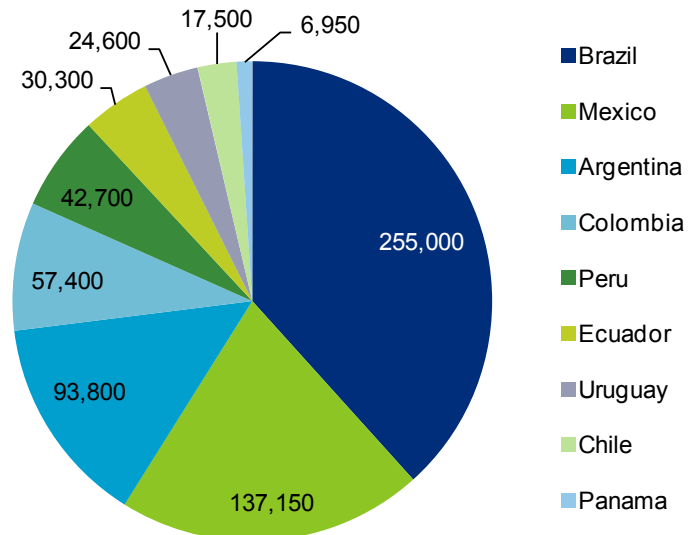
Mobile operators in Latin America directly create employment in their own operations and the operations of the mobile ecosystem.

In 2011, it was estimated that mobile operators directly employed 107,000 Full Time Equivalents ('FTEs') across the operations in nine countries.

The majority of the employment was however, created within the wider mobile ecosystem. This employed approximately 560,000 FTEs, emphasising the wider economic footprint of the mobile operators themselves.

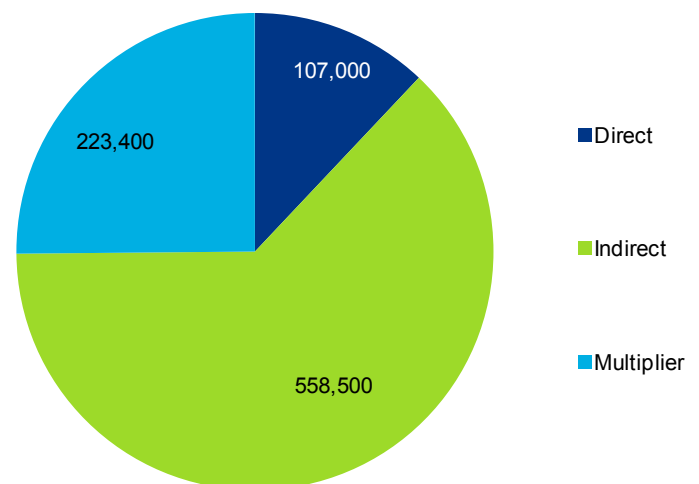
A further 223,000 FTEs were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem, i.e. the multiplier effect.

**Figure 10: Employment created, 2011 (FTEs), excluding multiplier**



Combining this with the mobile operators' and ecosystem's contribution gives an estimate of the total employment created through the operations of mobile telecommunications of 890,000 FTEs across the nine countries.

**Figure 11: Employment created in Latin America by component in 2011 (FTEs)**



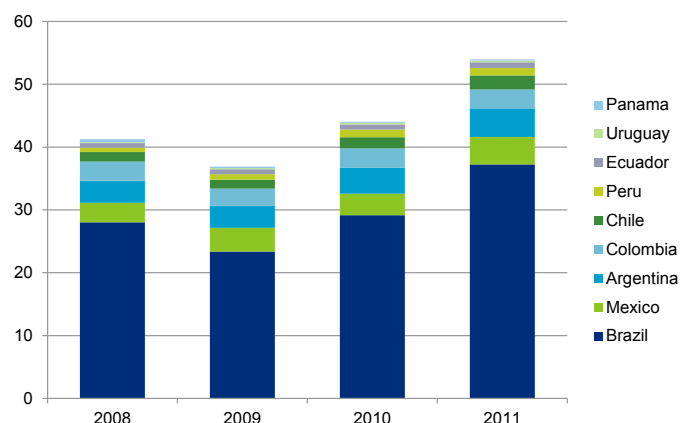
Over 340,000 FTEs were employed in Brazil alone, with significant employment contribution in Mexico and Argentina of 183,000 and 126,000 FTEs respectively.



## 2.3 Taxation paid

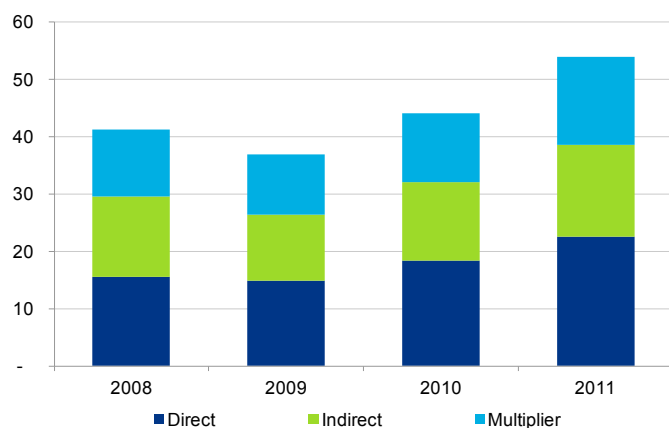
In 2011, the mobile operators and ecosystem in Latin America paid almost USD 54 billion to national governments in taxes and regulatory fees.<sup>6</sup> This increased by over 30% from USD 41.2 billion in 2008.

**Figure 12: Tax and regulatory payments from mobile operators and ecosystem, USD billions**



The direct taxation contribution from mobile operators was USD 22.6 billion in 2011, with the contribution of players in the wider ecosystem totalling USD 16 billion. An additional USD 15.4 billion of taxation revenue was estimated to be generated across the wider economy from the multiplier effect.

**Figure 13: Total tax revenues from the mobile ecosystem in Latin America, 2008-2011, USD billions**



## 2.4 Productivity impacts

In addition to the direct economic activity, employment and taxation benefits discussed above, mobile telephony increases productivity through the use of mobile telephony for business purposes.

In countries where fixed telephony is limited, mobile telecommunications act as a primary provider of connectivity to people in urban and rural areas, supporting sectors such as agriculture, finance and healthcare. In recent years, developments that have allowed this productivity enhancement to expand further include:

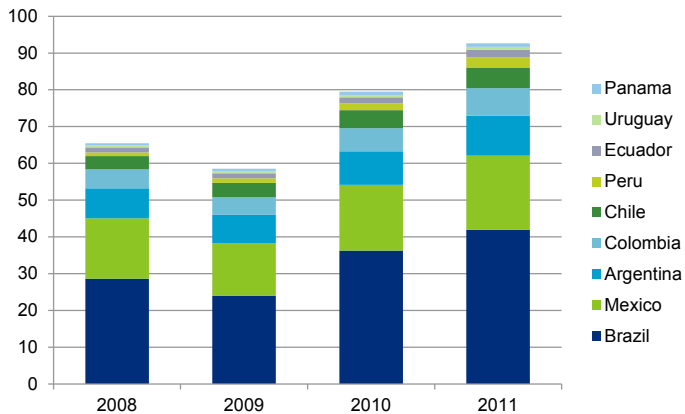
- The introduction of Machine-to-Machine ('M2M') technologies, which allow rapid exchange of data between a number of remote machines without the need for investment in fixed infrastructure.
- New mobile applications allowing health workers to collect patient data and transfer it to doctors, providing possibilities for improved healthcare. A mobile technology developed by Sana allows Brazilian health workers to collect patient data and transfer the information remotely to a doctor for review. Doctors can notify the health worker of the diagnosis by sending results through a mobile application.
- Customised software applications used by farmers and fishermen to receive updates on market trends and prices, e.g. coffee producers in Colombia.
- Mobile banking services that facilitate business transactions by allowing customers to easily and securely transfer money, and make payments using their mobile devices. In Panama, a joint venture by Movistar and MasterCard allows customers to use mobile phones to transfer money, make payments and easily and securely receive remittances from abroad.

Using an economic value approach, a high level estimate of these productivity benefits can be assessed. Assuming that mobile workers in Latin America achieved a 5% increase in their productivity as a result of using mobile phones, the total productivity impact of mobile services in these countries would be USD 92.7 billion in 2011, a 40% increase compared to 2008.

<sup>6</sup> This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.



**Figure 14: Economic impact in 2011 of increased productivity amongst high mobility workers, USD billions**



## 2.5 Consumer impacts

Mobile telecommunications also provide a number of intangible benefits to consumers, especially in the most rural areas of the Latin American continent. These benefits include the development of interpersonal and family communications, the promotion of social cohesion, the extension of communications and education to those with low incomes and assistance in disaster relief:

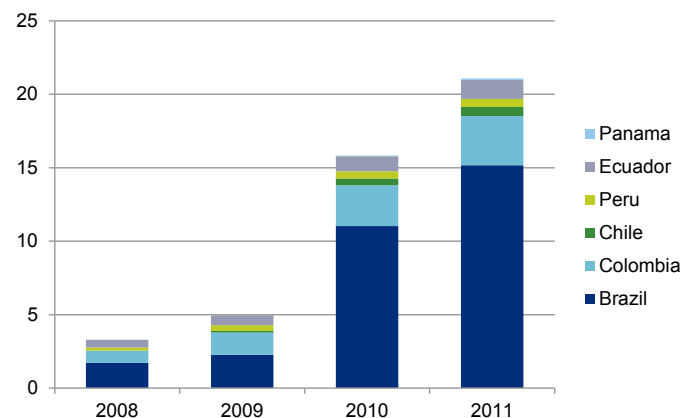
- **Social inclusion:** in Brazil, Vivo provides voice, broadband and mobile internet access, as well as eHealth and eEducation services, to villages in the heart of the Brazilian Amazon. Similarly, TIM Brasil delivers mobile broadband to Brazil's largest favela through a project which includes a public service that enables access to government and public utility websites.
- **M-Education:** in Argentina, Personal leverages mobile technologies to support teachers and students in the classroom.
- **Disaster relief:** mobile phones played an important role during the 2010 Chilean earthquake, as many consumers used 3G broadband to communicate via social media.
- **Environmental sustainability:** in Panama, Mas Móvil and Digicel have base stations powered by sun and wind energy in remote areas, providing mobile connectivity to areas lacking infrastructure.

Consumers also benefit through a number of region wide and country specific CSR programmes undertaken by

mobile operators. For instance, the Telefónica Foundation's Proniño initiative contributes to eradication of child labour and América Móvil has supported the RED Rush to Zero campaign in Latin America, which seeks to eradicate HIV/AIDS.

While such intangible consumer benefits cannot be accurately quantified, a 'willingness to pay' methodology that combines data on new subscribers, usage increases and price trends over the years can be employed to estimate how consumer benefits have increased in the last four years.<sup>7</sup> This approach suggests that in these countries consumers potentially enjoyed the equivalent of up to USD 21 billion in intangible benefits in 2011.

**Figure 15: Intangible benefits to consumers 2008-2011, USD millions**



## 2.6 Total economic impact

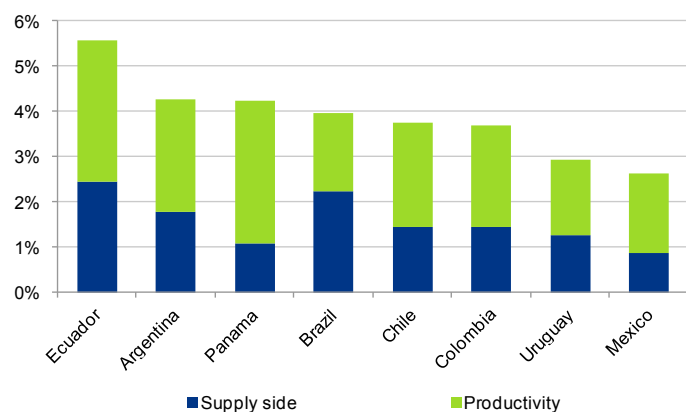
Substantial economic growth can be attributed to the development of the mobile industry in each of the nine countries. This impact results from the direct economic activity of mobile operators, the economic activity stimulated within the mobile ecosystem and across the wider economy, and the productivity increases associated with the use of the technology itself.

In 2011, it is estimated that the mobile telecommunications industry contributed USD 177 billion to the nine Latin American countries, representing 3.5% of GDP.<sup>8</sup> The supply side impact contributed almost 1.7% of GDP, while the productivity impacts represented 1.85% of GDP.

<sup>7</sup> This methodology has been employed to estimate impacts in Brazil, Chile, Colombia, Ecuador, Panama and Peru.

<sup>8</sup> This represents a weighted average of the figures for each country (see Figure 16), weighted by GDP. Regarding the intangible benefits to consumers, the weighted average includes also the countries where no such impacts were found.

**Figure 16: Total economic impact of mobile ecosystem as a proportion of GDP, 2011**



In less industrially developed countries, such as Ecuador, the contribution to a country's GDP is more important. In all countries, the importance of the productivity benefits created by the use of mobile telecommunications is clear.

In addition to these impacts, an extra USD 21 billion was estimated to have been derived by consumers in terms of intangible benefits received from increased usage and falling prices.

### 3 Taxation on mobile consumers and mobile operators in Latin America

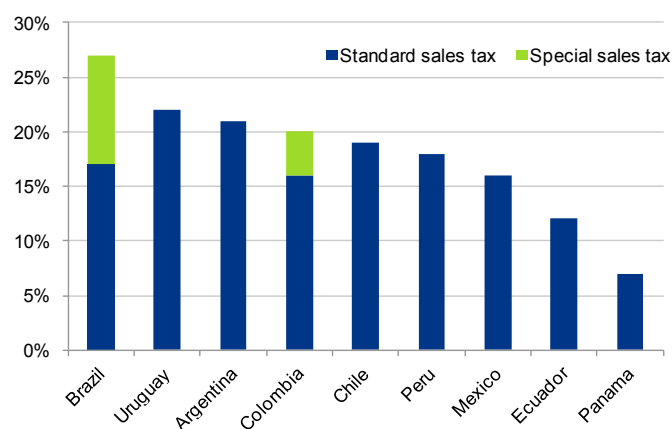
Despite the economic contribution estimated above, mobile consumers and operators in Latin America suffer from taxation regimes that impose a significant burden on them. In particular, there are a number of cases where mobile telephony is taxed more heavily than other sectors of the economy.

#### 3.1 Consumer taxes

Consumer taxation in Latin America affects all components of the mobile consumption bundle. The rates of sales taxes, typically VAT or ICMS in Brazil, vary across the region. At least two countries, Brazil and Colombia, impose higher than normal sales taxes upon mobile consumers:

- Brazil's ICMS regime taxes mobile services on average at 27%, 10% higher than the standard ICMS (17%).
- Colombia's VAT regime taxes mobile calls at 20%, 4% higher than the standard VAT (16%).

Figure 17: VAT (ICMS) rate applied to prepaid mobile calls

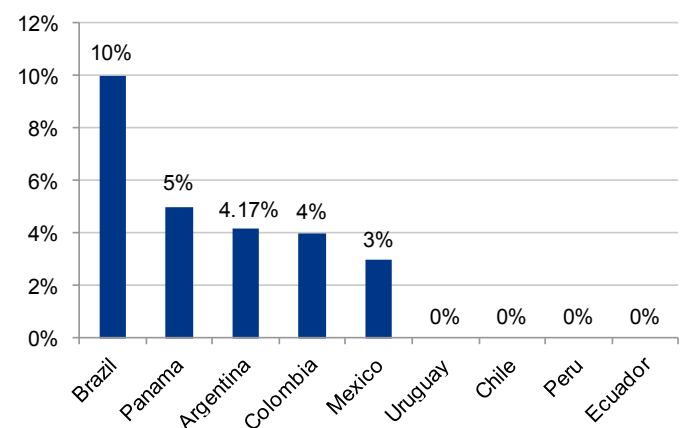


In certain countries, mobile telecoms are also subject to specific taxes that apply only to consumption of mobile telephony or to a restricted number of industries. Such specific taxes include:

- Mexico's IEPS<sup>9</sup>, a tax which applies to mobile service prices at a rate of 3%, excluding data services.
- Argentina's 4.17% excise tax paid by mobile users for call minutes, SMS and, importantly, for data usage.
- Panama's ISC<sup>10</sup>, a 5% special consumption tax applied to mobile calls, SMS and data usage.

The Organisation for Economic Cooperation and Development ('OECD') recently criticised the application of such specific taxes; in its Review of Telecommunication Policy and Regulation in Mexico, the OECD stated that "It is difficult to justify a specific sectoral tax, such as the IEPS, as it places a needless burden on the telecommunications industry unless used to support the sector in some form (universal service, the regulator, etc.)."<sup>11</sup>

Figure 18: Additional taxation rates applied on consumption of mobile services<sup>12</sup>



Discriminatory VAT and additional taxes on usage have negative consumption effects for mobile technology. These taxes have the potential to create obstacles to usage of mobile services by the poorer segments of the population. Given that mobile telecommunications, notably prepaid services, are the primary provider of communications services, has important policy considerations.

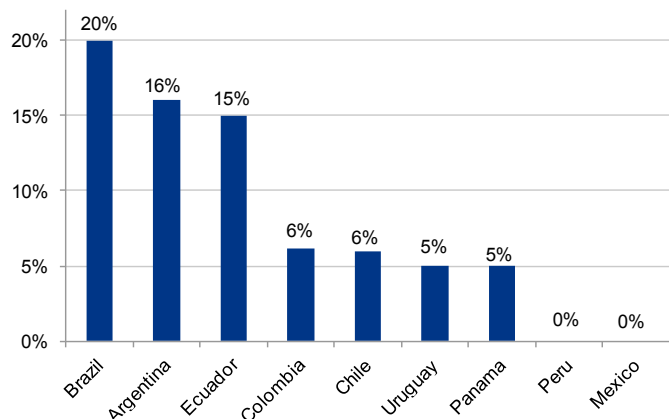
Handsets, another key component of the mobile consumer's bundle, face significant custom duties in addition to VAT in most Latin American markets.

9 Impuesto Especial sobre Producción y Servicios.

10 Impuesto Selectivo al Consumo

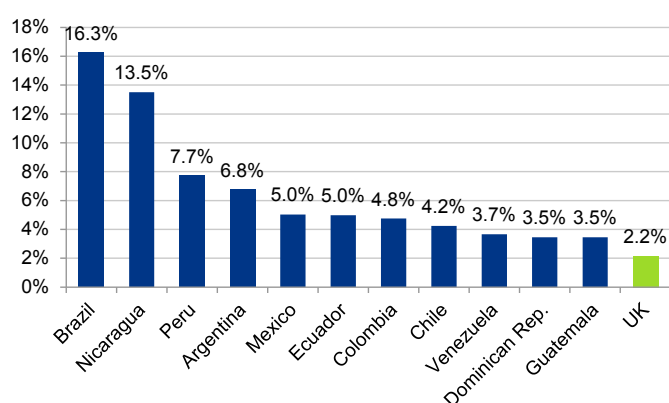
11 OECD (2012): "Review of telecommunication Policy and Regulation in Mexico".

12 The difference between the average tax rate on mobile calls and the standard rate on all other goods and services is reported in this figure as a luxury tax.

**Figure 19: Current import duties for mobile devices in sample countries<sup>13</sup>**

In Brazil and Argentina import duties are used as incentives to promote the local manufacturing and assembling industry, and handsets that are assembled locally receive a preferential tax treatment.

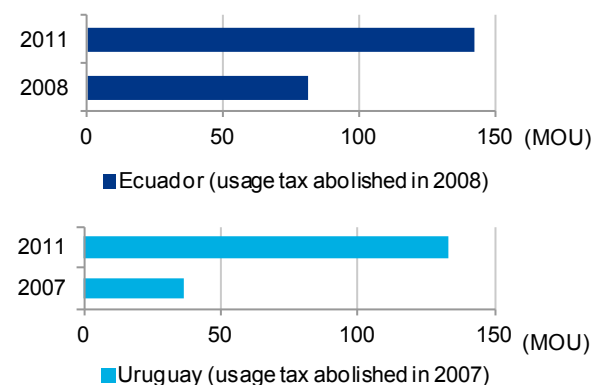
Taxation on mobile consumers raises the price of both devices and services thereby increasing the total cost of mobile ownership ('TCMO'). Taxes that target mobile services represent a significant obstacle to use by the poorer segments of the population, which could derive significant benefits from being connected. In Latin America TCMO can be up to 16% of GDP per capita while this is just above 2% for the United Kingdom ('UK').

**Figure 20: TCMO as a proportion of GDP per capita**

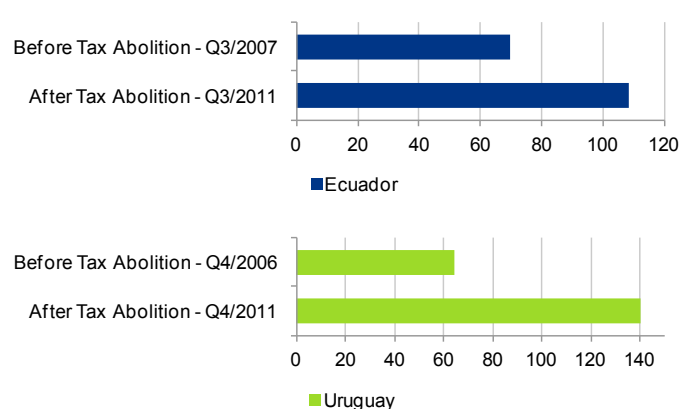
Source: GSMA Global Mobile Tax Review 2011; World Bank

This is an important consideration given that in most Latin American countries mobile is the primary way to access to broadband for certain segments of the population and in rural areas.

Taxes on usage affect penetration as well as total mobile usage. In 2007/8, the governments of Ecuador and Uruguay removed mobile specific taxes on usage and the subsequent years have seen dramatic increases in both penetration and usage. Whilst the extent to which this can be causally related to the tax reduction is uncertain, the scale of development of the sector in each country since the change is clear.

**Figure 21: Minutes of use (MOU) per user per month in Ecuador and Uruguay**

Source: Operators' data

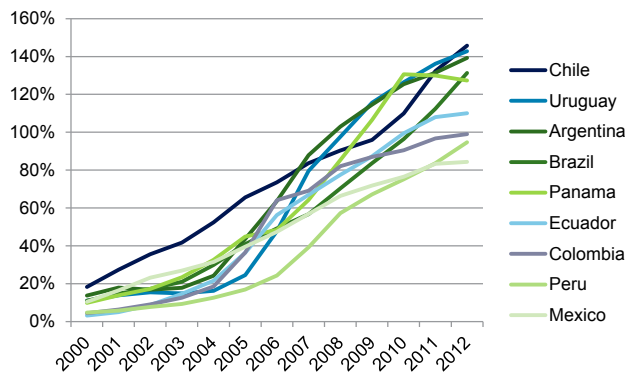
**Figure 22: Mobile penetration rates in Ecuador and Uruguay**

Source: Wireless Intelligence

Conversely, in Mexico and Panama, where taxation has recently increased, penetration and usage have either stalled or contracted.

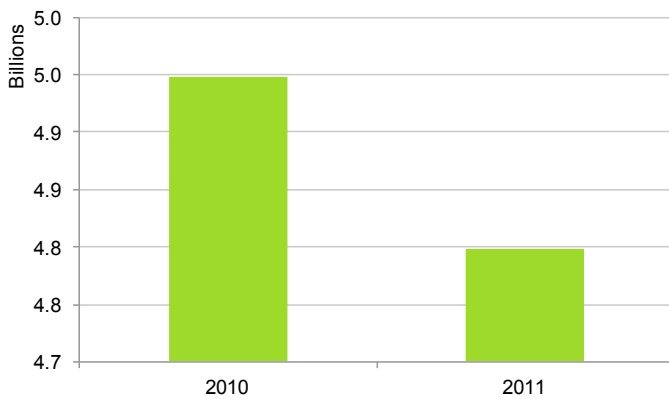
<sup>13</sup> Uruguay's import duties on mobile handsets range from 2% to 8%; the figure above represents an average.

Figure 23: Mobile penetration, 2000-2012 (taxation increased in Mexico in 2010)



Source: Wireless Intelligence

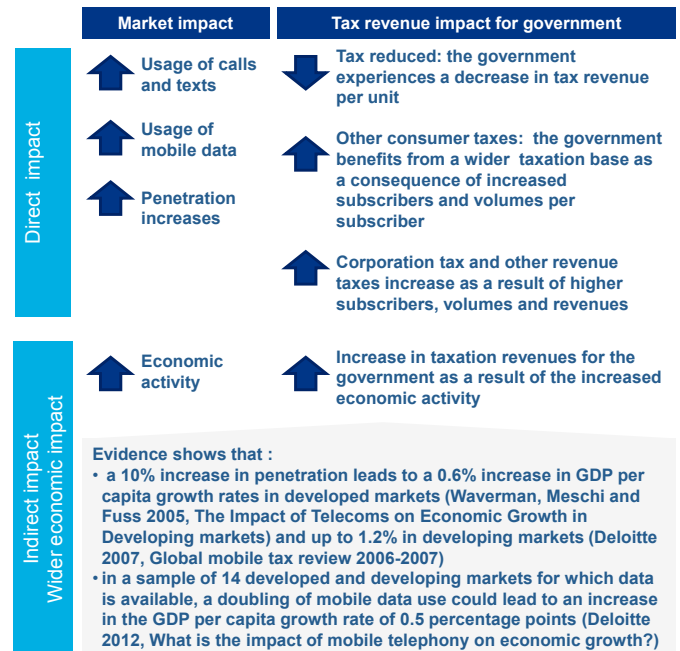
Figure 24: Total minutes of use in Panama (taxation extended in 2010)



Source: Deloitte analysis based on data from Autoridad Nacional de los Servicios Públicos

Governments might be concerned that reducing taxation rates to stimulate the growth of the mobile sector and, in particular, mobile data, could decrease their revenue irrespective of the positive impacts it has. However, in countries where consumer taxation on mobile telephony is relatively high, as is often the case in Latin America, reducing taxation has the potential to increase government taxation revenues over the long run.

Figure 25: Direct and indirect effects of tax reductions on government tax revenues

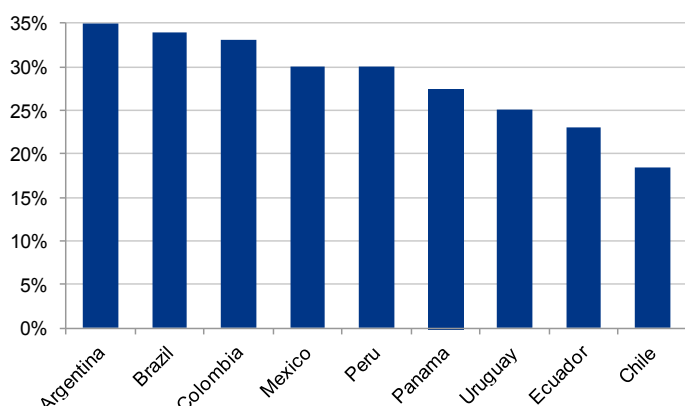
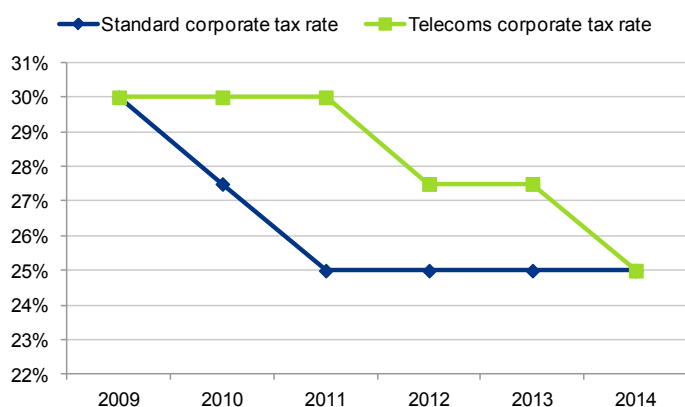


Further detailed investigation of these drivers at a country level is required to understand the relative impacts on government revenue, but the potential to support the further expansion of Latin American economies is clear.

### 3.2 Operator taxes and fees

Mobile operators in Latin America pay a series of corporate taxes as well as sector specific regulatory fees, i.e. licence and spectrum fees and universal service obligations.

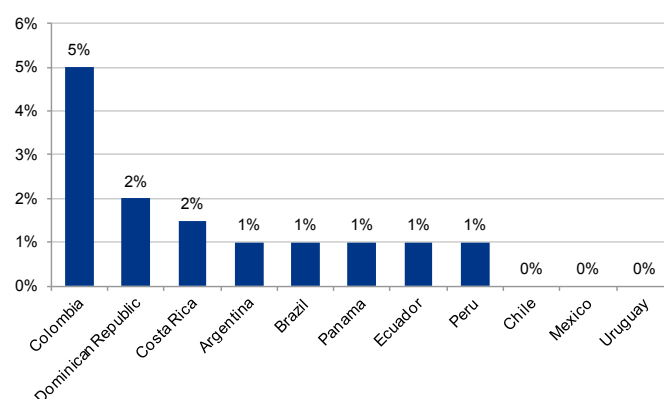
Corporate taxes are highest in Argentina, Brazil and Colombia. In most cases these rates are the same for other sectors, but in Panama mobile operators are subject to a higher tax rate than companies in other sectors.

**Figure 26: Current corporation tax in sample Latin American countries****Figure 27: Corporate tax rates in Panama**

Taxation regimes in Brazil and Argentina include turnover taxes imposed on mobile operators' revenues. Mobile operators cannot itemise such taxes in prices or receipts. The net effect of this is that mobile operators must either suffer a consistent reduction in their profitability or pass these taxes through to consumers in a non transparent way. International comparisons of tax regimes reveal that such taxes and fees are atypical in other markets such as the United States or Europe. Such taxes reduce incentives to operators to invest and encourage them to profit maximise over older networks.

In most Latin American markets, operators pay numerous licence fees and spectrum allocation fees to the government in order to attain the rights to provide mobile services and to use radiofrequency spectrum. Whilst such costs of operation exist internationally within the mobile sector, the costs in Latin America appear amongst the highest.

Operators also typically contribute a share of their revenues to the government's Universal Service Funds ('USF'), which were structured with the aim of providing telecoms services to rural or underserved areas. The USF can be a significant figure, for example in Colombia this represents 5% of revenue.

**Figure 28: Contributions to the Universal Service Fund in Latin America, 2011**

Taxation may also constrain the development of new services. For instance, in Brazil, mobile operators offering M2M services are subject to numerous turnover taxes. These taxes reduce the margins of both mobile operators and other service providers that develop the M2M facility. Consequently, operators struggle to allow sufficient margins to their stakeholders to attract them in providing M2M services. This complex taxation structure has been recently criticised as "irrational" by the Brazilian Communications Minister<sup>14</sup>, who highlighted how taxes are often levied more than once on the same service. A recent change in legislation was implemented in Brazil which reduced taxes on M2M services.<sup>15</sup> This represented a positive step for the industry and more legislation along these lines could contribute to release further benefits for consumers and the economy.

<sup>14</sup> [www.convergencialatina.com](http://www.convergencialatina.com); August 28th 2012.

<sup>15</sup> <http://www.rcrwireless.com/americas/20120919/networks/analysts-see-positive-brazils-new-law-tax-incentives-telecom-sector/>

## 4 Conclusion

The mobile sector in Latin America is providing substantial economic and social benefits to consumers and economies. However, the sector remains burdened by mobile specific taxes that raise consumer prices and operator costs.

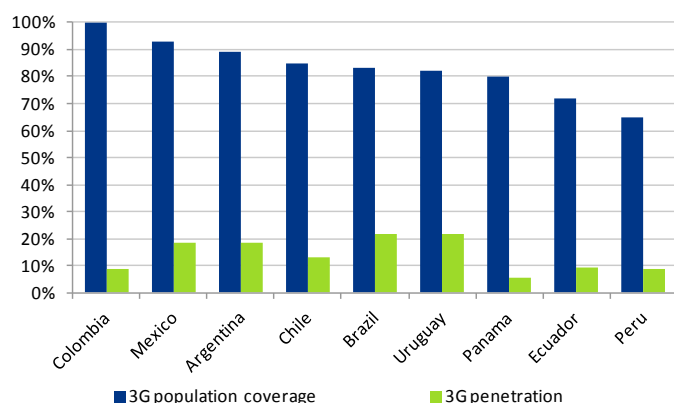
For consumers, this leads to reduced device acquisition and reduced service usage. Potential consumers are excluded from the advantages of mobile telephony due to the large associated costs. Consumers could reap further benefits from increased usage of mobile telephony if the specific taxes were reduced. In particular, consumer taxation, by raising service prices, is placing a significant constraint on the take up of 3G and of mobile broadband services.

For operators, mobile specific taxation increases costs and leads to reduced profits, limiting investment incentives.

Operators have invested significant amounts in 3G networks which now cover 86% of the population in the sample countries. However, despite network coverage, 3G penetration has remained low, constrained by device and service prices, which mobile specific taxation contributes to raise.

Mobile broadband represents a significant opportunity for economic and social inclusion in Latin America, and governments in the region have designed national plans to support the development of broadband. However, the limited availability of fixed lines in the region is such that mobile services *de facto* act as primary providers of telecommunication services. Policies that create barriers to consumption and discourage investment in the sector appear inconsistent with these government objectives, while reductions in mobile taxation can have positive impacts on government budgets through expansion of consumption of mobile services.

Figure 29: 3G population coverage and 3G penetration, 2011<sup>16</sup>



Source: Wireless Intelligence and operators' data

<sup>16</sup> For a few countries, population coverage in 2011 was not available and the picture reflects the most recent data available (e.g. Chile is Q42009).



# Appendix A Country case study: Brazil

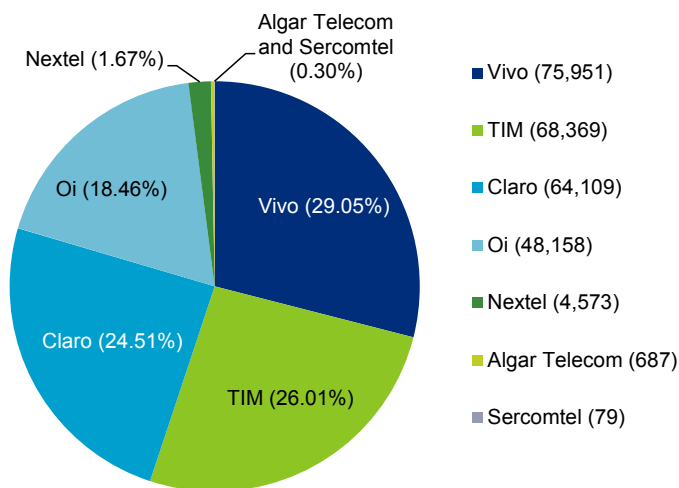
This Appendix provides an analysis of the impact of mobile telephony on the Brazilian economy and society in the last four years (2008 to 2011). It also describes taxation that applies to mobile consumers and mobile operators in Brazil, evaluating the effects that mobile specific taxes have on the industry and the wider economy.

This Appendix is based on discussions and data provided by mobile operators. Additional data has been provided by the GSMA and taken from publicly available sources that are referenced throughout.

## A.1 Mobile telecommunications in Brazil

The mobile telecommunications sector in Brazil is characterised by the presence of seven mobile operators. The largest operator, Vivo, enjoys a market share of 29%, followed by TIM (26%), Claro (24.5%) and Oi (18.5%). The three smallest operators (Nextel, Algar Telecom and Sercomtel) have a joint market share of approximately 2%.<sup>17</sup>

Figure 30: Brazilian mobile market share and subscribers (000s) by operator, Q1 2012



Source: Wireless Intelligence

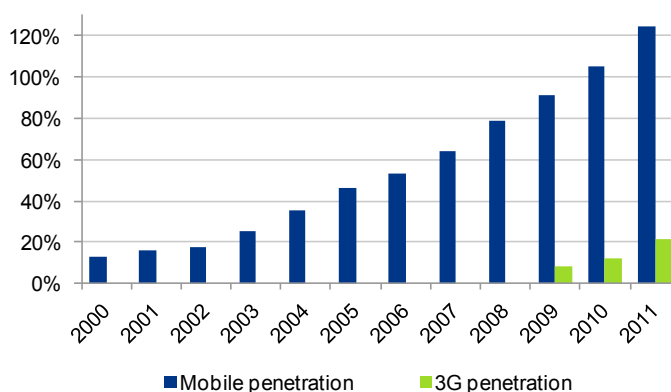
The Brazilian mobile market is the fourth in the world for number of connections, after China, India and the US respectively and represents almost 40% of the entire Latin American market. The market continues to grow strongly, with approximately 262 million subscribers in Q2 2012, up from 127 million at the beginning of 2008, representing an increase in mobile penetration from 67% to 134%, significantly higher than the Latin American average. It has been estimated that the market will continue to grow in terms of number

of subscribers at a rate of 11% and 10% in 2012 and 2013 respectively.<sup>18</sup>

The majority of Brazilian subscriptions are prepaid connections, representing about 80% of the total.<sup>19</sup>

Take-up of 3G services is also rapidly increasing and has reached a penetration of 31% in Q2 2012.<sup>20</sup>

Figure 31: Mobile penetration, 2000-2011



Source: Wireless intelligence and mobile operators' data

Notably, Brazil has a low fixed line teledensity compared to other developed mobile markets (22% in 2010<sup>21</sup>), emphasising the importance of mobile services (including mobile internet), especially outside urban centres.

## A.2 The economic contribution of mobile telephony to the economy

Mobile telephony in Brazil generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits gained by Brazilian consumers.

<sup>17</sup> Wireless Intelligence, Q4 2011.

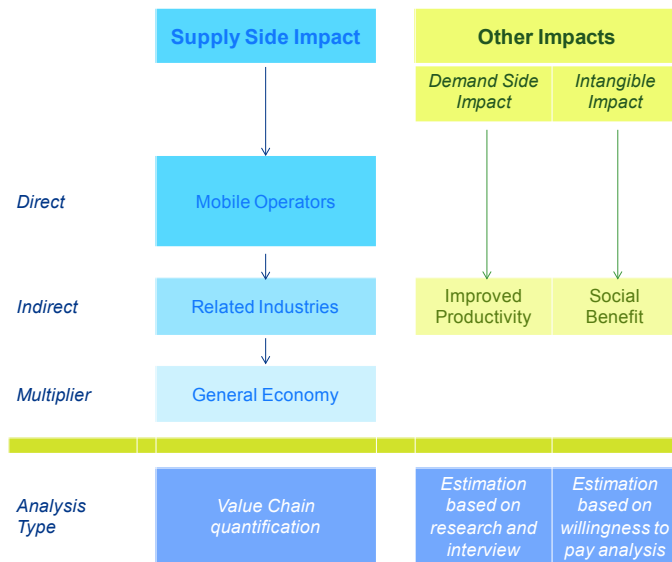
<sup>18</sup> Wireless Intelligence.

<sup>19</sup> Wireless Intelligence, Q2 2012.

<sup>20</sup> Wireless Intelligence, Q2 2012.

<sup>21</sup> World Bank, World Development Indicators.

Figure 32: Estimation of the economic impacts of mobile telephony



Source: Deloitte

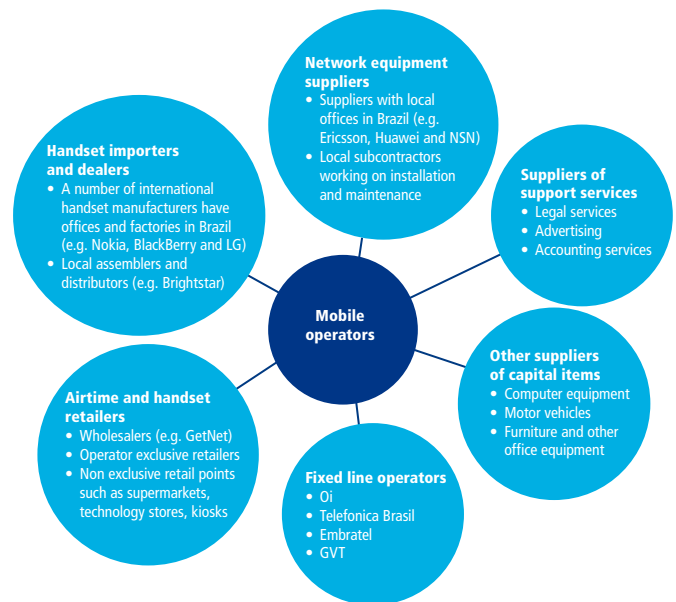
In addition to the mobile operators, the Brazilian mobile telecommunications industry is composed of a wider ecosystem of players.

International equipment providers, such as Alcatel-Lucent, Ericsson, Huawei, Motorola, Nec, Nokia Siemens Networks, Qualcomm and ZTE, recognising the importance of the Brazilian market, have established their offices in the country. Some of them have also established their own factories and now produce most network equipment directly in the country. In addition, international equipment providers rely on a number of local contractors and technical companies offering services such as installation and maintenance.

Major international handset manufacturers such as Apple, Huawei, LG, Motorola, Nokia, Samsung, Semp Toshiba and Sony also have offices in Brazil. Following government incentives to promote local employment, such as in the Free Economic Zone of Manaus, international handset manufacturers now assemble handsets directly in Brazil.

The mobile ecosystem also includes distributors and sellers of handsets and airtime and suppliers of other support services, such as advertising, to the mobile operators.

Figure 33: Mobile telecommunications ecosystem



Source: Deloitte

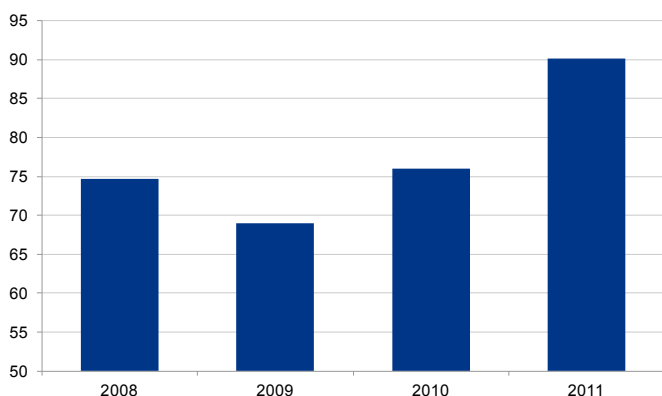
This study estimates the economic impact of mobile telephony in terms of the direct and indirect effects provided to the supply side of the Brazilian economy by the mobile operators and players in the wider mobile ecosystem, and of direct and indirect employment from firms in the ecosystem.

The study also discusses the productivity increases 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

Mobile operators provide numerous benefits to the supply side of the Brazilian economy through the direct effect of their expenditure. These benefits flow through to related industries in the mobile ecosystem and more widely across the economy.

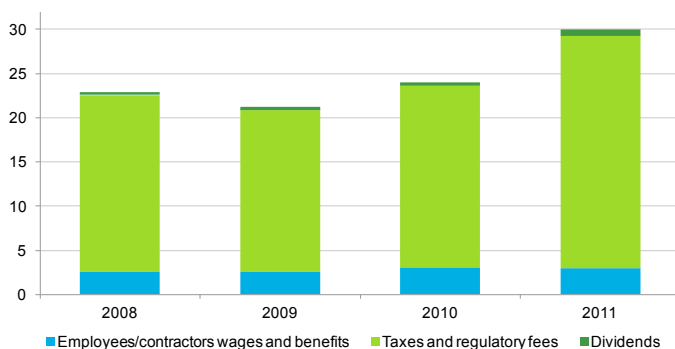
In 2011, the mobile telecommunications industry contributed BRL 90.1 billion from supply side impacts to the Brazilian economy.

**Figure 34: Supply side value add of mobile telecommunications, BRL billions**

Source: Deloitte analysis

To calculate the value add generated by the industry, the direct value add created by the mobile telecommunications industry was estimated first. This consists of the value created by mobile operators' expenditure on wages, corporate and social responsibility ('CSR') programmes, dividends paid by mobile operators and taxes paid as a result of the mobile operators' operations.

In 2011, mobile operators in Brazil were estimated to have provided a direct contribution of BRL 29.9 billion to the country's economy.

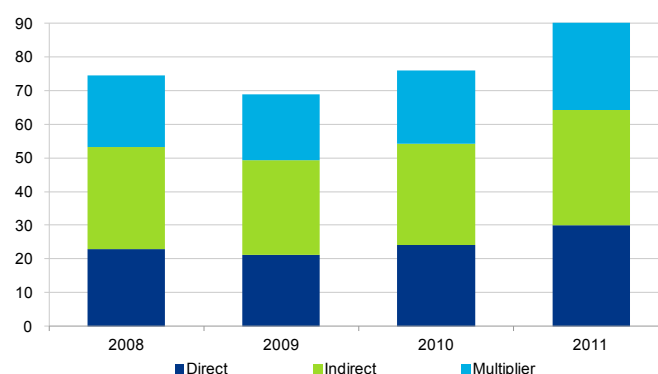
**Figure 35: Direct domestic value add of mobile operators (excluding multiplier effect), BRL billions**

Source: Deloitte analysis based on data provided by mobile operators, interviews and analysis of company accounts.

Mobile operators' direct contribution has slightly contracted in 2009 compared to 2008, reflecting worldwide economic conditions. This contribution, however, rapidly recovered in 2010, reaching a 30% higher level in 2011 than in 2008.

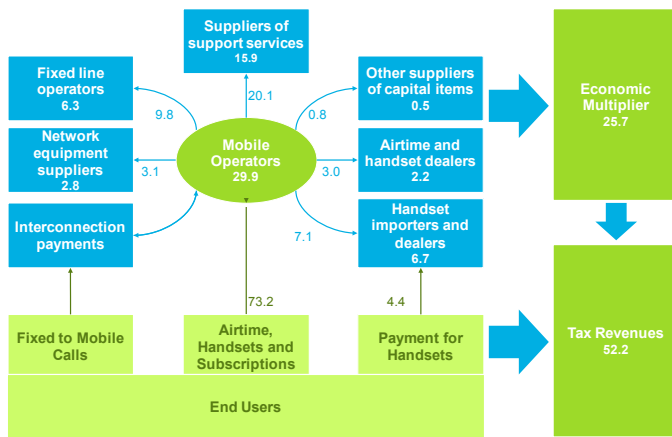
In addition to the direct economic contribution generated by the mobile operators, the indirect impacts from mobile operators' payments to stakeholders in the wider mobile ecosystem have been estimated, i.e. the percentage of the amount spent by the end users that remains within the national boundaries to be spent in the next round. This is calculated by examining mobile operators' expenditures towards their supplier of support services in the wider mobile ecosystem. The amounts of value add, including wages, profits and taxes generated by these payments are then estimated. Finally, a spend multiplier was applied to capture the effects on the wider economy.

This analysis finds that the indirect impacts from the mobile ecosystem amounted to BRL 34.4 billion, while the overall multiplier effect from the wider economy consisted of BRL 25.7 billion.

**Figure 36: Supply side value add from mobile telecommunications by component, BRL billions**

Source: Deloitte analysis

The value add relationship between the mobile operators and related industries in the ecosystem is shown below. The estimates of value add include the multiplier effect on the wider economy which is assumed to be 40% of the revenues generated by the mobile operators and the related supply chain.

**Figure 37: Mobile value chain and value add in 2011, BRL billions**

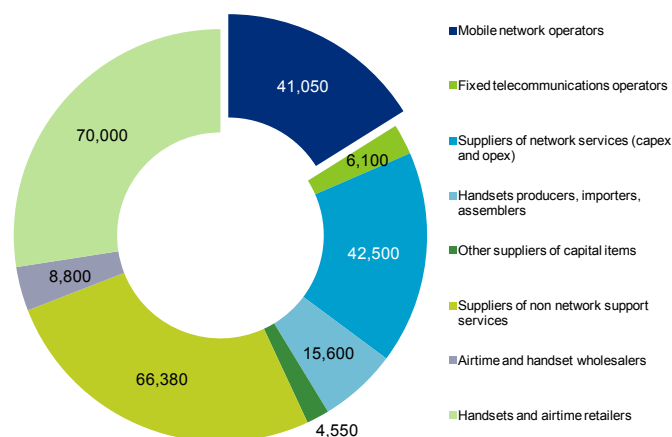
Source: Deloitte analysis; Values in the boxes represent value add

### Impact on employment

Mobile services in Brazil contribute to employment in several ways. This includes employment created:

- directly by mobile operators;
- in related industries;
- by outsourced work;
- by government spending on job creation; and
- by employees and beneficiaries spending their earnings in the wider economy.

It is estimated that in 2011 the Brazilian mobile telecommunication industry employed more than 250,000 Full Time Equivalents ('FTEs').

**Figure 38: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**

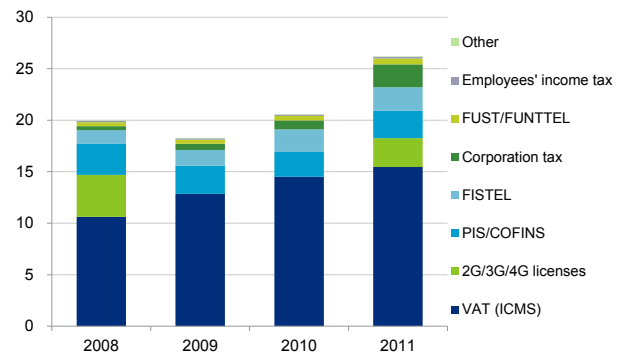
Source: Deloitte analysis, excludes multiplier

While mobile operators employed approximately 41,000 FTEs in 2011, the wider mobile ecosystem employed approximately 214,000 additional FTEs. Of these, 15,600 FTEs were the handset manufacturers and assemblers, while 70,000 were handset and airtime retailers consisting of both mobile operators' third party and other independent retailers operating from supermarkets, technology stores and smaller independent points of sale. Further employment contributions are created by the suppliers of network CAPEX and OPEX (42,500 FTEs) and the suppliers of support services (approximately 66,400 FTEs).

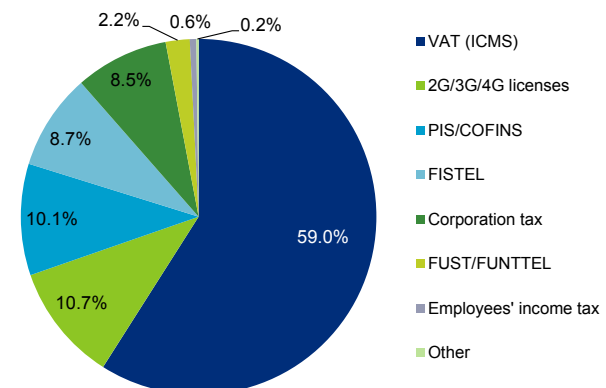
A further 85,000 FTEs were estimated to be generated in the wider economy as a result of the interactions with the mobile operators.

### Value add from taxation

In 2011, mobile operators in Brazil paid approximately BRL 26.2 billion to the government in taxes and regulatory fees. This represented a 30% increase compared to the contributions of 2008.

**Figure 39: Tax and regulatory payments from mobile operators, BRL billions<sup>22</sup>**

Source: Deloitte analysis based on operator data; These figures do not include a multiplier

**Figure 40: Tax and regulatory payments from mobile operators, 2011**

Source: Deloitte analysis, excludes multiplier

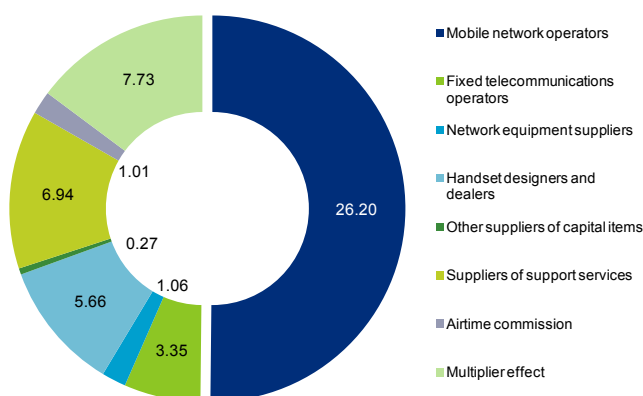
22 These taxes are described in detail below.

Taxes and regulatory fees represented more than 30% of domestic company revenues for Brazilian mobile operators in 2011. The largest proportion of tax revenue was raised through the ICMS, which accounts for almost 60% of taxes paid by mobile operators in 2011.

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another BRL 18.3 billion for the government in 2011. The largest payers of tax in the mobile supply chain, aside from the mobile operators, were the handset designers and dealers and the suppliers of support services.

A further BRL 7.7 billion tax revenues were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 41: Total tax revenues from the mobile value chain in 2011, BRL billions**



Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note this represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector

## Productivity impacts

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

There are numerous ways in which mobile services can lead to productivity increases in Brazil.

Vivo is a promoter of the "Fishing with 3G Nets" project,<sup>23</sup> which introduced 3G technology to support local fishermen's activities in the Bahia region. The project supports fishermen by providing them with 3G-enabled mobile devices equipped with customised software applications. This enhances

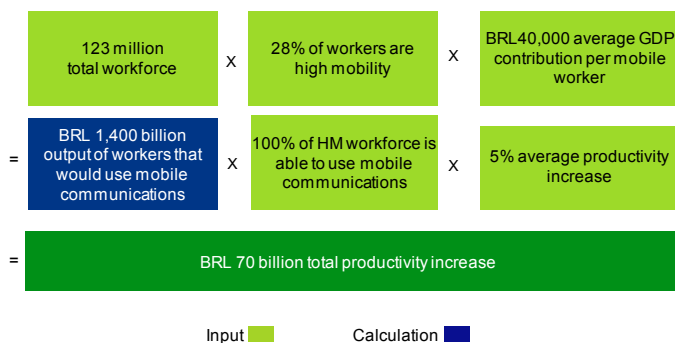
safety of navigation through real time updates on location and weather conditions, it improves fishermen's marketing capabilities by providing them with constant updates on market prices and demand, and allows them to connect directly with consumers and sell the daily catch via web-based applications.

Mobile technologies also play a central role for enhancing productivity in the Brazilian health sector. Using a mobile technology developed by Sana<sup>24</sup>, Brazilian health workers can collect patient data and transfer the information remotely to a doctor for review. Doctors can notify the health worker of the diagnosis by sending results through a mobile application. This is used in Brazil<sup>25</sup> to screen the population for eye diseases remotely and identify people with preventable causes of blindness.

The development of M2M services will further improve productivity and efficiency in various business areas, by allowing rapid exchange of data between a number of remote machines and a server that manages the information flows. At the 2012 Latin American "Connected Living" summit, the representatives of the Secretary of Telecommunications recognised the importance of reducing tax pressures as a key enabler of the growing M2M market.<sup>26</sup>

An economic value approach can be employed to provide a high level estimation of these productivity benefits for mobile workers. The results indicate that, if mobile workers in Brazil achieved a 5% increase in productivity as a result of using mobile technologies, the potential productivity impact of mobile services on the economy would have been BRL 70 billion in 2011, representing an increase of a third on 2008.

**Figure 42: Economic impact in 2011 of increased productivity amongst high mobility workers**



Source: Deloitte analysis based on Deloitte assumptions, interviews and Brazilian Bureau of Statistics. Differences might be due to rounding.

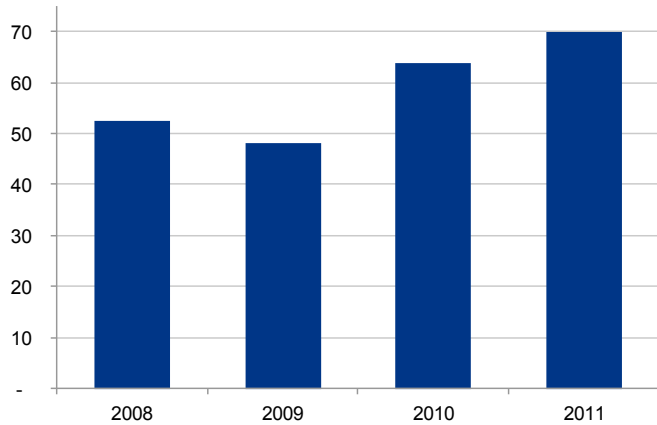
<sup>23</sup> The initiative was developed by Qualcomm along with Telefónica/Vivo, the United States Agency for International Development USAID, ZTE, Santa Cruz Cabralia town hall through the Secretary's Office of Agriculture and Fisheries and the Instituto Ambiental Brasil Sustentável (IABS).

<sup>24</sup> <http://sana.mit.edu/mission/projects>.

<sup>25</sup> The project is a collaboration between Sana, the Federal University of São Paulo and INATEL.

<sup>26</sup> <http://www.gsma.com/connectedliving/connected-living-latam-summit>.

**Figure 43: Economic impact of increased productivity amongst high mobility workers over time, BRL billions**



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

### Consumer impacts

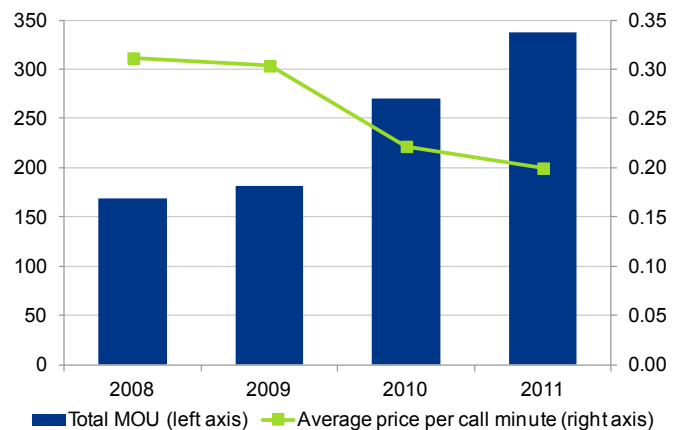
Mobile telecommunications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion and the extension of communication to those on low incomes.

Mobile operators have identified a number of CSR projects and services they provide in Brazil that deliver significant tangible and intangible benefits to consumers and businesses. These include:

- In 2011, TIM Brasil implemented a Wi-Fi project in Rocinha, Brazil's largest favela. TIM installed several antennas that deliver mobile broadband for the entire community and serve as wireless internet hot spots. The project included a public service that enabled access to government and public utility websites.
- The "Belterra Conexão Project" recently introduced by Vivo, Ericsson and the NGO Projeto Saúde & Alegria, provides voice, broadband and mobile internet access, as well as eHealth and eEducation services, to 30,000 people in 175 villages in the heart of the Brazilian Amazon. Local university research showed that 74% of the local traders registered an increase in sales after the deployment of Vivo's network. As a result, the project was named as one of the top five competing projects for the Global Mobile Award for Best Use of Mobile for Social and Economic Development at the 2011 Mobile World Congress.

In addition, the industry has encouraged mobile usage and has introduced a number of high-value services. Call charges have decreased over the last four years (more than 30% from 2008 to 2011) and total usage has increased over the same period.

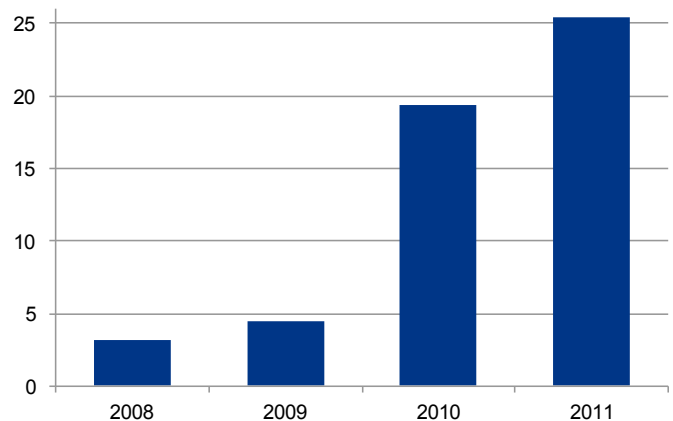
**Figure 44: Price per minute (BRL) and total minutes of use (billions), 2008-2011**



Source: Wireless Intelligence data; Deloitte analysis

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 have increased over time in the last four years. This approach suggests that consumers potentially enjoyed the equivalent of up to BRL 25.4 billion in intangible benefits in 2011.

**Figure 45: Intangible benefits using willingness to pay concept, BRL billions**



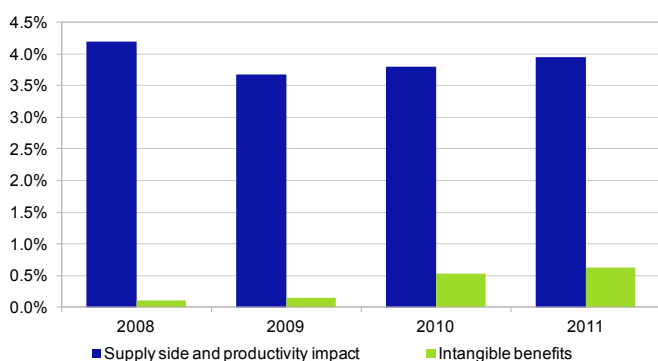
Source: Deloitte analysis.



## Total impacts

Overall, this study finds that in 2011 the mobile telecommunications industry contributed BRL 160 billion, which represented approximately 4% of GDP, plus up to an additional USD 25 billion from intangible benefits to consumers deriving from increased usage and falling prices.

**Figure 46: Domestic impact as a proportion of GDP, 2011**



Source: Deloitte Analysis

Mobile operators' total contribution to GDP slightly contracted in 2009, suggesting that the mobile sector has been particularly hit by the worldwide economic conditions. This, however, has rapidly recovered in 2011, when the overall contribution to GDP of the mobile ecosystem returned towards its 2008 level.

## A.3 Taxation on consumers and mobile operators

The economic contribution that mobile operators generate in the market is currently constrained in Brazil by a taxation regime which impacts both mobile consumers and mobile operators.

### Impacts of taxation on mobile consumers

Consumer taxation in Brazil affects both the handsets and usage cost components of mobile consumers' spend.

**Figure 47: Mobile specific taxation on consumers, 2011**

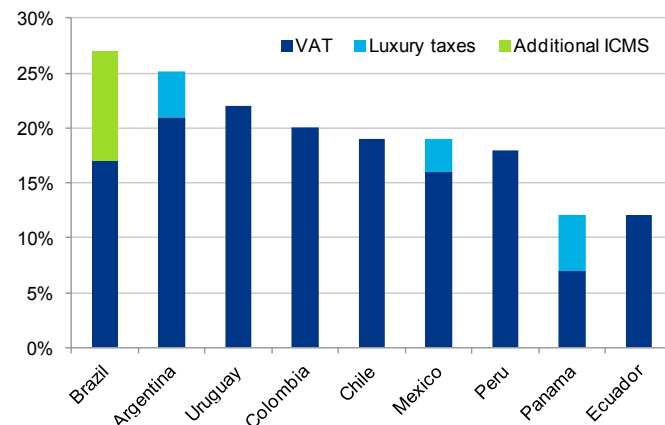
Product	Tax	Tax rate
Calls	VAT (ICMS)	27%
SMS		
Data		
Handsets	VAT (ICMS)	17%
	Import duty	20%
SIM cards	VAT (ICMS)	17%

Source: Mobile operators' data

The usage of mobile telephony services in Brazil is subject to the ICMS.<sup>27</sup> A special ICMS rate applies to call minutes, SMS and data: its rates vary across states, ranging from 25% to 35%, with an average value of 27%. At this average rate, the ICMS in Brazil is the highest sales tax amongst the Latin American countries studied.

In Brazil, ICMS is not imposed in addition to the billable amount but subtracted from the total billable amount. As such, ICMS represents 37% of mobile operators' net revenues.<sup>28</sup>

**Figure 48: Tax rates on prepaid mobile services, 2011**



Source: Operators' data; In Brazil, mobile services are subject to supranormal ICMS. The difference between the average ICMS on mobile services (27%) and the average ICMS on all other goods and services (17%) is reported in this figure as "additional ICMS"

This 27% average rate is also considerably higher than the standard ICMS usually levied by Brazilian states on other goods and services, which averages approximately 17%. As

<sup>27</sup> Imposto sobre a Circulação de Mercadorias e Serviços de Transporte Intermunicipal, interestadual e comunicação.

<sup>28</sup> For a 1 BRL paid by consumers, net revenue after ICMS for operators is BRL 0.73, while ICMS tax revenue for the government are BRL 0.27.



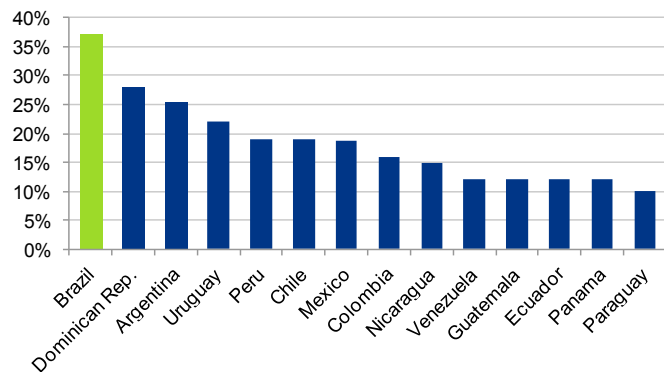
such, mobile telecommunications are discriminated against by the government, and the differential taxation rate, an average 10% extra tax compared to other services, can be interpreted as telecommunications specific taxation.

This mobile specific taxation has a number of negative impacts on consumers and the economy:

- It deters consumption: governments often introduce specific consumption taxation to discourage consumption of goods, e.g. tobacco and alcohol. However, the application of this rationale in the context of mobile services which generate positive social benefits does not appear appropriate.
- It hits the poorest consumers: this special ICMS can create a significant obstacle to usage of mobile services by the poorer sectors of the population, those that could derive the highest social and productivity benefits from being connected.

Due to the special ICMS on usage, Brazilian TCMU<sup>29</sup> is well above the levels of most other Latin American markets.

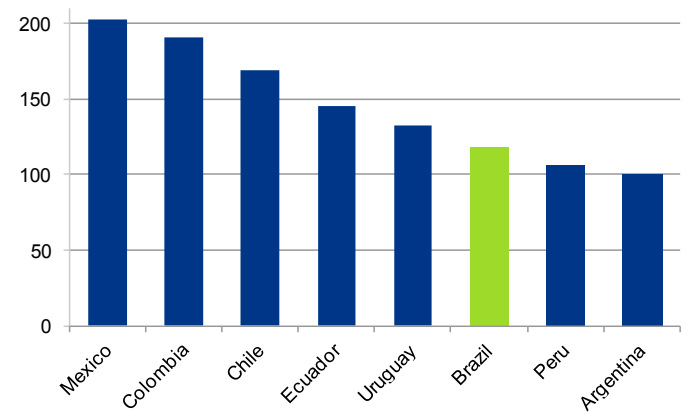
Figure 49: Tax as a percentage of TCMU, 2011



Source: Deloitte/GSMA Global Mobile Tax Review 2011; Figures for Argentina, Brazil, Panama and Uruguay have been added/updated according to further discussions with the mobile operators

Minutes of use ('MOU') per user in Brazil are substantially lower than in other countries such as Mexico, Colombia, Chile, Ecuador and Uruguay. As the Minister of Communications indicated in a recent interview<sup>30</sup>, current taxation rates are limiting the expansion of mobile services and a reduction of the ICMS on mobile services would play a central role in stimulating growth.

Figure 50: MOU per user per month, 2011



Source: Wireless Intelligence and operators' data

On the issue of ICMS on mobile usage, further coordination will be fundamental in the future between the government and the different states. This is because the states administer the ICMS and any reform will require their direct commitment.

Taxation on handsets in Brazil differs depending on whether the handsets are imported or locally assembled. Imported handsets are subject to the IPI<sup>31</sup>, a 20% import tax. Imported handsets are also subject to PIS and COFINS<sup>32</sup> (9.25% of the seller's revenues) and the ICMS, which is 17% on average in this case.

The majority of handsets sold in Brazil are assembled locally by the international handsets manufacturers which have established their factories in the country. These producers are still subject to a 20% IPI on imported components and a 17% ICMS, but not PIS and COFINS.

A study<sup>33</sup> by Deloitte on worldwide taxation on mobile consumers highlighted that, for imported handsets, taxes could represent up to 40% of a handset cost in Brazil in 2011, one of the highest levels among Latin American countries.

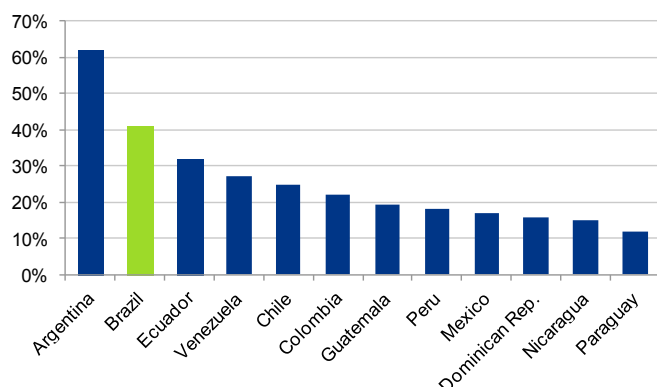
29 TCMU is the total cost of mobile usage, calculated as the weighted average of the taxes imposed on prepaid mobile usage and postpaid mobile usage.

30 <http://www.estadao.com.br/noticias/impresso,o-custo-das-telecomunicacoes-,877722,0.htm>.

31 Impostos sobre produção e importação.

32 PIS and COFINS are taxes paid by operators that impact consumers prices, as described in detail below.

33 Deloitte/GSMA Global Mobile Tax Review 2011.

**Figure 51: Tax as a percentage of handset cost, 2011**

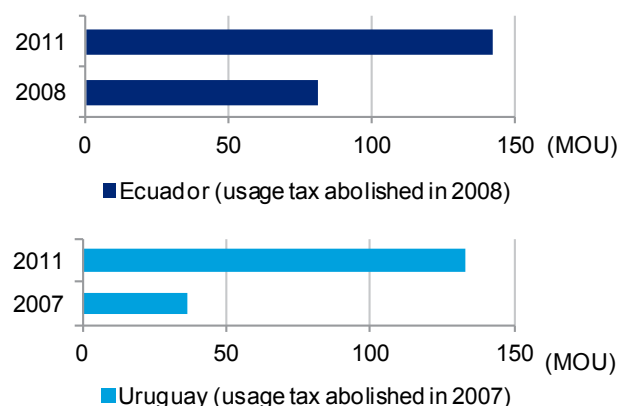
Source: Deloitte/GSMA Global Mobile Tax Review 2011

Taxes on handsets affect their retail prices and may inhibit the acquisition of smartphones and other 3G devices, which in Brazil represent the only access to wireless broadband for certain segments of the population and in rural areas.

In addition, operators have reported other related regulatory restrictions, for example, on the maximum length of long term contracts they can offer and on customers' right to switch to other operators before a contract expires. These regulations considerably lower mobile operators' incentives to subsidise handsets for post pay customers, potentially affecting handset circulation.

In countries, such as Brazil, where consumer taxation on mobile telephony is relatively high, reducing taxation has the potential to provide numerous positive effects. In particular, the potential exists to increase government revenues, as the growth in service consumption that results from the reduction of a high tax generates revenues that can compensate the initial loss.

For example, a reduction in the ICMS rate on calls and data would appear to have the potential to increase the level of mobile usage in Brazil to levels more similar to other Latin American countries. In Ecuador and Uruguay, which exhibit higher usage per subscriber than Brazil, usage increased notably when the governments reduced mobile specific taxes.

**Figure 52: MOU per user per month in Ecuador and Uruguay**

Source: Operators' data

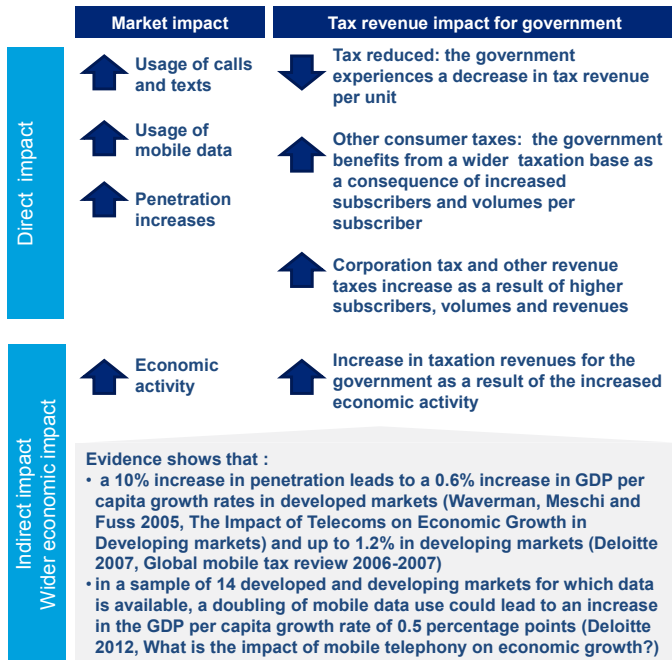
Increases in usage expand the taxable base for the government, leading to increased tax revenues. For example, if an ICMS tax reduction to 17%, matching the rate that applies to standard services, led to MOU in Brazil increasing to the average level of usage in Ecuador and Uruguay (138 MOU), the government would have gained an extra BRL 1.9 billion in 2011 from this expanded total usage.<sup>34</sup>

Increased usage would also be coupled with increased economic activity. A well-documented positive relationship exists between increases in mobile penetration and usage and GDP growth rates, due to the beneficial effects on the economy and on its productivity.<sup>35</sup>

<sup>34</sup> This has been calculated as the product of the total extra minutes of use and the reduced retail price resulting from the tax reduction.

<sup>35</sup> See, for example, the forthcoming Deloitte/GSMA paper "What is the impact of mobile telephony on economic growth?"

Figure 53: Direct and indirect effects of tax reductions on government tax revenues



The net impact of any taxation changes requires a dynamic approach where governments explicitly account for the indirect impacts driven by the increased economic activities that are generated by improved mobile penetration and usage.

Tax reductions not only contribute to market developments and benefits for consumers. These reductions can also lead, in the medium term, to a tax neutral or tax positive outcome for the government. This occurs when the extra tax receipts due to additional usage and to the additional economic activity resulting from tax reduction are taken into account.

## Impacts of taxation on mobile operators

In addition to pressures in a competitive market, mobile operators are subject to taxation on both their profits and revenues.

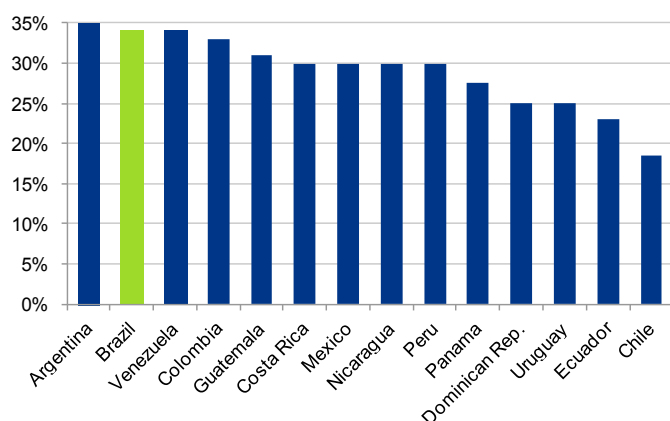
Figure 54: Taxation on mobile operators, 2011

Category	Tax	Tax rate
Taxes on profits	Corporation tax	34% on profits
Taxes on revenues	PIS/COFINS	3.65% on revenues from calls, SMS and data
	FUST and FUNTTEL	9.25% on revenues from SIM cards and handsets
	Spectrum licence fee	1% and 0.5% of revenues from calls, SMS and data
Other	FISTEL clients	Every 2 years, after the expiry of the first license, mobile operators pay 2% of the net revenues incurred in the previous year
	FISTEL equipment	BRL 26.8 for each new subscriber; additionally, BRL 13.4 for each customer from the previous year BRL 1,500 for each new BTS equipment installed; BRL 750 for each existing BTS equipment

Source: Mobile operators' data

An overall corporate tax rate of 34% applies on profits. This is made of a basic 15% tax, a further 10% for profits above BRL 240,000, and a 9% additional social contribution on net profits, and is one of the highest in the region.

Figure 55: Corporate tax rates, 2012



Source: IBFD Tax Research Platform; Deloitte analysis

Mobile operators are subject to two federal taxes, PIS<sup>36</sup> and COFINS<sup>37</sup>, which are imposed on gross revenues earned by each Brazilian legal entity. PIS is a mandatory employer contribution to an employee savings initiative and COFINS is a contribution to finance the social security system.

PIS and COFINS are imposed at 0.65% and 3% respectively on revenues from airtime (calls, SMS, data), while their rates are 1.65% and 7.6%, respectively, on revenues from handsets and SIM cards. PIS and COFINS are levied also on the importation of goods and services from abroad (PIS-Import and COFINS-Import). The rates are 1.65% and 7.6% respectively.

Mobile operators also pay contributions to the Universal Service Fund (FUST<sup>38</sup>) and contributions to the Telecommunications Technological Development Fund (FUNTTEL<sup>39</sup>). FUST and FUNTTEL amount, respectively, to 1% and 0.5% of airtime revenues (calls, SMS, data).

Substantial payments are also required for the awarding of spectrum licenses. The first licence is generally paid for as a one-off amount resulting from the auction's bids. A licence is typically valid for 15 years and can then be renewed for an additional 15 years. After the renewal of the first licence, every two years operators pay a contribution equal to 2% of the net revenues incurred in the previous year in the geographic area where the licence was renewed.

Overall, the plethora of taxes and other regulatory contributions based on revenues imposed on the Brazilian operators raises a number of concerns:

- These taxes, which mostly apply to revenues instead of profits, discourage investments: taxes applied on gross revenues directly reduce the profitability of all operators, independently of their level of profitability. In a given year, these taxes have the same effect on operators with positive profits and operators with no profits due to recent network investment. This mechanism is of particular concern in Brazil, where the EBITDA margins of mobile operators are lower than in the other main Latin American markets.
- These taxes are not transparent: unlike standard sales taxes, which are collected from consumers on behalf of the government, taxes imposed directly on operators' revenues imply that mobile operators must either suffer a consistent reduction in their profitability or pass these taxes through to consumers in a non transparent way, as they cannot itemise the tax in prices or receipts. The Minister of Communications has recognised that in the case of telecommunications, taxes are often applied non-transparently, and consumers do not notice a tax applies.<sup>40</sup>
- These taxes are inefficient for the economy: imposing taxation on firms' revenues produces lower market volumes and higher prices than a revenue-equivalent<sup>41</sup> tax on profits. When taxes are imposed on revenues, operators tend to adopt a low-turnover/high-margin strategy, as opposed to a low-margin/high-turnover strategy.

In addition to taxes on revenues, Brazilian operators are also subject to the FISTEL<sup>42</sup>, a regulatory tax paid to the Brazilian Regulatory Authority (ANATEL). The FISTEL has two components. The TFI<sup>43</sup>, which is a fixed tax linked to the amount of new subscriptions and new equipment installed in a given year, and the TFF<sup>44</sup>, a fixed amount which is levied on existing amount of subscriptions and equipment.

These fixed taxes heavily impact the operators' costs per user. The FISTEL subscription tax in particular considerably raises operators' cost per pre pay user. In Brazil, 80% of mobile connections are prepaid with typically low bills. Nevertheless, the FISTEL subscription tax requires operators to pay the same fixed amount for each of their subscribers, independently of the traffic revenue generated by the subscriber. In addition, mobile operators' costs are impacted by the atypical requirement to offer to their pre pay customers a detailed bill upon request.

36 Programa de Integração Social.

37 Contribuição sobre a Remuneração dos Empregados e Contribuintes Individuais.

38 Fundo de Universalização dos Serviços de Telecomunicações.

39 Fundo para o Desenvolvimento Tecnológico das Telecomunicações.

40 <http://www.gsma.com/latinamerica/tax-burden-telecommunications-brazil/>

41 Two different taxation policies are revenue-equivalent when they raise the same amount of tax revenues for the government.

42 Fundo de Fiscalização das Telecomunicações.

43 Taxa de Fiscalização de Instalação.

44 Taxa de Fiscalização de Funcionamento.

Fixed taxes impact a customer's bill indirectly, as operators need to take into account these extra costs when setting prices, thus ultimately impacting customers. In addition, the fixed tax based on BTSs and base stations may discourage investment: when considering cost and benefits of adding an extra site or BTS, operators' costs will be higher as a result of this tax, which therefore risks reducing investment in new sites.

Such taxation may also constrain the development of new services. For instance, mobile operators offering M2M services, are subject to: a 9.25% PIS/COFINS on revenue from sale of SIM card; a 3.65% PIS/COFINS; a 1.5% of FUST/FUNTTEL on revenues from usage; FISTEL and ICMS. These taxes reduce mobile operators' margins on M2M services, and consequently operators struggle to allow sufficient margins to their stakeholders to attract them in providing M2M services.

A recent legislative change substantially reduced taxes on M2M services.<sup>45</sup> This represented a positive step for the industry and more legislation along these lines could contribute to release further benefits for consumers and the economy.

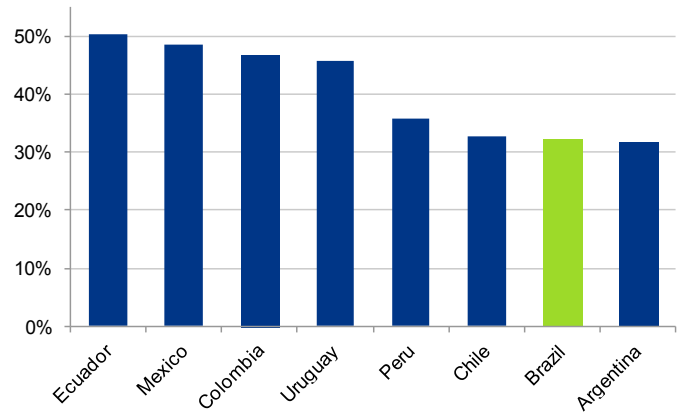
This complex taxation structure has recently been criticised as "irrational" by the Brazilian Communications Minister, who highlighted how taxes are often levied more than once on the same service.<sup>46</sup>

In addition to the taxation burden, operators face further costs arising from strict regulations. Spectrum licenses often contain provisions which impose important obligations on mobile operators, including geographic coverage obligations in addition to population coverage obligations. Furthermore, certain licenses require operators to run a retail store in any area served which has more than 100,000 inhabitants, further increasing operators' costs.

This uncoordinated set of taxations and regulations at both national and local level raises uncertainty for mobile operators with potential negative consequences on network investments. The Brazilian Minister of Communications has recently noted that taxation is limiting the expansion of the sector in Brazil and a reduction of this taxation pressure would double the current market rate of growth.

The comparatively low EBITDA margins in the Brazilian mobile sector raise concerns about the longer term attractiveness of the Brazilian mobile market to foreign investors and the ability of mobile operators to recoup the large fixed investments they incur in order to set up and upgrade their networks.<sup>47</sup>

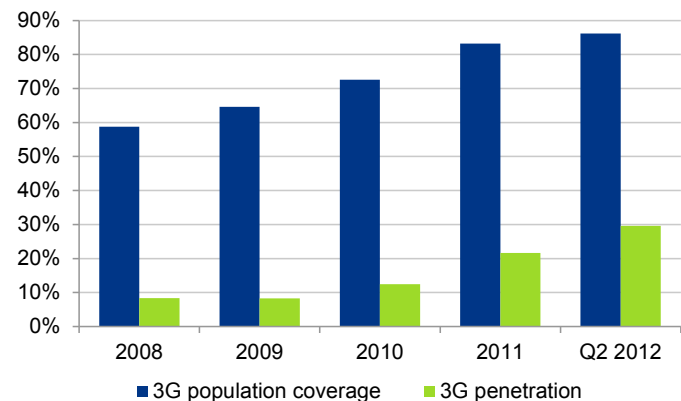
Figure 56: EBITDA margins, Q4 2011



Source: Wireless Intelligence

While operators have invested heavily in 3G networks, available in 2,998 (54%) municipalities, covering approximately 85% of the Brazilian population, in Q2 2012 only 30% of the population took advantage of mobile 3G services, well below levels observed in more developed markets.<sup>48</sup>

Figure 57: 3G population coverage and 3G penetration, 2008-2012



Source: Wireless Intelligence and <http://www.teleco.com.br>

As such, developing consumer demand for next generation mobile services is a key challenge for the mobile industry and for Brazil more widely. A reduction in consumer taxation, could spur such growth and provide the mobile operators with the funding required for further investment.

45 <http://www.rcrwireless.com/americas/20120919/networks/analysts-see-positive-brazils-new-law-tax-incentives-telecom-sector/>

46 [www.convergencialatina.com](http://www.convergencialatina.com); August 28th 2012.

47 <http://www.estadao.com.br/noticias/impresso,o-custo-das-telecomunicacoes,-877722,0.htm>.

48 Data from mobile operators, from Wireless Intelligence, and from <http://www.teleco.com.br>

# Appendix B Country case study: Mexico

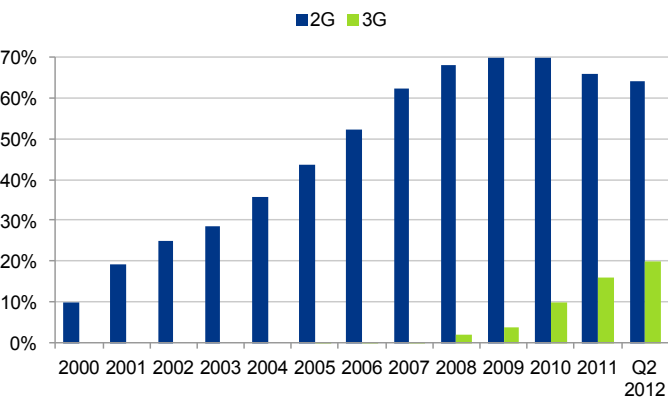
This Appendix provides an analysis of the impact of mobile telephony on Mexican citizens and the economy in the last four years (2008-2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in Mexico, evaluating the effects that mobile-specific taxes have on the industry and the wider economy.

This Appendix is based on discussions and data provided by a leading operator. Additional data has been provided by the GSMA and taken from publicly available sources that are referenced throughout.

## B.1 Mobile telecommunications in Mexico

Mexico has the second largest mobile market in Latin America after Brazil, and mobile connections have outpaced fixed lines since 2000. The largest major mobile operators were Telcel, Movistar, Iusacell and Nextel, which had market shares of 69.6%, 19.6%, 6.7% and 3.9%, respectively, in Q2 2012. Nextel entered the market in 2010. Total mobile service penetration was 84.3% in Q2 2012.<sup>49</sup>

Figure 58: 2G and 3G penetration levels



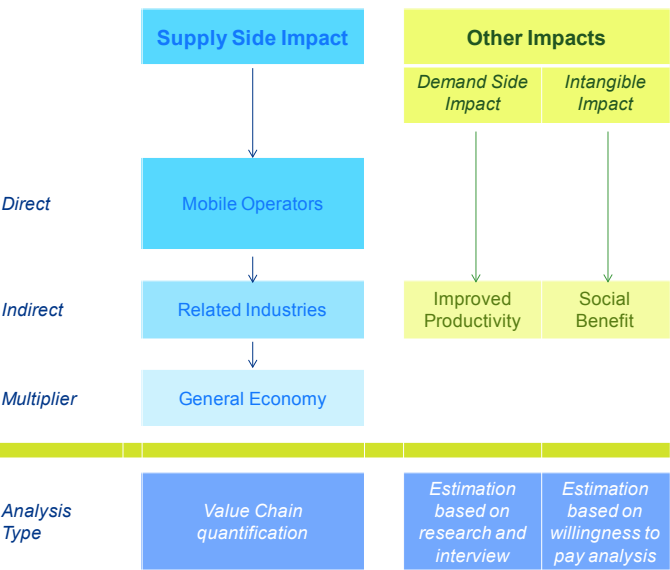
Source: Wireless Intelligence

3G penetration has increased to 20.1% since 2010, when spectrum auctions were held. As of Q2 2012, there are more than 23 million 3G connections in Mexico. The number of 2G connections has decreased since 2010.

## B.2 The economic contribution of mobile telephony to the economy

Mobile telephony in Mexico generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits gained by Mexican consumers.

Figure 59: Estimation of the economic impacts of mobile telephony



Source: Deloitte

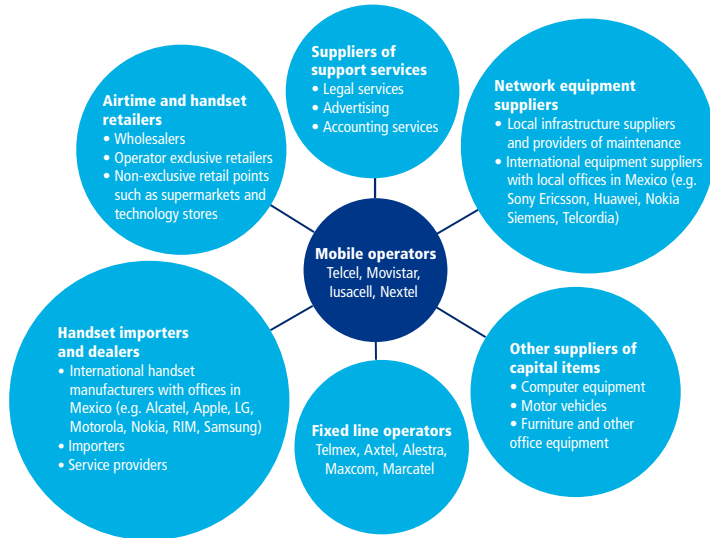
In addition to the mobile operators, the Mexican mobile telecommunications industry is composed of a wider ecosystem of players.

These include equipment providers (international equipment manufacturers with offices in Mexico, such as Ericsson, Huawei, Nokia Siemens Networks, and Telcordia), providers of other network services such as installation and maintenance, handset importers and distributors, airtime distributors and sellers (including a host of retail points throughout the country), and suppliers of other services (such as advertising and accounting) to mobile operators.

<sup>49</sup> Wireless Intelligence database, market share of all connections.



Figure 60: Mobile telecommunications ecosystem



Source: Deloitte analysis based on mobile operator data and market research

This study estimates the economic impact of the mobile industry in terms of the direct and indirect effects provided to the supply side of the Mexican economy by the mobile operators and players in the wider mobile ecosystem, and of direct and indirect employment from firms in the ecosystem.

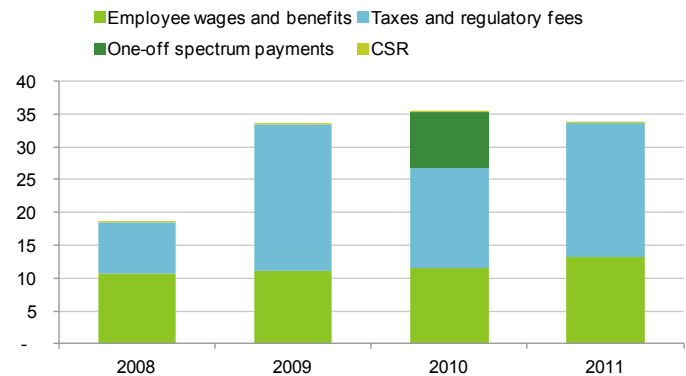
The study also discusses the potential productivity increases resulting from mobile workers using their phones for business purposes and the social benefits enjoyed by consumers as a result of access to mobile services.

### Supply side impact

The total supply side value add created through the mobile operators and the wider mobile ecosystem is estimated as the sum of three components: direct, indirect, and induced impacts.

The direct impacts generated by mobile operators include mobile operators' expenditure on wages, CSR programmes and taxes recovered as a result of the mobile operators' operations. These were estimated at approximately MXN 34 billion in 2011. In 2010, the direct impact estimated at over MXN 35 billion included one-off payments for mobile service licences and 3G spectrum purchased by operators. These one-off payments, estimated at MXN 8 billion, directly benefitted the Mexican government.

Figure 61: Direct domestic value add of mobile operators (excluding multiplier effect), MXN billions

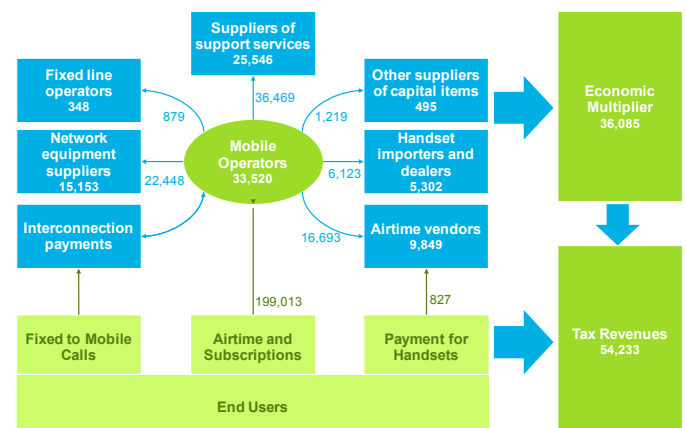


Source: Deloitte analysis based on data provided by the mobile operators, interviews and analysis of company accounts. Figures exclude multiplier.

The indirect impacts from mobile operators' expenditure to parties in the wider mobile ecosystem represent the percentage of any amount spent by end users that remains within the national boundaries, which serves as value add to be spent again. These are calculated by examining mobile operators' payments to their suppliers of support services in the wider mobile ecosystem. The amount of value add, including wages, profits and taxes generated by these players, is then projected. These effects were estimated at MXN 57 billion for 2011.

The induced impacts reflect the subsequent rounds of expenditure created by direct and indirect spend. For example, they include the increased domestic consumption afforded by increased employment. The induced effects were estimated using a spending multiplier of 40% to capture the broader effects on the wider economy. These were estimated at MXN 36 billion for 2011.

Figure 62: Mobile value chain and value add in 2011, MXN millions

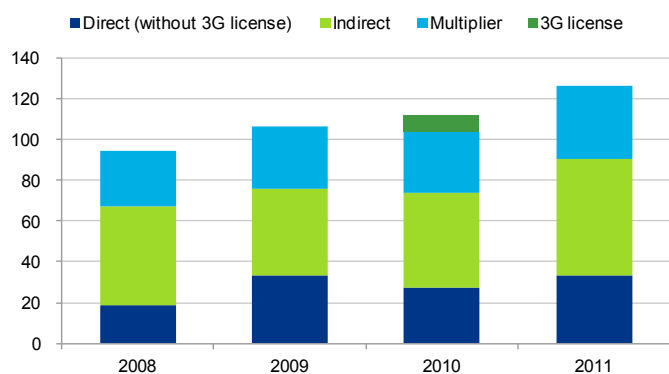


Source: Deloitte analysis ; Values in the boxes are value add



Combining the impacts described above, mobile operators in Mexico in 2011 created an estimated MXN 126 billion in value add in through the supply side 2011. In 2010, the supply side value add benefited from mobile operators' payments for spectrum usage rights.

**Figure 63: Supply side value add from mobile telecommunications by component, MXN billions**



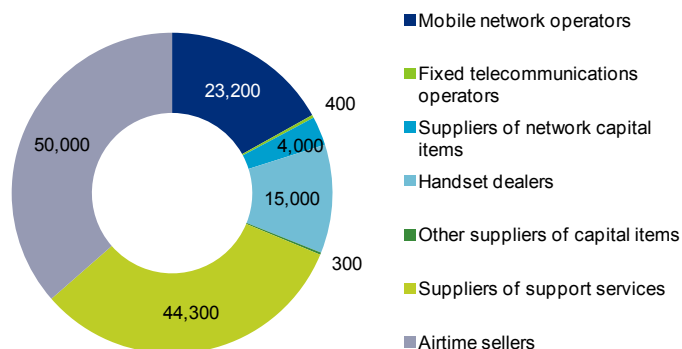
Source: Deloitte analysis<sup>50</sup>

### Impact on employment

Mobile services in Mexico contribute to employment in several ways, including direct employment by the mobile operators. Mobile operators also indirectly generate employment in the wider economy as a result of their expenditures. In addition, the government also subsequently spends on employment-creating activities using tax revenues generated directly and indirectly by the mobile sector. Additional induced employment is created by mobile sector employees and beneficiaries spending their earnings, thereby creating more work.

It is estimated that in 2011 mobile operators supported the employment of over 23,000 Full Time Equivalents ('FTEs') in Mexico. A further 114,000 FTEs were estimated to be generated in the wider mobile ecosystem as a result of mobile operators' expenditures.

**Figure 64: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**



Source: Deloitte analysis (differences due to rounding). Figure excludes multiplier.

Of the FTEs employed by the wider mobile ecosystem as a result of mobile operators' expenditures, over 50,000 were the airtime dealers and retailers operating from supermarkets, technology stores and smaller independent points of sale, with the majority of airtime being sold by convenience stores. Mobile operators in Mexico are introducing a project to sell airtime electronically, which will lead to an increase in the availability of airtime at independent sales outlets and improve the number of FTEs supported by airtime sales. In addition, while handsets are typically designed and produced abroad, international manufacturers including Alcatel, Apple, LG, Motorola, Nokia, and Samsung operate retail offices in Mexico, employing approximately 15,000 FTEs. Network equipment providers such as Sony Ericsson, Huawei, Nokia Siemens, and Telcordia also have a presence in Mexico to provide support to mobile operators and employ approximately 4,000 FTEs.

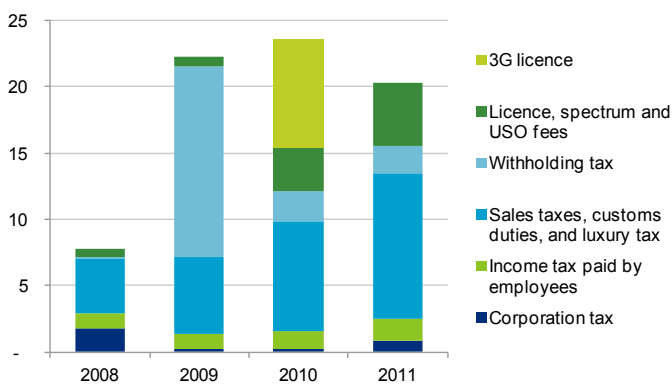
<sup>50</sup> The multiplier is not applied to the one-off payments for 3G spectrum.

<sup>51</sup> In 2009, a substantial payment by a major mobile operator contributed to the higher total withholding tax contributions in Mexico. This was due primarily to a payment made by one of the mobile operators to its parent company, which generated a significant tax liability.

## Value add from taxation

A major source of the value added created by mobile operators is the tax revenues they generate. In 2011, mobile operators in Mexico paid approximately MXN 20 billion to the government in taxes and regulatory fees. This represents a decrease from approximately MXN 24 billion in 2010, which included the large one-off payments mobile operators made for spectrum usage rights.

**Figure 65: Tax and regulatory payments from mobile operators, MXN billions<sup>51</sup>**

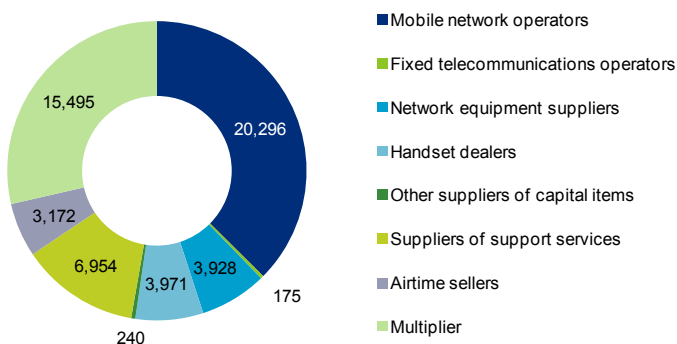


Source: Deloitte analysis based on mobile operator data

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another MXN 18 billion for the government in 2011.

A further MXN 15.5 billion tax revenues were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 66: Total tax revenues from the mobile telecommunications ecosystem in 2011, MXN millions**



Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note: This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.

## Productivity impacts

In addition to benefits to the supply side of the economy, mobile telephony in Mexico increases productivity through the use of wireless services for business purposes, as well as intangible and social benefits to consumers.

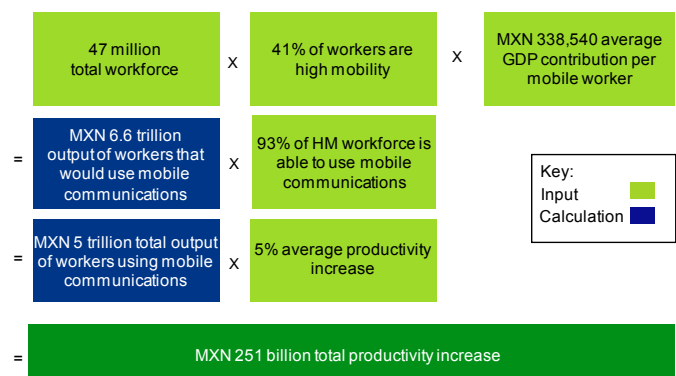
Mobile services have led to productivity increases in Mexico through numerous ways. Two areas are highlighted in particular:

- Businesses and consumers who use mobile internet services experience productivity improvements. These benefits can be enhanced by access to devices such as smartphones, tablets and dongles.
- The M2M services introduced by the main operators for their business clients improve productivity and efficiency in various business areas such as transport and agriculture, by allowing rapid exchange of data between a number of remote machines and a server that manages the information flows.

Mobile banking services are expected to launch in Mexico in 2013, enabling consumers and entrepreneurs to have improved access to financial services.

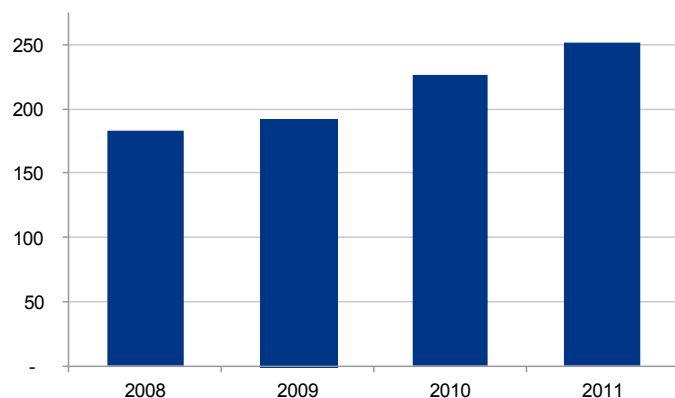
An economic value approach can be employed to provide a high level estimation of potential productivity benefits. This indicates that, if mobile workers in Mexico achieved a 5% increase on their productivity as a result of using mobile phones, the potential productivity impact of mobile services on the economy would have been MXN 251 billion in 2011, increasing by 37% from 2008.

**Figure 67: Economic impact in 2011 of increased productivity amongst high mobility workers**



Source: Deloitte analysis based on Deloitte assumptions, International Labour Organisation and Mexican national statistics authority

**Figure 68: Economic impact of increased productivity amongst high mobility workers, MXN billions**



Source: Deloitte analysis

### Consumer impacts

Mobile telecommunications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion, the extension of communication to those with low incomes and assistance in disaster relief.<sup>52</sup>

Consumers and businesses in Mexico also benefit through a number of CSR projects and services provided by mobile operators:

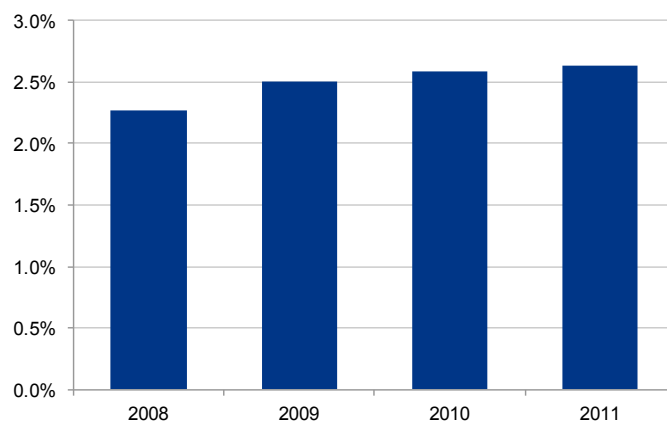
- Movistar, in collaboration with the Telefónica Foundation, operates the Proniño programme, which supports children's education and welfare.
- Movistar offers several services over its mobile platforms to promote inclusion of marginalised groups, including a service that allows tracing of elderly or disabled family members, a voice-to-text service that converts voicemail messages into SMS, and services in Náhuatl, an indigenous language.
- Telefónica also holds an annual program called "Bautizo Digital" that attempts to bridge the digital divide by providing information technology instruction to people who have never used a computer before. Between 2009 and 2010, 12,400 children gained access to IT skills through this program.

- Telcel participates in the "(RED) Rush to Zero" campaign against HIV/AIDS. América Móvil is working with mobile equipment manufacturers BlackBerry, Sony Mobile, Samsung, LG, Nokia, and HTC to offer a product line that will support the RED campaign.

### Total impacts

Overall, in 2011, the impact of mobile telephony on the Mexican economy was estimated to be MXN 377 billion, representing 2.6% of GDP.

**Figure 69: Economic impact of mobile telephony as a proportion of GDP**



Source: Deloitte analysis

## B3 Taxation on consumers and mobile operators

Mobile consumers and mobile operators in Mexico pay a variety of taxes and fees. Recently, both consumers and operators have been affected by increases in tax rates introduced in 2010.

### Consumer taxes

Two types of taxes affect mobile consumers in Mexico:

- VAT is levied at 16% and is applied to the import and purchase of handsets and other mobile devices, as well as mobile voice and data services.<sup>53</sup>
- The IEPS,<sup>54</sup> a special consumption tax, applies to mobile service prices at a rate of 3%, excluding data services.

Taxes on mobile consumers increased in 2010 due to an increase in the VAT rate and extension of the IEPS to include

<sup>52</sup> In studies for countries where the mobile industry is still in a developing phase, it is possible to estimate the intangible consumer benefits using a 'willingness to pay' methodology based on new subscribers, usage increase and price trends. However, as the Mexican mobile market has experienced price increases in recent years, it is not possible here to employ this methodology to quantify these significant benefits.

<sup>53</sup> A reduced rate of 11% applies to sales of goods and services in regions bordering the United States.

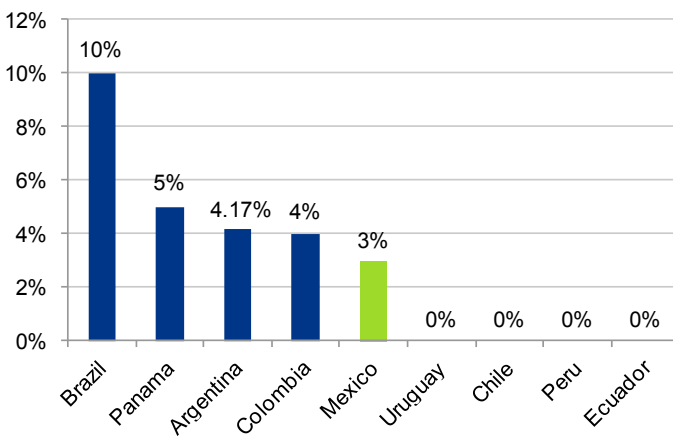
<sup>54</sup> Impuesto Especial sobre Producción y Servicios.

telecommunications services. Prior to 2010, mobile devices and services were subject to the standard VAT rate of 15% (10% in regions bordering the United States) and were not subject to any special consumption taxes. In 2010, the VAT rate increased to 16% (11% in border regions), and the IEPS was introduced on mobile services.

These increases in taxation resulted in increased costs to mobile consumers. Compared to the pre-2010 tax rates levied on mobile consumers, the effective tax rate on mobile consumers increased by 27% in non-border regions and by 40% in border regions as a result of the 2010 changes to VAT and IEPS. As a result, according to the *Deloitte/GSMA Global Mobile Tax Review 2011*, tax as a percentage of mobile ownership ('TCMO') in Mexico exceeds the world average.

This increased taxation on mobile consumers contrasts with recent reductions in mobile specific consumer taxation, such as those introduced by Ecuador and Uruguay.

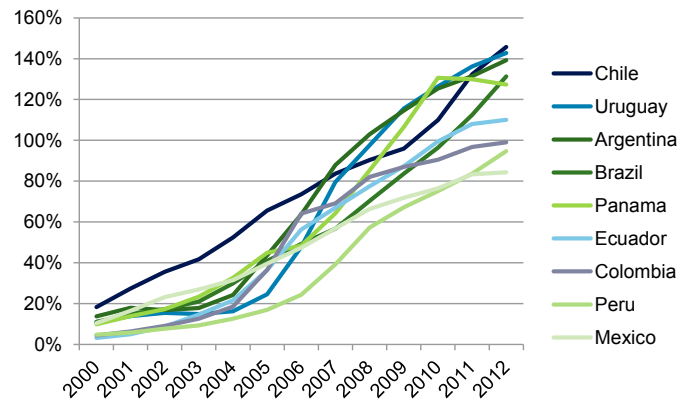
**Figure 70: Special consumption tax rates on prepaid mobile services, 2011**



Source: Deloitte analysis. In Brazil and Colombia, mobile services are subject to supranormal sales tax rates. The difference between the average tax rate on mobile calls and the standard rate on all other goods and services is reported in this figure as a mobile specific usage tax.

The increased taxation on mobile telephony in 2010 has accompanied a stagnation in mobile penetration growth in Mexico, which makes it the country with the lowest mobile penetration amongst the Latin American countries covered by this study.

**Figure 71: Mobile penetration, 2000-2012**

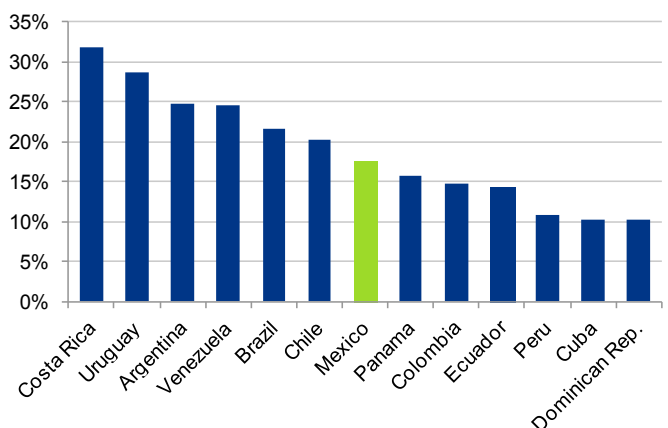


Source: Wireless Intelligence

This decline in penetration growth suggests that under the new tax policies, poorer segments of the population may have been priced out of the market and cannot afford to begin or continue using mobile services.<sup>55</sup> Taxes that target mobile service usage can represent a significant barrier to access to mobile services by the poorer sectors of the population, who could derive significant benefits from being connected.

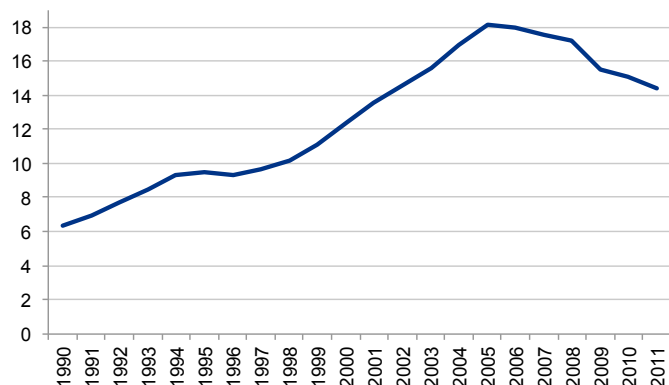
The negative impact of taxation on mobile penetration is of particular concern because of the relatively low level of fixed line teledensity in Mexico compared to penetration in other countries in the region, as well as the declining teledensity of fixed lines in the last seven years.

**Figure 72: Fixed telephone lines per 100 people, 2010**



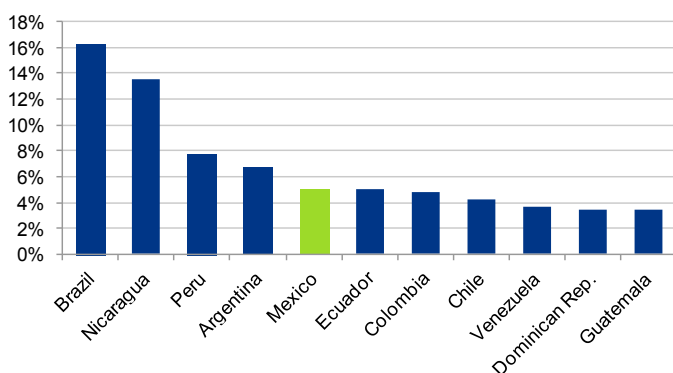
Source: World Bank data

<sup>55</sup> Mexico is affected by a high poverty level, as 51.3% of the population lived below the national poverty line in 2010 (World Bank's World Development Indicators database).

**Figure 73: Fixed telephone lines per 100 people**

Source: Economist Intelligence Unit

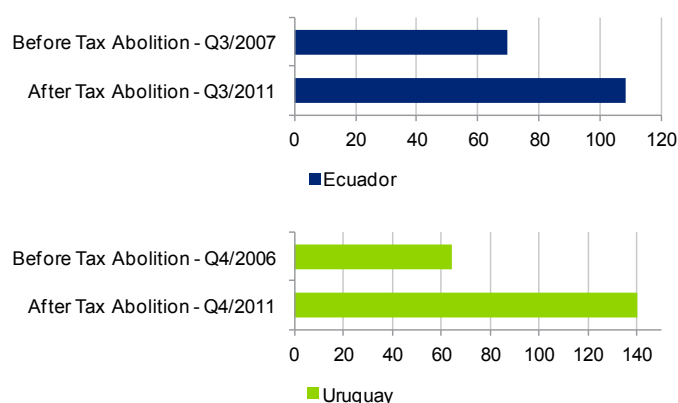
Additionally, consumers in Mexico appear more price-sensitive than in other Latin American countries with similar TCMO levels relative to income. Ecuador and Colombia have a similar TCMO as a percentage of GDP per capita than Mexico. However, for similar mobile bundle prices, they have achieved higher mobile penetration levels than Mexico. This suggests that Mexican consumers may react more strongly to mobile-specific taxation.

**Figure 74: TCMO as a percentage of GDP per capita, 2011**

Source: GSMA Global Mobile Tax Review 2011; World Bank data

In countries such as Mexico where consumer taxation on mobile telephony is relatively high, reducing taxation has the potential to increase government revenues; as the growth in penetration that results from the reduction of a high tax generates tax revenues that can compensate for any initial loss.

Removal of the IEPS could act to raise the level of mobile penetration in Mexico. In Ecuador and Uruguay, penetration increased notably when government reduced mobile-specific taxation. There have been studies that analysed in detail the impact of the elimination of the IEPS on Mexico's mobile sector.<sup>56</sup>

**Figure 75: Mobile penetration rates in Ecuador and Uruguay**

Source: Wireless Intelligence

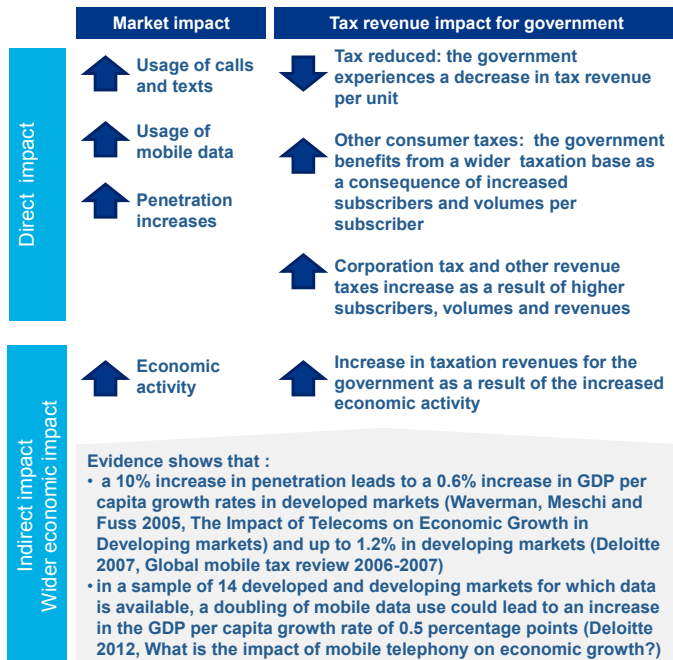
Increases in mobile service penetration expand the taxable base for the government, leading to an increase in tax revenues. For example, if the IEPS removal led penetration to reach the average penetration level of the other countries in the sample (122.43%) and new connections used the average MOU level of Uruguay and Ecuador (139 MOU per user), the removal of IEPS would lead to a net tax revenue gain of MXN 5 billion based on 2011 data from the widening of the tax base alone. The losses in tax revenue due to the decrease in the tax rate would be offset by revenue gained from applying VAT to the expanded total usage.

An increased total usage would also be coupled with increased economic activity. A well-documented positive relationship exists between increases in mobile penetration and usage and GDP growth rates,<sup>57</sup> due to the beneficial effects on the economy and on its productivity.

<sup>56</sup> See, inter alia, Katz, et al. "The Impact of Taxation on the Development of the Mobile Broadband Sector".

<sup>57</sup> See, for example, the forthcoming Deloitte/GSMA paper "What is the impact of mobile telephony on economic growth?".

**Figure 76: Direct and indirect effects of tax reductions on government tax revenues**



The net impact of any taxation changes requires a dynamic approach where governments explicitly account for the indirect impacts driven by the increased economic activities that are generated by improved mobile penetration and mobile usage.

When both the extra tax proceeds due to additional usage and extra economic activity resulting from tax reduction are taken into account, the impact of tax cuts can in the medium term lead to a tax neutral or tax positive outcome for the government, while contributing to market developments and benefits for consumers.

In addition to the direct impact on penetration growth, mobile taxation in Mexico raises a number of other concerns.

The tax regime may create distortions on the market for telephone calls in Mexico, since public and rural telephones and internet access are exempt from IEPS. These exemptions mean that some fixed telephone services are subject to lower consumer tax rates overall, and prices for these services are lower than they would be if they were subject to the same tax regime as mobile services. This creates a distortion against mobile telecoms, potentially impacting consumer choice

and competition in the market. This also raises a tax policy challenge as for many people in Mexico mobile phone services are a necessity, as opposed to a luxury good.

As mobile phone services are a necessity in a country like Mexico, rather than a luxury consumed only by high-income consumers, the government should consider whether it is appropriate to levy the IEPS, a special consumption tax, on mobile services alongside goods such as gambling, energy drinks, alcohol and cigarettes.

Mexico's policy of exempting handsets and smartphones from customs duties may help lower the cost barrier of accessing mobile devices. This has allowed Mexico to develop a higher penetration of smartphones than other countries in the region.<sup>58</sup>

The government could similarly consider temporarily exempting handsets from VAT in order to encourage growth in penetration. Handset costs and subscription costs could represent the most significant barrier to the consumption of mobile services, particularly for the poorer segments of the population. Since VAT raises the cost of device acquisition, it may prevent poorer members of the population from accessing mobile services and deriving benefits from consumption of mobile telephony.

In Kenya<sup>59</sup>, the government's decision to exempt mobile handsets from VAT was accompanied by increases in handset purchases by more than 200% and increases in penetration from 50% to 70%. The Mexican government could adopt a similar tax exemption to seek to raise penetration rates towards the regional average.

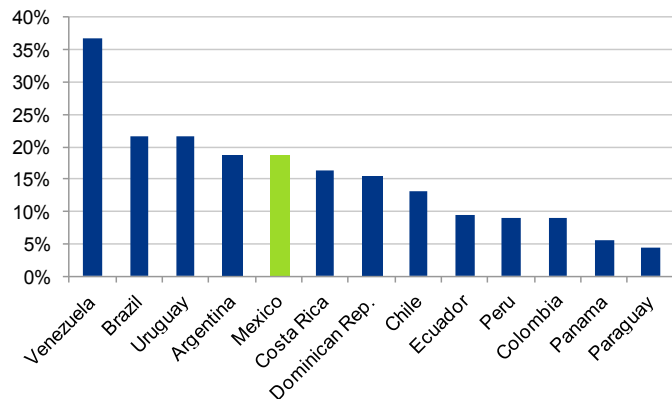
The government has recognised the importance of mobile broadband to Mexico's economy and has excluded internet services from the IEPS. This, combined with tax policies that support smartphone purchases, has supported growth in 3G penetration in Mexico, making Mexico among the top half of countries in the region in terms of 3G penetration.

<sup>58</sup> GSMA Latin America Mobile Observatory 2011.

<sup>59</sup> Deloitte/GSMA (2011). "Mobile telephony and taxation in Kenya".



Figure 78: 3G penetration, Q4 2011



Source: Wireless Intelligence

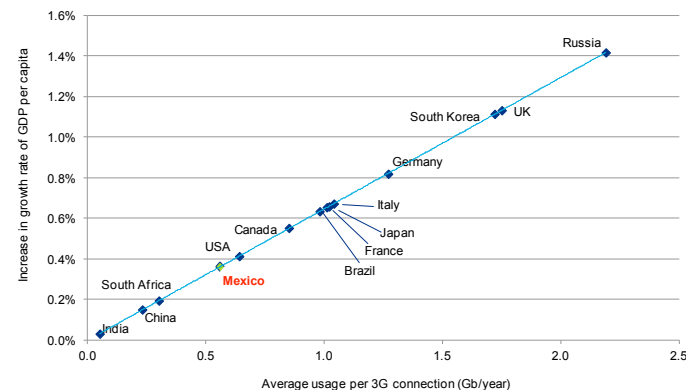
Nonetheless, in an international comparison of 3G penetration, Mexico is below the global average for countries of its income level.<sup>60</sup> Further supportive tax policies towards 3G usage could allow Mexico to become the regional leader in 3G penetration, building on its smartphone penetration levels.

The expansion of 3G networks and data usage in Mexico is expected to result in numerous economic benefits, including an improvement in GDP growth. A forthcoming Deloitte/GSMA study<sup>61</sup> found that:

- a 10% increase in 3G penetration per 100 people leads to a 0.15 percentage point increase in GDP per capita growth.
- increases in data usage by existing 3G subscribers would result in GDP per capita growth improvements, benefitting users and the economy at large.

At Mexico's current 3G penetration rate of 16%<sup>62</sup>, an increase of 10 3G users per 100 people would result in an increase in GDP per capita growth of 0.9%. Doubling 3G data consumption per user would lead to a change in GDP growth per capita of 0.4%.

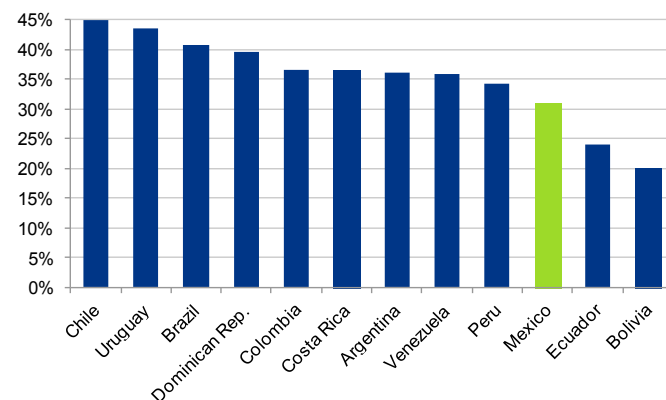
Figure 79: Marginal impact of doubling 3G data usage per user on GDP per capita growth



Source: Forthcoming Deloitte/GSMA study entitled "What is the impact of mobile telephony on economic growth?"

Given Mexico's low overall mobile penetration rate and relatively low internet penetration compared to neighbouring countries, mobile broadband represents an opportunity for Mexico to digitise its economy and for Mexicans to access the internet.

Figure 80: Internet users per 100 people, 2010



Source: World Bank data

60 Deloitte analysis based on Wireless Intelligence and World Bank data.

61 Forthcoming Deloitte/GSMA study entitled "What is the impact of mobile telephony on economic growth?"

62 Wireless Intelligence, Q2 2012.



## Taxes paid by operators

Mobile operators in Mexico are subject to numerous taxes and regulatory fees.

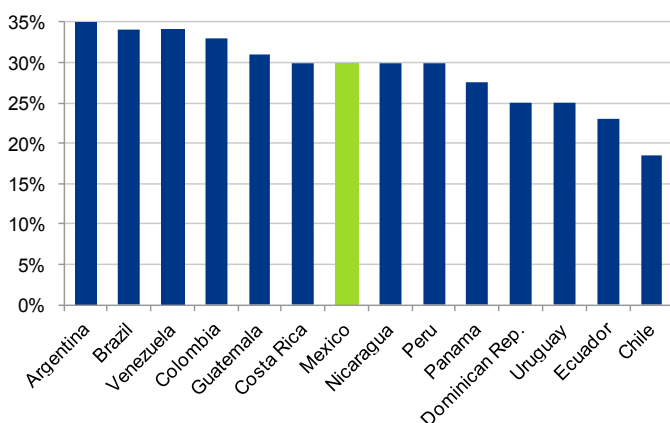
**Table 1: Taxes and regulatory fees paid by mobile operators in Mexico, 2012**

Category	Tax	Tax rate
Taxes	Corporate tax	30% tax on profits.
	Withholding tax	Tax on income derived by non-resident companies. Withholding tax rates vary from 4.9% to 40%. <sup>63</sup>
	Customs duties	Tax on imports of network equipment, ranging from 0% to 15%.
Regulatory fees	Mobile service licences	One-off payments at time of licensing in addition to annual fees.
	Spectrum usage fees	One-off payments at time of spectrum rights auction in addition to annual fees.

Source: Deloitte analysis

Corporate tax rate increased from 28% to 30% in 2010 and is set to be reduced to 29% in 2013 and 28% in 2014.

**Figure 81: Corporate tax rates, 2012**



Source: IBFD Tax Research Platform; Deloitte analysis

In addition to corporate taxes and customs duties, mobile operators are subject to sector-specific regulatory fees: mobile service licences and spectrum usage fees.

Mobile operators pay one-off licence fees at the time of signing concession agreements with the regulator, in addition to annual fees.

Spectrum usage fees determined at auction and annual spectrum usage fees also present a large cost to mobile operators. In 2010, mobile operators paid nearly MXN 3 billion for 2G spectrum and over MXN 5.2 billion for 3G spectrum. In addition to these one-off fees, operators pay annual fees for this spectrum beginning in 2012. The present value of these payments was estimated at the time of auction by the regulator at MXN 8.1 billion for 2G spectrum and MXN 13.9 billion for 3G spectrum.<sup>64</sup>

In addition, while most network equipment imports are exempt from customs duties, mobile operators are obliged to pay customs duties on selected network equipment imports.

**Table 2: Customs duty rates levied on network equipment imports, 2012**

Network equipment	Tax rate
Ultra-high frequency reception apparatuses (300-570 MHz)	5%
Ultra-high modulated frequency reception apparatuses	15%
Super-high frequency or microwave (over 1GHz) reception apparatuses	15%
Reception apparatuses for 26.2-27.5 MHz frequencies	15%

Source: Deloitte analysis

While free trade agreements have lessened the burden of customs duties on mobile operators, of particular concern to the mobile operators is the rate charged on reception apparatuses for frequencies over 1GHz, which affects equipment for 3G networks. This duty raises the cost of investment in 3G networks.

<sup>63</sup> There are some deviations from this rule. For example, Mexico has bilateral agreements with some countries, for which the withholding tax rate is reduced.

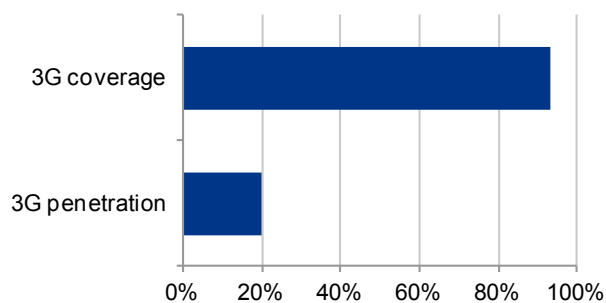
<sup>64</sup> Rafael del Villar Alrich, Federal Telecommunications Commission: "A step closer to next generation mobile services: Regulatory perspectives for Mexico".

## B4 Conclusion

Policies that encourage investment in Mexico's networks are needed to assure that networks reach the entire population and that consumers can access quality services.

As operators invest in mobile networks, the tax regime should also encourage access to and usage of mobile services by Mexicans of all income levels. Despite investments by operators to expand 3G coverage in Mexico, there has been limited uptake of 3G services by the population. Currently, 3G coverage in Mexico reaches 93% of the population while service penetration is only 20.1%.<sup>65</sup>

**Figure 82: 3G coverage and penetration, Q2 2012**



Source: Wireless Intelligence

Access to mobile broadband via 3G networks will boost consumers' productivity and allow Mexico to attain the economic benefits that connectivity and data usage bring.

<sup>65</sup> Wireless Intelligence. Coverage data is available for Telcel only.

# Appendix C Country case study: Argentina

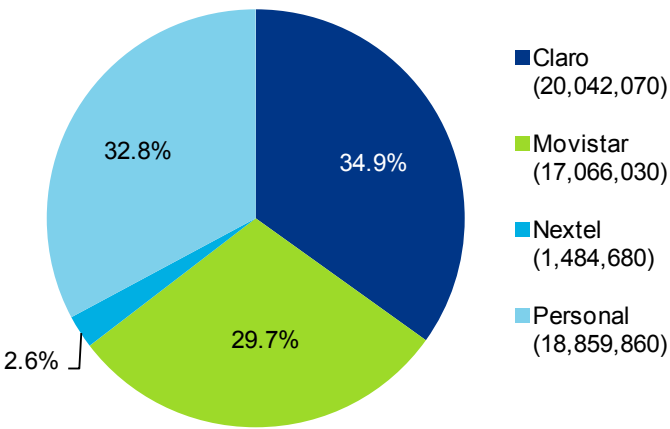
This Appendix provides an analysis of the impact of mobile telephony on Argentinean citizens and the economy in the last four years (2008 to 2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in the country, and the effects that mobile specific taxes have on the industry and the wider economy.

This Appendix is based on discussions and data provided by mobile operators. Additional data has been provided by the GSMA and taken from publicly available sources that are referenced throughout.

## C1 Mobile telecommunications in Argentina

The mobile telecommunications sector in Argentina is characterised by the presence of four mobile operators, Claro, Movistar, Personal and Nextel, each enjoining a market share of approximately 35%, 33%, 29% and 3% respectively in Q2 2012.<sup>66</sup>

Figure 83: Argentinean mobile market share and subscribers by operator, Q2 2012

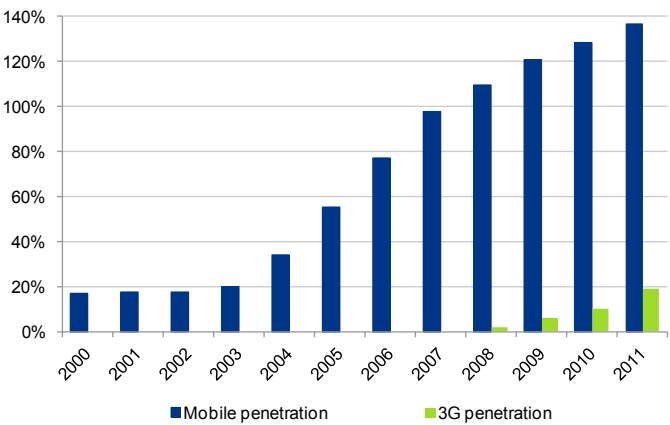


Source: Wireless Intelligence

Argentina’s mobile sector continues to grow strongly, with more than 57 million subscribers in Q2 2012 up from approximately 40 million at the beginning of 2008. This represents an increase in mobile penetration from 100% to 139%, significantly higher than the Latin American average. The majority of subscriptions are prepaid connections representing about 71% of the total.<sup>67</sup>

3G penetration is growing rapidly and has currently reached an estimated 23.9%.<sup>68</sup> Smartphone uptake has increased significantly, in particular the use of BlackBerry devices offered by all operators, although this still represents a small proportion of the market.

Figure 84: Mobile penetration and 3G penetration, 2000-2011



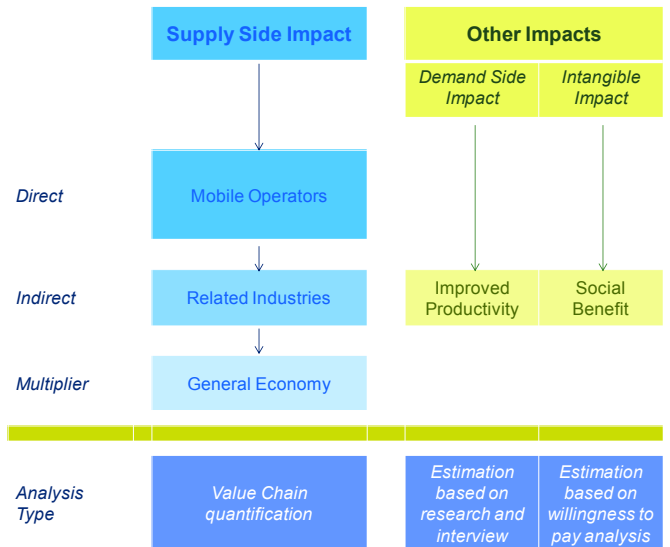
Source: Wireless intelligence

As a result of consumers increasingly requiring additional SIM cards for their tablets and dongles, it has been estimated that the market will continue to grow in terms of subscriber numbers at a rate of 6% and 5% in 2012 and 2013 respectively.<sup>69</sup>

## C.2 The economic contribution of mobile telephony to the economy

Mobile telephony in Argentina generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits gained by Argentinean consumers.

Figure 85: Estimation of the economic impacts of mobile telephony

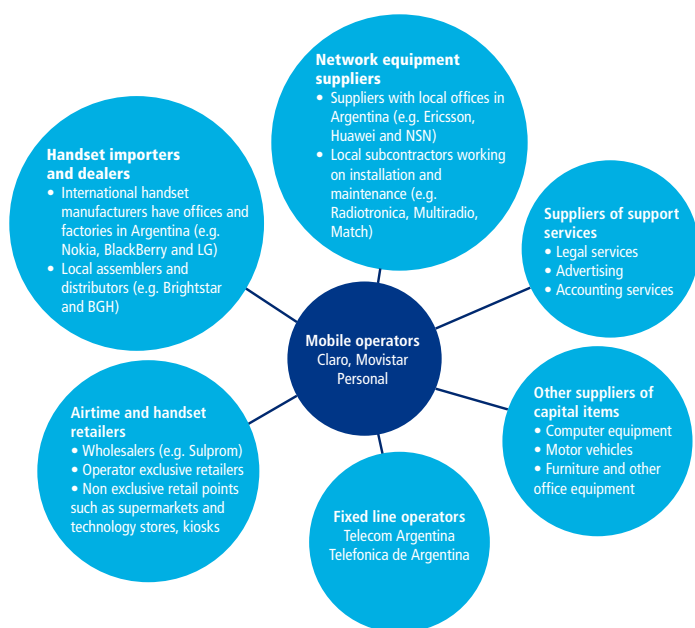


In addition to the mobile operators, the mobile telecommunications ecosystem in Argentina includes players such as international equipment manufacturers with offices

66 Wireless Intelligence.  
67 Wireless Intelligence, Q2 2012.  
68 Wireless Intelligence, Q2 2012.  
69 Wireless Intelligence.

in the country; providers of other network services such as installation and maintenance; handset importers and distributors and handset producers who assemble handsets in Tierra del Fuego; airtime distributors and sellers, which include a host of retail points throughout the country; and suppliers of other services to mobile operators such as advertising, accounting and other support activities.

**Figure 86: Mobile telecommunications ecosystem**



This study estimates the economic impact of the mobile industry in terms of the direct and indirect effects provided to the supply side of the Argentinean economy by the mobile operators and by players in the wider mobile ecosystem, and of direct and indirect employment from firms in the ecosystem.

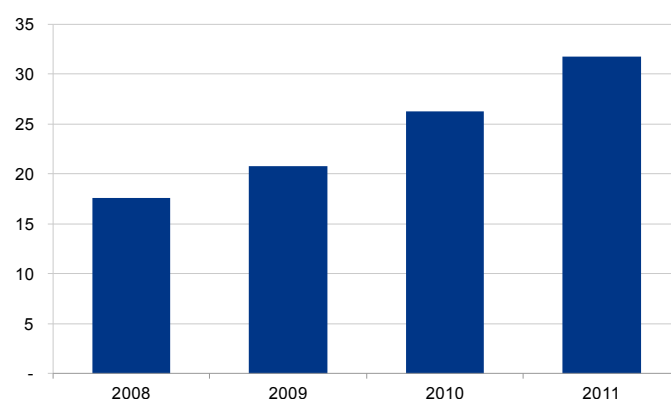
The study also discusses the potential productivity increases resulting from mobile workers using their phones for business purposes and the social benefits enjoyed by consumers as a result of access to mobile services.

### Supply side impact

Mobile operators provide numerous benefits to the supply side of the Argentinean economy through the direct effect of their expenditure, and these benefits flow through to related industries in the mobile ecosystem and more widely across the economy.

In 2011, the mobile telecommunications industry contributed ARS 31.8 billion from supply side impacts to the Argentinean economy.

**Figure 87: Supply side value add of mobile telecommunications, ARS billions**

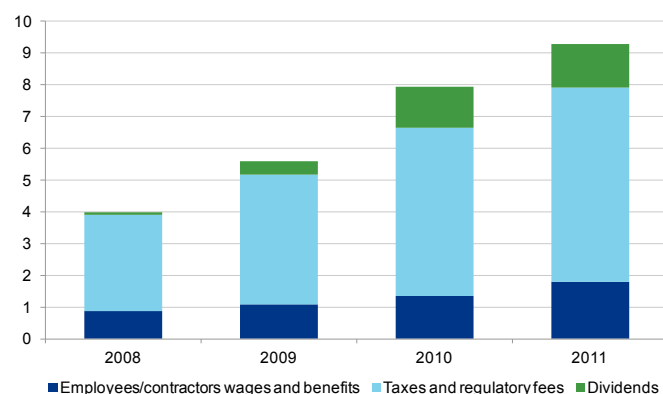


Source: Deloitte analysis

To calculate the value add generated by the industry, the value add created directly by the mobile operators was estimated first. This consists of the value add created by the mobile operators' expenditure on wages, dividends and taxes collected as a result of the mobile operators' operations.

In 2011, Argentinean mobile operators were estimated to have provided a direct contribution of ARS 9.3 billion to the country's economy.

**Figure 88: Direct domestic value add of mobile operators (excluding multiplier effect), ARS billions**

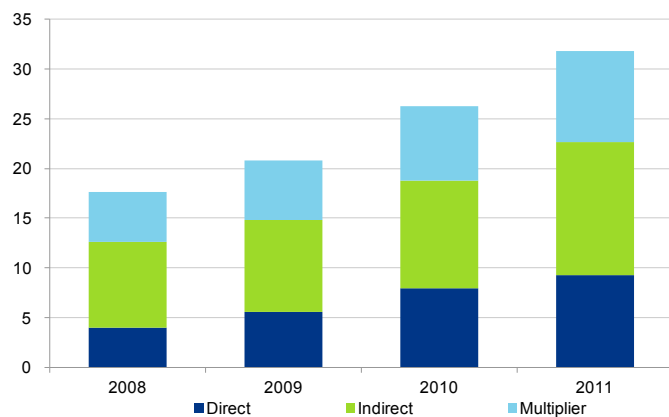


Source: Deloitte analysis based on data provided by the mobile operators, interviews and analysis of company accounts

In addition to the economic contribution generated by the mobile operators, the indirect impacts from mobile operators' expenditure to stakeholders 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. This is calculated by examining mobile operators' expenditures towards their supplier of support services in the wider mobile ecosystem. The amount of value add, including wages, profits and taxes generated by these players is then estimated. Finally, a spend multiplier was applied to capture the effects on the wider economy.

This analysis shows that the indirect impacts from the mobile ecosystem amounted to ARS 13.4 billion in 2011, while the overall multiplier effect from the wider economy consisted of ARS 9.1 billion.

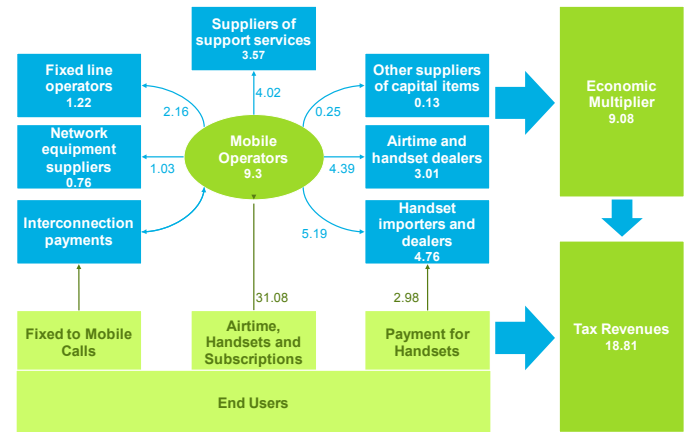
**Figure 89: Supply side value add from mobile telecommunications by component, ARS billions**



Source: Deloitte analysis

The value add relationship between the mobile operators and related industries in the ecosystem is shown below. The estimates of value add include the multiplier effect on the wider economy which is assumed to be 40% of the revenues generated by the mobile operators and the related supply chain.

**Figure 90: Mobile value chain and value add in 2011, ARS billions**



Source: Deloitte analysis, values in the boxes represent value add

### Impact on employment

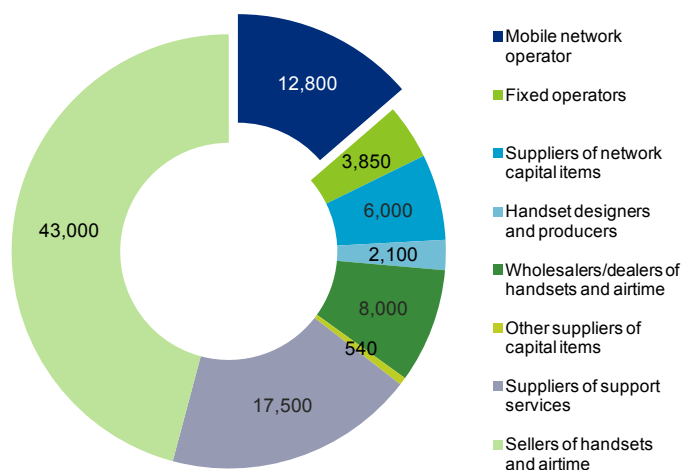
Mobile services in Argentina contribute to employment in several ways, including direct employment by the mobile operators, the employment in the related industries described above, the support employment created by outsourced work and taxes that the government subsequently spends on employment generating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

Contrary to most other Latin American countries, where many services related to mobile telephony (such as radio and network equipment, handsets and smartphones) are imported, Argentina is characterised by an extensive network of handset and equipment local assemblers. Government policies promoting local production mean that a reduced excise tax applies to handsets produced in Tierra del Fuego, a free trade zone. As a result, several handset manufacturers have set up arrangements with local companies, including Brightstar and BGH, who assemble handsets in Tierra del Fuego and resell them domestically.

International equipment providers such as Ericsson, Alcatel-Lucent, Huawei and NSN recognised the importance of the Argentinean market and have established offices and operations in the country. These operations include commercial offices for the sale of equipment as well as the provision of installation and maintenance services through contractors.

It is estimated that in 2011 the mobile telecommunication industry employed almost 94,000 Full Time Equivalents ('FTEs') in Argentina. A further 32,000 FTEs were estimated to be generated in the wider economy as a result of the interactions with the mobile operators (the multiplier impact).

**Figure 91: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**



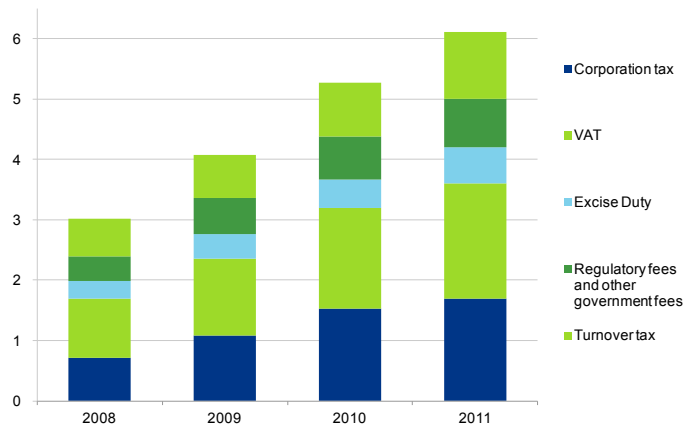
Source: Deloitte analysis; excludes employment generated by the multiplier effect

While mobile operators employed approximately 12,800 FTEs in 2011, the wider mobile ecosystem employed approximately 81,000 additional FTEs. Of these, 2,100 FTEs were the handset manufacturers and assemblers, while 43,000 were handset and airtime retailers consisting of both mobile operators' third party and other independent retailers operating from supermarkets, technology stores and smaller independent points of sale. Further employment contributions derive from the suppliers of network capital items (6,000 FTEs) and the suppliers of support services (17,500 FTEs).

### Value add from taxation

In 2011, mobile operators in Argentina paid approximately ARS 6.1 billion to the government in taxes and regulatory fees, more than double the contributions paid in 2008 (ARS 3 billion).

**Figure 92: Tax and regulatory payments from mobile operators, ARS billions**



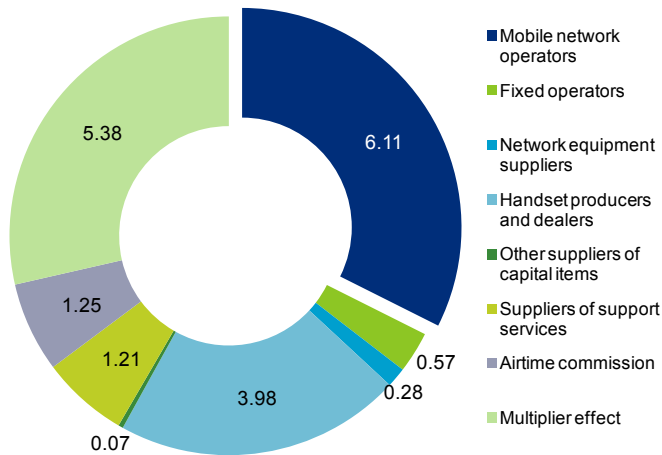
Source: Deloitte analysis based on operator data; The figures do not include a multiplier

Tax and regulatory fees represented 17% of domestic company revenues for Argentinean mobile operators in 2011. The largest proportion of government tax revenue was raised through VAT (which accounted for 31% of mobile operators tax payments in 2011), followed by corporation tax (28%) and turnover tax (18%).

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another ARS 7.4 billion for the government in 2011. The largest payers of tax in the mobile supply chain, aside from the mobile operators, are the handset designers and dealers, followed by the fixed operators and the suppliers of support services.

A further ARS 5.38 billion tax revenues are estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 93: Total tax revenues from the mobile value chain in 2011, ARS billions**



Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note this represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector

## Productivity impacts

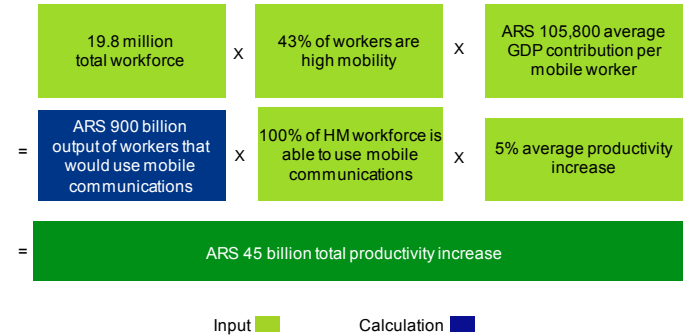
In addition to benefits to the supply side of the economy, mobile telephony increases productivity through the use of mobile technologies for business purposes as well as intangible and social benefits to consumers.

Discussions with mobile operators identified numerous ways in which mobile services have led to productivity increases in Argentina. Of particular note were the following:

- The M2M services introduced by the main operators for their business clients improve productivity and efficiency in various business areas, by allowing rapid exchange of data between a number of remote machines and a server that manages the information flows.
- Personal and Claro offer mobile 'Cloud' computing services. Smartphones, tablets or laptops using these services allow secure and flexible access to all information necessary to maintain communication and work remotely with staff, customers or suppliers.

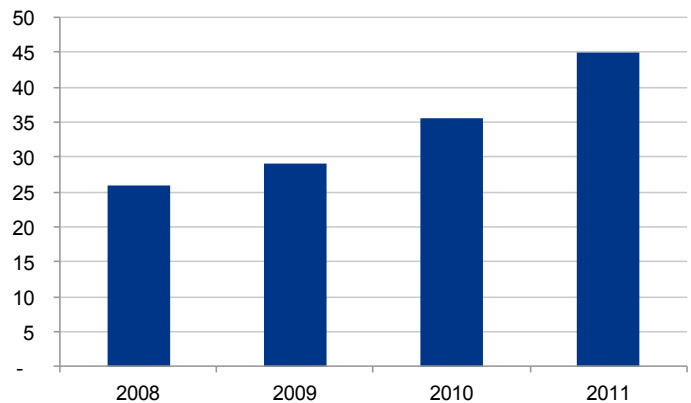
An economic value approach can be employed to provide a high level estimation of these productivity benefits for mobile workers. The results indicate that, if mobile workers in Argentina achieved a 5% increase on their productivity as a result of using mobile technologies, the potential productivity impact of mobile services on the economy would have been ARS 45 billion in 2011.

**Figure 94: Economic impact in 2011 of increased productivity amongst high mobility workers**



Source: Deloitte analysis based on Deloitte assumptions, interviews and Argentinean Bureau of Statistics. Differences might be due to rounding.

**Figure 95: Economic impact of increased productivity amongst high mobility workers, 2008-2011, ARS billions**



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

## Consumer impacts

Mobile telecommunications also provide a number of intangible benefits to consumers, including the development of interpersonal and family communications, the promotion of social cohesion and the extension of communication to those on low incomes.<sup>70</sup>

Mobile operators have identified a number of CSR projects that they provide in Argentina which deliver significant tangible and intangible benefits to consumers and businesses. These include the following:

- Personal contributes to the Senti2 Conecta2 program implemented by the Telecom group, which promotes technology to support teachers and students in the classroom.

<sup>70</sup> For countries where the mobile industry is still in a developing phase, it is possible to estimate the intangible consumer benefits using a 'willingness to pay' methodology based on new subscribers, usage increase and price trends. However, as the Argentinean mobile market is more mature and similar to the most developed markets, it is not possible here to employ this methodology to quantify these significant benefits.

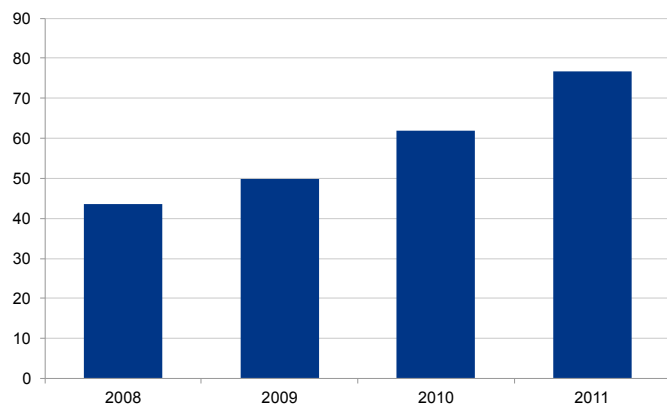


- Personal collaborates with the Network of Rural Communities (Red Comunidades Rurales) on projects aiming to evaluate the wider social and educational impacts of information and communication technologies ('ICT'). This draws from the experience on educational programs in communities and rural villages at risk, marginalised or characterised by high levels of poverty. The project also involves the 'Seeds of Empowerment' program of Stanford University (US): it provides students and teachers with tablets and notebooks and trains them to the use of ICT for educational purposes.
- Movistar contributes to the Proniño program that the Telefónica Group runs in Argentina. This was developed by Fundación Telefónica, with the aim of contributing to the prevention and progressive elimination of child labour in the country.

### Total impacts

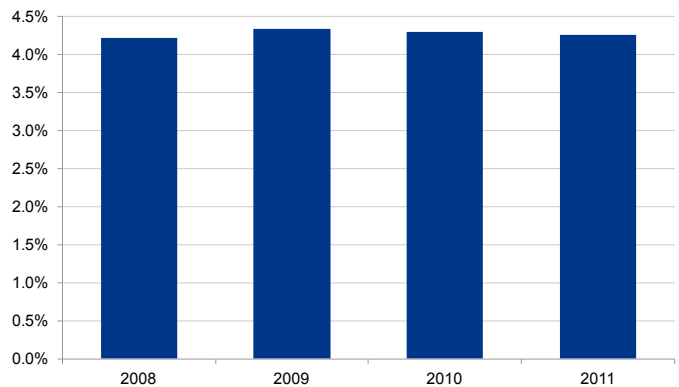
Overall, in 2011, it was estimated that the mobile telecommunications industry contributed ARS 77 billion, which represented approximately 4.3% of GDP.

Figure 96: Total domestic impact



Source: Deloitte Analysis

Figure 97: Domestic impact as a proportion of GDP, 2011



Source: Deloitte Analysis

## C.3 Taxation on consumers and mobile operators

Despite the economic contribution estimated above, mobile consumers and mobile operators in Argentina suffer a taxation regime which is specific to this industry and more severe than that faced by consumers in other industries and other countries in the region.

### Taxation on mobile consumers

Consumer taxation in Argentina is complex and affects both the handsets and usage cost components of mobile consumers' spend.

Figure 98: Mobile specific taxation on consumers, 2011

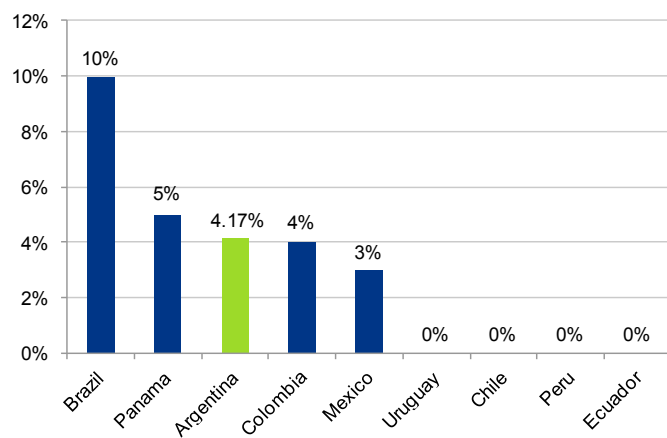
Product	Tax	Tax rate
Calls	VAT	21% for non owners of VAT accounts
		27% for owners of VAT accounts
SMS	Excise tax	4.17% (only calls and SMS)
		1% on postpaid usage
Handsets	VAT	21%
	Import duty	16%
	Excise tax	7% for locally assembled handsets, 20.48% for imported handsets
SIM cards	VAT	10.5%

Source: Mobile operators' data

A 21% VAT rate applies to calls and SMS originated by final consumers who do not own a VAT account, while a 27% VAT rate applies to calls and SMS originated by owners of VAT accounts. On data usage, VAT is levied at a rate of 21% for all types of customers.

A 4.17% excise tax ("impuesto interno") is paid directly by pre pay and post pay mobile users for call minutes and SMS.

**Figure 99: Special consumption tax rates on prepaid mobile services, 2011**



Source: Operators' data; In Brazil and Colombia, mobile services are subject to supranormal sales tax rates. The difference between the average tax rate on mobile calls and the standard rate on all other goods and services is reported in this figure as a mobile specific usage tax.

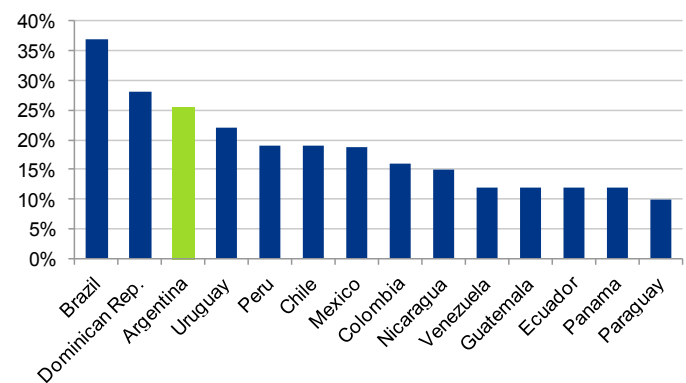
This is amongst the highest mobile specific taxes on usage in Latin America and generates a number of negative effects for consumers and the economy:

- It deters consumption: Governments often introduce specific consumption taxation to discourage consumption of goods, e.g. tobacco and alcohol. However, the application of this rationale in the context of mobile services which generate positive social benefits does not appear appropriate.
- It hits the poorest consumers: this excise tax can further represent a significant obstacle to usage of mobile services by the poorer sectors of the population, which are the ones that could derive the highest social and productivity benefits from being connected.
- It is discriminatory: this tax is not imposed on fixed usage, and, by affecting only the price of mobile calls, places mobile telephony on uneven competitive grounds compared to fixed telephony.

In addition to the excise tax and the VAT, a 1% levy applies to the price that mobile operators invoice to their post pay users, net of VAT. This levy finances the National Body of Sports Performance (ENARD). Of the countries included in this study, only Argentina, Mexico and Panama impose specific taxes on postpaid usage.

According to a recent benchmarking study conducted by Deloitte for the GSMA, the mobile telecommunications sector in Argentina showed a high level of taxation as a proportion of mobile usage costs (TCMU) when compared to the other Latin American countries included in the study.

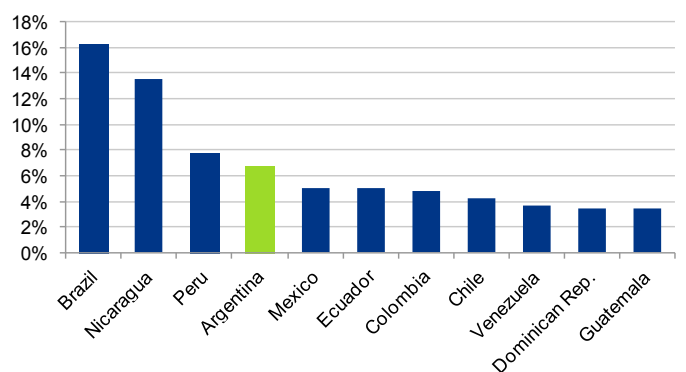
**Figure 100: Tax as a percentage of TCMU<sup>71</sup>, 2011**



Source: Deloitte/GSMA Global Mobile Tax Review 2011; Figures for Argentina, Brazil, Panama and Uruguay have been added/updated according to further discussions with the mobile operators

Argentina also has an above average TCMO as a percentage of GDP per capita in the Latin American region (6.8% in 2011), leading to consumers paying proportionately more for mobile services than in a number of neighbouring countries.

**Figure 101: TCMO as a percentage of GDP per capita, 2011**

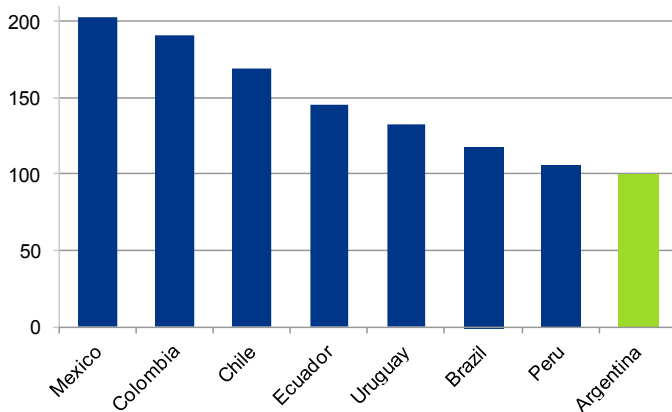


Source: Deloitte analysis based on data from the Deloitte/GSMA Global Mobile Tax Review 2011

71 TCMU is the total cost of mobile usage, calculated as the weighted average of the taxes imposed on prepaid mobile usage and postpaid mobile usage.

Argentina has one of the lowest levels of call minutes per user compared to neighbouring countries.

Figure 102: MOU per user per month, 2011

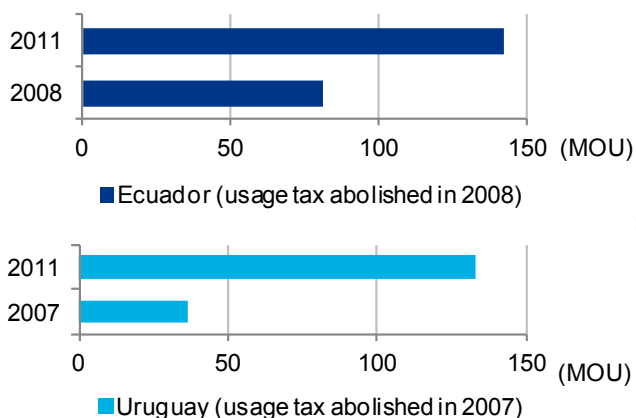


Source: Wireless Intelligence and operators' data

In countries such as Argentina where consumer taxation on mobile telephony is relatively high, reducing taxation has the potential to increase government revenues, as the growth in service consumption that results from the reduction of a high tax generates tax revenues that can compensate the initial loss.

For example, a removal of the airtime excise tax on mobile usage could act to raise the level of mobile usage in Argentina to a similar level seen in other Latin American countries. In Ecuador and Uruguay, which exhibit higher usage per subscriber than Argentina, usage increased notably over a period when the government reduced mobile specific taxation. To boost usage, a similar approach may be undertaken in Argentina with respect to the excise tax.

Figure 103: MOU per user per month in Ecuador and Uruguay

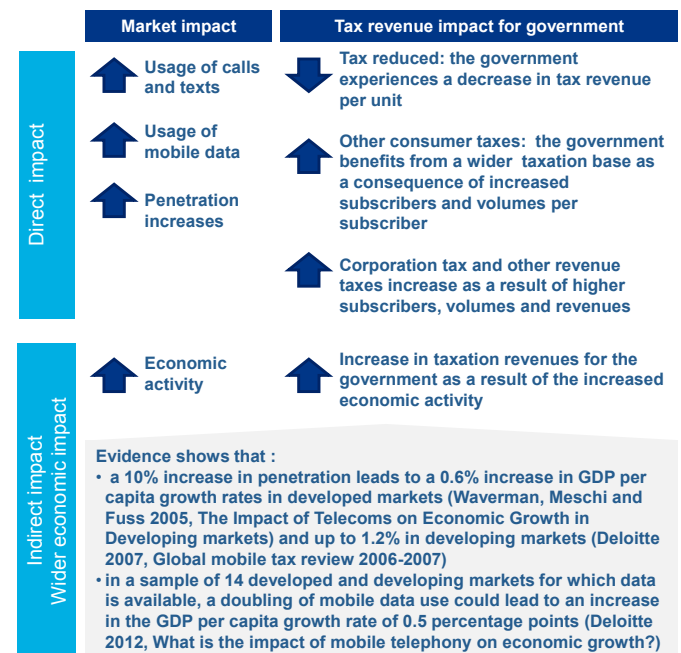


Source: Operators' data

Increases in usage expand the taxable base for the government, leading to an increase in tax revenues. For example, if the excise tax removal led to MOU in Argentina increasing to the average level of Ecuador and Uruguay (138 MOU per month), the government would have gained an extra ARS 2.5 billion in 2011 from the widening of the usage base.

An increased total usage would also be coupled with increased economic activity. A well-documented positive relationship exists between increases in mobile penetration and mobile usage and GDP growth rates,<sup>72</sup> due to the beneficial effects on the economy and on its productivity.

Figure 104: Direct and indirect effects of tax reductions on government tax revenues



The net impact of any taxation changes requires a dynamic approach where governments explicitly account for the indirect impacts driven by the increased economic activities that are generated by improved mobile penetration and mobile usage.

When both the extra tax proceeds due to additional usage and to the additional economic activity resulting from tax reduction are taken into account, the impact of tax cuts can in the medium term potentially lead to a tax neutral or tax positive outcome for the government, while contributing to market developments and benefits for consumers.

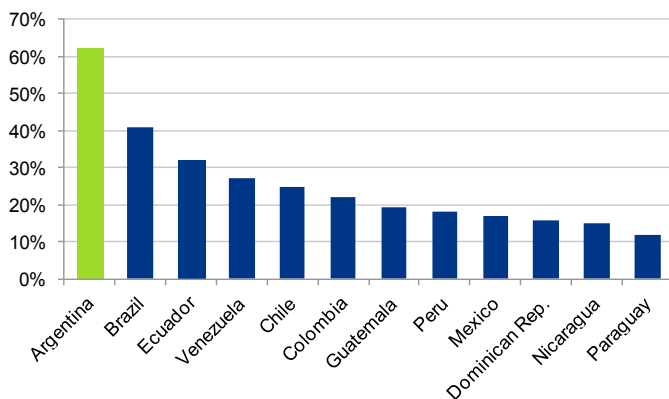
<sup>72</sup> See, for example, the forthcoming Deloitte/GSMA paper "What is the impact of mobile telephony on economic growth?".

Handsets, another key component of the mobile consumer's bundle, are also taxed heavily in Argentina. Taxation on handsets has a complex structure and is affected by government policies promoting local manufacturing.

Historically, the majority of handsets have been imported from abroad and were subject to a 16% import duty paid by the importer at the moment of importation. Operators have noted that this import duty was applied to a tax base 30% higher than the Cost, Insurance and Freight ('c.i.f.') price. Handsets were subject to a further 20.48% excise tax and a 21% VAT.

A study<sup>73</sup> by Deloitte on worldwide taxation on mobile consumers highlighted that, for imported handsets, taxes could have represented up to 60% of a handset cost in Argentina in 2011, the highest among other Latin American countries.

**Figure 105: Tax as a percentage of handset cost, 2011**

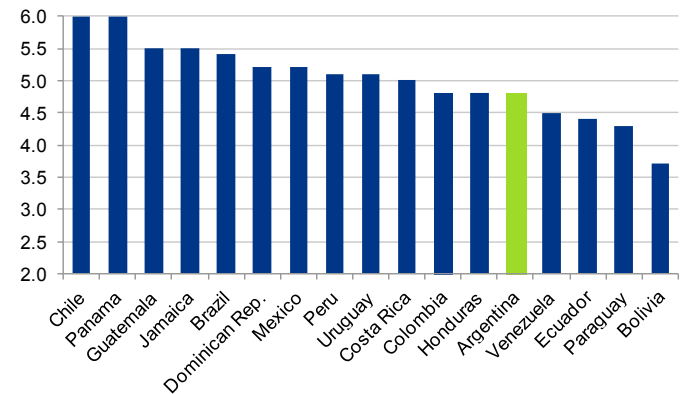


Source: Deloitte/GSMA Global Mobile Tax Review 2011

Current government policies promoting local manufacturing have introduced a reduced excise tax of 7% applying to handsets assembled in Tierra del Fuego, thus mitigating the overall tax burden on handsets. Notwithstanding, Argentina is currently the only Latin American country imposing a specific excise tax on handsets. This inhibits the acquisition of smartphones and other 3G devices, which in Argentina may represent the only access to wireless broadband for certain sectors of the population and in rural areas.

While the differentiated excise tax regime on handsets (20.48% if imported, 7% if locally assembled) introduced by the government has promoted local manufacturing, it has also potentially restricted the Argentinean customers from accessing the latest mobile technologies: for instance, the presence of Apple's iPhone in the Argentinean market is limited to unofficial channels.

**Figure 106: Availability of latest technologies, 2011**

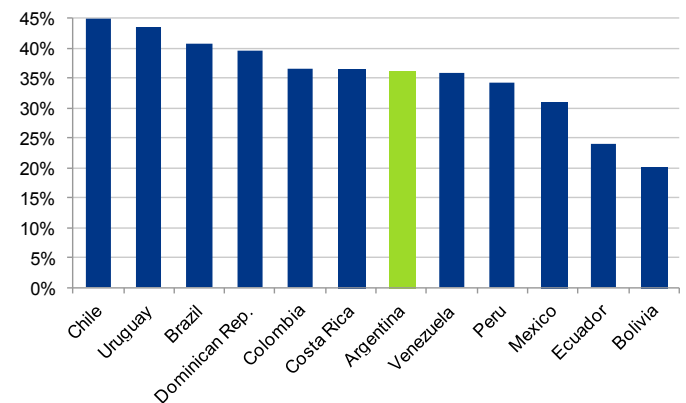


Source: World Economic Forum 2011-2012, Global Competitiveness Index based on the Executive Opinion Survey. To what extent are the latest technologies available in your country? [1 = not available; 7 = widely available].

The combination of taxes on handsets and on usage, including wireless data usage, risks limiting the development of mobile internet with consequent risks for connectivity.

While fixed teledensity (24.7% in 2010<sup>74</sup>) is high in Argentina compared to other regional markets, the number of internet users in the country lags behind the levels of less developed Latin American markets.

**Figure 107: Internet users per 100 people, 2010**



Source: World Bank data (2010); Deloitte analysis

Reduced taxation on smartphones and mobile data usage has the potential to address these connectivity gaps without necessarily affecting government tax receipts in the medium term. Lowering taxation on smartphones would reduce the initial expenditure that consumers incur when acquiring a new generation handset, incentivising consumers to substitute smartphones for feature phones. Any such reduction in taxation per smartphone sold and per Mb of data usage could potentially be offset in the medium term by the

73 Deloitte/GSMA Global Mobile Tax Review 2011.

74 World Bank, World Development Indicators.

increased customer base (number of feature phones users acquiring a new smartphone) and by the increased data usage per user.

### Taxation on mobile operators

Mobile operators in Argentina are subject to taxation on both profits and revenues.

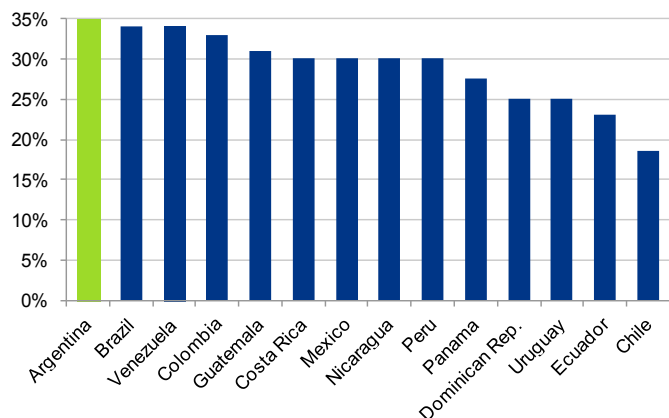
Figure 108: Taxation on mobile operators, 2011

Category	Tax	Tax rate
General taxation on mobile operators	Corporation tax	35% of profits
	Stamp duty	1% of revenues
Mobile specific taxation on mobile operators	Turnover tax	5.2% on revenues from calls and SMS
		4.06% on revenues from data usage
		3.7% of revenues from SIM cards and handsets
	Tasa derechos radioelectricos	2.55 pesos for each post pay customer 3.57% of revenues from pre pay users
	USF + Tasa de Control, Fiscalización y Verificación	1.5% of revenues

Source: Mobile operators' data

A corporate tax of 35% on profits is the highest in the Latin American region.

Figure 109: Corporate tax rates, 2012



Source: IBFD Tax Research Platform; Deloitte analysis

A stamp duty of 1% is levied on the value of all written contracts. Operators have noted that this duty also affects wholesale transactions such as interconnection services and roaming.

In addition to standard taxation, mobile operators are affected by taxes that are specific to their industry. They are subject to a turnover tax which is levied at different rates at the provincial level. This tax differs across types of service and across operators (depending on the structure of each operator's sales) and represents on average 5.2% of revenues<sup>75</sup> from call minutes and SMS. This has grown from a level of 4.7% in 2008 and operators have an expectation that provinces will keep increasing it in the future. Fixed operators are taxed at a lower rate of approximately 4% of service revenues. The turnover tax also applies to revenues from mobile data usage (4.06%) and revenues from the sales of handsets<sup>76</sup> and SIM cards (3.7%).

Operators have reported that turnover tax rates have been increased significantly in 2012. The new rates are approximately 6% for mobile calls and SMS, 4.7% for data usage and 4.5% for SIM cards and handsets. Also the turnover tax on fixed calls has increased in 2012 to 4.7%.

In addition to these turnover taxes, a number of regulatory contributions also apply:

- A tax for spectrum use (Tasa derechos radioelectricos) consisting of a fixed amount (2.55 pesos) for each existing post pay customer and a percentage of revenues (3.57%) from pre pay customers.
- Contributions to the Universal Service Fund ('USF'): These are set at 1% of total revenues, net of certain cost components such as interconnection and net of the turnover tax described above.
- Tasa de Control, Fiscalización y Verificación ('TCFV'): A further 0.5% tax levied by the CNC in a similar way to the Universal Service Fund.
- The structure of the turnover tax and of the other regulatory contributions raises a number of concerns for mobile operators:
- These taxes discourage investments: taxes applied on gross revenues directly reduce the profitability of all operators, independently of their level of profitability. In a given year, these taxes have the same effect on operators with positive profits and operators with no profits due

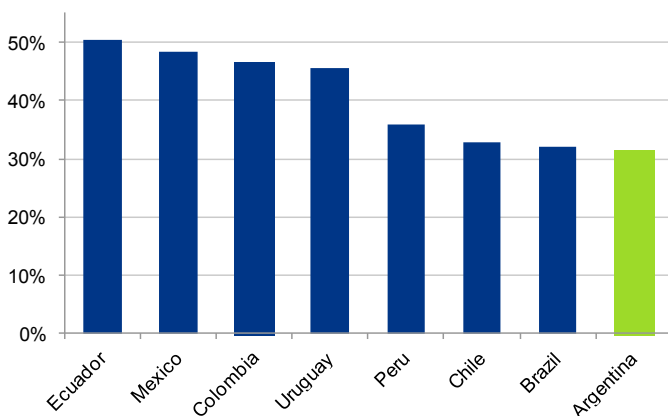
<sup>75</sup> Both retail and wholesale revenues. Information provided by Movistar and Personal.

<sup>76</sup> Both imported and locally assembled.

to recent network investment. This mechanism is of particular concern in Argentina, where the EBITDA margins of mobile operators are lower than in the main other Latin American markets.

- These taxes are not transparent: unlike VAT or the excise tax, which are collected from consumers on behalf of the government, the turnover taxes are levied on operators' revenues directly. This means that mobile operators must either suffer a consistent reduction in their profitability or pass these taxes through to consumers in a non transparent way, as they cannot itemise the tax in prices or receipts.
- These taxes are inefficient for the economy: imposing taxation on firms' revenues produces lower market volumes and higher prices than a revenue-equivalent<sup>77</sup> tax on profits. When taxes are imposed on revenues, operators tend to adopt a low-turnover/high-margin strategy, as opposed to a low-margin/high-turnover strategy which is optimal when taxation is imposed on profits.
- These taxes are discriminatory: mobile telephony is one of the sectors with the highest turnover tax burden, as the turnover tax is generally applied at a rate of 4% to other industries including fixed telephony.

Figure 110: EBITDA margins, Q4 2011



Source: Wireless Intelligence

## Other pressures on mobile operators

Mobile operators have indicated a number of regulatory pressures that, in addition to mobile specific taxation, are creating constraints on the sector development:

- Mobile operators are charged by municipalities for the installation of new sites. An initial contribution of ARS 20,000 and a monthly fee of ARS 2,000 apply. Mobile operators also pay a 'Tasa por Inspección de Seguridad e Higiene', a turnover tax paid by all companies at municipality level.
- A lack of coordination between local and national authorities is apparent in spectrum management. Operators have been reporting significant network congestion since 2010. At national level, a lack of a clear timetable for mobile spectrum allocation is creating uncertainty which discourages further network investment. For spectrum that is available, operators are concerned that local authorities are imposing charges and strict regulations on base stations and network sites, further constraining investment in next generation mobile networks and in turn affecting the quality of services provided to consumers.
- Asymmetric license provisions allow broadcasters to provide mobile services, but not vice versa. At a time of convergence between media and telecom services, and given market maturity, this asymmetry is affecting mobile operators' services growth.

<sup>77</sup> Two different taxation policies are revenue-equivalent when they raise the same amount of tax revenues for the government.

## C4 Conclusion

Mobile operators in Argentina operate in one of the most competitive markets in Latin America.

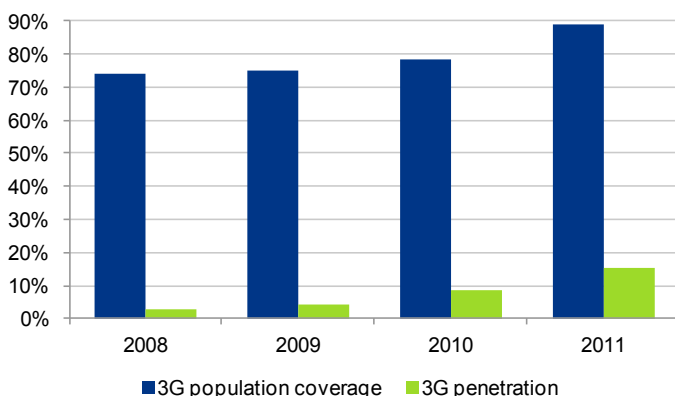
Their contribution to the Argentinean economy is significant and has been growing at a substantial pace. In 2011, the mobile ecosystem generated an economic impact reaching 4.3% of GDP and employed 94,000 FTEs.

However, consumers and operators in Argentina are subject to some of the highest taxation levels in Latin America. The sum of uncoordinated taxations and regulations at both national and local level raises uncertainty for mobile operators, which could potentially lead to negative consequences on network investments.

Legal and bureaucratic restrictions applied to new antenna installations, as well as discretionary approvals by municipal authorities, can block operators from executing their planned CAPEX, thus limiting network investment.

Argentina already has an established mobile infrastructure, with a 3G network that could currently serve up to 90% of the population. However, on average during 2011, only 15% of the population took advantage of mobile 3G services. Reducing mobile specific taxation on handsets with 3G capabilities and on wireless data could contribute to increased data connectivity in the country.

**Figure 111: 3G population coverage and 3G penetration**



Source: Wireless Intelligence and operators' data

More supportive taxation and regulatory policies have the potential to stimulate consumption of wireless services and promote the network investment required to support this growth.



## Appendix D Country case study: Colombia

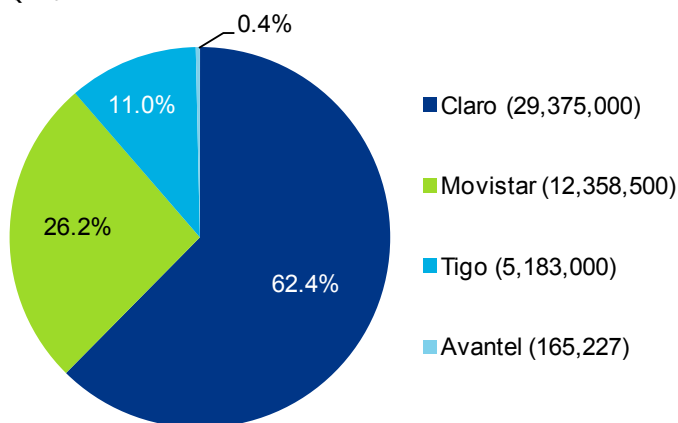
This Appendix provides an analysis of the impact of mobile telephony on Colombia and its economy in the last four years (2008-2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in Colombia, discussing the effects that mobile specific taxes have on the industry and the wider economy.

This Appendix is based on discussions and data provided by a leading mobile operator, publicly available information relating to other mobile operators, data from the Wireless Intelligence, and data from publicly available sources that are referenced throughout.

### D.1 Mobile telecommunications in Colombia

Colombia is one of the larger countries in Latin America, with the third highest GDP and second highest population on the continent.<sup>78</sup> It has a well established mobile market characterised by four mobile operators, Claro, Movistar, Tigo and Avantel each having market shares of approximately 62%, 26%, 11% and 0.4%.<sup>79</sup>

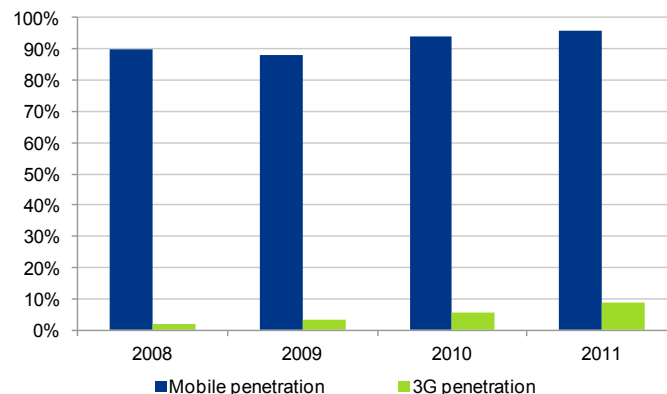
**Figure 112: Colombian mobile market share and subscribers by operator, Q2 2012**



Source: Wireless Intelligence

Mobile penetration is currently just under 100%, while 3G penetration, at less than 10%, is much lower and lags behind many other Latin American countries. Around 81% of connections in the market are prepaid.

**Figure 113: Mobile and 3G penetration, 2008-2011**



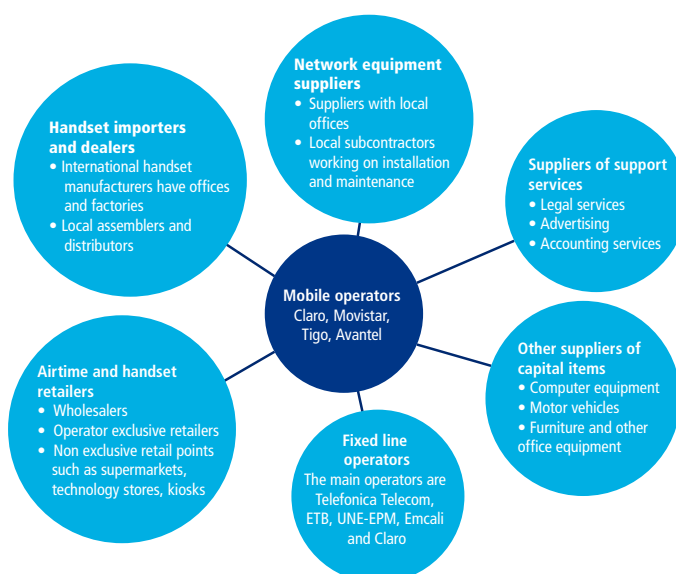
Source: Wireless Intelligence

### D.2 The economic contribution of mobile telephony to the economy

Mobile telephony in Colombia generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits to consumers.

While these benefits are delivered principally by the mobile operators, the mobile telecommunications ecosystem in Colombia also benefits from players such as international equipment providers who have established bases in Colombia, such as Ericsson, Huawei and NSN; handset manufacturers such as Samsung, Nokia and ZTE; airtime and handset wholesalers and suppliers of other services to mobile operators such as accounting, advertising and other support services.

**Figure 114: Mobile telecommunications ecosystem**



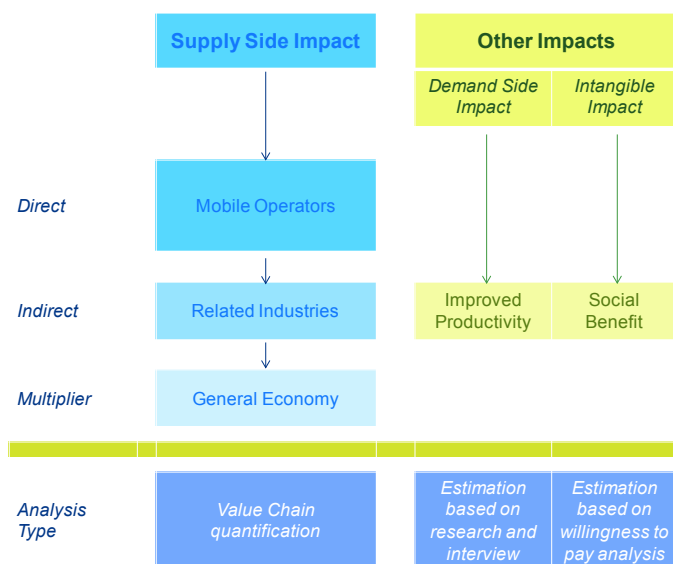
Source: Deloitte analysis

<sup>78</sup> Based on World Bank data.

<sup>79</sup> Wireless Intelligence (June 2012)

The economic impact of the mobile industry is discussed below in terms of the direct and indirect effects provided to the supply side of the Colombian economy by the mobile operators and by players in the wider mobile ecosystem, and in terms of direct and indirect employment from firms in the ecosystem. Also discussed are the productivity impacts on the Colombian economy resulting from mobile workers using their phones and tablets for business purposes, as well as the social benefits enjoyed by consumers as a result of access to mobile services.

**Figure 115: Estimation of the economic impacts of mobile telephony**



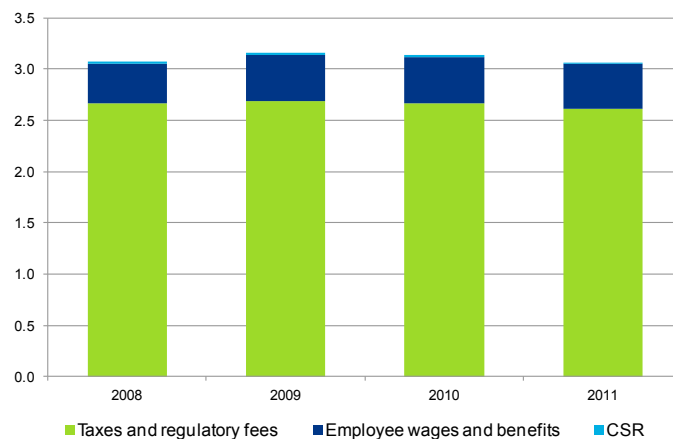
Source: Deloitte analysis

## Supply side impact

The total supply side value add created through the mobile operators and the wider mobile ecosystem is estimated as the sum of three components: direct, indirect, and induced impacts.

The direct impacts generated by mobile operators include mobile operators' expenditure on wages, CSR programmes, dividends paid by mobile operators and taxes recovered as a result of the mobile operators' operations. These were estimated at COP 3 trillion for 2011.

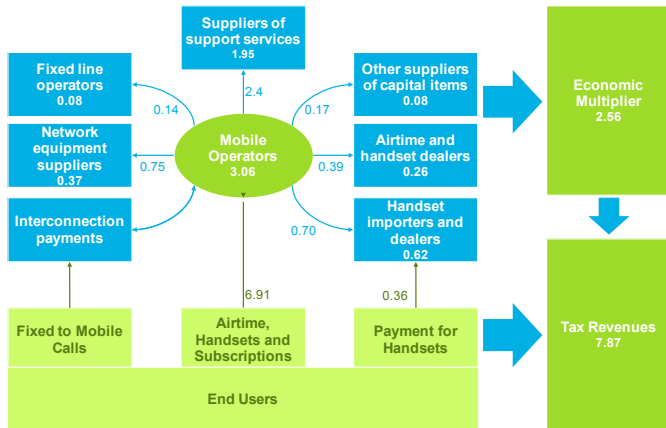
**Figure 116: Direct domestic value add of mobile operators (excluding multiplier effect), COP trillions**



Source: Deloitte analysis based on data provided by the mobile operators, interviews and analysis of company accounts. Figures exclude multiplier.

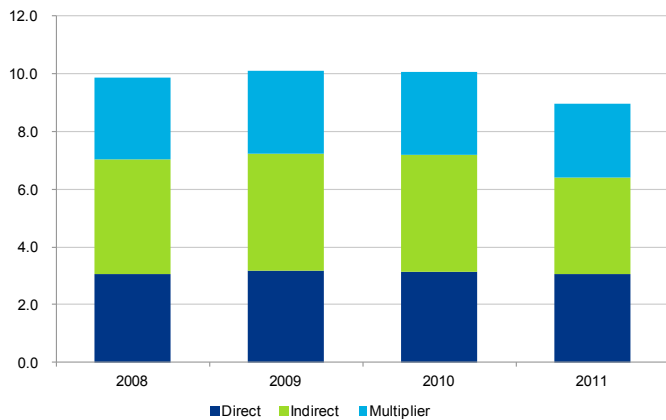
The indirect impacts from mobile operators' expenditure to parties in the wider mobile ecosystem represents the percentage of any amount spent by end users that remains within the national boundaries, which serves as value add to be spent again. These are calculated by examining mobile operators' payments to their suppliers of support services in the wider mobile ecosystem. The amounts of value add, including wages, profits and taxes generated by these players, are then estimated. These effects were estimated at COP 3.35 trillion for 2011.

The induced impacts reflect the subsequent rounds of expenditure created by direct and indirect spend. For example, they include the increased domestic consumption afforded by increased employment. The induced effects were estimated using a spending multiplier of 40% to capture the broader effects on the wider economy. These were estimated at COP 2.56 trillion for 2011.

**Figure 117: Mobile value chain and value add in 2011, COP trillions**

Source: Deloitte analysis; Values in the boxes represent value add

Combining the impacts described above, mobile operators in Colombia in 2011 created an estimated COP 9 trillion value add in through the supply side.

**Figure 118: Supply side value add from mobile telecommunications by component, COP trillions**

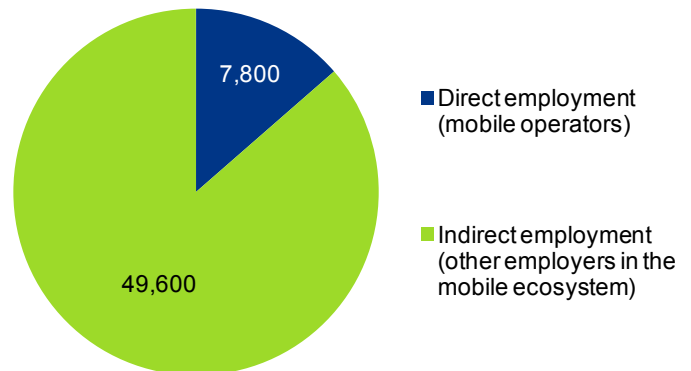
Source: Deloitte analysis

While the direct contribution of mobile operators has remained constant across 2008-2011, the indirect impact deriving from their major stakeholders has contracted slightly in 2011, suggesting a reduction in mobile operators' expenditure in support services.

## Impact on employment

Mobile services in Colombia contribute to employment in several ways, including direct employment by the mobile operators. Mobile operators also indirectly generate employment in the wider economy as a result of their expenditures. In addition, the government also subsequently spends on job creating activities using tax revenues generated directly and indirectly by the mobile sector. Additional induced employment is created by mobile sector employees and beneficiaries spending their earnings, thereby creating more employment.

Mobile operators employed approximately 7,800 FTEs in 2011. Based on benchmarks of indirect employment generated in the wider mobile ecosystem in other Latin American countries<sup>80</sup>, almost 50,000 additional FTEs were estimated to be generated in the wider mobile ecosystem. Finally, using an economic multiplier, 20,000 further FTEs were estimated to be generated in the wider economy as a result of mobile operators' expenditures.

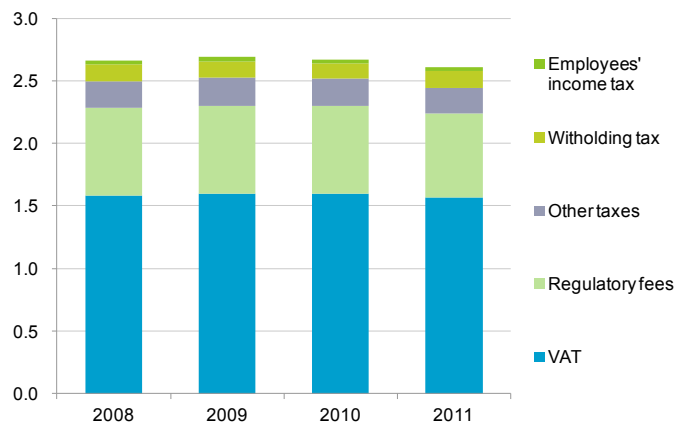
**Figure 119: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**

Source: Deloitte analysis (figures are rounded); The figure does not include a multiplier

## Value add from taxation

A major source of the value added by mobile operators originates from the tax revenues they generate. In 2011, mobile operators in Colombia paid approximately COP 2.6 trillion to the government in taxes and regulatory fees.

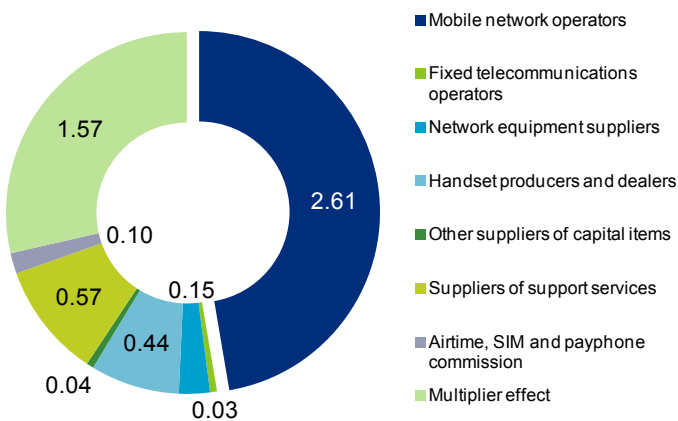
<sup>80</sup> Data on indirect employment was not available for Colombia.

**Figure 120: Tax and regulatory payments from mobile operators, COP trillions**

Source: Deloitte analysis based on mobile operator data; The figures do not include a multiplier.

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another COP 1.3 trillion for the government in 2011.

A further COP 1.57 trillion tax revenues were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 121: Total tax revenues from the mobile value chain in 2011, COP trillions**

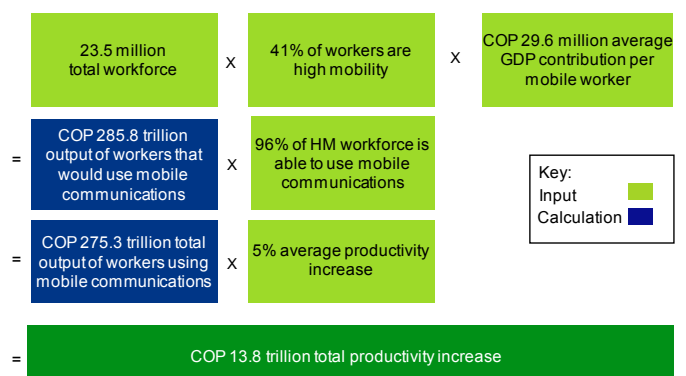
Source: Deloitte analysis based on company accounts, mobile operators' data. Note: This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.

## Productivity impacts

In addition to benefits to the supply side of the economy, mobile telephony in Colombia increases productivity through the use of wireless services for business purposes, as well as intangible and social benefits to consumers.

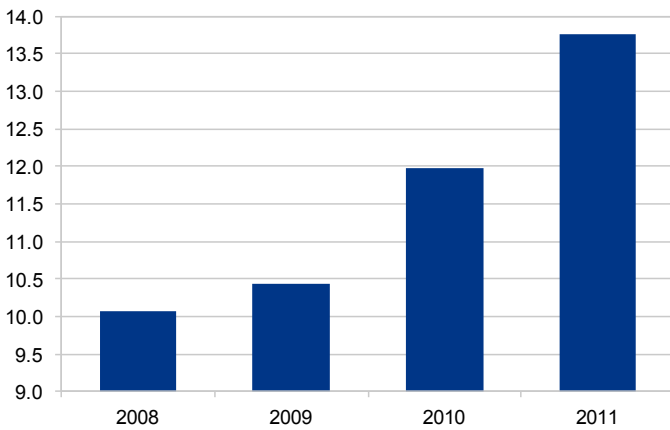
For instance, increasing the availability of smartphones inspired the National Federation of Coffee Producers to develop a project that implements mobile banking services offering coffee producers the chance to make transactions and access online information from their mobile phones. The system increases farmers' productivity by allowing them to constantly attend their coffee fields instead going to the city to carry out banking transactions.<sup>81</sup> Further, the project developed an SMS service that informs coffee producers about the price of coffee in international markets and allows them to exchange messages with each other and the Federation asking questions about issues and risks involving the sector.

An economic value estimation can be undertaken to estimate all these productivity effects by analysing the importance of mobile telephony to each sector of the Colombian economy. The economic value estimate indicates that, if business mobile phone users achieved a productivity improvement of 5%, the potential productivity impact would have been COP 13.8 trillion in 2011. This contribution has increased by almost 37 % above its 2008 value (COP 10 trillion).

**Figure 122: Economic impact in 2011 of increased productivity amongst high mobility workers**

Source: Deloitte analysis based on Deloitte assumptions, interviews and Colombia national statistics authority; Differences might be due to rounding.

<sup>81</sup> <http://en.colombiadigital.net/innovative-sme-entrepreneurs/others/item/1914-coffee-producers-connected-with-the-world-through-mobile-devices.html>

**Figure 123: Economic impact of increased productivity amongst high mobility workers, COP trillions**

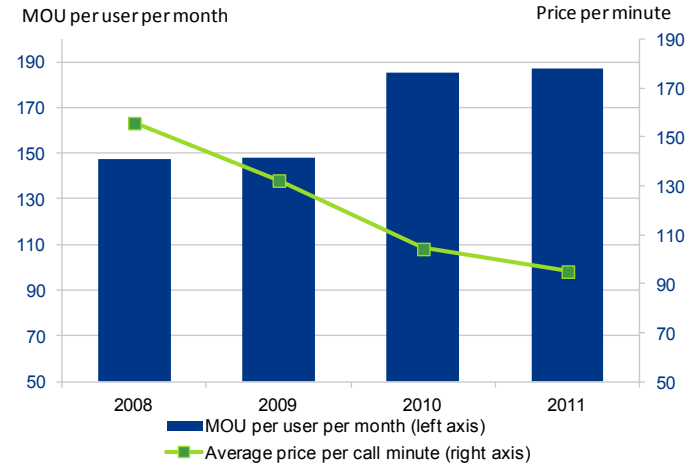
Source: Deloitte analysis based on Deloitte assumptions, interviews and Colombia Bureau of Statistics

### Consumer impacts

Mobile telecommunications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion and the extension of communication to those on low incomes. Additional benefits to consumers derive from corporate and social responsibility programmes undertaken by the mobile operators:

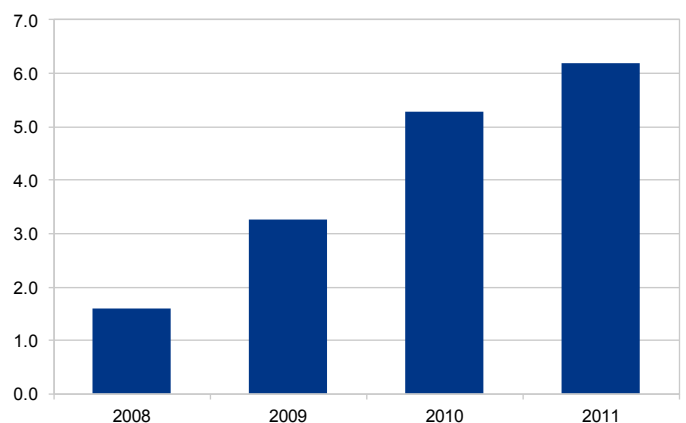
- Claro provides a free SMS donation service to the "Fondacion Solidaridad pro Colombia" (Colombian Solidarity Foundation) which provides scholarships to under-privileged youths.
- Movistar plays a key role within the continent through the Proniño campaign of Telefonica, aimed at protecting children at risk of child labour. This program benefitted almost 20,000 Colombian children in 2010.

Consumers also benefit from competition and innovation within the mobile industry. During recent years in the competitive Colombian mobile telephone market, the price of calls has fallen from an effective price per minute of COP 156 to 95. Simultaneously, the minutes of use per month per user has increased from 147 to 187.

**Figure 124: Price reductions and usage increases 2008-2011**

Source: Data from mobile operators and Wireless Intelligence

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 have increased over time in the last four years. This approach suggests that consumers potentially enjoyed the equivalent of over COP 6 trillion in intangible benefits in 2011, almost a fourfold increase with respect to the 2008 impact.

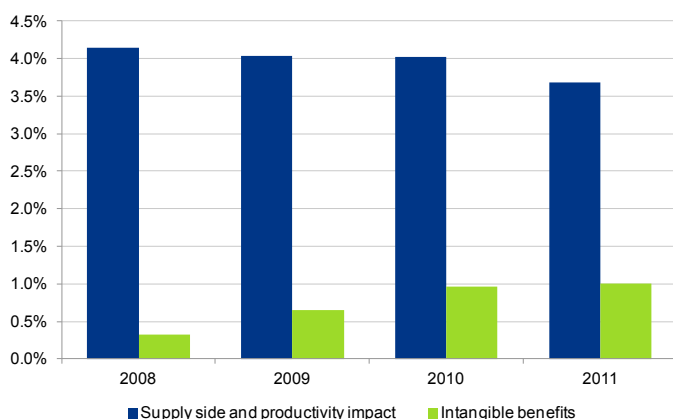
**Figure 125: Intangible benefits using willingness to pay concept, COP trillions**

Source: Deloitte analysis

## Total impacts

Overall, in 2011, the impact of mobile telephony to the Colombian economy was estimated to be COP 22.7 trillion, representing 3.7% of GDP, plus up to an additional COP 1 trillion from intangible consumer benefits.

**Figure 126: Economic impact of mobile telephony as a proportion of GDP**



Source: Deloitte analysis

## D.3 Taxation on mobile consumers and mobile operators

### Consumer taxes

Consumers in Colombia face a range of taxes on mobile services and products.

**Figure 127: Mobile specific taxation on consumers, 2011**

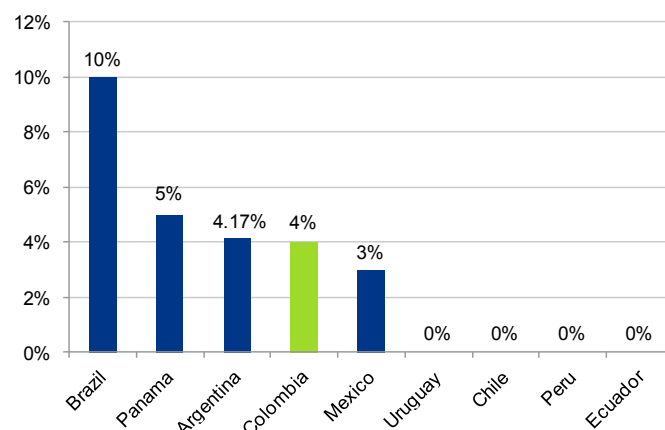
Product	Tax	Tax rate
SMS	VAT	16%
Data	VAT	16%
Calls	VAT	20%
Handsets	VAT	16%
	Import duty	5% import tax and 1.2% customs service tax

Source: Mobile operators' data

While VAT is levied at the standard rate of 16% on SMS and data services, the VAT on voice calls incurs a higher rate of 20%. This 4% differential can be interpreted as a special tax on usage of mobile telephony.

Mobile calls represent a major productivity enabler, as they allow making transactions and exchanging information on the move. As such, public policies should be targeted at promoting instead of inhibiting these services. On the contrary, Colombia is one of the few countries that impose an extra tax on usage of mobile telephony.

**Figure 128: Special consumption tax rates on prepaid mobile services, 2011**



Source: Operators' data; In Brazil and Colombia, mobile services are subject to supranormal sales tax rates. The difference between the average tax rate on mobile calls and the standard rate on all other goods and services is reported in this figure as a mobile specific usage tax.

This extra tax on calls generates a number of negative effects for consumers and the economy:

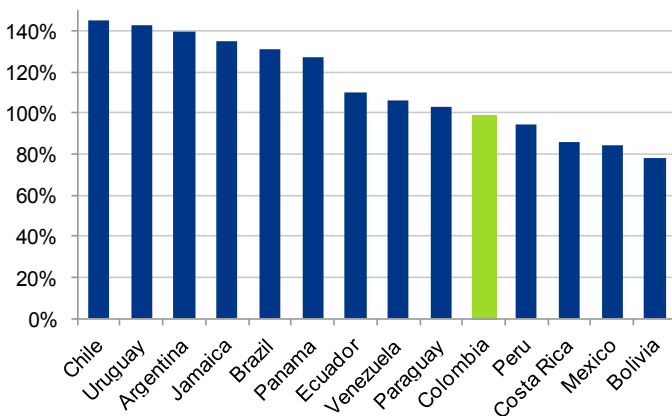
- It deters consumption. Governments often introduce specific consumption taxation to discourage the purchasing of goods, e.g. tobacco and alcohol. However, the application of this rationale in the context of mobile services which generate positive social benefits does not appear appropriate.
- It hits the poorest consumers: this extra tax can further represent a significant obstacle to usage of mobile services by the poorer sectors of the population, which are the ones that could derive the highest social and productivity benefits from being connected.
- It is discriminatory: no apparent economic or social rationale justifies the imposition of a higher tax rate on mobile calls than the rate imposed on SMS or data usage.

Higher taxation on basic mobile services inhibits access to and consumption of mobile services and negatively impacts not only the communications sector but also the wider economy. Public policies should instead aim at promoting connectivity in the country. Mobile penetration has often been associated with significant economic growth, as suggested by a Deloitte/

GSMA study<sup>82</sup> which finds that a 10% increase in mobile penetration increases long run GDP per capita growth by 1.1 percentage points.

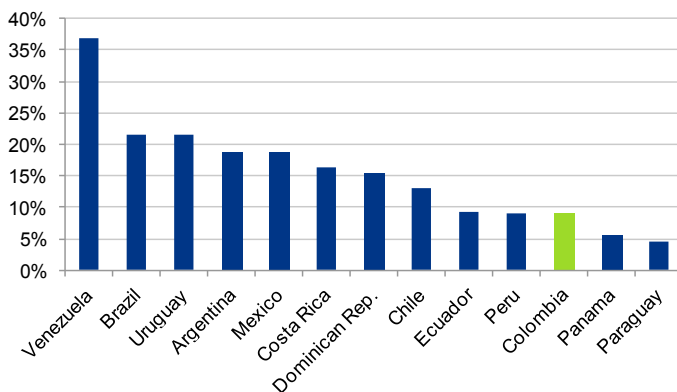
In Colombia, however, total mobile penetration and 3G penetration are lower than most other Latin American markets.

**Figure 129: Mobile penetration, Q2 2012**



Source: Wireless Intelligence

**Figure 130: 3G penetration, Q4 2011**

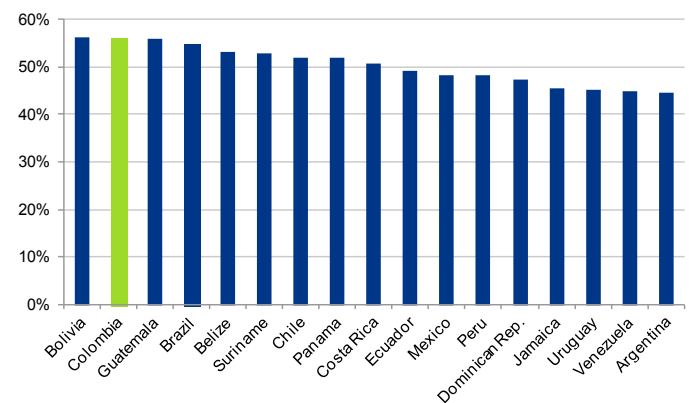


Source: Wireless Intelligence

The VAT rate applying to handsets is 16%. In addition, handsets incur a further import tax of 5% and a customs service tax of 1.2%. The cost of handsets is a key determinant of market access for mobile consumers. For this reason, VAT and import duties, which raise taxes as a percentage of a handset cost above 22%, constitute a major barrier to expansion for mobile services into new sectors of the population. While during 2011 and 2012 the import duties on handsets have been temporarily eliminated, there is expectation that these will be reinstated in 2013.

High taxation on handsets creates further barriers to entry for consumers in the market, reducing the affordability of mobile devices, particularly to the poorest sectors of the population. This is of particular concern in Colombia, a country in which the Gini coefficient<sup>83</sup> suggests that inequality is high, even for Latin American standards.

**Figure 131: Gini coefficient of inequality**



Source: World Bank data

Limiting access to the newest mobile devices, import duties negatively affect 3G connectivity in the country. In Colombia, 3G penetration is under 10% of the population, a level which is lower than in many other countries in Latin America and significantly lower than European or North American standards.

### Taxes on mobile operators

Mobile operators are subject to a range of general and telecoms specific taxes.

<sup>82</sup> Forthcoming Deloitte/GSMA paper "What is the impact of mobile telephony on economic growth?".

<sup>83</sup> The Gini coefficient measures the inequality among values of a frequency distribution (for example levels of income). It is commonly used as a measure of inequality of income or wealth.

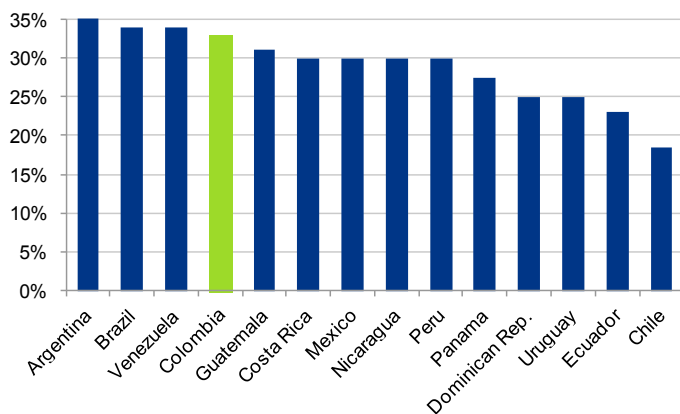


**Figure 132: Taxation on mobile operators, 2011**

Category	Tax	Tax rate
General taxation on mobile operators	Corporation tax	33% of profits
	Wealth taxes	2.4% of asset values between COP 3 billion and COP 5 billion, and 4.8% for asset value exceeds COP 5 billion
	Industry and commerce tax	between 0.2 and 1% of revenues
	Property tax	between 0.1 and 1.6%
	Tax on financial transactions	0.4% (applies to every financial transaction)
Mobile specific taxation on mobile operators	Universal Service Fund	5% of revenues

Source: Mobile operators' data

Corporation tax in Colombia is levied at 33% of profits, which is higher than many other countries in Latin America.

**Figure 133: Corporation tax rates, 2012**

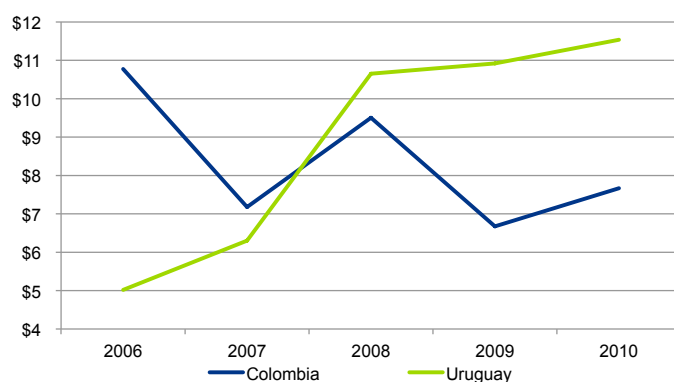
Source: Deloitte analysis

A high corporation tax may act as a deterrent for foreign investment in the Colombian mobile market. Public policies instead should aim to promote the development of the mobile telecommunications sector by making Colombia a more attractive investment market.

Instead, the corporation tax in Colombia is charged on companies even if they do not make any profit. When this occurs, companies are charged corporation tax on a minimum profit defined as 3% of equity. This policy discourages investment, as it hits mobile operators independently of their level of profitability. In a given year, these taxes have the same effect on operators with positive profits and operators with no profits due to recent network investment.

Tax rebates on corporation tax rates have been adopted by other countries such as Uruguay in order to encourage investment in the mobile phone sector. The corporation tax rate in Uruguay is substantially lower (23%) than in Colombia. In addition, the government allows mobile operators to benefit from significant tax incentives (almost halving their corporate tax contribution) in recognition of their economically and socially beneficial operations.

As a result, in 2006 Uruguay had capital expenditure per capita in the mobile phone sector which was 46% that of Colombia. However in the last 5 years in Uruguay, capital investment in mobile telephony per capita has doubled, while in Colombia CAPEX per capita has fallen by 30%.

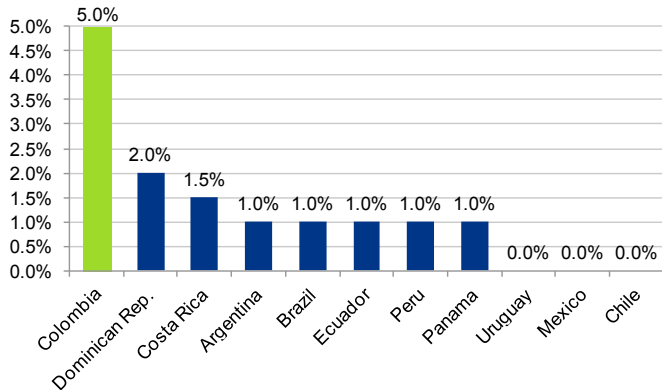
**Figure 134: Average capex per capita in Colombia and Uruguay (USD)**

Source: WI and Deloitte Analysis

Unlike many other countries in Latin America, Colombia also applies a "wealth tax" (impuesto al patrimonio) on companies, which has varied between 1.2 and 4.8% of total assets' value since 2007. Currently, the wealth tax is payable by corporations and individuals with asset values greater than COP 3 billion. The rate applied is 2.4% for asset values between COP 3 billion and COP 5 billion, and 4.8% is applied if the asset value exceeds COP 5 billion.

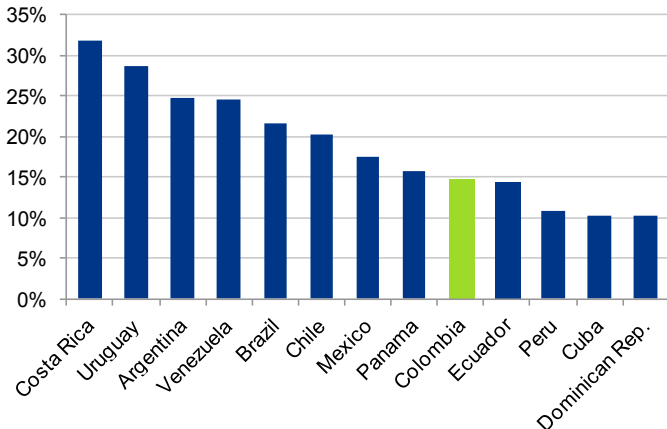
By hitting mobile operators' assets, wealth taxes act as an additional disincentive for mobile operators to invest in network infrastructure.

In addition to these taxes, mobile operators contribute 5% of their revenues to the government's Universal Service Fund. This is by far the highest USF contribution among the major Latin American markets.

**Figure 135: Contributions to the Universal Service Fund**

Source: Operators' data

While the USF typically subsidise the provision of telecoms services to rural or underserved areas, the comparatively lower levels of fixed teledensity in Colombia suggest that it is mobile telephony the primary provider of communications in the country.

**Figure 136: Fixed telephone lines per 100 people, 2010**

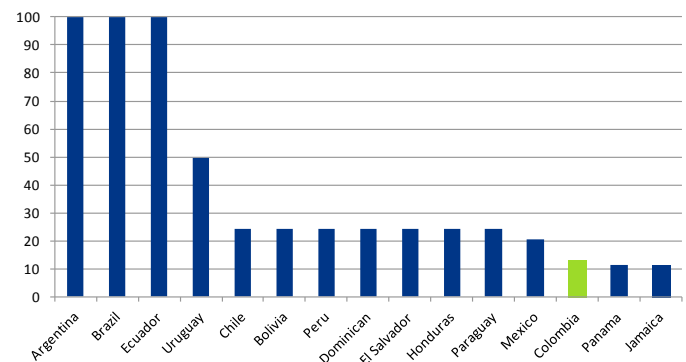
Source: World Bank data

Colombian mobile operators are also subject to other general forms of taxation:

- An "industry and commerce tax", which taxes industrial, commercial and services activities at a rate ranging between 0.2% and 1% of revenues.
- A "property tax" (impuesto predial), which ranges between 0.1% and 1.6%. This tax is levied annually by each municipality on the ownership of real estate properties located in Colombia.
- A 0.4% tax applies to every financial transaction (domestic or international).

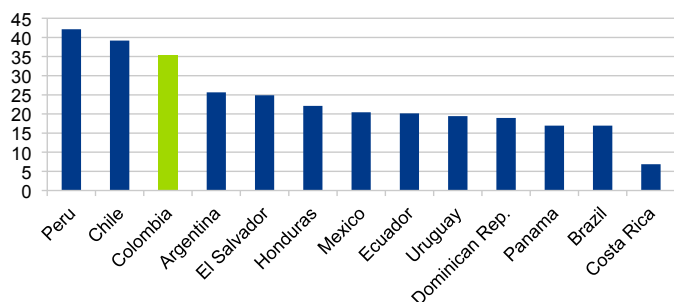
The combined effect of these taxes risks having a negative impact on investment in Colombia.

Colombia would receive particular advantages from greater investment in mobile internet technologies. Speeds on existing mobile broadband services are lower than in many other Latin American countries, and the alternative of fixed broadband is more expensive.

**Figure 137: Maximum access speed for mobile broadband (Score 0-100)**

Source: GSMA's "Latin American Mobile Observatory 2011"

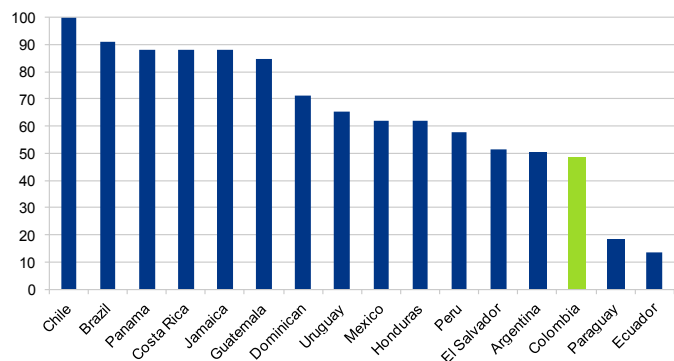
**Figure 138: Fixed broadband monthly cost (USD, 2010)**



Source: ITU's World Telecommunication/ICT Indicators Database

These factors could be expected to deter the use of the internet, a key source of the economic benefits associated with mobile telephony. For instance, Colombia has a much lower level of internet use by businesses than in many other Latin American countries.

**Figure 139: Use of the internet by businesses (score 0-100), 2010**



Source: GSMA's "Latin American Mobile Observatory 2011"

# Appendix E Country case study: Chile

This Appendix provides an analysis of the impact of mobile telephony on Chilean citizens and the economy in the last four years (2008-2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in Chile, evaluating the effects that mobile specific taxes have on the industry and the wider economy.

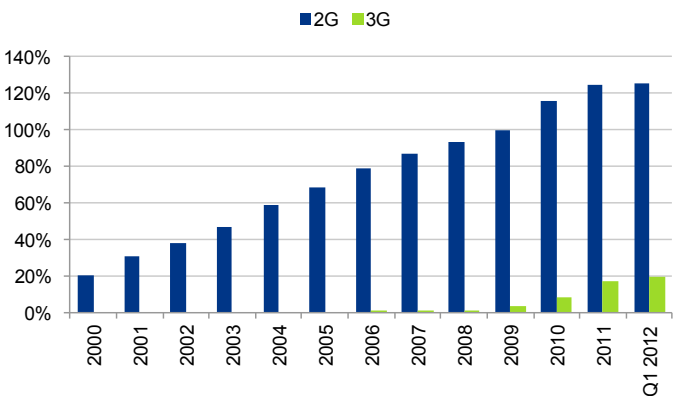
This Appendix is based on discussions and data provided by a leading mobile operator. Additional data has been provided by the GSMA and taken from publicly available sources that are referenced throughout.

## E.1 Mobile telecommunications in Chile

The three largest mobile operators in Chile are Entel, Movistar and Claro, with market shares of 38.7%, 38.1%, and 22.6%, respectively, in Q2 2012. Nextel and VTR Movil had 0.58% of the market between them.<sup>84</sup>

In Chile, the number of mobile subscribers has increased every year for over a decade, with the total number of connections reaching 25.3 million in Q2 2012. The number of 3G connections in Chile has also increased in recent years and has reached over 4 million connections. Total penetration of all connections reached 145.4% in Q2 2012.

Figure 140: Mobile and 3G penetration levels



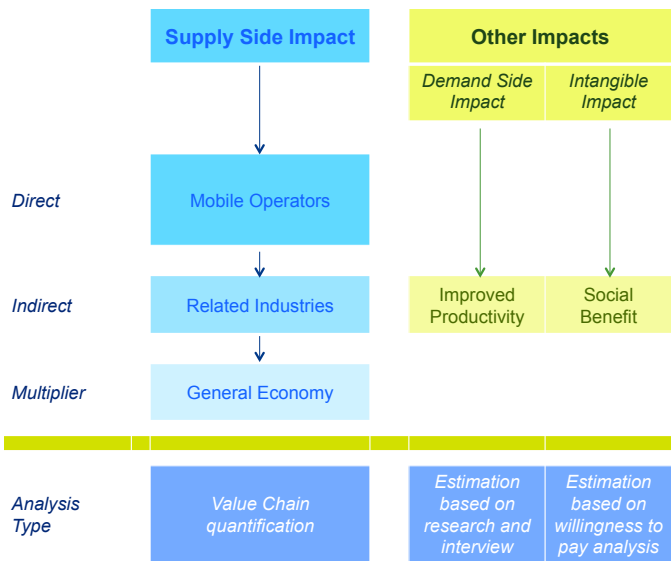
Source: Wireless Intelligence<sup>85</sup>

<sup>84</sup> Wireless Intelligence.  
<sup>85</sup> Data is for Q4 unless otherwise indicated.

## E.2 The economic contribution of mobile telephony to the economy

Mobile telephony in Chile generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits gained by Chilean consumers.

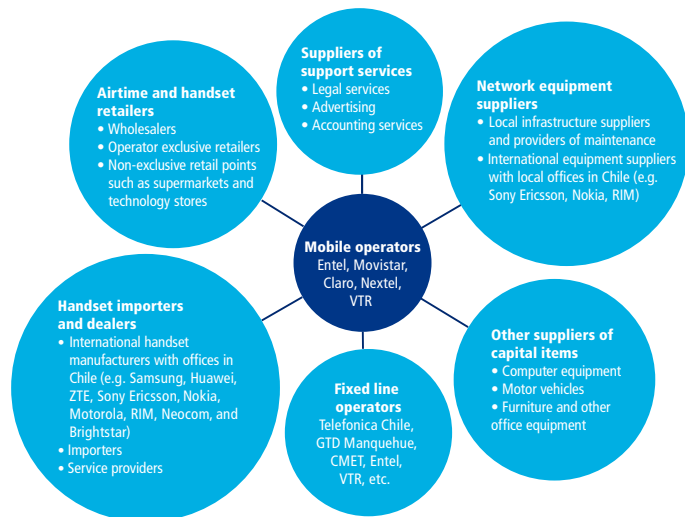
Figure 141: Estimation of the economic impacts of mobile telephony



Source: Deloitte

In addition to the mobile operators, the Chilean mobile telecommunications industry is composed of a wider ecosystem of players. These include equipment providers (international equipment manufacturers with offices in Chile, such as Ericsson, Nokia and ZTE), providers of other network services such as installation and maintenance, handset importers and distributors, airtime distributors and sellers (including a host of retail points throughout the country), and suppliers of other services (such as advertising and accounting) to mobile operators.

Figure 142: Mobile telecommunications ecosystem



Source: Deloitte analysis based on mobile operator data and market research

This study estimates the economic impact of the mobile industry in terms of the direct and indirect effects provided to the supply side of the Chilean economy by the mobile operators and by players in the wider mobile ecosystem, and of direct and indirect employment from firms in the ecosystem.

The study also discusses the potential productivity increases 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

The total supply side value add created through the mobile operators and the wider mobile ecosystem is estimated as the sum of three components: direct, indirect, and induced impacts.

The direct impacts generated by mobile operators include mobile operators' expenditure on wages, CSR programmes, dividends paid by mobile operators and taxes recovered as a result of the mobile operators' operations. These were estimated at approximately CLP 766 billion for 2011. In 2009, the direct impact estimated at over CLP 572 billion includes one-off payments for mobile service licences and 3G spectrum purchased by operators. These one-off payments, estimated at CLP 9.9 billion, directly benefitted the Chilean government.

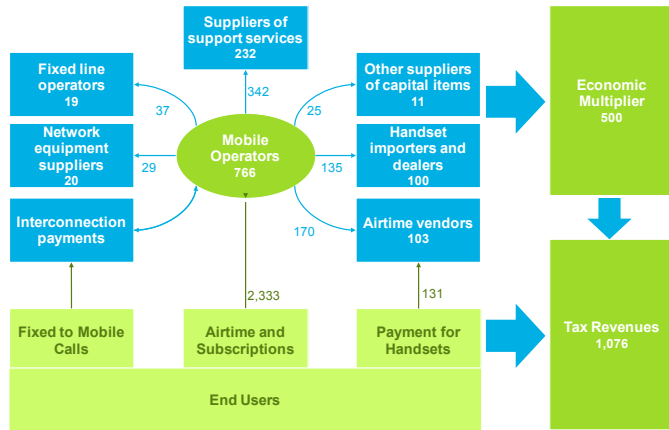
Figure 143: Direct domestic value add of mobile operators (excluding multiplier effect), CLP billions



Source: Deloitte analysis based on data provided by the mobile operators, interviews and analysis of company accounts. Figures exclude multiplier.

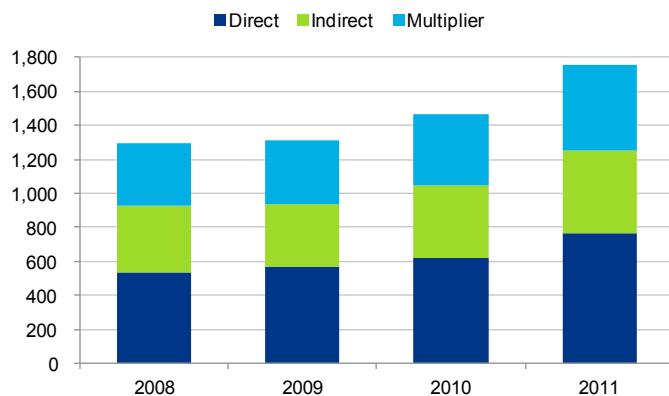
The indirect impacts from mobile operators' expenditure to parties in the wider mobile ecosystem represents the percentage of any amount spent by end users that remains within the national boundaries, which serves as value add to be spent again. These are calculated by examining mobile operators' payments to their suppliers of support services in the wider mobile ecosystem. The amount of value add, including wages, profits and taxes generated by these players, is then estimated. These effects were estimated at CLP 485 billion for 2011.

The induced impacts reflect the subsequent rounds of expenditure created by direct and indirect spend. For example, they include the increased domestic consumption afforded by increased employment. The induced effects were estimated using a spending multiplier of 40% to capture the broader effects on the wider economy. These are estimated at CLP 500 billion for 2011.

**Figure 144: Mobile value chain and value add in 2011, CLP billions**

Source: Deloitte analysis ; Values in the boxes represent value add

Combining the impacts described above, mobile operators in Chile in 2011 created an estimated CLP 1,751 billion in value add in through the supply side in 2011.

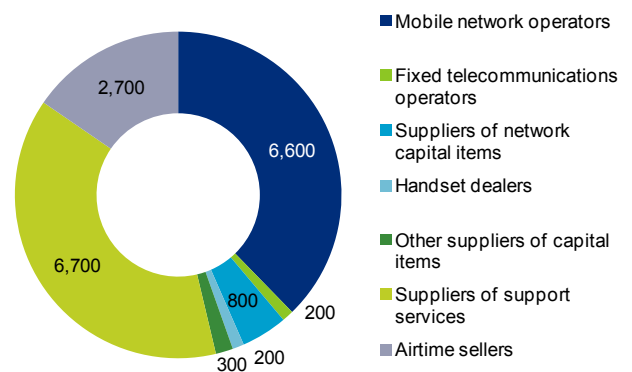
**Figure 145: Supply side value add from mobile telecommunications by component, CLP billions**

Source: Deloitte analysis<sup>86</sup>

## Impact on employment

Mobile services in Chile contribute to employment in several ways, including direct employment by the mobile operators. Mobile operators also indirectly generate employment in the wider economy as a result of their expenditures. In addition, the government also subsequently spends on employment-creating activities using tax revenues generated directly and indirectly by the mobile sector. Additional induced employment is created by mobile sector employees and beneficiaries spending their earnings, thereby creating more employment.

It was estimated that in 2011 the mobile telecommunication industry supported the employment of over 6,600 Full Time Equivalents ('FTEs') in Chile. A further 10,900 FTEs are estimated to be generated in the wider mobile ecosystem as a result of mobile operators' expenditures.

**Figure 146: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**

Source: Deloitte analysis (differences due to rounding). Figure excludes multiplier.

Of the FTEs employed by the wider economy as a result of mobile operators' expenditures, over 2,700 are the airtime dealers and retailers operating from supermarkets, technology stores and smaller independent points of sale. In addition, while handsets are typically designed and produced abroad, international manufacturers including LG, Motorola and Samsung have established permanent bases in Chile. Handset dealers employed approximately 200 FTEs. Network equipment providers such as Ericsson, Huawei, and Nokia Siemens also have a presence in Chile to provide support to mobile operators, employing approximately 800 FTEs.

## Value add from taxation

A major source of the value added by mobile operators originates from the tax revenues they generate. In 2011, mobile operators in Chile paid approximately CLP 563 billion to the government in taxes and regulatory fees, composed primarily of sales and other consumer taxes. Due to low profits over the period, Chilean mobile operators paid no corporation taxes, and other tax payments by operators were lower than those levied on consumers.

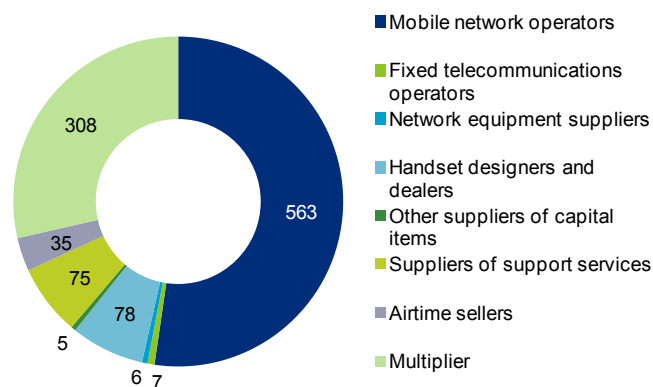
<sup>86</sup> The multiplier is not applied to the one-off payments for mobile service licences and 3G spectrum.

**Figure 147: Tax and regulatory payments from mobile operators, CLP billions**

Source: Deloitte analysis based on mobile operator data

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another CLP 206 billion for the government in 2011.

A further CLP 308 billion tax revenues were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 148: Total tax revenues from the mobile telecommunications ecosystem in 2011, CLP billions**

Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note: This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.

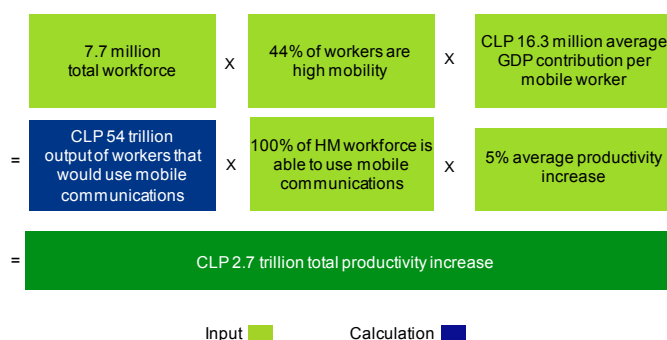
## Productivity impacts

In addition to benefits to the supply side of the economy, mobile telephony in Chile increases productivity through the use of wireless services for business purposes, as well as intangible and social benefits to consumers.

Mobile services have led to productivity increases in Chile through numerous ways. In particular, these included the following:

- Businesses and consumers who use mobile internet services experience productivity improvements. These benefits can be enhanced by access to devices such as smartphones, tablets and dongles.
- The M2M services introduced by the main operators for their business clients improve productivity and efficiency in various business areas, by allowing rapid exchange of data between a number of remote machines and a server that manages the information flows.

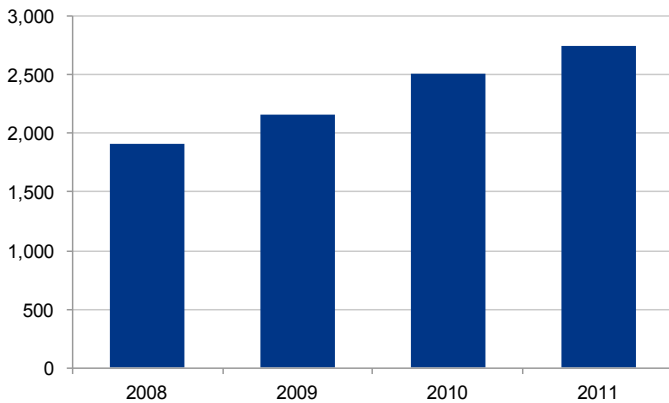
An economic value approach can be employed to provide a high level estimate of potential productivity benefits. This indicates that, if mobile workers in Chile achieved a 5% increase on their productivity as a result of using mobile phones, the potential productivity impact of mobile services on the economy would have been CLP 2.7 trillion in 2011, an increase of 44% from 2008.

**Figure 149: Economic impact in 2011 of increased productivity amongst high mobility workers**

Source: Deloitte analysis based on Deloitte assumptions, interviews and Chile national statistics authority



**Figure 150: Economic impact of increased productivity amongst high mobility workers, CLP billions**



Source: Deloitte analysis

## Consumer impacts

Mobile telecommunications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion, the extension of communication to those with low incomes and assistance in disaster relief. Consumers also benefit through CSR programmes undertaken by the mobile operators, including health and education programmes.

A number of CSR projects and services provided in Chile by mobile operators deliver significant tangible and intangible benefits to consumers and to businesses:

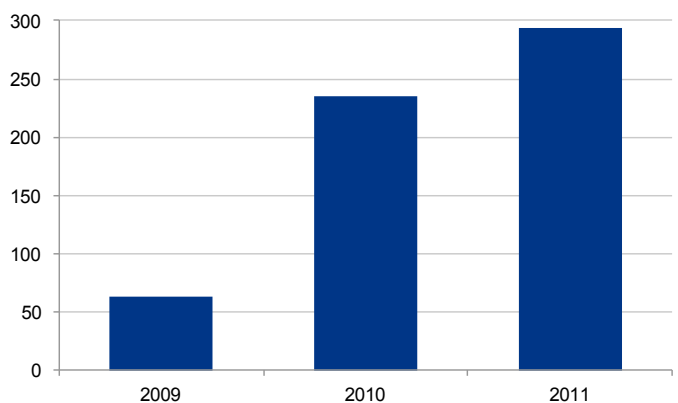
- Movistar, in collaboration with the Telefónica Foundation, operates the Proniño programme, which supports children's education and welfare.
- Movistar created the Innova initiative and website in 2011, which is the first business and private enterprise incubator in Latin America. The initiative provides information and support to entrepreneurs in Chile and the region.
- Movistar has set up mobile antennas in remote areas to provide connectivity and has launched call centres in indigenous local languages such as Mapudungun.
- Claro participates in the "(RED) Rush to Zero" campaign against HIV/AIDS. América Móvil is working with mobile equipment manufacturers BlackBerry, Sony Mobile, Samsung, LG, Nokia, and HTC to offer a product line that will support the RED campaign.

- Mobile phones were widely used in Chile to communicate during the 2010 earthquake. Many consumers reported using 3G broadband to communicate via social media.

In addition to these social benefits, competition in the industry resulted in a reduction of prices, with the price for a three-minute peak local call falling by 80% from 2005 to 2009,<sup>87</sup> and leading to usage increases.

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 have increased over time in the last four years. This approach suggests that consumers potentially enjoyed the equivalent of up to CLP 294 billion in intangible benefits in 2011.

**Figure 151: Intangible benefits using willingness to pay concept, CLP billions**



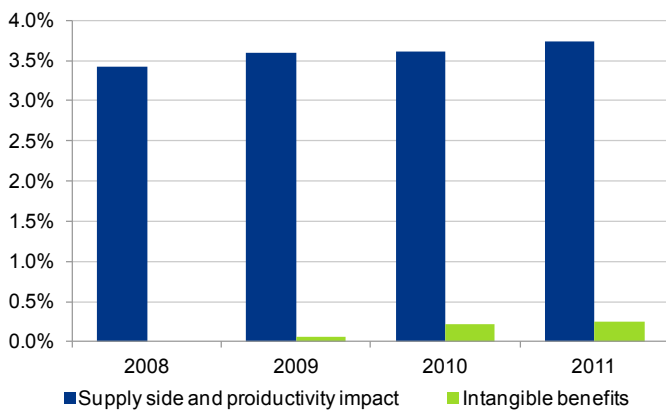
Source: Deloitte analysis

## Total impacts

In 2011, the overall impact of mobile telephony on the Chilean economy was estimated to be CLP 4.5 billion, representing 3.7% of GDP, plus up to an additional CLP 0.3 billion from intangible consumer benefits.

<sup>87</sup> ITU database.

**Figure 152: Economic impact of mobile telephony as a proportion of GDP**



Source: Deloitte analysis

### E.3 Taxation on consumers and mobile operators

Mobile consumers and mobile operators in Chile pay a variety of taxes and fees.

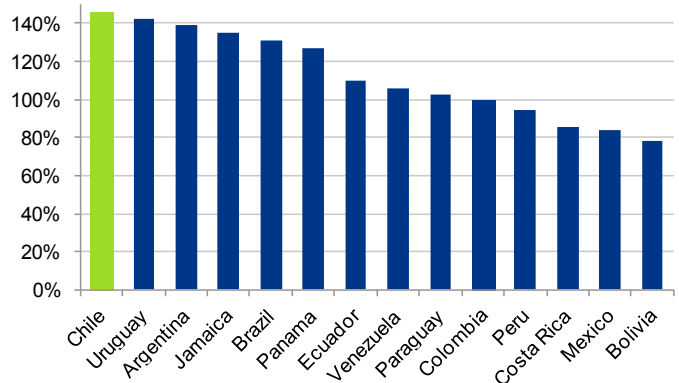
#### Consumer taxes

Consumers in Chile pay two taxes on mobile telecommunications:

- A standard 19% VAT is applied to most goods and services in Chile, including mobile services and handsets; and
- A standard 6% customs duty is applied to imports of most goods in Chile, including mobile handsets and other mobile devices.

As mobile telecommunications are not subject to any sector-specific taxes or higher-than-normal tax rates, the sector in Chile is not subject to distortionary tax treatment. This supportive tax regime has enabled Chile to achieve the highest mobile penetration rate compared to neighbouring countries.

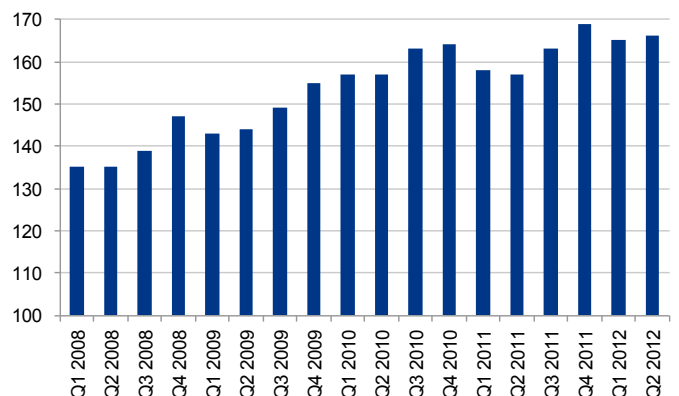
**Figure 153: Mobile penetration, Q2 2012**



Source: Wireless Intelligence

Supported by the tax regime, minutes of use (MOU) per user and total MOU have increased since 2008.

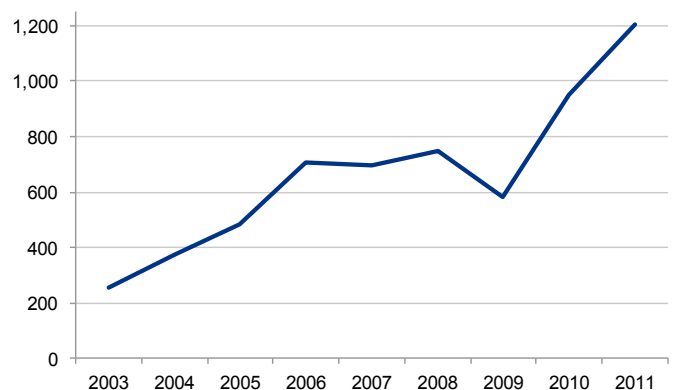
**Figure 154: Average MOU per user**



Source: Deloitte analysis based on Wireless Intelligence data

Additionally, imports of mobile phones in Chile have increased steadily over recent years, allowing consumers to benefit from imported mobile phones.

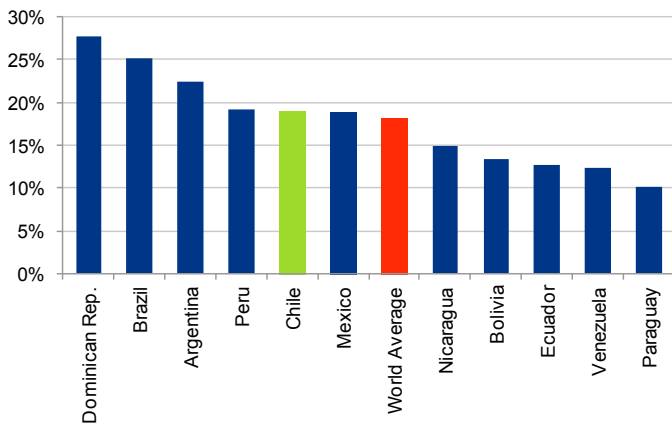
**Figure 155: Value of imported mobile phones (USD millions)**



Source: Chilean Central Bank

However, Chile's VAT rate, which is amongst the highest in the region, and customs duty contribute to tax's share in the Total Cost of Mobile Ownership (TCMO) for mobile users being higher than in other Latin American countries and the world average.

**Figure 156: Tax as a percentage of TCMO, 2011**

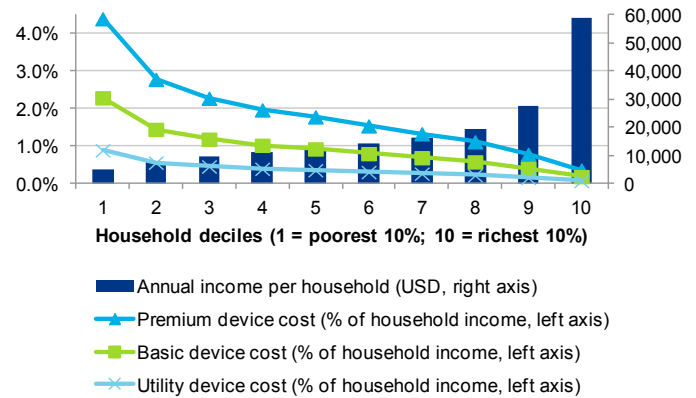


Source: Deloitte/GSMA Global Mobile Tax Review 2011

This tax burden, by increasing costs, may especially affect low-income consumers, for whom the cost of mobile phones represents a key barrier to ownership. Income inequality in Chile is amongst the highest in the world, with a Gini coefficient of 52.06 and 15% of the population below the national poverty line in 2009.<sup>88</sup>

The high cost of mobile devices due to taxes, especially customs duty, may prevent poorer members of the population from accessing mobile services and deriving benefits from consumption of mobile telephony. This is particularly problematic in the case of premium devices such as smartphones, where the price of a smartphone can represent more than 4% of a household's annual income for poorest households, compared to less than 0.2% of household income for the wealthiest households.

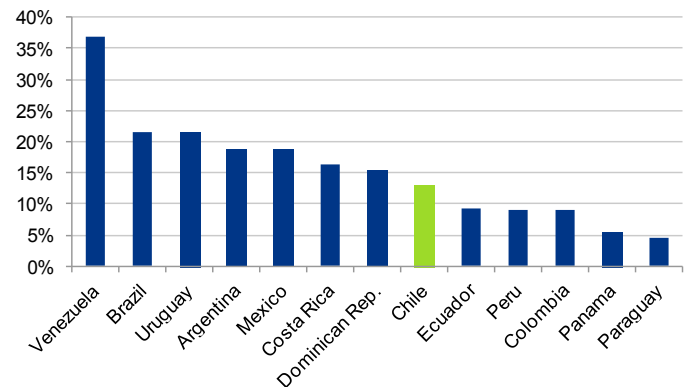
**Figure 157: Mobile telecommunication device costs as a percentage of household annual income, 2010**



Source: Deloitte analysis based on Instituto Nacional de Estadísticas and Gartner data

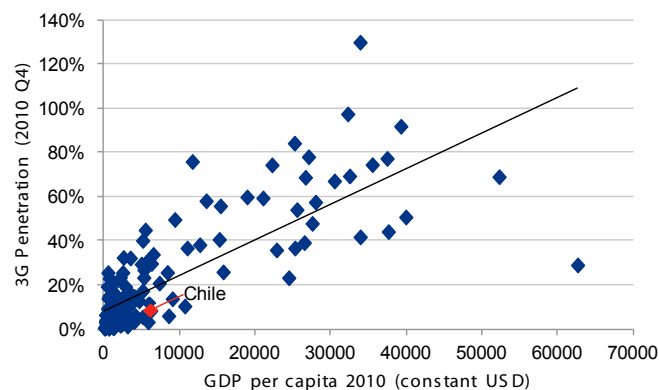
Taxes on smartphones and 3G service usage may limit access to mobile internet and may have contributed to Chile's relatively low 3G penetration compared to neighbouring countries and compared to the level that would be expected for a country with Chile's income. Since handsets and smartphones may represent the only possibility for accessing broadband internet for certain sectors of the population and in rural areas, handset taxes such as customs duties and VAT may lead to underconsumption of internet services, thus worsening the Digital Divide.

**Figure 158: 3G penetration, Q4 2011**



Source: Wireless Intelligence

Figure 159: 3G penetration relative to income, 2010

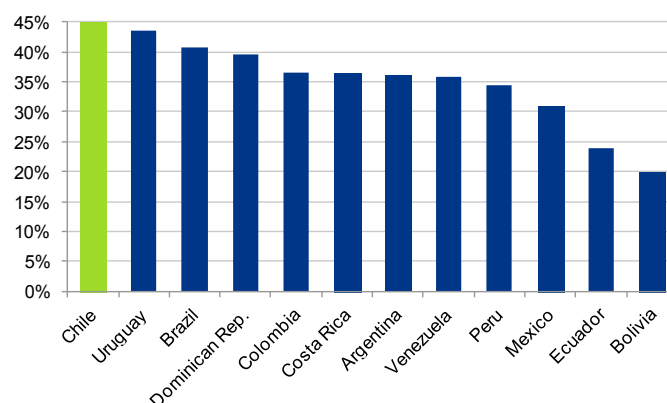


Source: Deloitte analysis based on Wireless Intelligence and World Bank data

The expansion of 3G networks and data usage in Chile is expected to result in numerous economic benefits, including an improvement in GDP growth. A forthcoming Deloitte/GSMA study<sup>89</sup> found that a 10% increase in 3G penetration per 100 people leads to a 0.15 percentage point increase in GDP per capita growth. At Chile's current 3G penetration rate of 23%<sup>90</sup>, an increase of 10 3G users per 100 people would result in an increase in GDP per capita growth of 0.6%. The study also found that increases in data usage by existing 3G subscribers result in GDP per capita growth improvements, benefitting users and the economy at large. The study found that on average across the countries studied, doubling usage per connection results in GDP growth of 0.5 percentage points.

3G services are an important growth opportunity for Chile. While Chile's internet penetration rate is among the highest in Latin America, more than half of the population does not use the internet, making Chile lag behind the G7. In this context, mobile broadband represents an important opportunity for Chile to catch up with the rest of the world and digitise its economy and for Chileans to access the internet.

Figure 160: Internet users per 100 people, 2010



Source: World Bank data

### Taxes paid by operators

The taxes and regulatory fees paid by Chilean operators are summarised in the table below.

Table 3: Taxes and regulatory fees paid by mobile operators, 2012

Category	Tax	Tax rate
Taxes	Corporate tax	18.5% tax on profits.
	Withholding tax on income derived by non-residents	Generally 35% on the gross amount. <sup>91</sup>
	Customs duties on network equipment	6% tax on price of imported goods.
Regulatory fees	Mobile service licences	One-off fees paid every 30 years.
	Spectrum usage fees	One-off fees determined in spectrum auctions and annual fees.

Source: Deloitte analysis

The tax and regulatory fee regime in Chile is relatively supportive of mobile operators if compared with other countries in the region, with relatively low rates for corporate taxes and customs duties, no unique or higher-than-normal taxes for mobile operators, and fewer regulatory fees than in other countries.

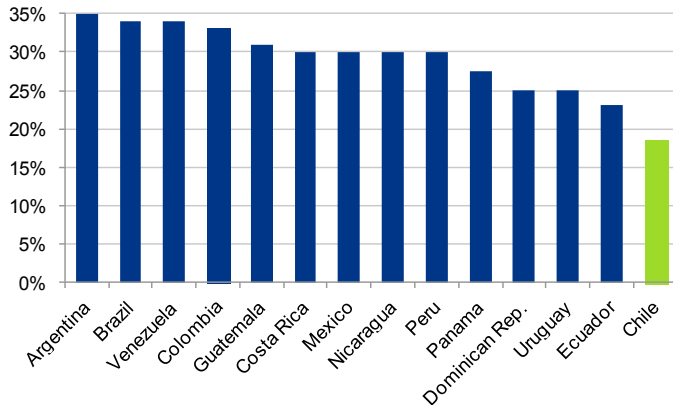
For example, the corporation tax rate paid by mobile operators is the lowest in the region; currently set at 18.5% in order to finance reconstruction after the 2010 tidal wave and earthquake, the rate is set to decline to its normal level of 17% in 2013.<sup>92</sup>

<sup>89</sup> Forthcoming Deloitte/GSMA study entitled "What is the impact of mobile telephony on economic growth?"

<sup>90</sup> Wireless Intelligence, Q2 2012.

<sup>91</sup> Different rates apply depending on the type of income. International telecommunications are exempt.

<sup>92</sup> IBFD (January 2012): Tax Research Platform.

**Figure 161: Corporate tax rates, 2012**

Source: IBFD Tax Research Platform; Deloitte analysis

The relatively low corporate tax rate has encouraged investment in the sector by mobile operators, enabling upgrades in networks that benefit customers through improved service quality and increased service coverage.

However, withholding taxes are charged on income derived by non-resident companies, generally at a rate of 35%. This impacts Movistar, Claro and Nextel in particular, as these operators are non-resident companies. A key concern for these operators is that as the withholding tax rate is the highest in the sample of countries studied, it may deter foreign direct investment in Chile by reducing the potential return on investments. This could prevent mobile operators from maintaining or improving network and service quality or investing in next generation networks for mobile broadband.

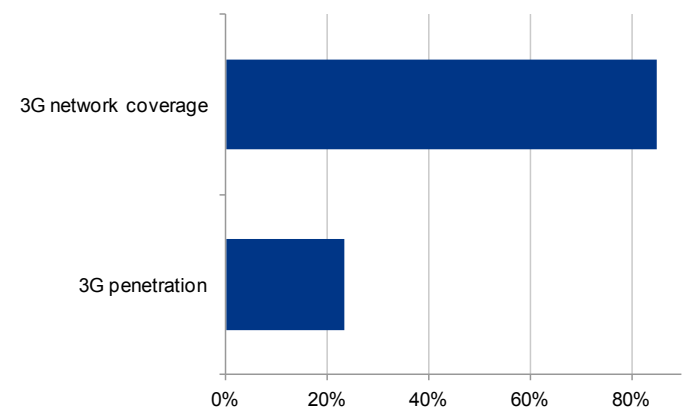
Mobile operators in Chile are also subject to service licences and spectrum usage fees. Licence fees are paid to the regulator once every 30 years. Spectrum usage fees are determined at auction and are payable annually. These fees present a high cost to mobile operators; Nextel paid USD 14.6 million for two 30MHz blocks of spectrum and VTR paid USD 3 million for a single 30 MHz block in 2009.

Mobile operators' tax and regulatory fee obligations raise their operational costs. As a result, mobile operators must either suffer a consistent reduction in their profitability or pass these taxes through to consumers in a non-transparent way, as they cannot itemise the tax in prices or receipts.

## E.4 Conclusion

Mobile operators in Chile have benefitted from price liberalisation in recent years. As the market has become more competitive, price and access regulation has lessened, reducing operators' regulatory burdens.

Tax policies that are relatively supportive of mobile operators compared to other countries in the region have encouraged investment in Chile's networks, as demonstrated by 3G network coverage of over 80% of the population. However, tax policies that support mobile consumers are needed in order to raise 3G user numbers and assure that all Chileans have access to mobile telephony.

**Figure 162: 3G coverage (Q4 2009) and penetration (Q2 2012)<sup>93</sup>**

Source: Wireless Intelligence

<sup>93</sup> Network coverage data is available for Claro only and reflects the most recent data available (Q4 2009).

# Appendix F Country case study: Peru

This Appendix provides an analysis of the impact of mobile telephony on Peru and its economy in the last four years (2008 to 2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in Peru, and discusses the effects that mobile specific taxes have on the industry and the wider economy.

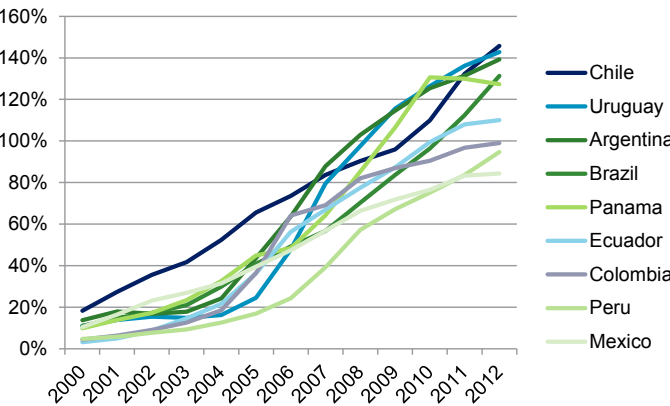
This Appendix is based on discussions and data provided by a leading mobile operator, publicly available information relating to other mobile operators, data from the Wireless Intelligence, and data from publicly available sources that are referenced throughout.

## F.1 Mobile telecommunications in Peru

Peru is one of the larger countries in Latin America, with the fifth highest GDP and population on the continent.<sup>94</sup> It has a well established mobile market characterised by three mobile operators, Movistar, Claro and Nextel each having market shares of approximately 52%, 43% and 5%.<sup>95</sup> Around 70% of connections in the market are prepaid.

Penetration is currently about 95%. While penetration rapidly increased from approximately 20% in 2006, it has persistently lagged behind many other Latin American countries.

Figure 163: Mobile penetration, 2000-2012



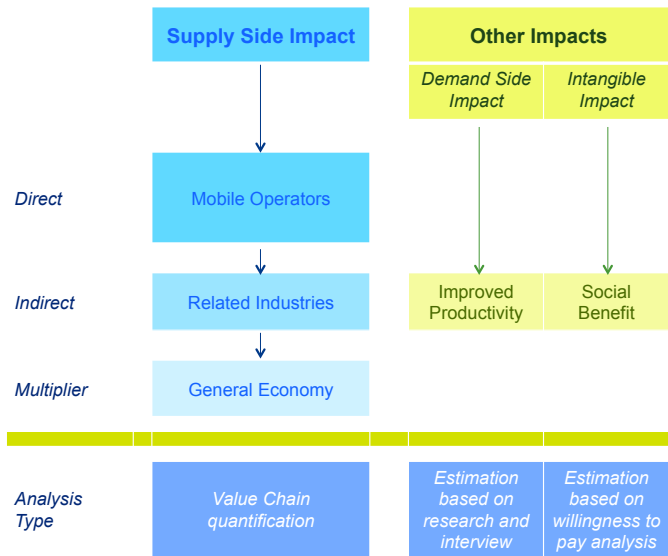
Source: Wireless Intelligence

Penetration of 3G services, including wireless data and broadband, has reached 8%.

## F2 The economic contribution of mobile telephony to the economy

Mobile telephony in Peru generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits to consumers.

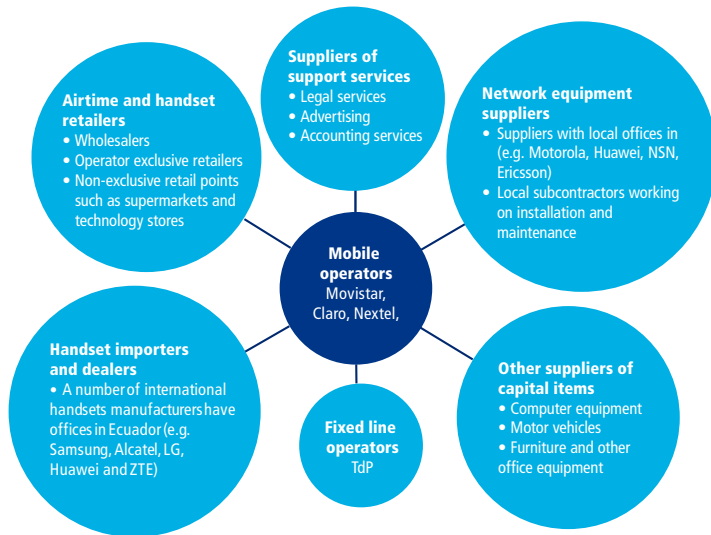
Figure 164: Estimation of the economic impacts of mobile telephony



Source: Deloitte analysis

While these benefits are delivered principally by the mobile operators, the mobile telecommunications ecosystem in Peru also benefits from players such as international equipment providers who have established bases in Peru; airtime and handset wholesalers; and suppliers of other services to mobile operators such as accounting, advertising and other support services.

94 Based on World Bank data.  
95 Wireless Intelligence (June 2012).

**Figure 165: Mobile telecommunications ecosystem**

Source: Deloitte analysis

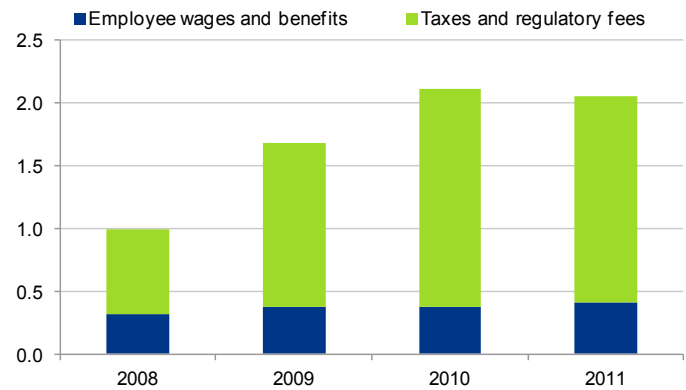
The economic impact of the mobile industry is discussed below in terms of the direct and indirect effects provided to the supply side of the Peruvian economy by the mobile operators and by players in the wider mobile ecosystem, and in terms of direct and indirect employment from firms in the ecosystem. Also discussed are the productivity impacts on the Peruvian economy resulting from mobile workers using their phones and tablets for business purposes, as well as the social benefits enjoyed by consumers as a result of access to mobile services.

### Supply side impact

Mobile operators provide numerous benefits to the supply side of the Peruvian economy through the direct effect of their expenditure, and these benefits flow through to related industries in the mobile ecosystem and more widely across the economy.

To calculate the value add generated by the industry, the value add created directly by the mobile operators was first estimated. This consists of the value add created by the mobile operators' expenditure on wages, dividends and taxes collected as a result of the mobile operators' operations.

In 2011, Peruvian mobile operators were estimated to have provided a direct contribution of PEN 2.1 billion to the country's economy. This represented an increase over previous years as a result of a reported growth in direct employment by the mobile operators, which led to an increase in the value add through employee wages and benefits.

**Figure 166: Direct domestic value add of mobile operators (excluding multiplier effect), PEN billions**

Source: Deloitte analysis based on data provided by the mobile operators, interviews and analysis of company accounts. Figures exclude multiplier.

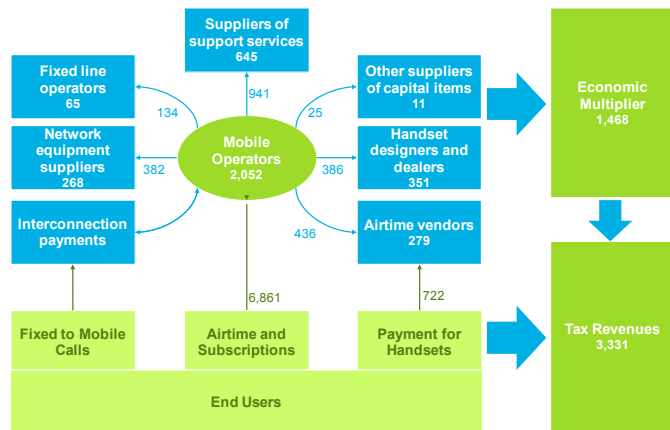
In addition to the economic contribution generated by the mobile operators, the indirect impacts from mobile operators' expenditure to stakeholders in the wider mobile ecosystem have been estimated, i.e. what percentage of any amount spent by the end users remains within the national boundaries to be spent in the next round. This is calculated by examining mobile operators' expenditures towards their supplier of support services in the wider mobile ecosystem. The amount of value add, including wages, profits and taxes generated by these players is then estimated. Finally, a spend multiplier was applied to capture the effects on the wider economy.

This analysis finds that the indirect impacts from the mobile ecosystem amounted to PEN 1.6 billion, while the overall multiplier effect from the wider economy consisted of PEN 1.5 billion.

The value add relationship between the mobile operators and related industries in the ecosystem is shown below. The estimates of value add include the multiplier effect on the wider economy which is assumed to be 40% of the revenues generated by the mobile operators and the related supply chain.



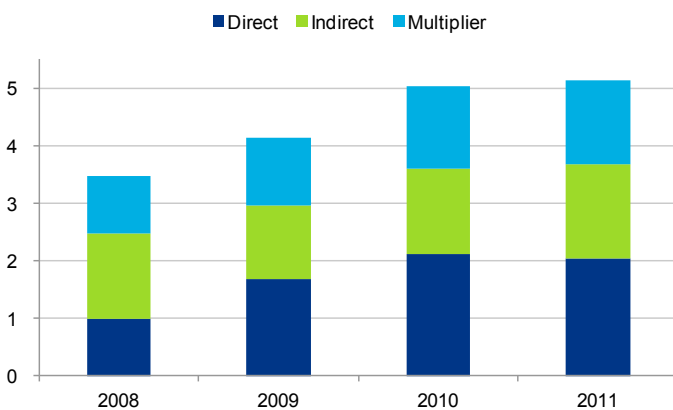
**Figure 167: Mobile value chain and value add in 2011, PEN millions**



Source: Deloitte analysis; Values in the boxes represent value add

As such, in 2011 the mobile telecommunications industry contributed PEN 5.1 billion from supply side impacts to the Peruvian economy.

**Figure 168: Supply side value add from mobile telecommunications by component, PEN billions**



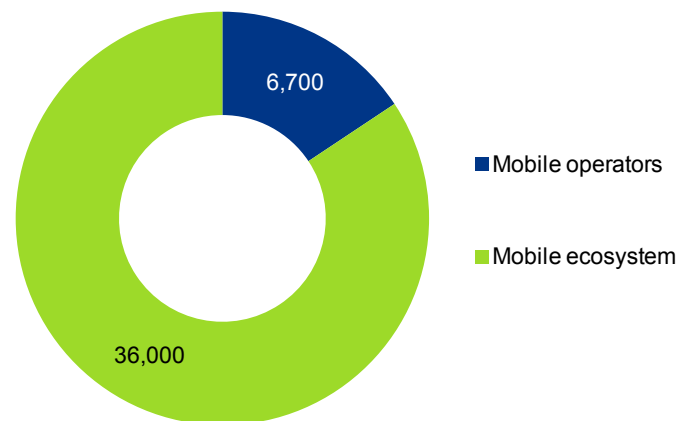
Source: Deloitte analysis

## Impact on employment

Mobile services in Peru contribute to employment in several ways, including direct employment by the mobile operators. Mobile operators also indirectly generate employment in the wider economy as a result of their expenditures. In addition, the government also subsequently spends on job creating activities using tax revenues generated directly and indirectly by the mobile sector. Additional induced employment is created by mobile sector employees and beneficiaries spending their earnings, thereby creating more employment.

It is estimated that in 2011 the mobile telecommunication industry directly supported the employment of almost 6,700 Full Time Equivalents ('FTEs') in Peru. Based on benchmarks of indirect employment generated by the mobile ecosystem in other Latin American countries,<sup>96</sup> a further 36,000 FTEs are estimated to be generated in the wider mobile ecosystem as a result of mobile operators' expenditures. Suppliers of network capital items and of network support services, e.g. installation, maintenance and security, handset importers and dealers, airtime sellers in retail shops and kiosks, and suppliers of other support services (advertising, accounting, etc.) are all professions that benefit from mobile operators' expenditures.

**Figure 169: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**



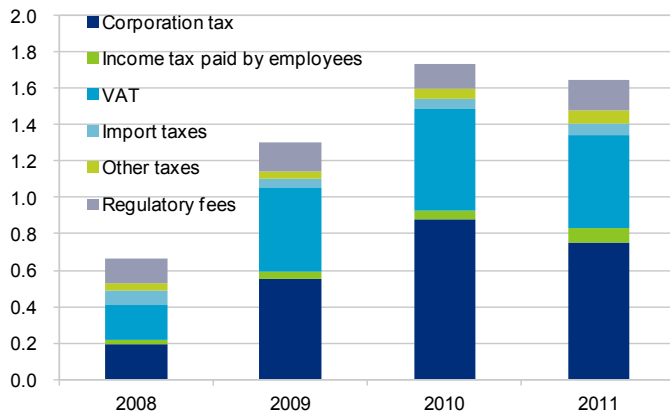
Source: Deloitte analysis (differences due to rounding). Figure does not include multiplier.

## Value add from taxation

A major source of the value added by mobile operators originates from the tax revenues they generate. In 2011, mobile operators in Peru paid approximately PEN 1.6 billion to the government in taxes and regulatory fees. This has increased from PEN 0.7 billion in 2008. The VAT rate decreased from 19% to 18% in 2011, contributing to a decrease in overall tax payments in 2011.

<sup>96</sup> Data on indirect employment was not available for Peru.

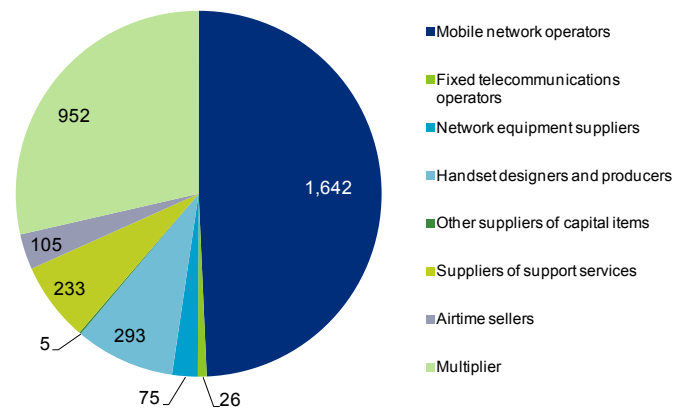
**Figure 170: Tax and regulatory payments from mobile operators, PEN billions**



Source: Deloitte analysis based on mobile operator data, excludes multiplier

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another PEN 737 million for the government in 2011. Considering the multiplier, the total tax generated is PEN 3.3 billion.

**Figure 171: Total tax revenues from the mobile value chain in 2011, PEN millions**



Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note: This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.

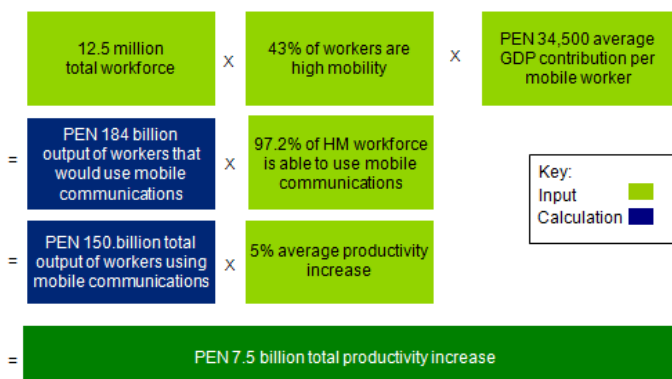
## Productivity impacts

In addition to benefits to the supply side of the economy, mobile telephony in Peru increases productivity through the use of wireless services for business purposes, as well as intangible and social benefits to consumers.

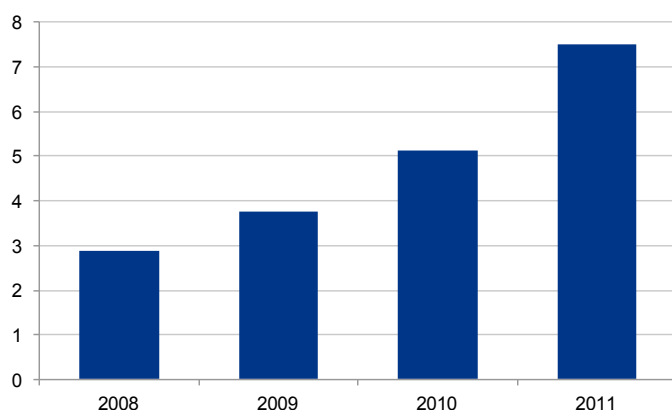
Discussions with mobile operators and other stakeholders identified a number of growing forms of increased worker productivity:

- While 3G and mobile data services are still limited to a low percentage of the population, businesses and other early adopters of these services experience productivity improvements. These benefits can be enhanced by access to devices such as smartphones, tablets, dongles which are used to access mobile broadband.
- The benefit M2M technology provides: for example, Movistar provides M2M SIM cards on automated platforms for wireless usage (including e.g. health and agriculture) for a number of organisations in the public and private sector. M2M technology provides connectivity without the need for investment in fixed telecoms infrastructure.

An economic value estimation can be undertaken to estimate these productivity effects by analysing the importance of mobile telephony to each sector of the Peruvian economy and by considering the impact of mobile phones on business workers. The economic value estimate indicates that, if business mobile phone users achieved a productivity improvement of 5%, the potential productivity impact would have been PEN 7.5 billion in 2011.

**Figure 172: Economic impact in 2011 of increased productivity amongst high mobility workers**

Source: Deloitte analysis based on Deloitte assumptions, interviews and Peru national statistics authority

**Figure 173: Economic impact of increased productivity amongst high mobility workers, PEN billions**

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

## Consumer impacts

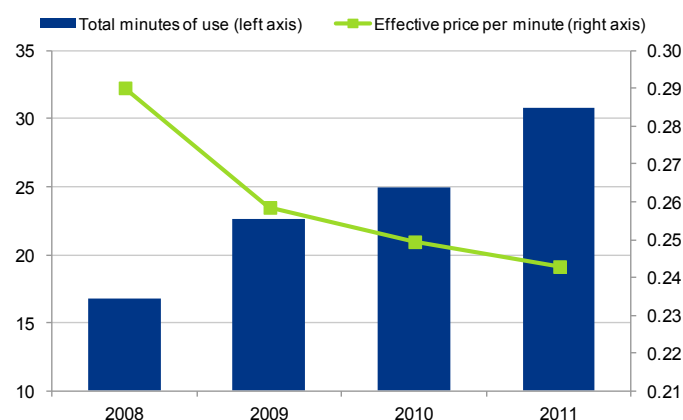
Mobile telecommunications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion and the extension of communication to those on low incomes. Consumers also benefit through corporate and social responsibility programmes undertaken by the mobile operators.

Health and education programs include “United Way Peru” from Claro which delivers school supplies and warm winter clothing in the mountain regions and over 34,000 free cataract eye operations. Claro also works with the Carlos Slim foundation to provide wheelchairs to veterans and children. Operators also support telephone health and lifestyle advice services. Movistar’s “Yellow Portal”, “Last Resource” and

“Line mom” provide drug and family guidance.

Mobile operators also perform a variety of initiatives to improve connectivity. On affordability, Peru’s “Fone ya” provides 560,000 households with a wireless-based house phone for just USD 0.30 per day. On coverage, Movistar’s “Integrare” project has extended mobile services to enfranchise an additional 98,000 rural inhabitants. On handsets, Claro’s network of 150 recycling points has recycled 34,000 handsets. Finally, operators also help in times of national distress, Movistar donated satellite phones to the 2010 floods relief effort.

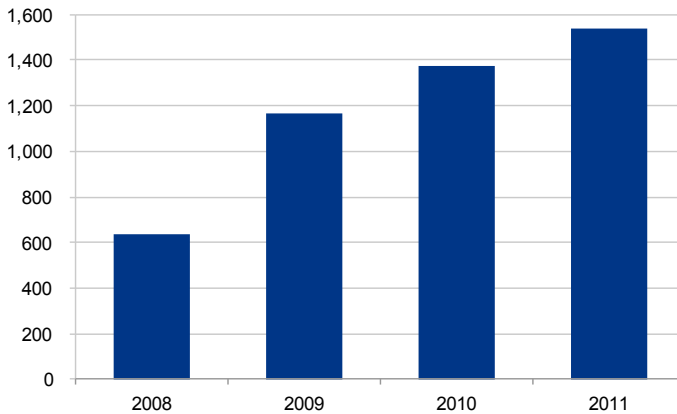
Consumers also benefit from competition and innovation within the mobile industry. During recent years in the competitive Peruvian mobile telephone market, the price of calls has fallen from an effective price per minute of PEN 0.29 to 0.24. Over the same period, the aggregate number of minutes has increased from 16 to 30 billion.

**Figure 174: Call price per minute (PEN) and total usage increases (billions), 2008-2011**

Source: Data from mobile operators

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 have increased over time in the last four years. This approach suggests that consumers potentially enjoyed the equivalent of over PEN 1.5 billion in intangible benefits in 2011.

**Figure 175: Intangible benefits using willingness to pay concept, PEN millions**



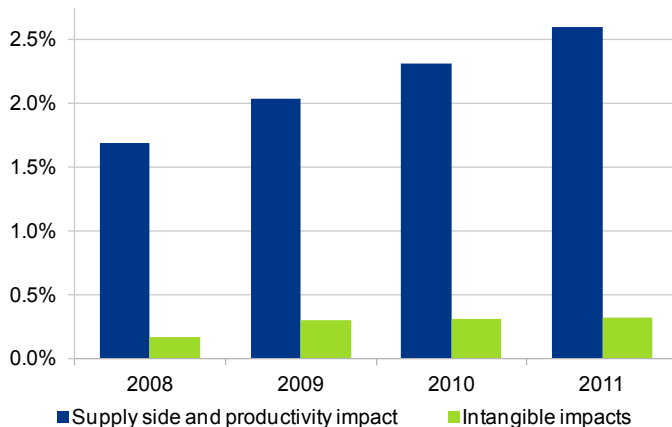
Source: Deloitte analysis

### Total impacts

In 2011, the overall impact of mobile telephony to the Peruvian economy was estimated to be PEN 12 billion, representing 2.6% of GDP, plus up to an additional PEN 1.5 billion from intangible consumer benefits.

This highlights the importance of mobile telephony on productivity and business in Peru. In a country with low fixed teledensity and a large geographically isolated and economically marginalised population, the benefits of mobile connectivity on productivity are a key element to economic development.

**Figure 176: Economic impact of mobile telephony as a proportion of GDP**



Source: Deloitte analysis

## F.3 Taxation on mobile consumers and mobile operators

### Consumer taxes

Consumers of mobile telephony services face sales taxes on both mobile usage and handsets.

**Table 4: Mobile specific taxation on consumers, 2011**

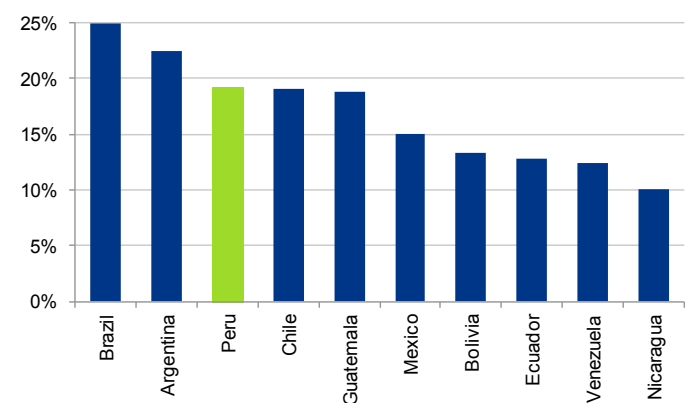
Product	Tax	Tax rate
Calls	VAT	18%
SMS		
Data		
Handsets	VAT	18%
SIM cards	VAT	18%

Source: Mobile operators' data

VAT is levied at the rate of 18% on all mobile services, including voice calls, texts and data services, and handsets.

While no mobile specific taxes apply to consumers in Peru, the rather high level of VAT affects both the cost of usage and, by increasing the cost of handsets, increases barriers to entry in the mobile market, especially for poorer consumers. Tax as a proportion of mobile ownership in Peru is amongst the highest in Latin America.

**Figure 177: Tax as a percentage of TCMO 2011**



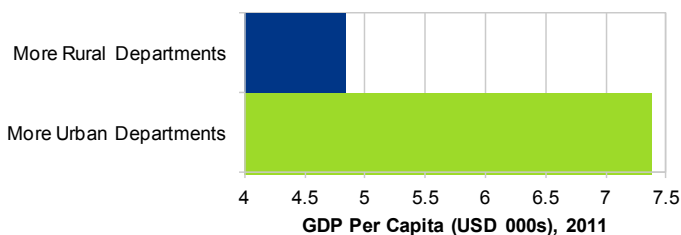
Source: Deloitte/GSMA Global Mobile Tax Review 2011

High taxes as a percentage of TCMO act to increase the barriers to entry for consumers in the market.

Penetration, both 2G and 3G, in Peru has lagged behind other countries in Latin America. This generates negative consequences for the wider economy and for the sector, as mobile penetration and broadband usage are associated with significant economic growth. A GSMA/Deloitte study found that a 10% increase in mobile penetration increases the long run GDP per capita growth by 1.1 percentage points, while the World Bank has indicated that<sup>97</sup> for every 10% increase in the penetration of broadband services, there is an increase in economic growth of 1.3%.<sup>98</sup>

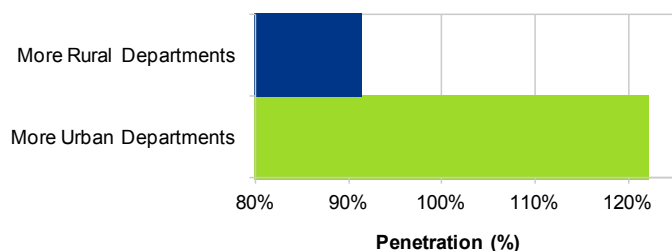
High costs of mobile telephony, which sales tax contributes to raise, have a number of additional negative implications in Peru, where the Digital Divide between urban and rural sectors of the population is significant and income levels are notably lower in rural than urban areas.

**Figure 178: GDP per capita in rural and urban departments of Peru, USD, 2011**



Source: Peruvian national statistics authority.

**Figure 179: Mobile penetration in the more rural and urban departments of Peru 2011**



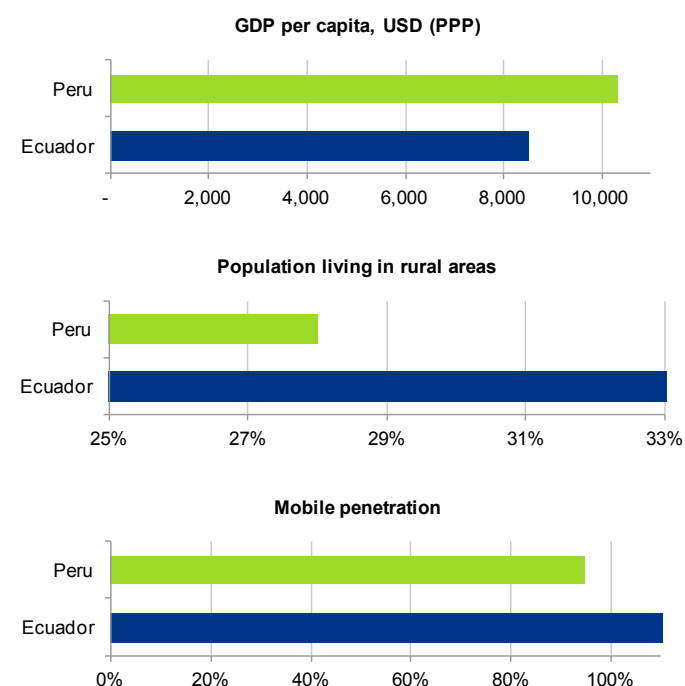
Source: Ospitel and Peruvian national statistics authority. Rural and Urban are respectively defined as departments with below and above median population density.

Having one of the lowest penetration levels in the region and a comparatively high tax as a proportion of total mobile costs, Peru risks being left behind its neighbouring countries in capitalising on the full economic benefits of mobile telephony.

For example, when compared to neighbouring Ecuador, Peru shows both higher income per capita levels and a lower level of rural population. However, tax as a proportion of

TCMO in Peru is notably higher than in Ecuador, where the government, recognising the beneficial economic and social impacts of mobile telephony, has significantly reduced mobile specific taxation from 27% to 12% between 2007 and 2011. As a result, both penetration and minutes of usage are higher in Ecuador than in Peru.

**Figure 180: Comparison of Ecuador and Peru**



Source: World Bank and Wireless Intelligence

Giving the experience in Ecuador, the government in Peru could consider reducing the VAT applying to mobile telephony services. This would create substantial benefits for the government as a decrease in VAT would spur total usage with consequent expansion of the taxable base, which may lead to tax revenues increases. For example, if total minutes of use in Peru had increased by 10% as a result of penetration increases, the government would have gained an extra PEN 135 million in 2011 from the widening of the usage base alone. Increases in total usage are also generally coupled with increased economic activity, which further widens the tax base for the government.

In addition, while the Peruvian government has removed custom duties on imported handsets, the elevated cost of device acquisition remains an important issue in the country:

- A high cost of device acquisition may prevent poorer members of the population from accessing mobile services and deriving benefits from consumption of

<sup>97</sup> Forthcoming Deloitte/GSMA paper "What is the impact of mobile telephony on economic growth?".

<sup>98</sup> World Bank, Qiang, 2009

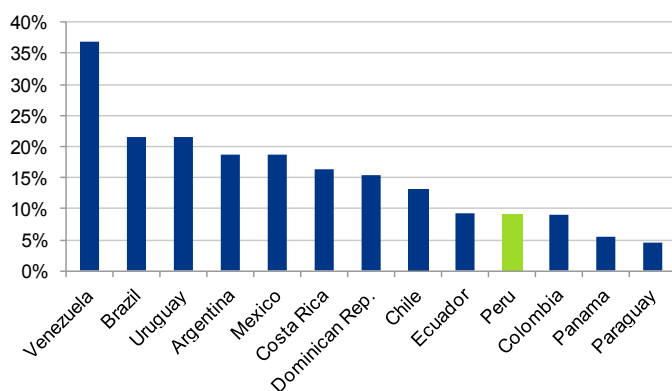
mobile telephony. Handset costs represent the most significant barrier to the consumption of mobile services, particularly for the poorer sectors of the population.

- Since handsets and smartphones may represent the only possibility of accessing broadband internet for certain sectors of the population and in rural areas, handset taxes may lead to underconsumption of internet services.

In particular, affordability is an acute concern for smartphones in Peru. The level of smartphone penetration, in Peru is three to four times lower than in many other Latin American countries.<sup>99</sup>

While the elimination of the import duty on handsets may change this landscape in the coming years, the penetration of 3G services in the country is still lower than most other Latin American markets.

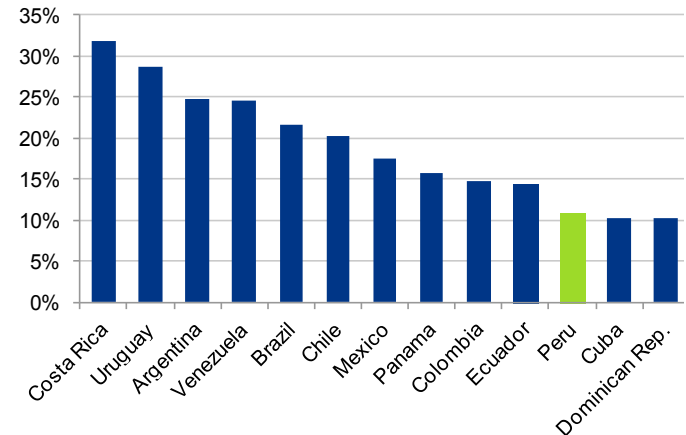
Figure 182: 3G penetration, Q4 2011



Source: Wireless Intelligence

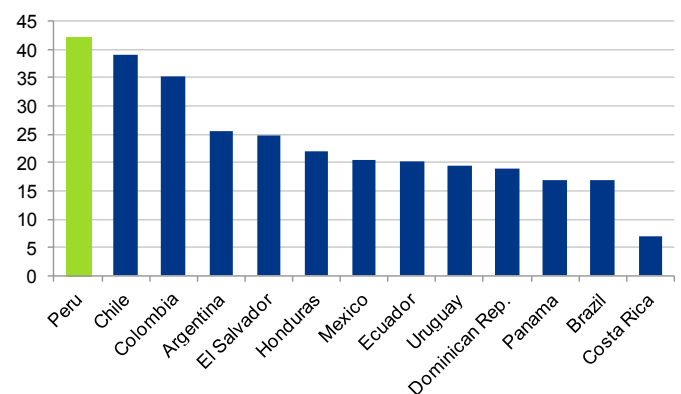
In a country with very low teledensity and high costs for fixed line broadband such as Peru, smartphones and 3G represent one of the few opportunities for consumers to access internet and enjoy the economic and social benefits of an interconnected society.

Figure 183: Fixed telephone lines per 100 people, 2010



Source: World Bank data

Figure 184: Cost of a fixed broadband internet (USD), 2010



Source: ITU's World Telecommunication/ICT Indicators Database

## Taxes on mobile operators

Mobile operators are subject to a range of general and telecoms specific taxes.

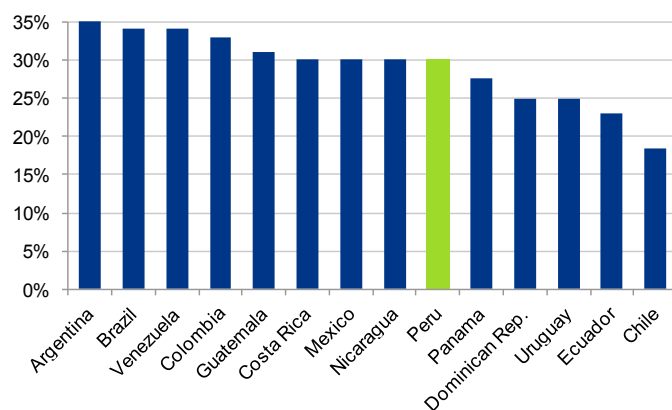
Table 5: Mobile specific taxation on operators, 2011

Category	Tax	Tax rate
General taxation on mobile operators	Corporation tax	30% of profits
	Capital Exit tax	0.05% of the value of outgoing international payments
Telecom Specific Taxation	FITEL – Universal Service Obligation	1% of revenues
	MTC Exploitation Tax	0.5% of revenues
	Ospitel Regulatory Contribution	0.5% of revenues

Source: Mobile operators' data

Peru's corporation tax, levied at 30% of profits, is higher than in a number of other countries in Latin America.

**Figure 185: Corporation tax, 2012**



Source: Deloitte Analysis

A capital transaction or exit tax of 0.05% applies to financial transactions. This was reduced from a rate of 0.5% in 2011 at the same time that VAT was reduced from 19% to 18%.

In addition, mobile operators face a range of telecoms specific taxes. A universal service obligation (FIDTEL) is levied at 1% of airtime revenues. The Ministry of Transport and Communications levies a tax of 0.5% of revenues called the MTC Exploitation Tax. Finally, a 0.5% levy on most revenues is levied as a regulatory contribution to Ospitel.

These taxes and regulatory contributions raise a number of concerns:

- These taxes discourage investment: taxes applied on gross revenues directly reduce the profitability of all operators, independently of their level of profitability. In a given year, these taxes have the same effect on operators with positive profits and operators with no profits due to recent network investment.
- These taxes are not transparent: unlike VAT, which is collected from consumers on behalf of the government, these taxes and fees are levied on operators directly. This means that mobile operators must either suffer a reduction in their profitability or pass these taxes through to consumers in a non-transparent way, as they cannot itemise the tax in prices or receipts.

- These taxes are inefficient for the economy: imposing taxation on firms' revenues produces lower market volumes and higher prices than a revenue-equivalent tax on profits.<sup>100</sup> In fact, when taxes are imposed on revenues, operators tend to adopt a low-turnover/high-margin strategy, as opposed to a low-margin/high-turnover strategy which is optimal when taxation is imposed on profits.

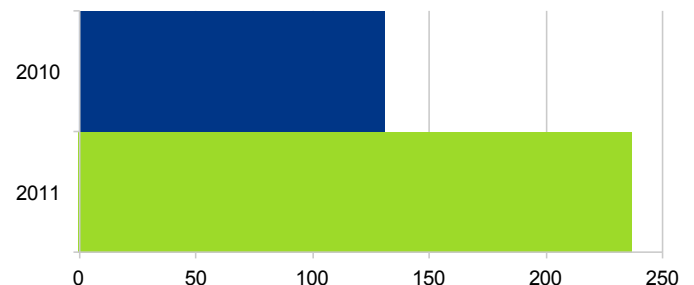
These taxes contribute to increase the risks and costs associated with network investment, in particular in a country such as Peru where investment is of foreign nature. When allocating investment between their subsidiaries, international telecom companies would consider the incidence of taxation on their returns, and higher taxation could represent an obstacle to further investment in the country.

As such, tax treatments for mobile companies should be considered in the light of the investment required to boost network coverage and services, as well as the social and economic benefits that this investment would deliver to the economy, as discussed above.

A larger rural population, the expensive cost of providing non-conventional mobile telecommunication technologies, e.g. satellite connections, and a recent history of theft of copper cables from telecoms infrastructure also mean that the country risks in Peru may be higher than in other countries. A supportive tax treatment could balance out these risks.

Despite these pressures, mobile operators in Peru have been increasing investment in recent years, in particular to provide increased 3G coverage for mobile broadband.

**Figure 186: Total market CAPEX increase between 2010 and 2011 (millions of Soles)**



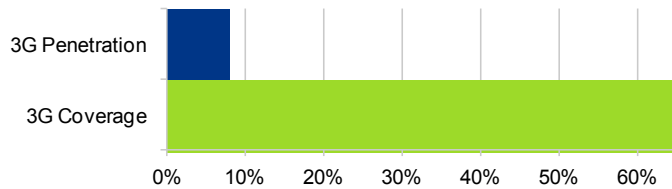
Sources: Wireless Intelligence and operators' data

<sup>100</sup> Two different taxation policies are revenue-equivalent when they raise the same amount of tax revenues for the government.



Although mobile operators offer a 3G coverage of 65%, 3G penetration is currently only 8%.

**Figure 187: 3G Coverage and 3G penetration, 2012**



Source: Wireless Intelligence and mobile operators' data

Relaxing mobile telephony taxation for consumers and operators could contribute to increase access and consumption of mobile broadband services, thus reducing the Digital Divide.

# Appendix G Country case study: Ecuador

This Appendix provides an analysis of the impact of mobile telephony on Ecuadorian citizens and the economy in the last four years (2008-2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in Ecuador, evaluating the effects that mobile specific taxes have on the industry and the wider economy.

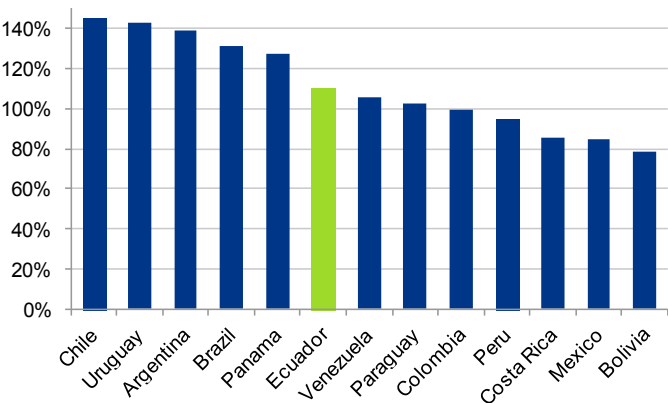
This Appendix is based on discussions and data provided by a leading mobile operator, publicly available information relating to other mobile operators, and data from the Wireless Intelligence. Additional data from publicly available sources is referenced throughout.

## G.1 Mobile telecommunications in Ecuador

Ecuador is among the poorest countries in South America, with a GDP per capita 56% below the South American average.<sup>101</sup> However, it has a well established mobile market characterised by three mobile operators, Claro, Movistar and Alegro, enjoying market shares of approximately 69%, 29%, and 2%, respectively in June 2012. The market is dominated by prepaid mobile connections, which account for 83% of total subscriptions.<sup>102</sup>

GSM networks cover 89% of the population and penetration currently exceeds 100%, ranking Ecuador in the top half of a sample of other Latin American countries.

Figure 188: Mobile penetration, 2011



Source: Wireless Intelligence

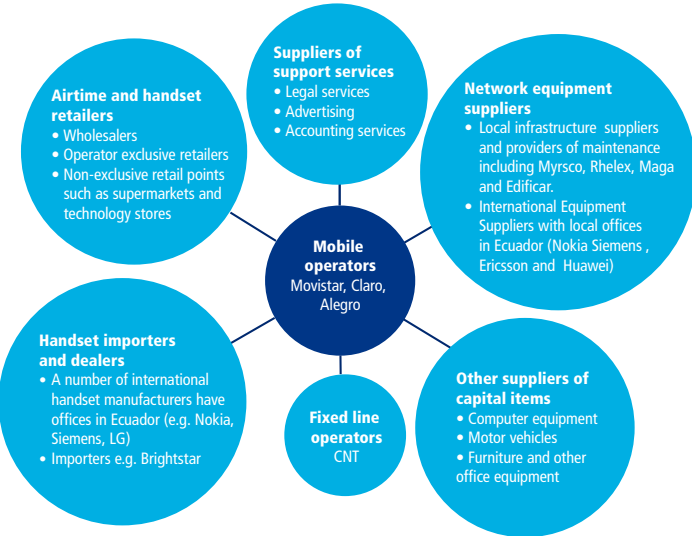
Penetration of 3G services, which were launched in 2009 and include wireless data and broadband, has reached 12%. Operators have also been undertaking Long Term Evolution (LTE) trials.

## G.2 The economic contribution of mobile telephony to the economy

Mobile telephony in Ecuador generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits to consumers.

While these benefits are delivered principally by the mobile operators, the mobile telecommunications ecosystem in Ecuador also benefits from players such as equipment providers, typically international equipment manufacturers with offices in Ecuador, such as Nokia, Siemens and LG; local providers of infrastructure, installation and maintenance, such as Myrscos, Rhelex, Maga and Edificar; handset importers and distributors; airtime distributors and sellers with retail points throughout the country; and suppliers of other services to mobile operators such as accounting, advertising and other support services.

Figure 189: Mobile telecommunications ecosystem

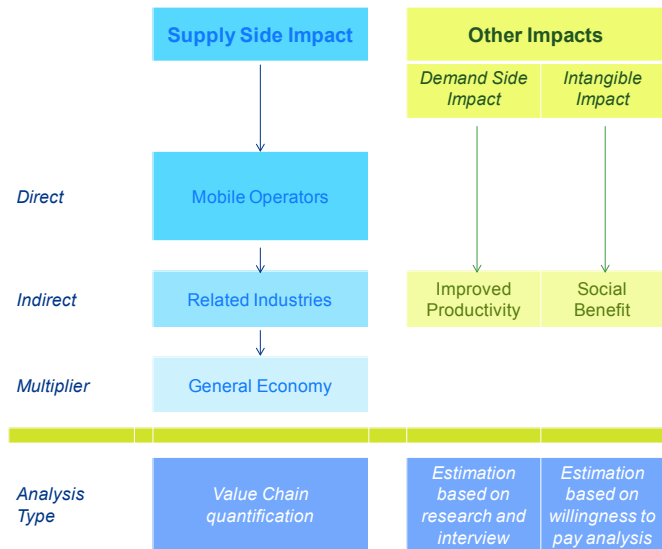


Source: Deloitte analysis

The economic impact of the mobile industry is discussed below in terms of the direct and indirect effects on the supply side of the Ecuadorian economy made by the mobile operators and by players in the wider mobile ecosystem, and in terms of direct and indirect employment from firms in the ecosystem. Also discussed are the productivity impacts on the Ecuadorian economy that result from mobile workers using their phones for business purposes, as well as the social benefits enjoyed by consumers as a result of access to mobile services.

101 Paul Budde Communication Pty Ltd (2011): "Latin America – Telecoms, Broadband and Mobile Forecasts - Ecuador"

102 Supertel (March 2012): Statistics on mobile phone usage

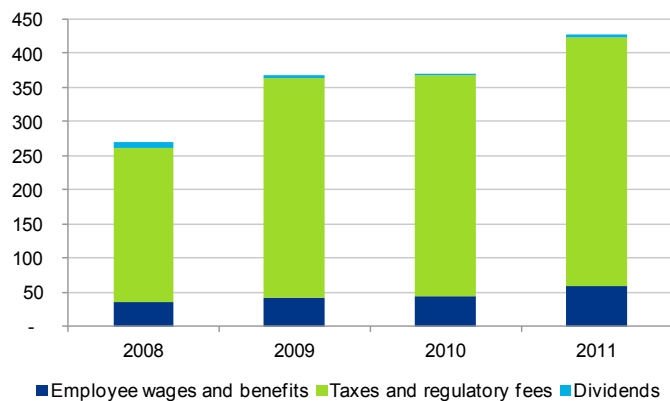
**Figure 190: Estimation of the economic impacts of mobile telephony**

Source: Deloitte analysis

### Supply side impact

The total supply side value add created by mobile telephony through the mobile operators and the wider mobile ecosystem is estimated as the sum of three components.

The direct impacts generated by mobile operators include mobile operators' expenditure on wages and CSR programmes, dividends paid by mobile operators, and taxes recovered as a result of the mobile operators' operations. These were estimated at USD 429 million for 2011.

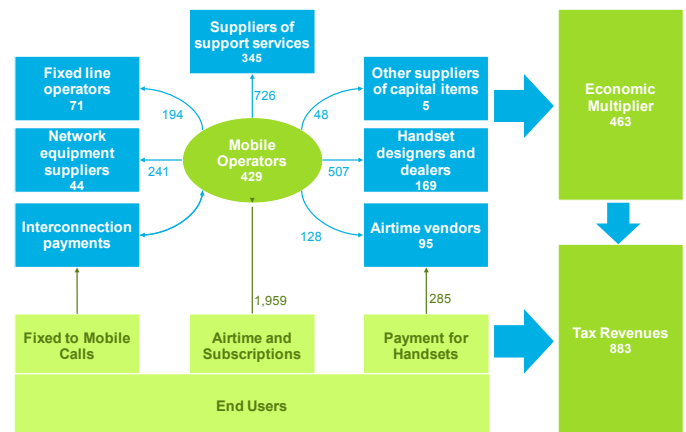
**Figure 191: Direct domestic value add of mobile operators (excluding multiplier effect), USD millions**

Source: Deloitte analysis based on data provided by mobile operators, interviews and analysis of company accounts. Excludes multiplier.

The indirect impacts from mobile operators' expenditure to parties in the wider mobile ecosystem are measured by the percentage of end users' expenditure that remains within Ecuador, which becomes value add to be spent again. These are calculated by examining mobile operators' payments to their suppliers of support services in the wider mobile ecosystem. The amount of value add, including wages, profits and taxes generated by these players, is then estimated. These effects were estimated at USD 728 million for 2011.

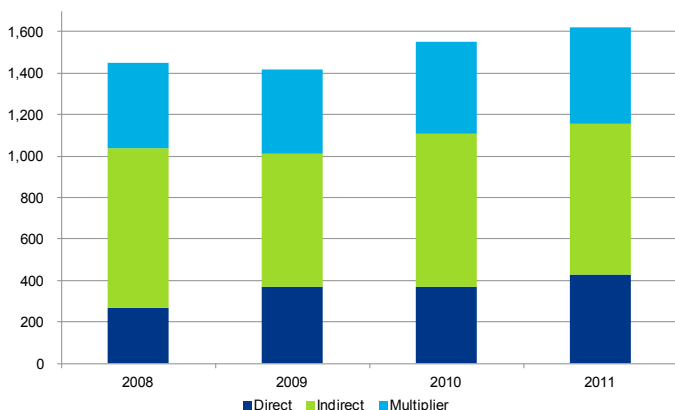
The induced impacts reflect the subsequent rounds of expenditure created by direct and indirect spend. For example, they include the increased domestic consumption afforded by increased employment. The induced effects were estimated using a spending multiplier of 40% to capture the broader effects on the wider economy. These were estimated at USD 463 million for 2011.

The value add relationship between the mobile operators and related industries in the ecosystem, such as equipment importers, producers and providers of network support services, handset dealers, retailers of airtime, is shown below. The estimates of value add include the multiplier effect on the wider economy.

**Figure 192: Mobile value chain and value add in 2011, USD millions**

Source: Deloitte analysis; Values in the boxes represent value add

Combining the impacts described above, it was estimated that mobile operators in Ecuador created USD 1.6 billion value add in 2011. This has grown from USD 1.45 billion in 2008.

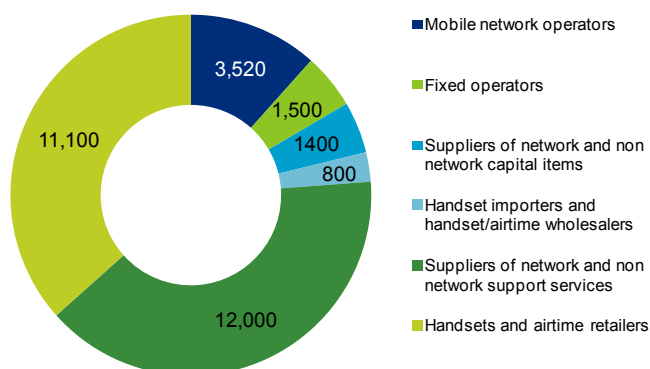
**Figure 193: Supply side value add from mobile telecommunications by component, USD millions**

Source: Deloitte analysis

### Impact on employment

Mobile services in Ecuador contribute to employment in several ways, including the direct employment of the mobile operators, the employment in the wider mobile ecosystem described above, and the additional employment generated by the government through taxes. Additional induced employment is created by employees and beneficiaries spending their earnings, thereby creating more employment.

While many services related to mobile telephony (such as radio and network equipment, handsets and smart-phones) are designed abroad, international providers have established offices and operations in the country, e.g. network equipment providers such as Nokia Siemens, Huawei, Brightstar, Ericsson and ZTE. Other handset manufacturers with a presence include LG and Siemens. In addition, other local providers of mobile-related services also contribute to the economy.

**Figure 194: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**

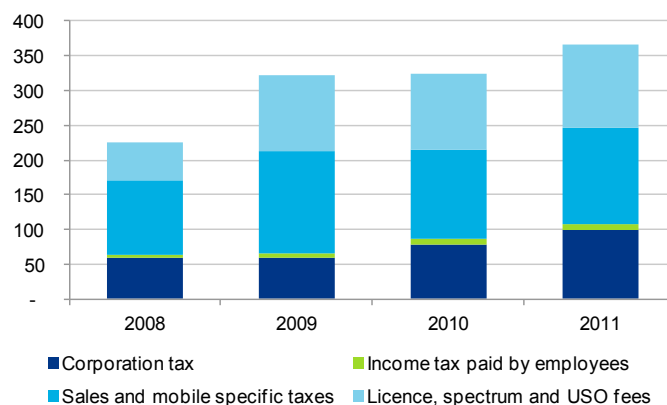
Source: Deloitte analysis; The figure excludes the multiplier

As shown in the figure above, it was estimated that in 2011 the mobile telecommunication industry employed more than 30,000 Full Time Equivalents ('FTEs') in Ecuador. In addition to employment generated by airtime and handset sellers (approximately 11,000 FTEs), particularly important in Ecuador is employment generated in support services (12,000 FTEs), as a result of mobile operators outsourcing a significant number of roles to external service providers. Also relevant in Ecuador is the contribution of mobile telephony to the total revenues of the fixed operator through interconnection fees, which can be associated with an estimated 1,500 FTE. When considering economic multiplier effects, the total employment generated by mobile operations in Ecuador amounts to approximately 41,000 FTEs in 2011.

### Value add from taxation

A major source of the value added by mobile operators and the mobile ecosystem originates from the tax revenues they generate for the government.

In 2011, mobile operators in Ecuador paid approximately USD 366 million to the government in taxes and regulatory fees. This has increased from USD 226 million in 2008.

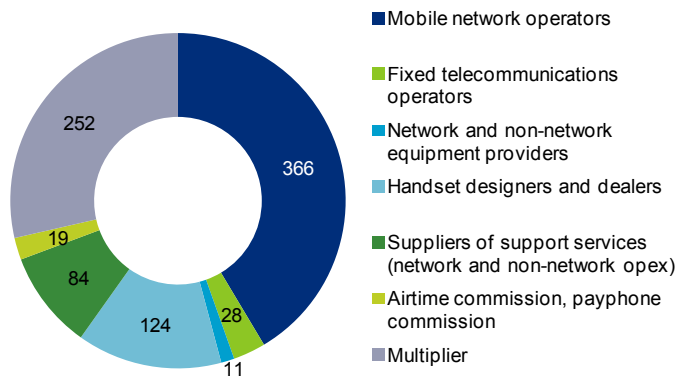
**Figure 195: Tax and regulatory payments from mobile operators, USD millions**

Source: Deloitte analysis based on operator data.

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another USD 265 million for the government in 2011.

A further USD 252 million tax revenues were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 196: Total tax revenues from the mobile value chain in 2011, USD millions**



Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note: This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.

## Productivity impacts

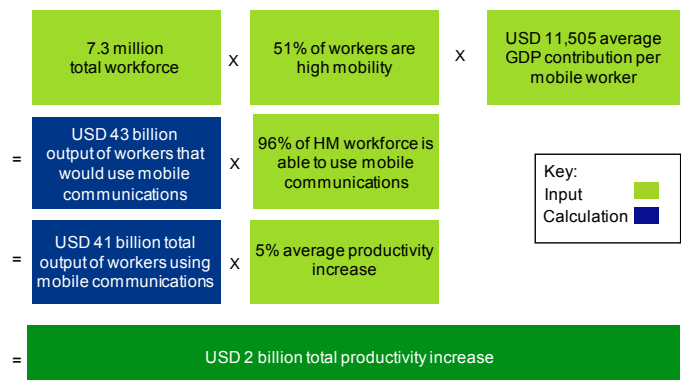
In addition to benefits to the supply side of the economy, mobile telephony in Ecuador increases productivity through the use of mobile telephony for business purposes as well as intangible and social benefits to consumers.

Discussions with mobile operators and other stakeholders identified a number of positive productivity effects of mobile telephony for the Ecuadorian economy, including the following:

- **Benefits of wireless data services:** In a country where fixed line teledensity is limited to 14.4%,<sup>103</sup> the deployment of 3G technology is allowing Ecuadorian businesses to enjoy full wireless data services in the country. However, with limited 3G penetration, this benefit could be greatly extended.
- **Benefits from the development of M2M operations:** For example, Movistar provides SIM cards on automated platforms for wireless usage (including health and agriculture) for a number of companies in the public and private sector.
- **Mobile banking services:** A recent Deloitte analysis<sup>104</sup> identified this productivity benefit could reduce average transaction costs from USD 4 to just USD 0.04.

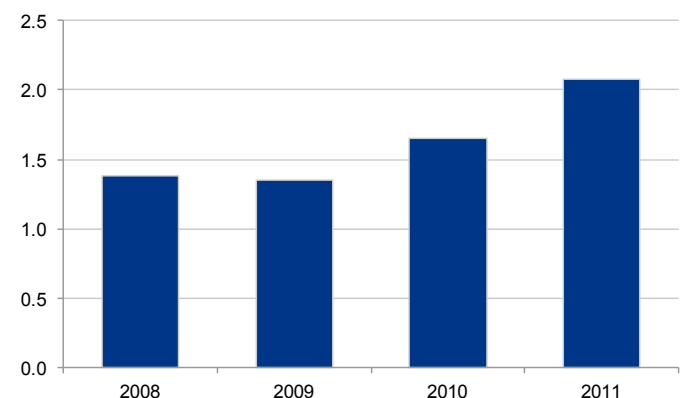
An economic value estimation can be undertaken to estimate these productivity effects by analysing the importance of mobile telephony to each sector of the Ecuadorian economy. The economic value estimate indicates that, if high mobility workers achieved a productivity improvement of 5%, the potential productivity impact would have been USD 2.1 billion in 2011. The similar impact between 2008 and 2009 can be explained by the global financial crisis and recession in Ecuador.

**Figure 197: Economic impact of increased productivity amongst high mobility workers, 2011**



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

**Figure 198: Economic impact of increased productivity amongst high mobility workers, USD billions**



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

103 ITU (2010)

104 Deloitte: "Marco para evaluar las oportunidades de servicios bancarios móviles" available at [http://www.deloitte.com/view/es\\_UY/uy/perspectivas/tendenciasperspectivas/8fc30075e0008310VgnVCM3000001c56f00aRCRD.htm](http://www.deloitte.com/view/es_UY/uy/perspectivas/tendenciasperspectivas/8fc30075e0008310VgnVCM3000001c56f00aRCRD.htm)

## Consumer impacts

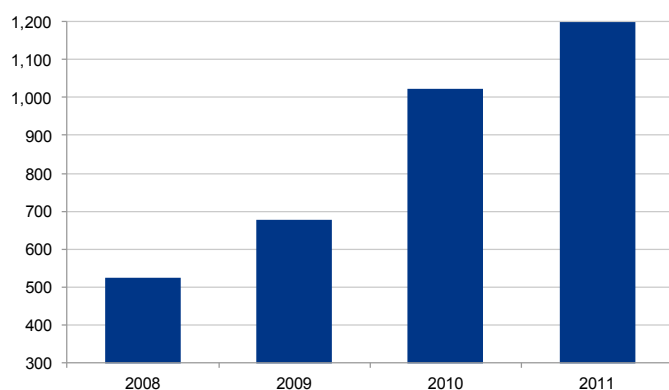
Mobile telecommunications also provide a number of intangible benefits to consumers, especially in a country such as Ecuador with high levels of poverty. These include the development of interpersonal and family communications, the promotion of social cohesion, the extension of communication to those on low incomes and assistance in disaster relief. Consumers also benefit through corporate and social responsibility programmes undertaken by the mobile operators, including health and education programmes.

These include the Movistar Pronino programme, a company initiative to fight the eradication of child labour; health initiatives such as Claro's Red Rush to Zero fund for AIDS eradication,<sup>105</sup> environmental initiatives tailored to Ecuador such as Claro's reforestation initiatives.

Consumers also benefit from competition and innovation within the mobile industry. In recent years, the price of calls in the competitive Ecuadorian mobile telephone market, the price of calls has fallen from an effective price per minute of USD 0.19 to USD 0.07. Simultaneously, the average number of minutes per user per month has grown from just over 60 to 140.

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 have increased over time in the last four years. This approach suggests that consumers potentially enjoyed the equivalent of a substantial USD 1.1 billion in intangible benefits in 2011. This is the result of call prices falling by more than half, and usage more than doubling in the years following the abolition of a mobile specific tax, as discussed in more detail in Section G.3.

**Figure 199: Intangible benefits using willingness to pay concept, USD millions**

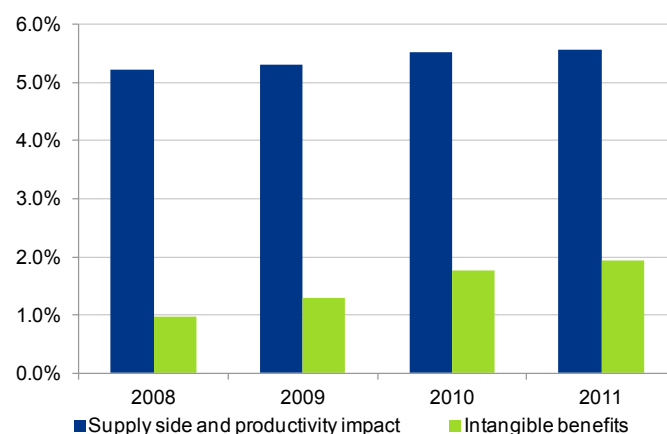


Source: Deloitte analysis

## Total impacts

Overall, in 2011, the impact generated by the mobile telephony ecosystem was estimated to be USD 3.7 billion, representing 5.6% of GDP, plus up to an additional USD 1.3 billion from intangible consumer benefits.

**Figure 200: Economic impact as a proportion of GDP**



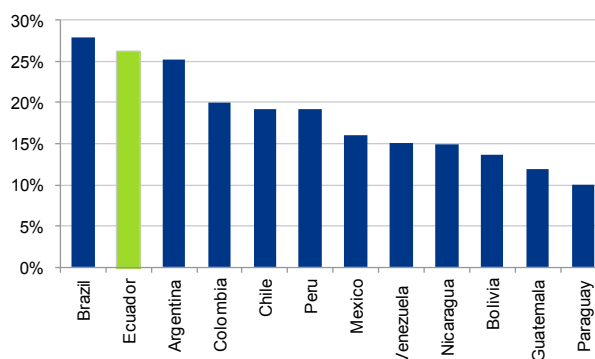
Source: Deloitte analysis

## G.3 Taxation on mobile consumers

Mobile consumers in Ecuador have benefitted over time from positive taxation policies that, recognising the importance of mobile telephony to boost development and support the poorer segment of the population, have succeeded in reducing taxation and boosting usage and penetration.

Until 2008, Ecuadorian mobile consumers were subject to a 15% telecommunications excise tax that applied on mobile usage and subscriptions in addition to a 12% VAT. This excise tax, at the time amongst the highest in the world, contributed to increase tax as a proportion of Total Cost of Mobile Ownership (TCMO) to 26%. Tax as a proportion of TCMO was one of the highest in both Latin America and worldwide.

**Figure 201: Tax as a percentage of TCMO, 2007**



Source: Deloitte/GSMA Global Mobile Tax Review 2007

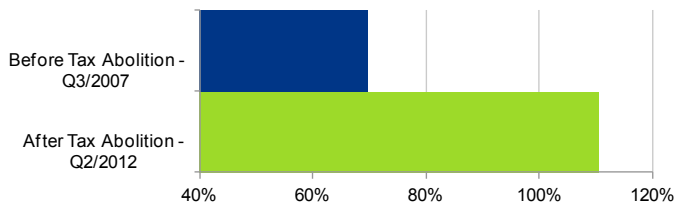
<sup>105</sup> Claro Ecuador (2012): <http://www.facebook.com/claroecua>

This excise tax on mobile usage had a number of negative effects on consumers and ultimately constrained the development of the sector and of communications in general in Ecuador.

This tax was abolished in 2008, which resulted in numerous benefits for consumers and the economy.

Firstly, penetration has increased from 70% to over 110% in 2012, thus extending mobile services to the poorer segments of the population.

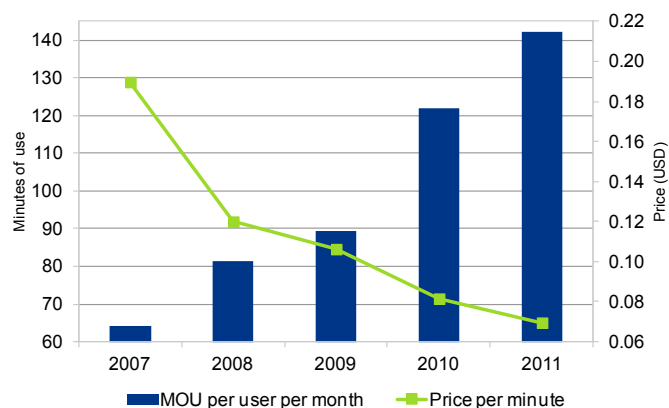
**Figure 202: Mobile penetration in Ecuador**



Source: Wireless Intelligence

In addition, the effective cost per minute of calls has fallen from USD 0.19 to USD 0.07 and usage per user has more than doubled, increasing from 60 to 140 minutes of usage per user per month, thus making Ecuadorians more connected.

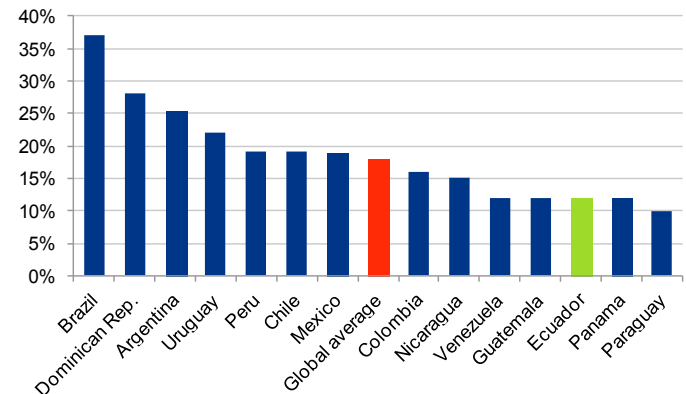
**Figure 203: Price per minute (USD) and minutes of use per user per month over time**



Source: Wireless Intelligence

As a result, in 2011, tax as a proportion of TCMU in Ecuador was amongst the lowest in the region and well below the global average.

**Figure 204: Tax as a percentage of TCMU, 2011**



Source: Deloitte/GSMA Global Mobile Tax Review 2011; Figures for Argentina, Brazil, Panama and Uruguay have been added/updated according to further discussions with the mobile operators

As noted above, this policy has also had a direct impact on the supply side's share of GDP, which has increase to 2.4% since the tax was abolished.

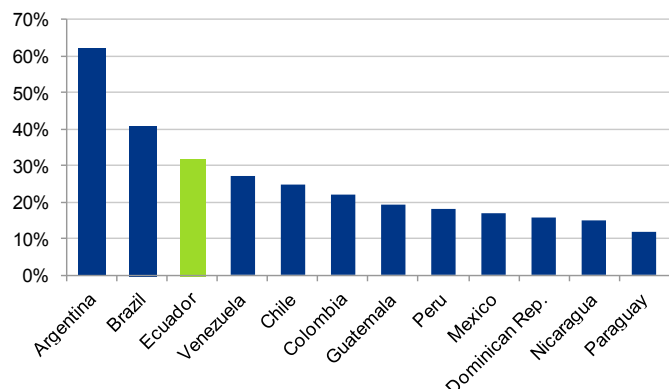
Of the existing consumer taxation on mobile telephony, a 12% VAT rate that applies to handsets, airtime and subscriptions represents the key tax component for mobile consumers.

Additionally, despite the positive benefits of the elimination of the mobile specific excise tax, Ecuadorian consumers continue to suffer from a high taxation on handset imports.

The price of handsets in Ecuador is negatively affected by a 15% custom duty when handsets are imported. In addition, handset price is also affected by a Capital Exit Taxes that Ecuadorian handset importers face, representing a 5% tax on international outgoing payments. In recent years, this tax has risen from 0.5% to 5%. This tax also raises the cost of other imports such as network equipment and some service costs such as international outgoing calls.

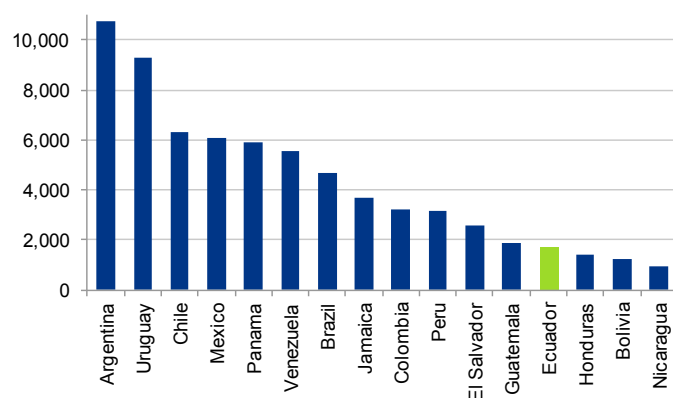
As a result, handset taxes could have represented up to 32% of the price of a handset price imported into Ecuador in 2011, well above the Latin American average of 27% and the global average of 23%.



**Figure 205: Tax as a percentage of handset cost, 2011**

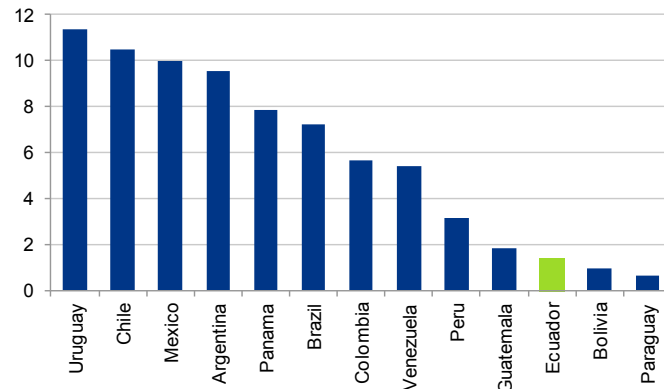
Source: Deloitte/GSMA Global Mobile Tax Review 2011

Handset affordability raises a particular concern in Ecuador, which is characterised by one of the lowest per capita incomes of Latin American countries. In other countries with lower GDP per capita, such as Bolivia and Guatemala, handset duties are up to 12% lower than in Ecuador.

**Figure 206: GDP per capita 2010 (constant USD)**

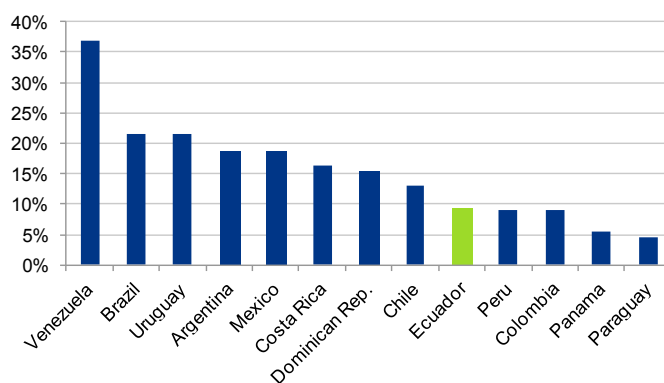
Source: World Bank data

3G services can spread broadband internet access to a wide area and population. In Ecuador, this is particularly important given that uptake of fixed line broadband is lower than in many other Latin American countries. Retaining higher taxes on handsets risks sustaining the disenfranchisement of Ecuadorians in terms of access to the latest 3G handsets and smartphones, which allow consumers to connect and use mobile internet.

**Figure 207: Fixed broadband connections per 100 inhabitants, 2010**

Source: ITU's World Telecommunication/ICT Indicators Database

While today 3G coverage is offered by mobile operators to 69% of the population, 3G penetration, below 10%, is lagging behind leading countries in the region.

**Figure 208: 3G penetration, Q4 2011**

Source: Wireless Intelligence

Reducing taxation on handsets, tablets and other devices that support mobile broadband could increase 3G penetration, reduce the barriers to accessing the internet, especially for the poorest sectors of the population. This could deliver significant economic benefits to the economy: a forthcoming Deloitte/GSMA study<sup>106</sup> found that, for a given level of mobile penetration, a 10% increase in 3G penetration increases GDP per capita growth by 0.15%.

106 Forthcoming Deloitte/GSMA study entitled "What is the impact of mobile telephony on economic growth?"

## G.4 Taxation and regulations on mobile operators

In addition to a standard corporation tax rate set at 23% of profits, mobile operators in Ecuador are subject to a number of specific taxes.

**Figure 209: Summary of specific taxes affecting mobile operators**

Category	Tax	Tax rate
General taxation on mobile operators	Corporation tax	23% of profits
Mobile specific taxation on mobile operators	Licence fee	2.93% of airtime revenue
	USF	1% of revenues

Source: Discussions with mobile operators

Mobile operators pay 2.93% of all their airtime revenue as a license fee. Payments for this charge were estimated at around USD 119 million from the sector in 2011.

In addition, mobile operators must also pay 1% of revenues as a Universal Service Obligation. Mobile operators complained that CNT, the fixed telecom incumbent operator, receives a great share of these funds and as such other operators see this amount as a transfer of resources away from mobile operations where they could be invested to support development of 3G services.

These two turnover taxes raise a number of concerns for mobile operators. Unlike VAT, which is collected from consumers directly on the government's behalf, these taxes are raised on mobile operators and cannot be itemised and are therefore not transparent to consumers. These taxes also discriminate against mobile telephony compared to fixed telephony, which mobile directly competes against.

Furthermore, economic theory indicates that taxation of turnover leads to lower economic welfare than taxation of profits or value add. This is because it results in lower incentives for mobile operators to adopt new technology or reduce costs in order to increase either penetration or usage. This reduces the welfare of both mobile users and mobile operators.

Operators' costs (in particular in relation to network equipment) are also influenced by a Capital Exit Tax of 5% on outgoing international payments. This tax raises the cost

of importing the latest technology equipment into Ecuador, including network equipment, platforms and software, thus impacting network investment and potentially affecting quality of service.

This tax also contributes to raising a barrier to attracting foreign investment in the Ecuadorian economy, as it increases the cost of achieving any given return on investment. Foreign direct investment is important in the mobile industry, as the two main operators have benefitted from investment and knowledge transfers from their parent companies.

Finally, operators pay substantial spectrum fees. In addition to an initial one-off payment for access to the frequency bands, they are also charged a fixed amount for every base station installed. This approach to setting spectrum fees may give negative incentives for further investment.

In addition to these taxation pressures, conversations with mobile operators have highlighted a range of regulatory issues that are creating concerns for mobile operators' investment.

Of significant impact to mobile operators is the presence of a 95% population coverage requirement for urban areas. This generates coverage costs for mobile operators that are additional to annual USO charges that mobile operators pay to fund CNT.

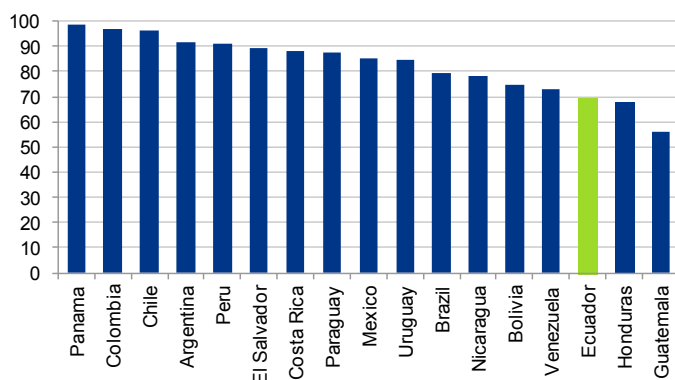
While no funds are received by mobile operators to comply with this obligation, operators in Ecuador incur higher costs than operators in other countries to provide network coverage as many areas in the country, including the capital Quito, are located in mountainous areas. This combines with the spectrum shortages that operators have reported. While the allocation of 3G spectrum in the 1600MHz band may alleviate some of these concerns and act to reduce deployment costs, at present the authorities have not yet made a decision on the allocation mechanism, and it is not expected that a rollout<sup>107</sup> will be able to take place until 2014-15.

Mobile operators are also concerned about the revenue impacts of widely discussed reductions in interconnection rates from the incumbent CNT. This combines with strict new regulations on retail competition, which limits the scope of promotions which operators may offer, reducing pricing and marketing innovation; and with recent regulations on top-up billing data, whereby operators have been forced to maintain for an indefinite period the balances which prepaid customers top-up.

<sup>107</sup> This rollout also includes LTE technology.

As such, a combination of taxation on mobile operators and on foreign investment, strict regulations impacting revenues, a challenging geographic environment and a lack of spectrum, are risking the development of sector investment in Ecuador. These pressures on operators are reflected in low general conditions for business entrepreneurship in Ecuador relative to other countries in the region.

**Figure 210: Conditions for business entrepreneurship (0 = worst, 100 = best, 2010)**



Source: GSMA/AT Kearney Latin American Mobile Observatory 2011

High mobile specific taxation, including on foreign investment, increases the service cost for mobile operators. As a result, mobile operators may have to pass some or all of these higher costs onto consumers, or alternatively, reducing expenditure in other areas of the business.

Elimination of mobile telecommunication specific taxation on consumers has created substantial and growing economic benefits in Ecuador, and is associated to substantial increases in penetration and usage, and to the sector contributing to 2.4% of GDP, plus a further 5.1% from productivity and consumer benefits.

A supportive taxation and regulatory environment towards handsets taxation and network investment could extend the benefits of next generation mobile services, notably wireless internet, helping Ecuador boost usage of internet service and reap the benefits of a wireless economy.

## Appendix H Country case study: Uruguay

This Appendix provides an analysis of the impact of mobile telephony on Uruguay and its economy in the last four years (2008-2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in Uruguay, discussing the effects that mobile specific taxes have on the industry and the wider economy.

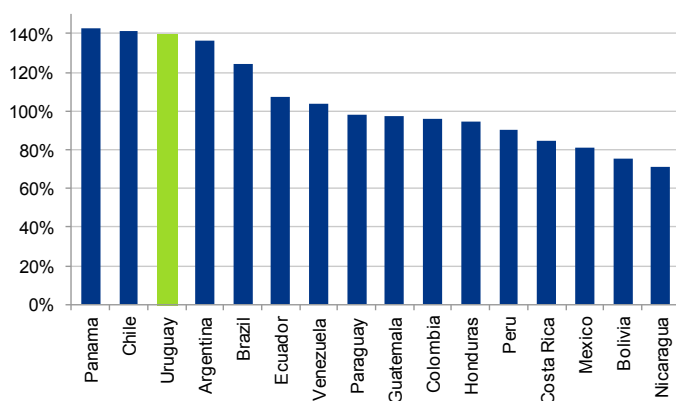
This Appendix is based on discussions and data provided by a leading mobile operator, publicly available information relating to other mobile operators, data from the Wireless Intelligence, and data from publicly available sources that are referenced throughout.

### H.1 Mobile telecommunications in Uruguay

Uruguay is among the richest countries in Latin America, with the third highest GDP per capita on the continent.<sup>108</sup> It has a well established mobile market characterised by three mobile operators, Ancel, Movistar and Claro, each having market shares of approximately 47%, 38% and 16%.<sup>109</sup> Seventy percent of connections in the market are prepaid.

GSM networks cover 100% of the population, and penetration today is 138%, so Uruguay ranks highly among a sample of other Latin American countries.

Figure 211: 2G penetration, 2011



Source: Wireless Intelligence

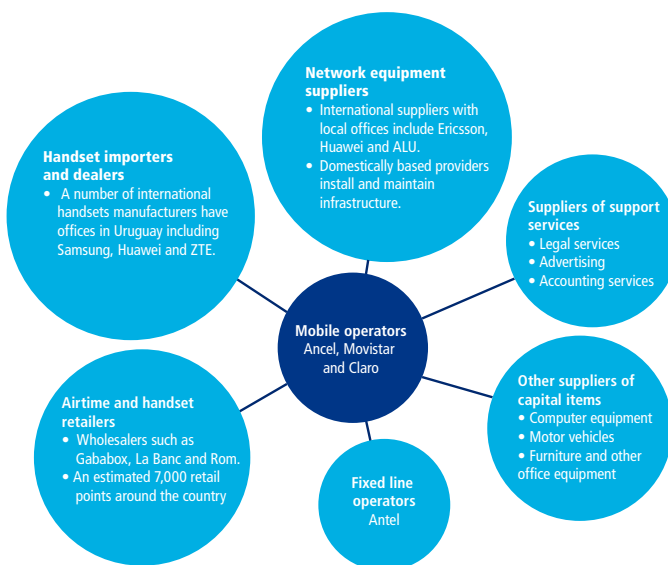
Penetration of 3G services, which were launched in 2009 and include wireless data and broadband, has reached 10% of the total mobile customers. Operators have also been undertaking LTE trials.

### H.2 The economic contribution of mobile telephony to the economy

Mobile telephony in Uruguay generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits to consumers.

While these benefits are delivered principally by the mobile operators, the mobile telecommunications ecosystem in Uruguay also benefits from players such as international equipment providers who have established bases in Uruguay, such as Ericsson, Huawei and ALU; handset manufacturers such as Samsung, Huawei and ZTE; airtime and handset wholesalers such as E-Mobile, Gababox, Rom and La Banc who supply retail points throughout the country; and suppliers of other services to mobile operators such as accounting, advertising and other support services.

Figure 212: Mobile telecommunications ecosystem

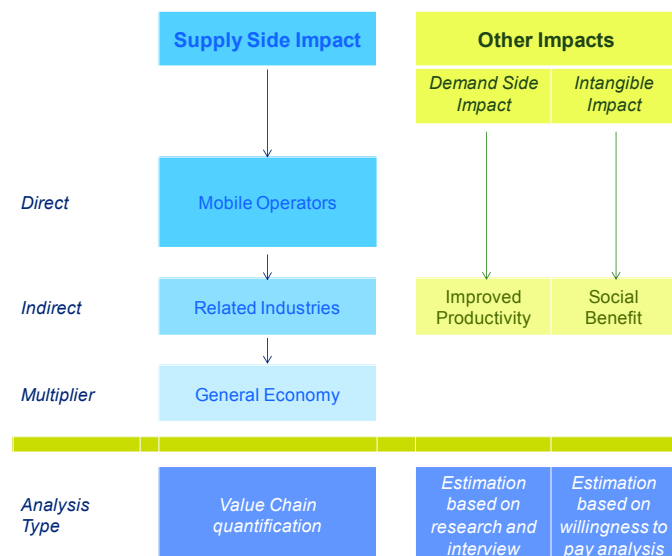


Source: Deloitte analysis

The economic impact of the mobile industry is discussed below in terms of the direct and indirect effects provided to the supply side of the Uruguayan economy by the mobile operators and by players in the wider mobile ecosystem, and in terms of direct and indirect employment from firms in the ecosystem. Also discussed are the productivity impacts on the Uruguayan economy resulting from mobile workers using their phones and tablets for business purposes, as well as the social benefits enjoyed by consumers as a result of access to mobile services.

108 Based on World Bank GDP per capita data.

109 Wireless Intelligence (March 2012)

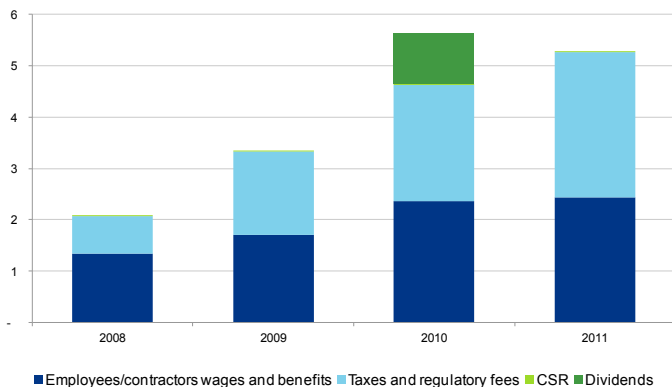
**Figure 213: Estimation of the economic impacts of mobile telephony**

Source: Deloitte analysis

### Supply side impact

The total supply side value add created through the mobile operators and the wider mobile ecosystem is estimated as the sum of three components: direct, indirect, and induced impacts.

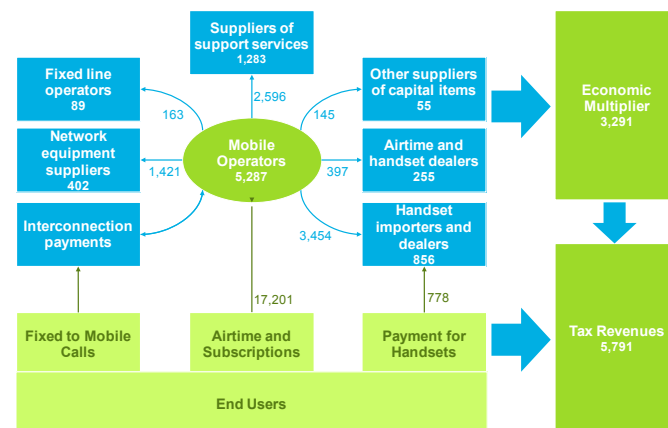
The direct impacts generated by mobile operators include mobile operators' expenditure on wages, CSR programmes, dividends paid by mobile operators and taxes recovered as a result of the mobile operators' operations. These were estimated at UYU 5.3 billion for 2011.

**Figure 214: Direct domestic value add of mobile operators (excluding multiplier effect), UYU billions**

Source: Deloitte analysis based on data provided by the mobile operators, interviews and analysis of company accounts. Figures exclude multiplier.

The indirect impacts from mobile operators' expenditure to parties in the wider mobile ecosystem represents the percentage of any amount spent by end users that remains within the national boundaries, which serves as value add to be spent again. These are calculated by examining mobile operators' payments to their suppliers of support services in the wider mobile ecosystem. The amount of value add, including wages, profits and taxes generated by these players, is then estimated. These effects were estimated at UYU 2.9 billion for 2011.

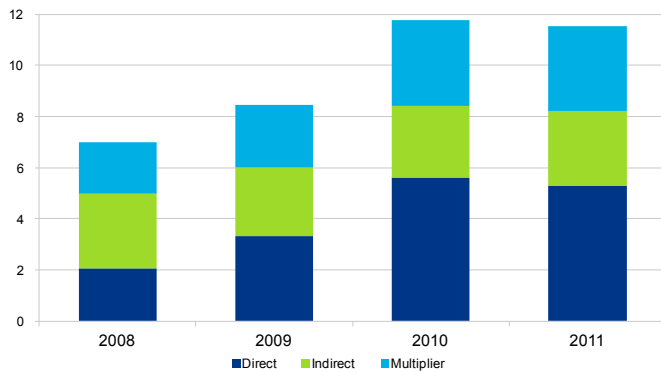
The induced impacts reflect the subsequent rounds of expenditure created by direct and indirect spend. For example, they include the increased domestic consumption afforded by increased employment. The induced effects were estimated using a spending multiplier of 40% to capture the broader effects on the wider economy. These were estimated at UYU 3.3 billion for 2011.

**Figure 215: Mobile value chain and value add in 2011, UYU millions**

Source: Deloitte analysis; Values in the boxes represent value add

Combining the impacts described above, mobile operators in Uruguay in 2011 created an estimated UYU 11.5 billion value add in through the supply side. This has grown from UYU 7 billion in 2008, driven in large part by the increase in direct value added, which has risen from UYU 2.1 billion to UYU 5.3 billion over the same period.

**Figure 216: Supply side value add from mobile telecommunications by component, UYU billions**



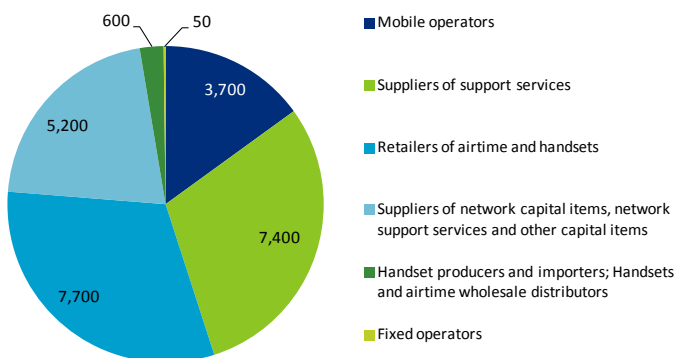
Source: Deloitte analysis

### Impact on employment

Mobile services in Uruguay contribute to employment in several ways, including direct employment by the mobile operators. Mobile operators also indirectly generate employment in the wider economy as a result of their expenditures. In addition, the government also subsequently spends on job creating activities using tax revenues generated directly and indirectly by the mobile sector. Additional induced employment is created by mobile sector employees and beneficiaries spending their earnings, thereby creating more employment.

It was estimated that in 2011 the mobile telecommunication industry supported the employment approximately 24,600 Full Time Equivalents ('FTEs') in Uruguay. A further 8,400 FTEs were estimated to be generated in the wider economy as a result of mobile operators' expenditures.

**Figure 217: Employment generated by the mobile telecommunications ecosystem in 2011 (FTEs)**



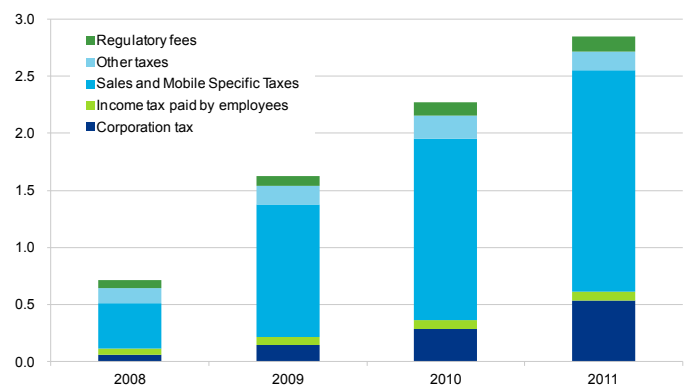
Source: Deloitte analysis; The figure excludes the multiplier

Mobile operators employed over 3,600 FTEs in 2011, and this figure includes the employees of incumbent Airtel that can be attributed to mobile telephony. The wider mobile ecosystem employed over 20,900 additional FTEs. Of these, over 7,700 are the airtime dealers and retailers operating from supermarkets, technology stores and smaller independent points of sale. In addition, while handsets are typically designed and produced abroad, international manufacturers including Huawei and ZTE have established permanent bases in Uruguay, while others such as Samsung have indicated that they will increase their employment in Uruguay in coming months. Network equipment providers such as Ericsson, ZTE and ALU also have a presence in Uruguay to provide support to mobile operators.

### Value add from taxation

A major source of the value added by mobile operators originates from the tax revenues they generate. In 2011, mobile operators in Uruguay paid approximately UYU 2.8 billion to the government in taxes and regulatory fees. This has increased from UYU 0.7 billion in 2008.

**Figure 218: Tax and regulatory payments from mobile operators, UYU billions**

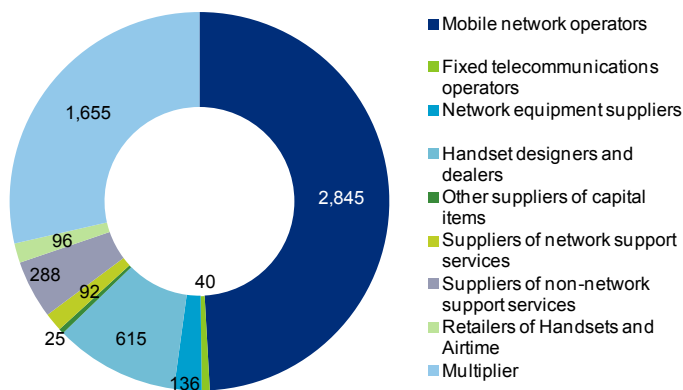


Source: Deloitte analysis based on mobile operator data

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another UYU 2.9 billion for the government in 2011.

A further UYU 1.7 billion tax revenues were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 219: Total tax revenues from the mobile value chain in 2011, UYU millions**



Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note: This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.

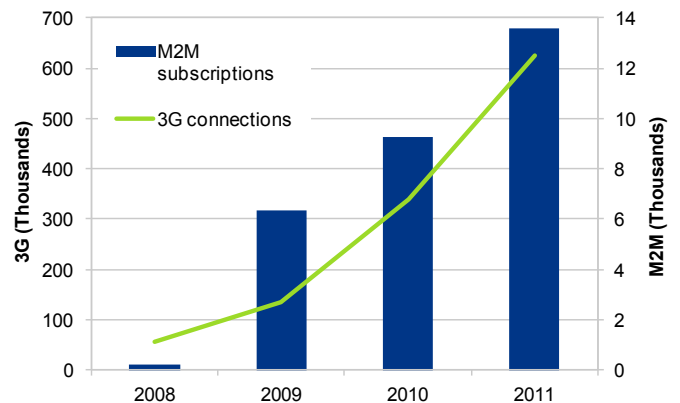
## Productivity impacts

In addition to benefits to the supply side of the economy, mobile telephony in Uruguay increases productivity through the use of wireless services for business purposes, as well as intangible and social benefits to consumers.

Discussions with mobile operators and other stakeholders identified a number of growing forms of increased worker productivity, including:

- The benefit of mobile data services: Uruguay has low fixed line ADSL speeds<sup>110</sup> and no cable providers, and the number of 3G connections has risen from 60,000 in 2008 to 625,000 in 2011.
- The benefit of M2M technology: For example, Movistar provides M2M SIM cards on automated platforms for wireless usage (including health and agriculture) for a number of organisations in the public and private sector. M2M technology provides connectivity without the need for investment in fixed telecoms infrastructure.

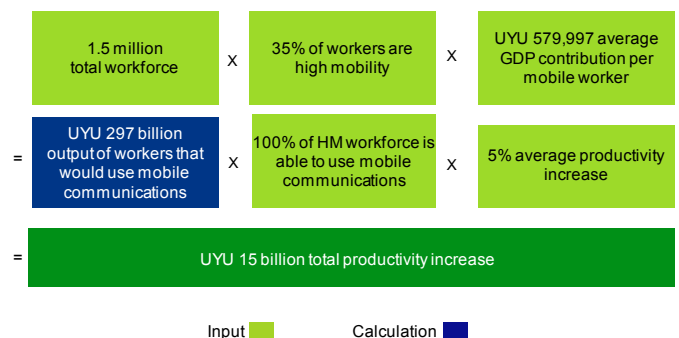
**Figure 220: 3G connections and M2M subscriptions 2008-2011**



Source: Wireless Intelligence

An economic value estimation can be undertaken to estimate all these productivity effects by analysing the importance of mobile telephony to each sector of the Uruguayan economy. The economic value estimate indicates that, if high mobility workers achieved a productivity improvement of 5%, the potential productivity impact would have been UYU 14.8 billion in 2011.

**Figure 221: Economic impact in 2011 of increased productivity amongst high mobility workers**

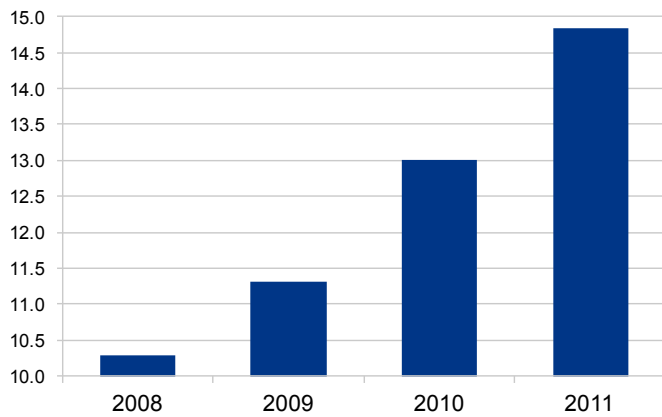


Source: Deloitte analysis based on Deloitte assumptions, interviews and Uruguayan Bureau of Statistics

110 Ookla (February 2011): "Ookla Household Download Index"



**Figure 222: Economic impact of increased productivity amongst high mobility workers, UYU billions**



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

### Consumer impacts

Mobile telecommunications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion and the extension of communication to those on low incomes. Consumers also benefit through corporate and social responsibility programmes undertaken by the mobile operators, including numerous health programmes such as:

- Down's Syndrome Association of Uruguay, promoted by Movistar.
- RED Rush to Zero, a global campaign against AIDS, to which Claro contributes from sales of Blackberry smartphone devices.
- Fundacion Teleton, a nationwide rehabilitation service for children with motor-neurone disabilities, supported by Claro and Ancel.

Mobile operators also support a range of nationwide counselling services, including:

- "Yellow Portal" and "Last Resource": Movistar provides the infrastructure for free phone service providing scientifically backed advice on drugs and counselling advice.
- "Line mom", implemented by Movistar and the Ministry of Public Health.

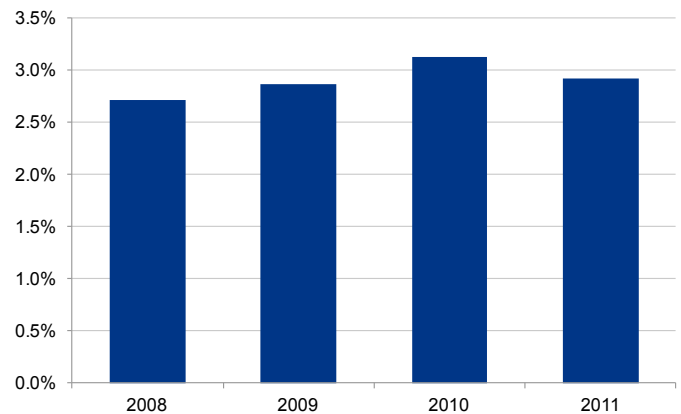
In studies for countries where the mobile industry is still in a developing phase, it is possible to estimate the intangible consumer benefits using a 'willingness to pay' methodology based on new subscribers, usage increase and price trends.

However, as the Uruguayan mobile market is more mature and similar to the most developed markets, it is not possible in this case to employ this methodology to quantify these significant benefits.

### Total impacts

In 2011, the overall impact of mobile telephony to the Uruguayan economy was estimated to be UYU 26.4 billion, representing 2.9% of GDP.

**Figure 223: Economic impact of mobile telephony as a proportion of GDP**



Source: Deloitte analysis

## H.3 Taxation on mobile consumers and mobile operators

Mobile consumers and operators in Uruguay have benefitted over time from positive changes to taxation policies, which recognised the importance of mobile telephony in the economy.

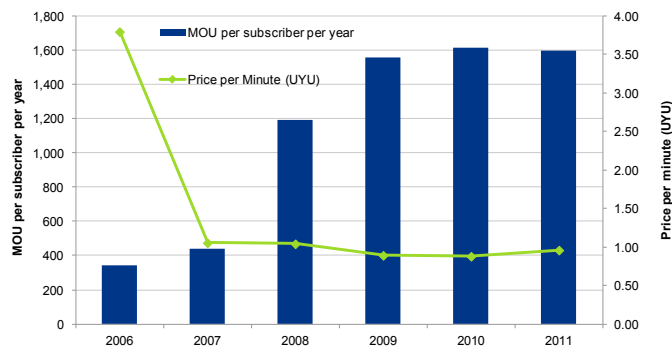
### Consumer taxes

In 2007, the Uruguayan government abolished an excise tax (ITEL) on airtime that affected telecom usage, directly impacting mobile consumers. This fixed tax, consisting of UYU 0.4 per minute for local calls<sup>111</sup> and UYU 2 per minute for long distance calls, accounted for 30%-50% of the cost of calls and as such had a negative impact on call prices. This affected usage but also contributed to increase barriers to entry in the market, especially for low income consumers.

A number of positive effects have materialised since the tax was removed. First, call prices have fallen by two thirds, and usage increased by more than three times.

111 Business News Americas (2002) : « ILD players criticize telecoms tax » available at [http://www.bnamerica.com/news/telecommunications/ILD\\_players\\_criticize\\_telecoms\\_tax](http://www.bnamerica.com/news/telecommunications/ILD_players_criticize_telecoms_tax)

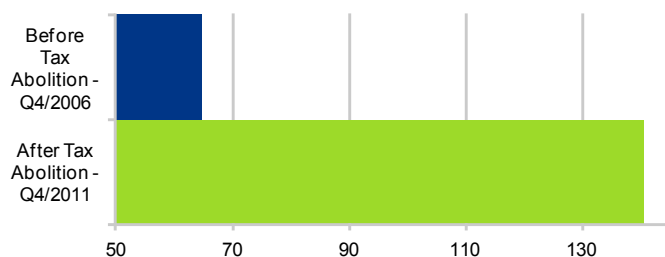
**Figure 224: Price reductions and usage increases following abolition of ITTEL Tax**



Source: Data from mobile operators

In addition, in the years following the tax abolition, mobile penetration has also more than doubled, increasing from 65% to 141%.

**Figure 225: Mobile penetration in Uruguay**



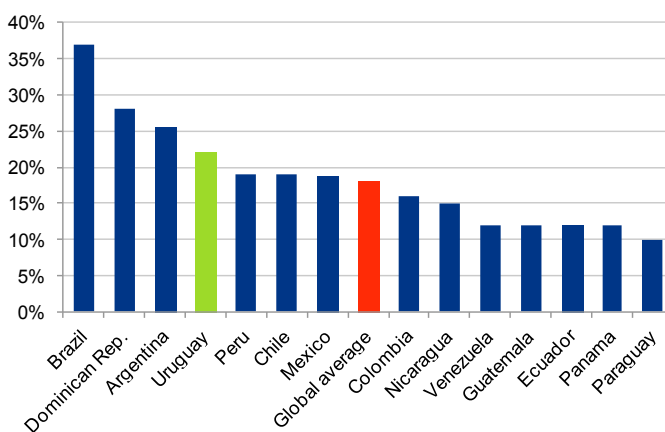
Source: Wireless Intelligence

As such, tax reductions on mobile telephony have benefitted consumers and delivered higher usage and penetration, ultimately making Uruguay a more connected country. Furthermore, tax and regulatory fees raised from mobile network operators have increased an estimated fourfold, thus providing a significant windfall to the government, as shown in Figure 218.

Today, mobile consumers in Uruguay are no longer subject to mobile-specific taxation. However, their use of mobile telephony is subject to general taxes as levied on many other goods and services.

The standard rate of 22% VAT applies on handsets, airtime and subscriptions, a rate which was reduced from 23% in 2007. As this VAT rate is higher than in many Latin American countries, tax as a percentage of the Cost of Mobile Usage (TCMU) in Uruguay is higher than both the global average and that of many neighbouring countries.

**Figure 226: Tax as a percentage of TCMU 2011**

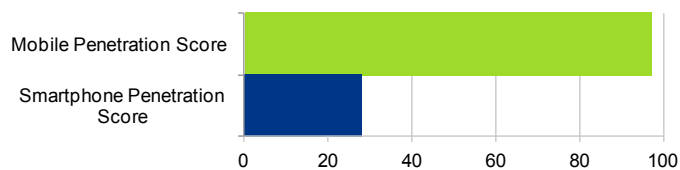


Source: Deloitte/GSMA Global Mobile Tax Review 2011; Figures for Argentina, Brazil, Panama and Uruguay have been added/updated according to further discussions with the mobile operators

In addition, when purchasing handsets, consumers are also subject to handset importation duties of 2% to 8%. As Uruguay is part of the Mercosur trading area, the handset market is also affected by Argentinean and Brazilian governments' policies that seek to promote local production, with effects on prices and choice of handsets for Uruguayan consumers.

One possible consequence of this is a low penetration of smartphones relative to feature phones in Uruguay. The GSMA Latin American Mobile Observatory 2011<sup>112</sup> scored Latin American countries between 0 and 100 depending on relative performance. The results of this study indicated that while Uruguay compares well with other Latin American countries on mobile penetration, it compares poorly on smartphones.

**Figure 227: Uruguay's mobile and smartphone penetration scores, 2010**



Source: GSMA Latin American Mobile Observatory 2011

### Taxes on mobile operators

Mobile operators in Uruguay are subject to a 23% corporate tax rate on profits. However, the government allows mobile operators to benefit from significant tax incentives (almost halving their corporate tax contribution) in recognition of their ability to achieve socially relevant objectives, including employment creation, introduction of new technology and infrastructure investment.

In addition, unlike many other countries in the region, in Uruguay there are no Universal Service Obligation (USO) contributions mandated on mobile operators. Mobile operators pay, in addition to regulatory contributions linked to mobile operators' use of base stations and frequencies, a licence fee set at 0.3% of revenues, one of the lowest levels in Latin America.

This taxation regime creates a friendly commercial environment for investment in mobile infrastructure.

Maintaining low mobile-specific taxes and regulatory contributions is important to ensure that investment in infrastructure in the mobile telecommunications sector continues. This will lead to greater availability of mobile data services on next generation mobile networks in Uruguay.

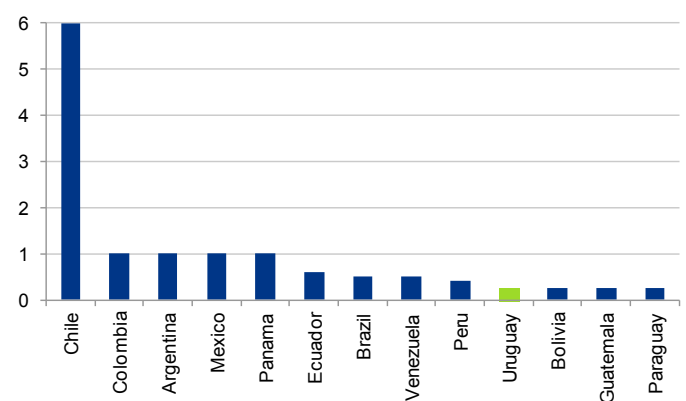
Mobile operators have indicated a number of regulatory areas where more effective regulation could help increase certainty for investors, leading to further network investment:

- Access to spectrum should be provided to all operators on an equitable basis, and the fixed incumbent should not be favoured. The next spectrum auction would be a good opportunity to allow a rebalancing to take place.
- Regulatory and legislative obstacles affecting network roll out should be eased to ensure network upgrades and development.
- Higher certainty should be provided with regards to the interpretation of telecom legislation and regulation, to increase certainty that the incumbent provider does not receive preferential treatment and that technology neutrality is promoted. One important example might be ensuring a competitive market for fibre optic connections.

An equitable treatment of all market players would contribute to increasing competition in the market and ultimately benefit consumers and promote connectivity in the country.

Currently, Uruguay has one of the lowest average speeds for fixed broadband in the region, due to ADSL being provided by a single supplier and to the absence of cable or other fixed providers.

**Figure 228: Fixed broadband internet speed, 2010 (Mbps)**

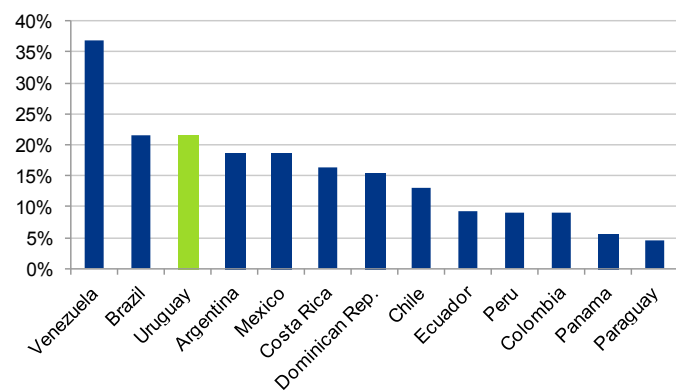


Source: ITU's World Telecommunication/ICT Indicators Database

As such, provision of mobile broadband will soon become key to serving an increasing demand for data from consumers. While Uruguay has one of the highest 3G penetration levels in the region, it is still far from levels seen in Europe or in North America, and more investment is required to support this growth.

112 A full explanation of the methodology is available in this report.

Figure 229: 3G penetration, Q4 2011



Source: Wireless Intelligence

To ensure that Uruguayan citizens can benefit from high quality fast internet, and that increasing demand for 3G data services is met, the government should continue to support the mobile industry in Uruguay through supportive taxation and regulatory policies.

# Appendix I Country case study: Panama

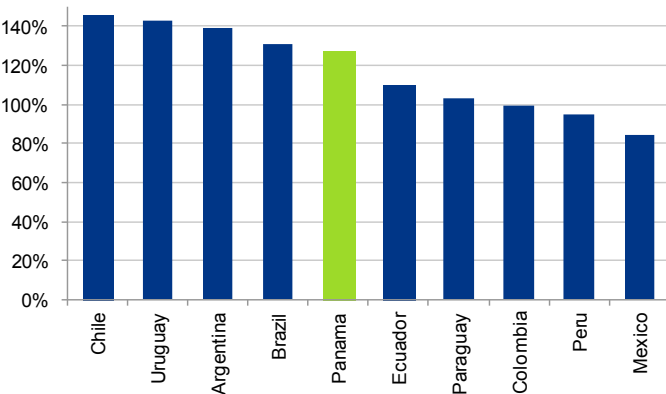
This Appendix provides an analysis of the impact of mobile telephony on Panamanian citizens and the economy in the last four years (2008-2011). It also describes the level of taxation that applies to mobile consumers and mobile operators in Panama, evaluating the effects that mobile-specific taxes have on the industry and the wider economy.

This Appendix is based on discussions and data provided by a leading mobile operator. Additional data has been provided by the GSMA and taken from publicly available sources that are referenced throughout.

## I.1 Mobile telecommunications in Panama

In Panama, the number of mobile subscribers overtook fixed telephone lines in 2001. Mobile penetration is high, at 127% in Q2 2012,<sup>113</sup> which exceeds the average for Latin America and the Caribbean.

Figure 230: Mobile penetration, Q2 2012



Source: Wireless Intelligence

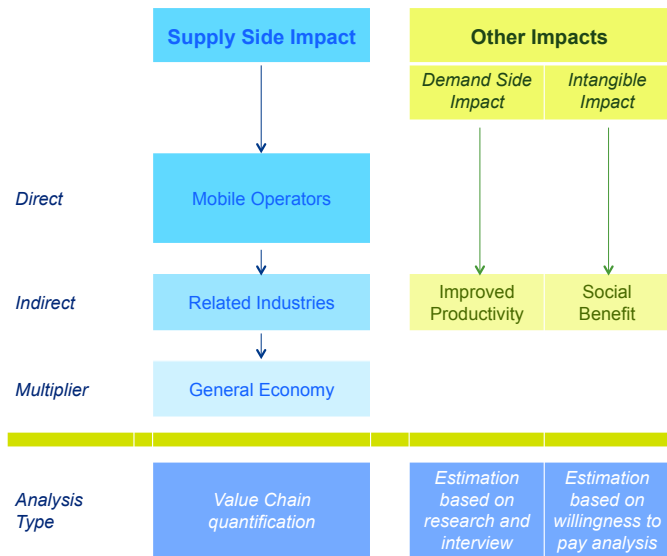
Four mobile operators operate in Panama: Movistar, Mas Móvil, Digicel Panama and Claro, with estimated market shares of 40%, 36%, 17% and 6% respectively in Q2 2012.<sup>114</sup> Digicel and Claro entered the market in 2008 and 2009, respectively. The vast majority of subscribers use prepaid services; only 5% of subscribers have contracts.<sup>115</sup> 3G services have been available since 2008, and 3G penetration was at 7% in Q2 2012.

113 Wireless Intelligence database, all connections.  
114 Wireless Intelligence database, market share of all connections.  
115 Paul Budde Communication Pty Ltd (2011): "Panama – Telecoms, Mobile, Broadband and Forecasts".

## I.2 The economic contribution of mobile telephony to the economy

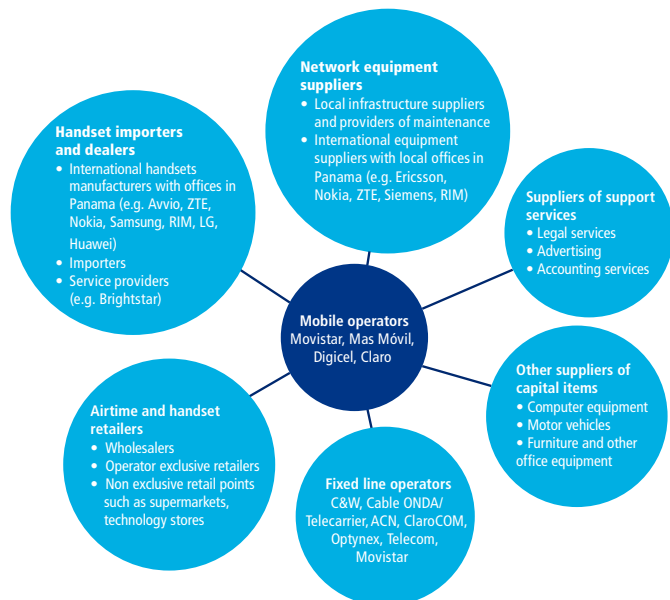
Mobile telephony in Panama generates significant economic impacts through effects on the supply side of the economy, employment, increases in productivity and benefits gained by Panamanian consumers.

Figure 231: Estimation of the economic impacts of mobile telephony



Source: Deloitte

In addition to the mobile operators, a variety of other players compose the mobile telecommunications ecosystem in Panama. These include equipment providers (international equipment manufacturers with offices in Panama, such as Ericsson, Nokia and ZTE), providers of other network services such as installation and maintenance, handset importers and distributors, airtime distributors and sellers (including a host of retail points throughout the country), and suppliers of other services (such as advertising and accounting) to mobile operators.

**Figure 232: Mobile telecommunications ecosystem**

Source: Deloitte analysis based on mobile operator data and market research

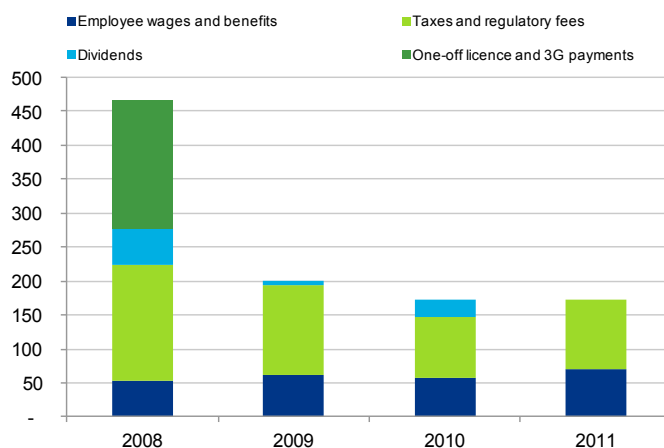
This study estimates the economic impact of the mobile industry in terms of the direct and indirect effects provided to the supply side of the Panamanian economy by the mobile operators and by players in the wider mobile ecosystem, and of direct and indirect employment from firms in the ecosystem.

The study also discusses the potential productivity increases 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

The total supply side value add created through the mobile operators and the wider mobile ecosystem is estimated as the sum of three components: direct, indirect, and induced impacts.

The direct impacts generated by mobile operators include mobile operators' expenditure on wages, CSR programmes, dividends paid by mobile operators and taxes recovered as a result of the mobile operators' operations. These were estimated at approximately USD 172 million for 2011. In 2008, the direct impact estimated at over USD 467 million includes one-off payments for mobile service licences and 3G spectrum purchased by operators. These one-off payments, estimated at USD 191 million, directly benefitted the Panamanian government.

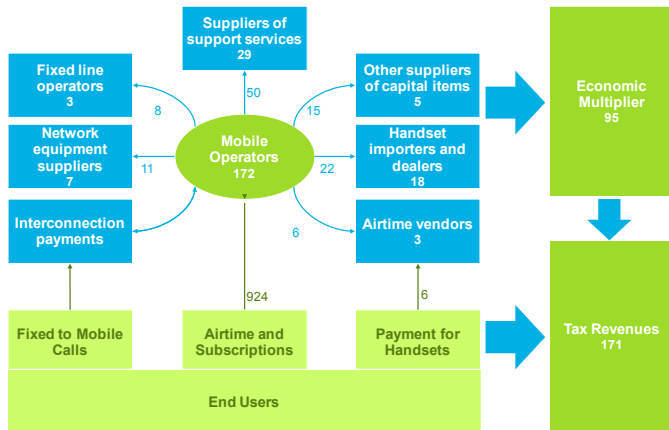
**Figure 233: Direct domestic value add of mobile operators (excluding multiplier effect), USD millions**

Source: Deloitte analysis based on data provided by the mobile operators, interviews and analysis of company accounts. Figures exclude multiplier.

The indirect impacts from mobile operators' expenditure to parties in the wider mobile ecosystem represents the percentage of any amount spent by end users that remains within the national boundaries, which serves as value add to be spent again. These are calculated by examining mobile operators' payments to their suppliers of support services in the wider mobile ecosystem. The amount of value add, including wages, profits and taxes generated by these players, is then estimated. These effects were estimated at USD 69 million for 2011.

The induced impacts reflect the subsequent rounds of expenditure created by direct and indirect spend. For example, they include the increased domestic consumption afforded by increased employment. The induced effects were estimated using a spending multiplier of 40% to capture the broader effects on the wider economy. These were estimated at USD 95 million for 2011.

Figure 234: Mobile value chain and value add in 2011, USD millions

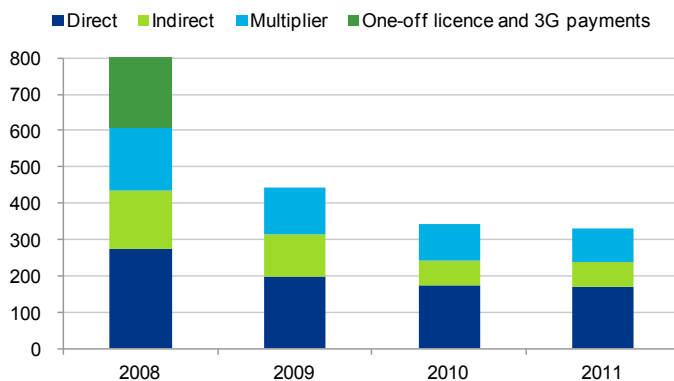


Source: Deloitte analysis ; Values in the boxes represent value add

Of particular importance to the indirect value add in 2008 and 2009 was the network investment undertaken by the two new entrant mobile operators and the investment in 3G networks by existing operators. This amounted to approximately USD 137 million in 2008 and USD 77 million in 2009.

Combining the impacts described above, mobile operators in Panama in 2011 created an estimated USD 332 million in value add through the supply side. In 2008 and 2009, the supply side value add benefited from mobile operators' payments for mobile service licences and 3G spectrum usage rights, and network investment carried out by market entrants Claro and Digicel. Since the completion of the one-off investment, the value add impact of the industry has stabilised at approximately USD 300 million.

Figure 235: Supply side value add from mobile telecommunications by component, USD millions



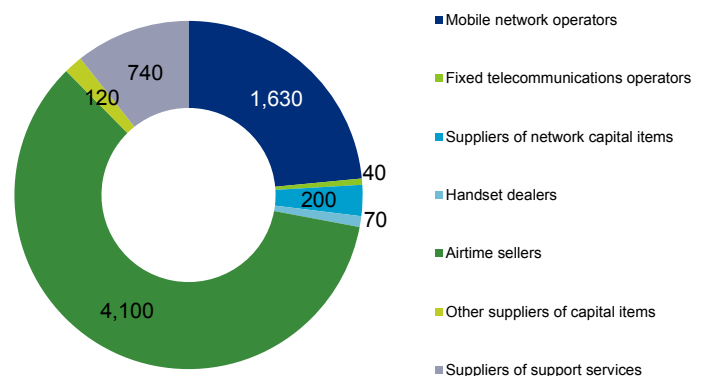
Source: Deloitte analysis<sup>116</sup>

## Impact on employment

Mobile services in Panama contribute to employment in several ways, including direct employment by the mobile operators. Mobile operators also indirectly generate employment in the wider economy as a result of their expenditures. In addition, the government also subsequently spends on employment-creating activities using tax revenues generated directly and indirectly by the mobile sector. Additional induced employment is created by mobile sector employees and beneficiaries spending their earnings, thereby creating more employment.

It was estimated that in 2011 the mobile operators supported the employment of over 1,600 Full Time Equivalents ('FTEs') in Panama. A further 5,300 FTEs are estimated to be generated in the wider mobile ecosystem as a result of mobile operators' expenditures.

Figure 236: Employment generated by the telemobile communications ecosystem in 2011 (FTEs)



Source: Deloitte analysis (differences due to rounding). Figure excludes multiplier.

Of the FTEs employed by the wider economy as a result of mobile operators' expenditures, over 4,100 are the airtime dealers and retailers operating from supermarkets, technology stores and smaller independent points of sale. In addition, while handsets are typically designed and produced abroad, international manufacturers including Avvio, Nokia, Samsung, and RIM have established permanent bases in Panama. Network equipment providers such as Ericsson, Nokia and ZTE also have a presence in Panama to provide support to mobile operators.

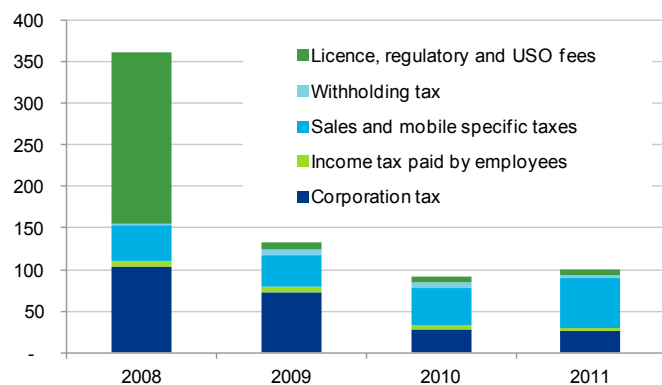
116 The multiplier is not applied to the one-off payments for mobile service licences and 3G spectrum.



## Value add from taxation

A major source of the value added by mobile operators originates from the tax revenues they generate. In 2011, mobile operators in Panama paid approximately USD 101 million to the government in taxes and regulatory fees. This represents a decrease from USD 361 million in 2008, which included the large one-off payments mobile operators made for mobile service licences and 3G spectrum usage rights. Corporation tax payments also declined from 2008 to 2011 due mainly to declining net profit before taxes, while payments for sales and mobile-specific taxes increased.

**Figure 237: Tax and regulatory payments from mobile operators, USD millions**

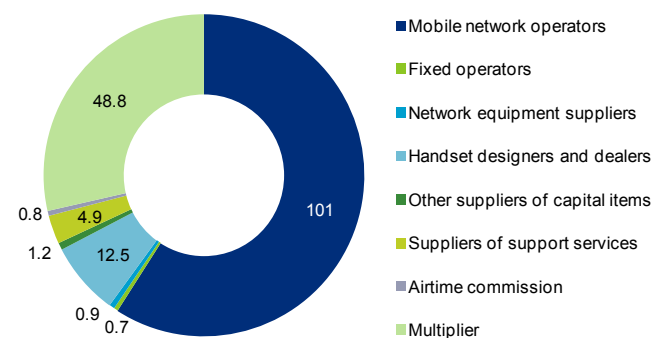


Source: Deloitte analysis based on mobile operator data

In addition to the direct tax revenue received from mobile operators, other players in the mobile industry value chain generated another USD 21 million for the government in 2011.

A further USD 49 million tax revenues were estimated to be generated in the wider economy as a result of interactions with the mobile ecosystem.

**Figure 238: Total tax revenues from the mobile telecommunications ecosystem in 2011, USD millions**



Source: Deloitte analysis based on company accounts, mobile operators' data and interviews. Note: This represents tax revenues directly created by revenue flows from the mobile operators and not total tax revenues from the sector.

## Productivity impacts

In addition to benefits to the supply side of the economy, mobile telephony in Panama increases productivity through the use of wireless services for business purposes, as well as intangible and social benefits to consumers.

There are numerous ways in which mobile services have led to productivity increases in Panama:

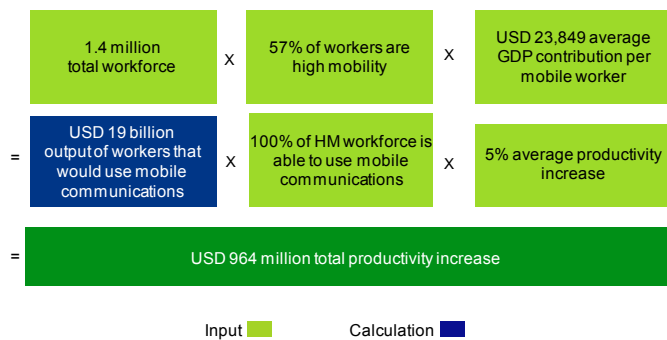
- While 3G and mobile data services are still limited to a low percent of the population, businesses and consumers, early adopters of the services, experience productivity improvements. These benefits can be enhanced by access to devices such as smartphones, tablets, dongles and Machine To Machine ('M2M').
- Movistar's Broadband Global Area Network provides broadband in remote areas using satellite technology to wholesale business consumers,<sup>117</sup> allowing businesses to enhance productivity through greater connectivity and increased access to information.
- Mobile phones are increasingly used to provide financial services to consumers who would otherwise be excluded from the financial services. Financial companies such as BAC International Bank and YellowPepper offer financial services in partnership with the mobile operators. Additionally, a joint venture by Movistar and MasterCard allows customers to use mobile phones to transfer money and make payments, facilitating business transactions and allowing customers to easily and securely receive remittances from abroad.<sup>118</sup>

<sup>117</sup> Central America Data (January 21, 2011): "New Global Connectivity Service in Panama" available at [http://www.centralamericadata.com/en/article/home/New\\_Global\\_Connectivity\\_Service\\_in\\_Panama](http://www.centralamericadata.com/en/article/home/New_Global_Connectivity_Service_in_Panama).

<sup>118</sup> Central America Data (January 26, 2011): "Telefonica and MasterCard offer mobile payments" available at [http://www.centralamericadata.com/en/article/home/Telefonica\\_and\\_Mastercard\\_Offer\\_Mobile\\_Payments](http://www.centralamericadata.com/en/article/home/Telefonica_and_Mastercard_Offer_Mobile_Payments).

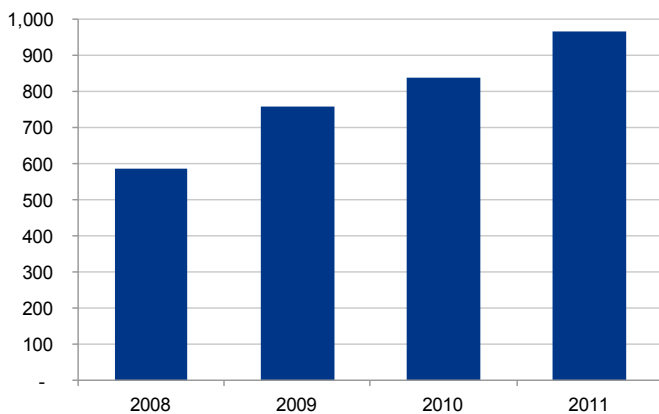
An economic value approach can be employed to provide a high level estimation of potential productivity benefits. This indicates that, if mobile workers in Panama achieved a 5% increase on their productivity as a result of using mobile phones, the potential productivity impact of mobile services on the economy would have been USD 964 million in 2011.

**Figure 239: Economic impact in 2011 of increased productivity amongst high mobility workers**



Source: Deloitte analysis based on Deloitte assumptions, interviews and Peru national statistics authority

**Figure 240: Economic impact of increased productivity amongst high mobility workers, USD millions**



Source: Deloitte analysis

## Consumer impacts

Mobile telecommunications also provide a number of intangible benefits to consumers. These include the development of interpersonal and family communications, the promotion of social cohesion, the extension of communication to those with low incomes and assistance in disaster relief. Consumers also benefit through CSR programmes undertaken by the mobile operators, including health and education programmes.

A number of CSR projects and services provided in Panama by mobile operators deliver significant tangible and intangible benefits to consumers and to businesses:

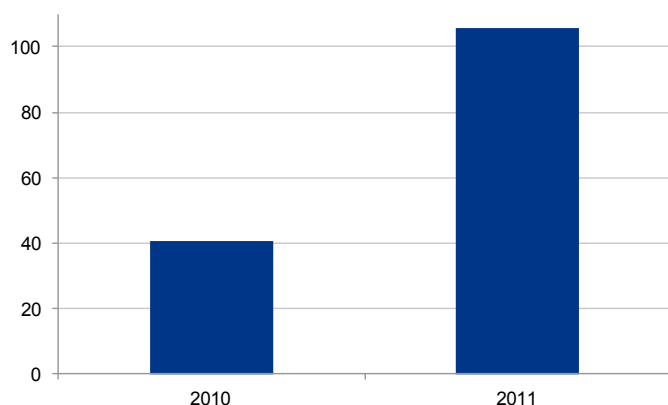
- Movistar, in collaboration with the Telefónica Foundation, operates the Proniño programme, which supports children's education and welfare.
- Movistar operates a mobile phone recycling programme to reduce mobile phone waste.
- Claro participates in the "(RED) Rush to Zero" campaign against HIV/AIDS. América Móvil is working with mobile equipment manufacturers BlackBerry, Sony Mobile, Samsung, LG, Nokia, and HTC to offer a product line that will support the RED campaign.
- Mas Móvil and Digicel have installed base stations powered by sun and wind energy in remote areas, providing mobile connectivity to areas that lack infrastructure and promoting environmental sustainability.<sup>119</sup>
- Mobile operators report that mobile services have played a key role in providing internet connectivity to schools nationwide, including in remote areas. A network utilises satellite internet, which schools access via computers connected to mobile phones.

In addition to these social benefits, competition in the industry resulted in a reduction of prices, with the price for a three-minute peak local call falling by 75% from 2003 to 2009,<sup>120</sup> and spurred usage increases.

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 have increased over time in the last four years. This approach suggests that consumers potentially enjoyed the equivalent of up to USD 106 million in intangible benefits in 2011.

119 Central America Data (August 6, 2009): "Telecom companies invest in renewable energy" available at [http://www.centralamericadata.com/en/article/home/Telecom\\_Companies\\_Invest\\_in\\_Renewable\\_Energy](http://www.centralamericadata.com/en/article/home/Telecom_Companies_Invest_in_Renewable_Energy).

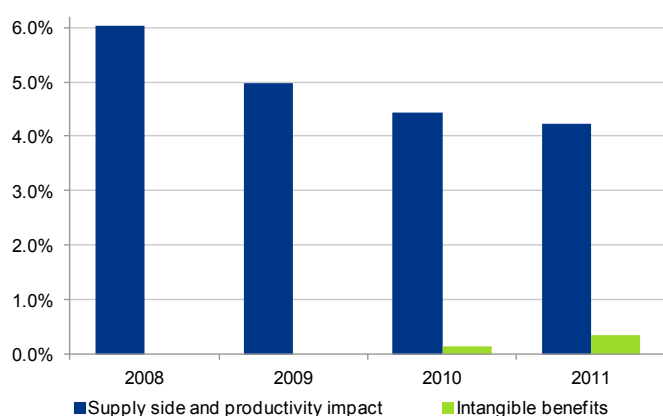
120 ITU database.

**Figure 241: Intangible benefits using willingness to pay concept, USD millions**

Source: Deloitte analysis

### Total impacts

In 2011, the overall impact of mobile telephony on the Panamanian economy was estimated to be USD 1.3 billion, representing 4.2% of GDP, plus up to an additional USD 0.1 billion from intangible consumer benefits.

**Figure 242: Economic impact of mobile telephony as a proportion of GDP**

Source: Deloitte analysis

## I.3 Taxation on consumers and mobile operators

Mobile consumers and mobile operators in Panama have historically benefitted from a tax regime that supported growth in mobile penetration, but in recent years, taxes on mobile consumers and operators have increased significantly.

### Consumer taxes

Four types of taxes affect mobile consumers in Panama.

**Table 6: Mobile specific taxation on Panamanian consumers, 2012**

Product	Tax	Tax rate
Mobile voice and data usage	ITBMS <sup>121</sup>	7% VAT-style tax on sales of goods and services. Both prepaid and postpaid mobile services are subject to the tax.
	ISC <sup>122</sup>	5% special consumption tax in Panama that applies to "discretionary" spending items including gambling, automobiles, television, soft drinks, firearms, cigarettes and alcohol. Both prepaid and postpaid mobile services are subject to the tax.
	Cable burying tax	0.5% special charge on telecommunication and cable television services which was introduced in April 2012 in order to cover the costs of burying cables. The tax applies to fixed and postpaid mobile telecoms services, as well as cable television services.
Handsets and other mobile devices	ITBMS	7%, as for mobile voice and data usage.
	Import duty	5%.

Source: Deloitte analysis

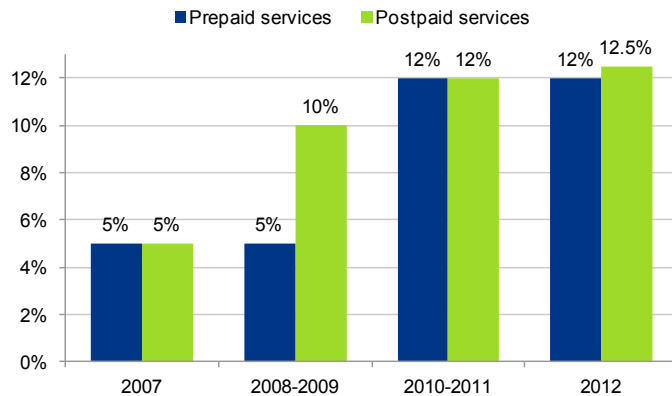
Taxes on mobile consumers have increased over time. Prior to 2010, the ITBMS standard rate was 5%, which applied to both prepaid and postpaid mobile services. In 2010, the ITBMS rate increased from 5% to 7% for most goods and services, including mobile services and handsets.

In addition to ITBMS, mobile service usage is also subject to the ISC of 5% and the cable burying tax of 0.5%. The ISC was introduced in 2008 on postpaid mobile services, and since 2010, it has been extended to prepaid mobile services. Since April 2012, the cable burying tax is levied on mobile telecoms services, though prepaid services are exempt from the tax.

121 Impuesto de Transferencia de Bienes Muebles y Servicios.

122 Impuesto Selectivo al Consumo.

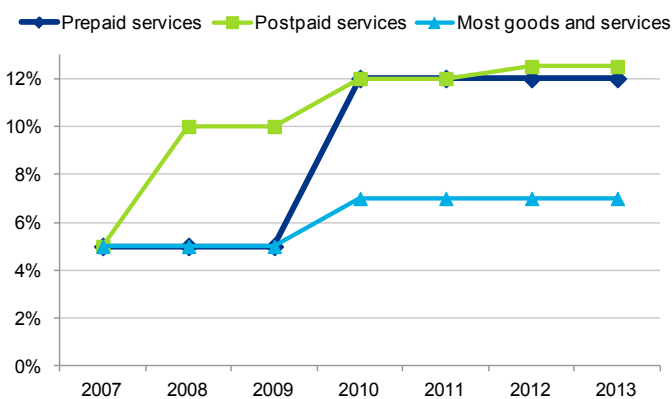
Figure 243: Consumer taxes on mobile services



Source: Deloitte Analysis

The changes to the ITBMS and introduction of the ISC and the cable burying tax resulted in increased costs to mobile consumers. The total tax rate that applies to mobile service usage far exceeds the total tax rate that applies to most goods and services, while the burden on users of prepaid services increased from 5% to 12% in 2010.

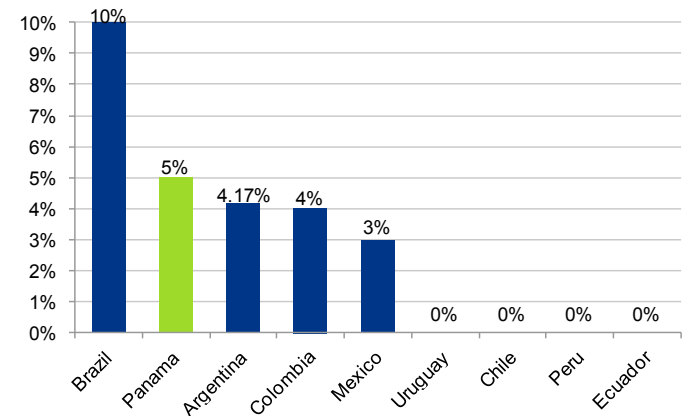
Figure 244: Consumer taxes applied to mobile prepaid and postpaid services compared to most goods and services



Source: Deloitte analysis

This trend of increasing taxes on mobile consumers contrasts with the trend of decreasing taxes on mobile consumption observed in other Latin American countries, such as in Ecuador and Uruguay. Further, in the context of this study, among the Latin American countries which apply special consumption taxes on mobile services, Panama's rates are the second-highest for both prepaid and postpaid mobile services.

Figure 245: Special consumption tax rates on prepaid mobile services, 2012

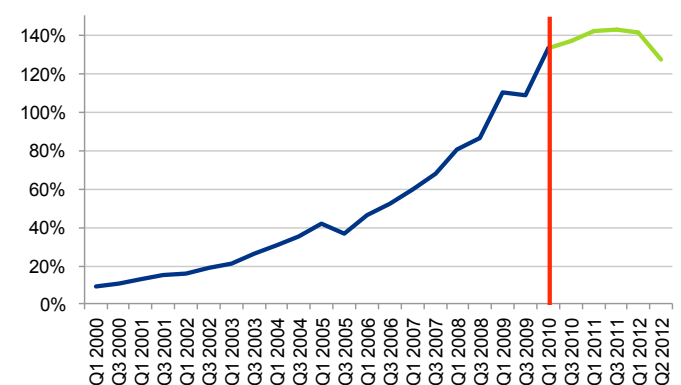


Source: Deloitte analysis. In Brazil and Colombia, mobile services are subject to supranormal sales tax rates. The difference between the average tax rate on mobile calls and the standard rate on all other goods and services is reported in this figure as a mobile specific usage tax.

### Increasing taxes on mobile telephony negatively impacted penetration rates and usage.

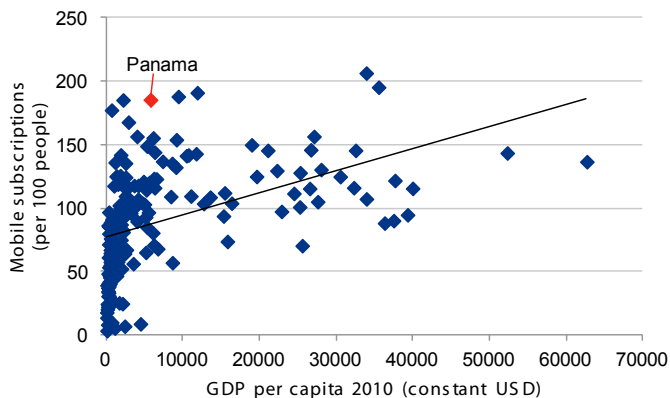
While at the beginning of the century Panama's penetration rates were on par with those of its peers, positive taxation policies contributed to rapid penetration growth from 2005 to 2010, giving Panama the lead in penetration in the region and even exceeding the penetration rate that would be expected given GDP per capita in Panama. However, penetration slowed dramatically in 2010 with the increase in consumer taxes and penetration decreased in 2012.

Figure 246: Mobile penetration



Source: Wireless Intelligence

**Figure 247: Mobile penetration and GDP per capita in Panama and the rest of the world, 2010**



Source: World Bank data

The increased tax burden on Panamanian mobile consumers has also been associated with decreased consumption of mobile services.

Total minutes of use have declined in Panama. This is in contrast with international trends of increasing usage of mobile telephony. The impact on mobile usage prices of the rapid increase in taxation of mobile services contributed to consumers cutting back on consumption of mobile telephony.

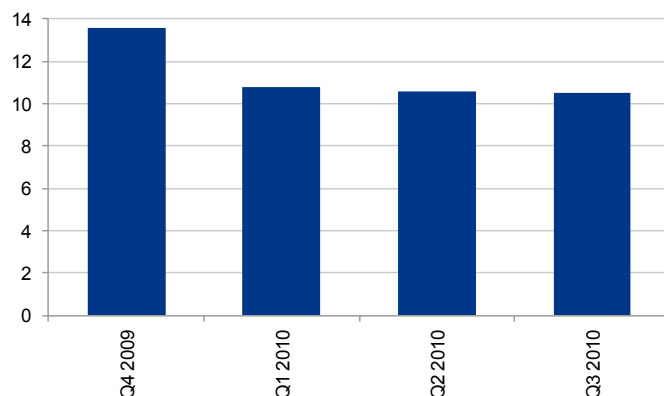
**Figure 248: Minutes of use, billions**



Source: Deloitte analysis based on Autoridad Nacional de los Servicios Públicos and Wireless Intelligence data

Declining usage has also had negative consequences for operators, whose average revenue per user has declined.

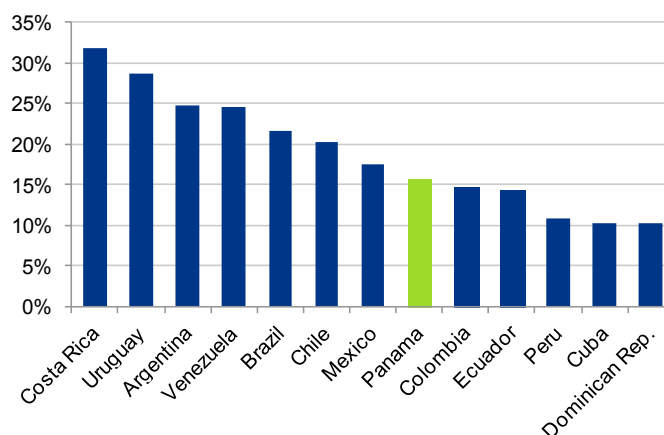
**Figure 249: Average revenue per user, USD**



Source: Wireless Intelligence

The negative impact of taxation on mobile penetration and usage is likely to be exacerbated by the relatively low level of fixed teledensity in Panama compared to penetration in other countries in the region.

**Figure 250: Fixed telephone lines per 100 people, 2010**



Source: World Bank data

In addition to these direct impacts, mobile taxation in Panama raises a number of other concerns.

The tax regime may create distortions on the market for telephone calls in Panama, since public and semi-public fixed telecoms are exempt from ITBMS<sup>123</sup> and ISC does not apply to fixed telephone service. These exemptions mean that fixed telephony is subject to lower consumer tax rates and therefore, prices for fixed telephone services are lower than they would be if they were subject to the same tax regime as mobile services. This creates a bias against private, mobile telecoms, which potentially distorts consumer choice and competition in the market, also affecting private investment.

123 KPMG: "Panama: Country VAT/GST essentials". This refers to phones located in public areas, such as public parks and shopping centres.

The tax changes that have occurred since 2008 may adversely affect low-income consumers. Panama is affected by high poverty and inequality; with a Gini coefficient of 51.9%, Panama is amongst the most unequal countries in the world, and 32.7% of the population lived below the national poverty line in 2008.<sup>124</sup> Taxes that target mobile service usage can represent a significant obstacle to usage of mobile services by the poorer segments of the population, who could derive significant benefits from being connected. The extension of ISC to prepaid services and increase in the ITBMS rate applied to prepaid services in 2010 is likely to have a disproportionate impact on low-income consumers who rely on prepaid mobile services due to their lack of access to credit.

Since mobile phone services are a necessity, rather than a luxury consumed only by high-income consumers, the government should consider whether it is appropriate to levy the ISC (a special consumption tax) on mobile services. As postpaid telecoms services are generally consumed more by wealthier consumers with access to capital, the imposition of the cable burying tax reinforces the view that the government considers mobile telecoms, and particularly postpaid services, to be a “luxury”, rather than a necessity.

Handsets, another key component of the mobile consumer’s bundle, are also subject to taxation in Panama. Panama does not have a local handset manufacturing industry, so handsets used by consumers are imported from abroad and are subject to a duty of 5% paid by the importer at the moment of importation. This tax is then passed onto consumers.

Handsets are also subject to ITBMS. This affects consumer access to mobile telephony by raising the cost of device acquisition. The elevated cost of device acquisition due to customs duty and ITBMS has two key implications for consumers:

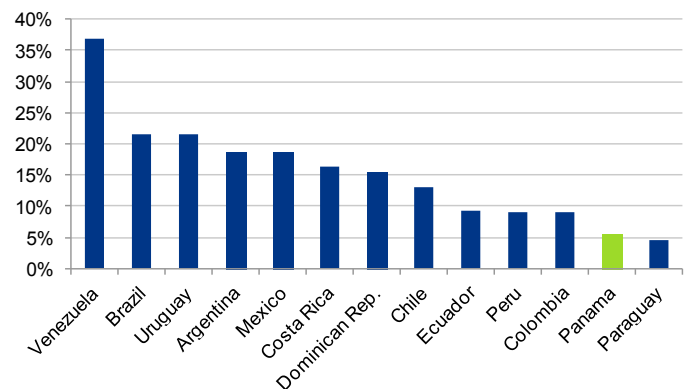
- The increased cost of device acquisition due to taxes may prevent poorer members of the population from accessing mobile services and deriving benefits from consumption of mobile telephony. Handset costs and subscription costs represent the most significant barrier to the consumption of mobile services, particularly for the poorer sectors of the population.

- Since handsets and smartphones may represent the only possibility of accessing broadband internet for certain sectors of the population and in rural areas, handset taxes may lead to underconsumption of internet services, thus worsening the Digital Divide.

Though Panama is one of the stronger regional performers in terms of internet penetration, the majority of Panama’s population still lacks access to the internet. Since 2010, the Panamanian government has offered free wireless internet access nationwide using WiMAX technology, reaching 80% of the population; however, under 4,000 subscribers used WiMAX by 2011. Broadband subscribers increased 18% from 2009 to 2010, yet per capita broadband penetration was only 7.7% in 2010.<sup>125</sup>

In this context, mobile broadband represents an important opportunity for Panama to catch up with the rest of the world and digitise its economy and for Panamanians to access the internet. Yet, 3G penetration in Panama is among the lowest in the region, despite mobile operators’ recent investments in 3G, and the 3G penetration rate is lower than would be expected for a country with Panama’s income.

Figure 251: 3G penetration, 2011

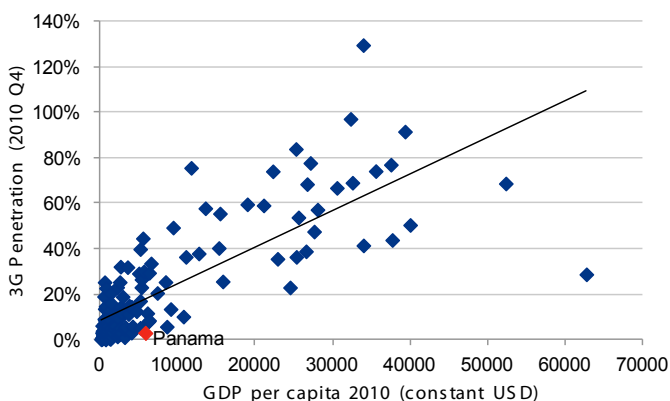


Source: Wireless Intelligence

<sup>124</sup> World Bank.

<sup>125</sup> Paul Budde Communication Pty Ltd (2011).

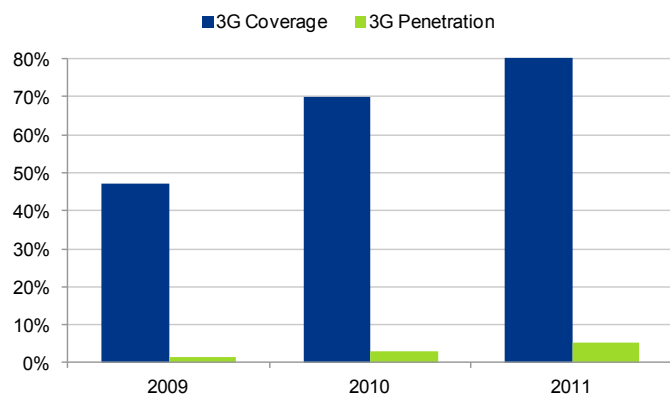
Figure 252: 3G penetration relative to GDP, 2010



Source: Wireless Intelligence and World Bank

The ITBMS, ISC, and cable burying tax are applied to mobile data consumption, raising the cost of usage of mobile internet. The cost of data usage acts as a barrier to usage and may contribute to Panama's low 3G penetration rate.

Figure 253: 3G coverage and penetration



Source: Movistar and Wireless Intelligence

A more supportive tax regime could provide mobile operators with the incentives necessary to continue to invest in 3G infrastructure and could make mobile data devices and services more affordable for consumers, thus extending access to and usage of 3G and providing Panamanians with much-needed connectivity.

## Taxes paid by operators

Mobile operators in Panama are subject to numerous taxes as well as regulatory fees.

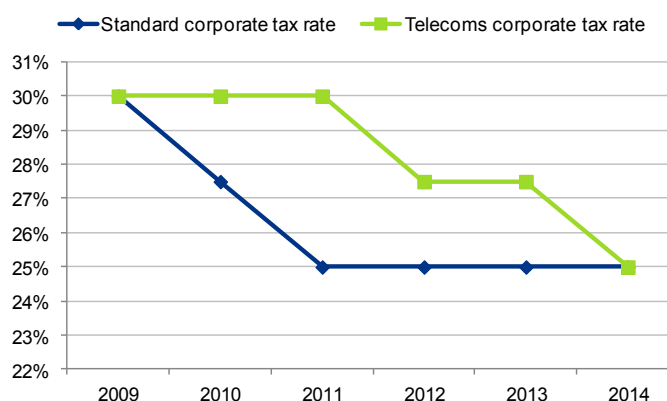
Table 7: Taxes and regulatory fees paid by mobile operators, 2012

Category	Tax	Tax rate
Taxes	Corporate tax	27.5% tax on profits.
	Withholding tax	Tax on payments to non-resident companies. Withholding tax rates vary from 5 to 20% and are charged on 50% of the expenditure amount. <sup>126</sup>
Regulatory fees	Annual operating permit fee	2% of the company's net worth. <sup>127</sup>
	Mobile service licences	One-off payments.
	Spectrum usage fees	One-off payments.
	Universal service obligation fees	1% of service revenues. <sup>128</sup>
	Other regulatory fees	0.922% of profits.

Source: Deloitte analysis

Telecoms operators in Panama are subject to a higher-than-normal corporate tax rate; corporate tax rates declined from 30% to 27.5% in 2010 and to 25% in 2011 for most companies, while telecoms companies paid the 30% corporate tax rate until 2012, when the tax rate declined to 27.5%. Telecoms companies will continue to pay a higher rate until 2014, when they will be subject to the same 25% rate paid by other companies.<sup>129</sup>

Figure 254: Corporate tax rate



Source: Deloitte analysis

This tax rate structure is discriminatory. Compared to companies in other sectors, due to the higher corporate tax rate, telecoms operators receive a lower post-tax profit and pass on lower returns to shareholders in the form of dividends. This discourages investment in Panamanian telecoms.

126 There are some deviations from this rule. For example, Panama has bilateral agreements with some countries, for which the withholding tax rate is reduced, and lower tax rates apply to payments between subsidiaries of the same multinational company.  
127 Net worth is defined as total assets minus total liabilities and includes amounts owed to foreign affiliates and parent companies.

128 Panama National Assembly (August 11 2008): Law No. 59.  
129 Law 8 of 15 March 2010, available at [http://www.dgi.gob.pa/documentos/Ley\\_8\\_20100315.pdf](http://www.dgi.gob.pa/documentos/Ley_8_20100315.pdf), specifies these corporate tax rates. Companies involved in banking, power generation, cement manufacturing, casino and gambling activities, and insurance are subject to the same corporate tax schedule as telecoms companies.



The corporate tax burden on mobile operators increased in 2010 as international service revenues, which previously had been partially deductible from corporate taxes, became fully taxable.<sup>130</sup>

In addition to discriminatory corporate taxes, mobile operators are subject to sector-specific regulatory fees: mobile service licences, spectrum usage fees, universal service obligations and other regulatory fees.

All companies in Panama pay annual operating permit fees equal to 2% of the company's net worth (with a maximum payment of USD 60,000), but mobile operators are subject to payment of additional mobile service licences. These one-off fees present a high cost to mobile operators; Digicel and Claro each paid USD 86 million for mobile service licences in 2008,<sup>131</sup> and Movistar and Mas Móvil will pay mobile service licence fees again when their current 20-year licences expire.

Spectrum usage fees determined at auction also present a large cost to mobile operators. In 2008, Mas Móvil paid USD 18.9 million to acquire 3G spectrum usage rights. Movistar paid USD 18.7 million in 2007 and USD 10 million in 2008 to acquire 3G spectrum.

Mobile operators are also subject to annual regulatory fees, including a universal service obligation fee of 1% of service revenues, and an additional regulatory fee payment equivalent to 0.922% of mobile service profits.<sup>132</sup>

These taxes and regulatory contributions raise a number of concerns:

- These taxes discourage investment: taxes applied on gross revenues or net worth directly reduce the profitability of all operators, independently of their level of profitability, while a discriminatory corporate taxation policy increases risks to telecoms investors. In a given year, these taxes have the same effect on operators with positive profits and operators with no profits due to recent network investment. These taxes increase the risks and costs associated with network investment.
- These taxes are not transparent: unlike ITBMS, ISC or the cable burial tax, which are collected from consumers on behalf of the government, these taxes and fees are levied on operators directly. This means that mobile operators must either suffer a consistent reduction in their profitability or pass these taxes through to consumers in a non-transparent way, as they cannot itemise the tax in prices or receipts.

- These taxes are inefficient for the economy. imposing taxation on firms' revenues or net worth produces lower market volumes and higher prices than a revenue-equivalent<sup>133</sup> tax on profits. In fact, when taxes are imposed on revenues, operators tend to adopt a low-turnover/high-margin strategy, as opposed to a low-margin/high-turnover strategy which is optimal when taxation is imposed on profits.

While the majority of the Panamanian population uses mobile telephony, the National Public Services Authority (ASEP) has expressed concerns that the market is not yet fully developed.<sup>134</sup> Further investment in the sector is needed in order to continue extending coverage and improving service quality. Taxation may represent a barrier to the extension of coverage and penetration.

An additional concern for mobile operators is that as the mobile telecommunications market in Panama has become increasingly competitive, particularly with the market entry of Digicel and Claro in 2008,<sup>135</sup> operators have reduced prices and subsidised handsets in order to attract customers.<sup>136</sup> These strategies have eroded operators' margins.

## I.4 Conclusion

While the exemption of most mobile services from consumer taxes from 2000 to 2010 encouraged rapid growth in mobile penetration, since 2010 taxes on mobile consumers have increased, negatively affecting consumers and operators and contributing to a decline in mobile usage. Despite investment by operators in 3G networks, 3G penetration in Panama lags behind penetration in other countries in the region. The increases in taxes on consumers and operators could have negative implications for the already underdeveloped mobile internet market.

A supportive taxation and regulatory environment could encourage further investment in mobile networks and uptake of mobile devices and services, extending the benefits of next generation mobile services, notably wireless internet, helping Panama boost usage of internet and reap the benefits of a wireless economy.

130 Pardini y Asociados: "Panama's new tax law reform" available at <http://www.pardinilaw.com/publications/news.php?newsid=189&p=3&catid=6>.

131 Movistar's concession was signed in 1996 and +Movil's concession was signed in 1997.

132 The regulatory fee rate for most telecoms services is 0.922% of profits, but for long distance international calls the rate is 0.25%.

133 Two different taxation policies are revenue-equivalent when they raise the same amount of tax revenues for the government.

134 Sherly Díaz: "Telecomunicaciones: Un Mercado al que aún le falta madurar" available

at [http://www.martefinanciero.com/history/2012/03/20/dossier\\_5.asp](http://www.martefinanciero.com/history/2012/03/20/dossier_5.asp).

135 Telegeography (November 25, 2008): "Panama cellcos prepare for competition with price drops" available at <http://www.telegeography.com/products/commsupdate/articles/2008/11/25/panama-cellcos-prepare-for-competition-with-price-drops/>.

136 Revista Summa (May 17, 2011): "Panamá, segundo con tarifa móvil más baja de la región" available at <http://www.revistasumma.com/tecnologia/12104-panama-segundo-con-tarifa-movil-mas-baja-de-la-region.html>.

# Appendix J Methodology and assumptions

This Appendix outlines the approach taken in estimating the economic contributions of the mobile industry in each of the sample Latin American economies. For each country, it also describes data sources and assumptions.

## J.1 Estimation of the economic impact of mobile telephony

### Static analysis

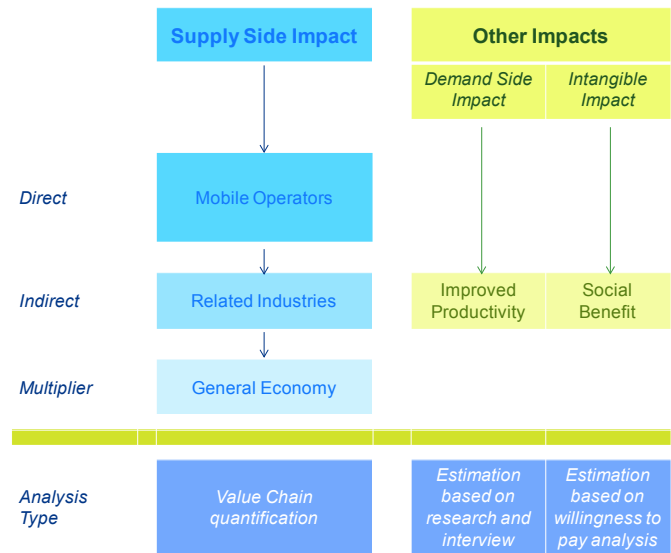
Static analysis refers to the impact of mobile services for a particular period of time and does not seek to estimate the longer term impacts on economic welfare. However, static analysis is extremely useful due to the greater availability of disaggregated data, relative to dynamic analysis, where a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

Publicly available data and mobile operator data were employed together with interviews and assumptions based on economic literature to estimate the value of mobile telecommunications 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>137</sup>

- Direct impact from the mobile operators;
- Indirect impact from other industries related to mobile services;
- Indirect impact due to the surplus enjoyed by consumers in terms of productivity improvements; and
- 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 calculate the total economic impact.<sup>138</sup>

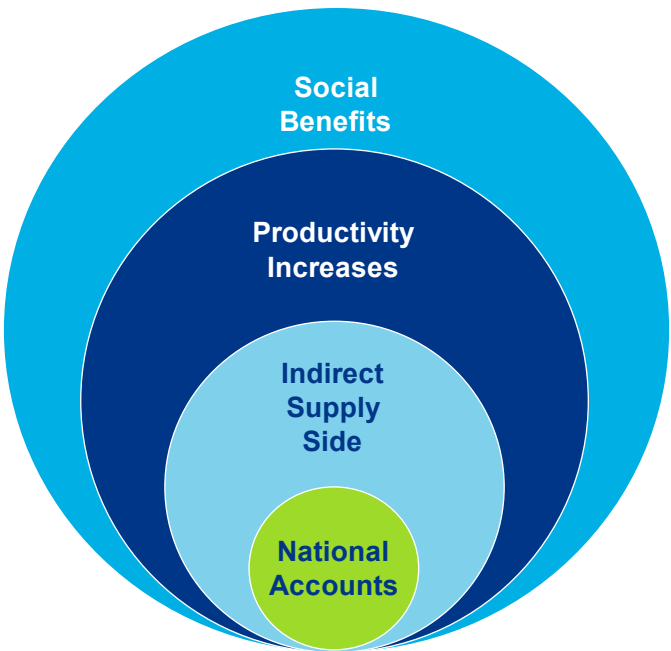
Figure 255: Structure of the analysis of economic impact on GDP and employment



Source: Deloitte

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

Figure 256: Economic contribution of the mobile sector



Source: Deloitte

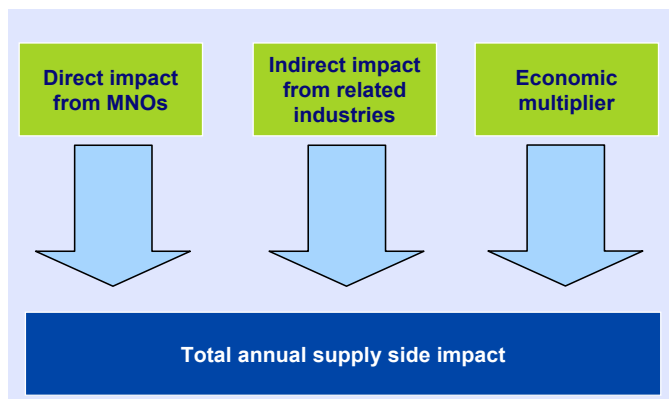
137 The approach adopted is consistent with that adopted across the economic literature, see for example: McKinsey & Co. (September 2006): “Wireless Unbound: The surprising economic value and untapped potential of the mobile phone.”

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

### J.1.1 Supply side impact

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

Figure 257: Structure of the supply side analysis

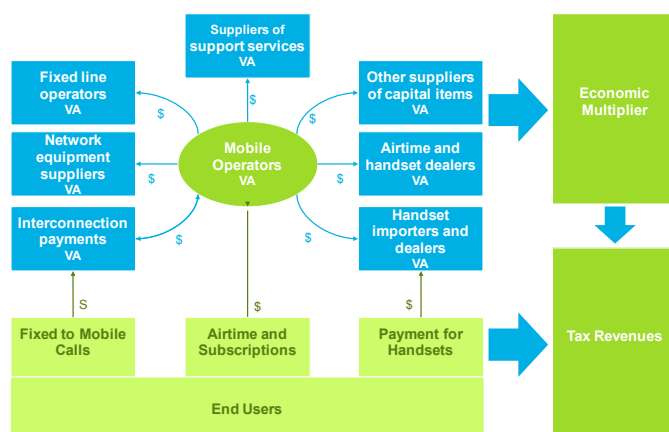


Source: Deloitte

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

Each of the main stakeholders in the industry has been identified. Flows of value between stakeholders are shown in the diagram below.

Figure 258: Mobile value chain



Source: Deloitte

Estimates of the flows are based on:

- Discussions with mobile operators;
- Interviews with local market experts, handset and airtime dealers;
- Analysis of government taxation statistics; and
- Analysis of accounts and billing information.

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

#### Direct value add from mobile operators

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

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

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

#### Indirect value add

The revenues that flow directly from the mobile operators to other domestic industry players have been identified. The proportion of revenues that is value add was then estimated, using the five categories of value add used in the mobile network operator analysis above.

#### The multiplier

The value add created by the mobile telecommunications 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 incur operating expenses which are paid to additional players. These players will then create value as they pay wages, taxes, etc. The economic literature quantifies these effects by applying an 'economic multiplier' to the initial rounds of value generated. The table below shows the values of multipliers that have been calculated in other studies.

**Table 8: Multiplier benchmarks**

Title of study	Multiplier
O2 for ONS (2002): "The contribution of mobile phones to the UK economy"	1.13
Ovum studies on economic impact of mobile telephony in Bangladesh and USA based on review of various other studies*	1.6
Association Française des Opérateurs Mobiles	1.7
Europe economics, based on ONS: "Economic impact of spectrum use in the UK"	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
Deloitte for Telenor (2008): "Economic Impact of mobile telephony in Serbia"	1.3
Zain/Ericsson (2009): "Economic impact of Mobile Communications in Sudan"	1.2
Aloyce R. Kaliba, et al (2004) "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
Deloitte/GSMA (2011): "Mobile telephony and taxation in Bangladesh"	1.4
Deloitte/GSMA (2012): "Mobile telephony and taxation in Turkey"	1.4

Source: Deloitte

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 telephony on GDP and employment. This was assumed following a literature review, considering a benchmark used for countries in the region with similar characteristics for previous studies, and using the data provided by mobile operators about the proportion of expenditure by key players which remains in Latin America.

## J.1.2 Calculating tax revenues

Government tax revenues are raised through taxes on mobile consumers and operators, including consumption taxes, customs duties, corporation taxes, and regulatory fees. Tax revenues are collected from all components in the mobile telecommunications ecosystem. Based on interviews with the key stakeholders, assumptions were made on the percentage of money flows that are subject to the national tax regime.<sup>139</sup>

Information on revenues for various taxes was collected as follows:

- Economy-wide taxes: value added (sales) taxes, corporate taxes and income tax paid by employees.
- Mobile taxes: licence, spectrum and other regulatory fees, plus all mobile-specific taxes found in the sample countries' tax systems.

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

## J.1.3 Calculating the impact on employment

Mobile services contribute to employment in several ways:

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

The first impact was partly estimated directly by collecting data from the mobile operators. For the related industries, information from interviews with the mobile operators 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 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 on this issue, and it was chosen to apply a multiplier of 1.4 on all value add, including employment.

<sup>139</sup> Following interviews with the main parties, only a limited degree of leakage from the informal sector has been assumed.

### J.1.4 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 more developed markets such as Latin America. Several important effects have been identified in the research in the last years. These include the following:

- Improving information flows: mobile services allow workers in certain occupations 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 wastage.
- Reducing travel time and costs: mobile services allow workers to trade and share information without travelling.
- Improving efficiency of mobile workers: mobile services improve the efficiency of all workers in the economy. This effect will particularly be felt by workers with unpredictable schedules, for example those involved in repair and maintenance, or collection and delivery. 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 entrepreneurship: mobile phones have encouraged the growth of small business and have increased their efficiency.
- Data and smartphone proliferation amplifies these effects by giving access to applications and email.

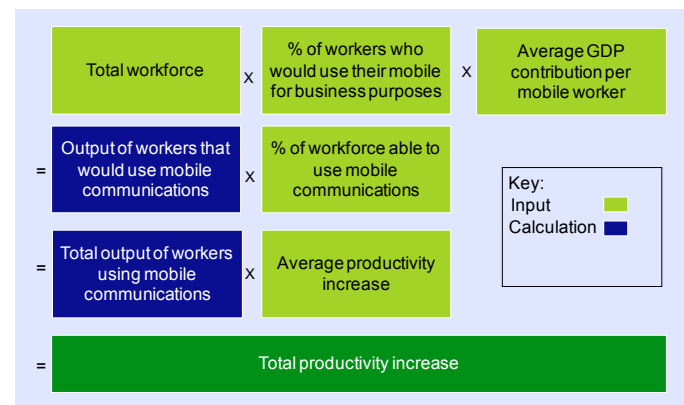
No established economic methodology exists to estimate the GDP and employment effects of such productivity improvements across the economy. As such, available evidence from the literature in this area was considered and interviews with stakeholders have been undertaken in order to provide an indication of the demand-side impact of mobile telecommunications.

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>140</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. The proportion of high mobility workers was calculated by referring to data from national statistics offices and international labour databases. The productivity gain of high mobility workers with access to mobile phones was estimated by undertaking interviews to identify the impacts seen in each country and by referring to previous studies.

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

**Figure 259: Calculation of economic impact of productivity improvements**



Source: Deloitte

### J.1.5 Intangible benefits

Finally, the intangible impact of the mobile industry was identified. Information provided during interviews with mobile operators in Latin America was used; additional findings from other economic impact reports were drawn upon and extended.

As when calculating increases in productivity, economic and social research was undertaken on the numerous ways in which mobile services can promote intangible benefits. These are set out below and include the following:

- Promoting social cohesion: through enabling contact with family members or friends who have moved away, and building trust through sharing of handsets (which has been found to be common in developing countries). In addition, a number of studies found a statistically robust relationship between mobile ownership and willingness to help others in the community.
- 

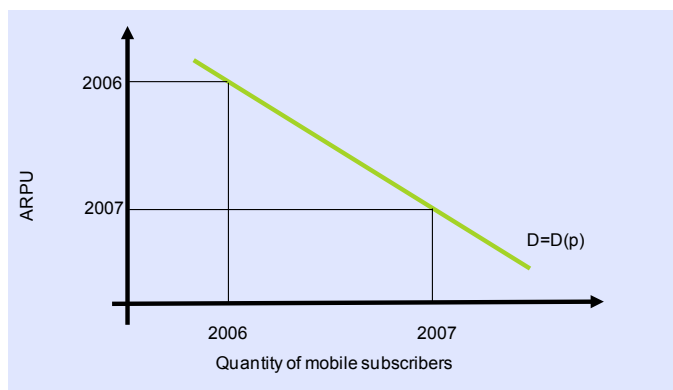
140 See, for example: McKinsey & Co. (September 2006): "Wireless Unbound: The surprising economic value and untapped potential of the mobile phone".



- Extension of communications: especially to users with low education and literacy.
- Stimulating local content: this can be particularly useful for allowing users to learn about local services such as healthcare or education.
- Assisting in disaster relief: mobile services allow families and friends to stay in touch in the event of a natural disaster, which can also ensure that they obtain more rapid relief.

Whilst it is difficult to assign a specific value to these benefits in terms of contribution to GDP or employment, it is clear that many of these social and educational benefits could make people happier, healthier and more motivated 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>141</sup> This seeks to calculate the increase in consumer surplus that results from a change in the price of a good.

**Figure 260: Increase in consumer surplus following a reduction in price**



Source: Deloitte

The willingness to pay concept was used to calculate the value of the intangible benefits of mobile phones in this study.<sup>142</sup> Historical minutes of use ('MOU') per user and average price per minute show how much customers are willing to pay for mobile services. If it is assumed that these intangible benefits of owning a mobile 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.

There are numerous reasons why these estimates could underestimate or overestimate the true value of intangible benefits. This methodology assumes that all subscribers in 2007 joined the network in 2007: this allows estimating only the consumer surplus enjoyed by customers that joined the network from 2008 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.

<sup>141</sup> See, for example: McKinsey & Co. (September 2006): "Wireless Unbound: The surprising economic value and untapped potential of the mobile phone".

<sup>142</sup> There is a potential for double counting between the productivity improvement and the intangible impact.

# Appendix J Methodology and assumptions

## J.1.6 Data limitations and detailed assumptions

The tables below report the detailed assumptions used in the economic impact assessment.

Table 9 Brazil

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b></p> <p>Data was obtained directly from Vivo and TIM, while estimates were used for the other operators based on publicly available information, including market shares.</p> <p><b><u>Indirect employment</u></b></p> <p>Employment figures for most segments of the value chain were estimated based on discussions with mobile operators. 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 mobile operators. Average wage was estimated by using assumptions on operator wage and average wage in Brazil.</p> <p>For airtime employment, interviews with mobile operators' staff identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>For the employment generated by handset manufacturers and assemblers, information was based on direct data provided by a major handset manufacturer and an uplift was applied based on market shares in order to capture the FTEs for the entire Brazilian market.</p> <p>A multiplier of 1.4 was applied to indirect levels to gauge the total employment effect in the economy. No multiplier was applied to direct mobile operators' 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><u>Direct value add of mobile operators</u></b></p> <p>All data was obtained directly from mobile operators</p> <p><b><u>Indirect value add</u></b></p> <p>These percentages are estimated based on interviews and a review of accounts of companies in Latin America. 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>64%</td></tr> <tr> <td>Network equipment suppliers</td><td>89%</td></tr> <tr> <td>Handset producers and dealers</td><td>95%</td></tr> <tr> <td>Other suppliers of capital items</td><td>63%</td></tr> <tr> <td>Suppliers of support services</td><td>79%</td></tr> <tr> <td>Airtime, SIM and commission</td><td>74%</td></tr> </table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	64%	Network equipment suppliers	89%	Handset producers and dealers	95%	Other suppliers of capital items	63%	Suppliers of support services	79%	Airtime, SIM and commission	74%
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Airtime commission	Commissions data was based on interviews with mobile operators.														



Assumption	Value																																																																		
Handsets	Handset prices, percentage of handsets sold by mobile operators, proportion of illegal and second hand sales were estimated based on interviews and estimates from mobile operators.																																																																		
Productivity improvement	<p>An annual productivity improvement of 5% for high mobility workers is assumed based on interviews and a review of similar studies.</p> <p>The estimate of the percentage of high mobility workers in each employment activity is provided below.</p> <table><tr><th>Employment by sector</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>% of high mobility</th></tr><tr><td>Agriculture, Forestry, Hunting, Fishing</td><td>17,118,949</td><td>16,777,825</td><td>16,443,498</td><td>16,115,834</td><td>25%</td></tr><tr><td>Mining and Quarrying</td><td>294,555</td><td>296,198</td><td>297,850</td><td>299,512</td><td>25%</td></tr><tr><td>Manufacturing</td><td>12,520,285</td><td>12,255,785</td><td>11,996,873</td><td>11,743,430</td><td>25%</td></tr><tr><td>Electricity, Gas, Water</td><td>409,761</td><td>412,478</td><td>415,213</td><td>417,966</td><td>25%</td></tr><tr><td>Building and Construction</td><td>6,906,679</td><td>6,885,353</td><td>6,864,093</td><td>6,842,898</td><td>25%</td></tr><tr><td>Wholesale and Retail Trade, Restaurants and Hotels</td><td>26,250,246</td><td>27,053,042</td><td>27,880,389</td><td>28,733,039</td><td>50%</td></tr><tr><td>Transport and Communications</td><td>6,123,846</td><td>5,783,737</td><td>5,462,517</td><td>5,159,137</td><td>75%</td></tr><tr><td>Financial intermediation</td><td>947,663</td><td>961,579</td><td>975,699</td><td>990,027</td><td>75%</td></tr><tr><td>Real Estate and Business services</td><td>656,726</td><td>661,130</td><td>665,564</td><td>670,027</td><td>75%</td></tr><tr><td>Public administration, Education, Health</td><td>25,003,899</td><td>25,560,012</td><td>26,128,494</td><td>26,709,619</td><td>35%</td></tr></table> <p>Employment information for 2008-2011 was obtained from the national statistics office. Percentages of workers who are high mobility are Deloitte assumptions based on benchmarks from previous studies and experience. Average high mobility is a weighted average.</p> <p>The GDP contribution of these workers 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	2008	2009	2010	2011	% of high mobility	Agriculture, Forestry, Hunting, Fishing	17,118,949	16,777,825	16,443,498	16,115,834	25%	Mining and Quarrying	294,555	296,198	297,850	299,512	25%	Manufacturing	12,520,285	12,255,785	11,996,873	11,743,430	25%	Electricity, Gas, Water	409,761	412,478	415,213	417,966	25%	Building and Construction	6,906,679	6,885,353	6,864,093	6,842,898	25%	Wholesale and Retail Trade, Restaurants and Hotels	26,250,246	27,053,042	27,880,389	28,733,039	50%	Transport and Communications	6,123,846	5,783,737	5,462,517	5,159,137	75%	Financial intermediation	947,663	961,579	975,699	990,027	75%	Real Estate and Business services	656,726	661,130	665,564	670,027	75%	Public administration, Education, Health	25,003,899	25,560,012	26,128,494	26,709,619	35%
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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 Latin American economy.</p> <p>This multiplier was selected following a literature review and interviews. This choice is discussed in more detail in Appendix J.1.1.</p>																																																																		

Table 10 Mexico

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b></p> <p>Data was obtained directly from Movistar, while estimates were used for Telcel, Iusacell, Unefon and Nextel based on publicly available information, including market shares.</p> <p><b><u>Indirect employment</u></b></p> <p>Employment figures 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 mobile operators. Average wage was estimated by using assumptions on operator wage and average wage in Latin America.</p> <p>For airtime employment, interviews with mobile operators' staff identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>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 mobile operators' 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><u>Direct value add of mobile operators</u></b></p> <p>All data was obtained directly from mobile operators</p> <p><b><u>Indirect value add</u></b></p> <p>These percentages are estimated based on interviews and a review of accounts of companies in Latin America. The value add margins used for the supply chain are as follows:</p> <table border="1"> <thead> <tr> <th>Margin on domestic revenues</th><th>% value add margin</th></tr> </thead> <tbody> <tr> <td>Fixed telecommunications operators</td><td>40%</td></tr> <tr> <td>Network equipment suppliers</td><td>68%</td></tr> <tr> <td>Handset producers and dealers</td><td>87%</td></tr> <tr> <td>Other suppliers of capital items</td><td>41%</td></tr> <tr> <td>Suppliers of support services</td><td>70%</td></tr> <tr> <td>Airtime, SIM and commission</td><td>59%</td></tr> </tbody> </table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	40%	Network equipment suppliers	68%	Handset producers and dealers	87%	Other suppliers of capital items	41%	Suppliers of support services	70%	Airtime, SIM and commission	59%
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Table 11 Argentina

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b></p> <p>Data was obtained directly from Movistar and Personal, while estimates were used for the other operators based on publicly available information, including market shares.</p> <p><b><u>Indirect employment</u></b></p> <p>Employment figures for most segments of the value chain were estimated based on discussions with mobile operators. 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 mobile operators. Average wage was estimated by using assumptions on operator wage and average wage in Argentina.</p> <p>For airtime employment, interviews with mobile operators' staff identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>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 mobile operators' 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><u>Direct value add of mobile operators</u></b></p> <p>All data was obtained directly from mobile operators</p> <p><b><u>Indirect value add</u></b></p> <p>These percentages are estimated based on interviews and a review of accounts of companies in Latin America. The value add margins used for the supply chain are as follows:</p> <table border="1"> <thead> <tr> <th>Margin on domestic revenues</th><th>% value add margin</th></tr> </thead> <tbody> <tr> <td>Fixed telecommunications operators</td><td>56%</td></tr> <tr> <td>Network equipment suppliers</td><td>74%</td></tr> <tr> <td>Handset producers and dealers</td><td>92%</td></tr> <tr> <td>Other suppliers of capital items</td><td>51%</td></tr> <tr> <td>Suppliers of support services</td><td>89%</td></tr> <tr> <td>Airtime, SIM and commission</td><td>69%</td></tr> </tbody> </table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	56%	Network equipment suppliers	74%	Handset producers and dealers	92%	Other suppliers of capital items	51%	Suppliers of support services	89%	Airtime, SIM and commission	69%
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Table 12 Colombia

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b></p> <p>Data was obtained directly from Movistar, while estimates were used for the other operators based on publicly available information, including market shares.</p> <p><b><u>Indirect employment</u></b></p> <p>The operators were unable to provide information on employment in the wider ecosystem. Consequently, an estimate of this employment used benchmarks based on surrounding markets of comparable size, combined with information on mobile operators' employment in Colombia.</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 mobile operators' 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><u>Direct value add of mobile operators</u></b></p> <p>All data was obtained directly from mobile operators</p> <p><b><u>Indirect value add</u></b></p> <p>The operators were unable to provide information required to estimate the value add margins used for the supply chain. The value add margins from surrounding markets of comparable size were therefore used in this case.</p> <table> <tr> <th>Margin on domestic revenues</th><th>% value add margin</th></tr> <tr> <td>Fixed telecommunications operators</td><td>53%</td></tr> <tr> <td>Network equipment suppliers</td><td>49%</td></tr> <tr> <td>Handset producers and dealers</td><td>88%</td></tr> <tr> <td>Other suppliers of capital items</td><td>46%</td></tr> <tr> <td>Suppliers of support services</td><td>82%</td></tr> <tr> <td>Airtime, SIM and commission</td><td>66%</td></tr> </table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	53%	Network equipment suppliers	49%	Handset producers and dealers	88%	Other suppliers of capital items	46%	Suppliers of support services	82%	Airtime, SIM and commission	66%
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Table 13 Chile

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b></p> <p>Data was obtained directly from Movistar, while estimates were used for Claro, Entel and Nextel based on publicly available information, including market shares.</p> <p><b><u>Indirect employment</u></b></p> <p>Employment figures for most segments of the value chain were estimated based on discussions with mobile operators. 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 mobile operators or from publicly available data such as company annual reports. Average wage was estimated by using operator wage data and data from the ILO and Chilean National Statistics authority.</p> <p>For airtime employment, interviews with mobile operators' staff identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>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 mobile operators' employment as a large amount of employment will already be captured by the first round flows.</p>														
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	<table><tr><th>Employment by sector</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>% of high mobility</th></tr><tr><td>Agriculture, Hunting, Forestry Fishing and Mining</td><td>811,567</td><td>823,326</td><td>890,018</td><td>945,336</td><td>25%</td></tr><tr><td>Wholesale and retail trade and restaurants and hotels</td><td>1,356,604</td><td>1,376,259</td><td>1,480,993</td><td>1,573,041</td><td>60%</td></tr><tr><td>Construction</td><td>565,557</td><td>573,752</td><td>607,764</td><td>645,538</td><td>25%</td></tr><tr><td>Electricity, gas and water</td><td>36,280</td><td>36,806</td><td>40,249</td><td>42,751</td><td>25%</td></tr><tr><td>Financial, insurance, real estate, and loans services</td><td>631,617</td><td>640,768</td><td>695,130</td><td>738,334</td><td>75%</td></tr><tr><td>Mining and quarry</td><td>100,024</td><td>101,473</td><td>114,374</td><td>121,483</td><td>25%</td></tr><tr><td>Manufacturing industries</td><td>849,260</td><td>861,564</td><td>875,489</td><td>929,904</td><td>25%</td></tr><tr><td>Community, social and personal services</td><td>1,828,529</td><td>1,855,023</td><td>1,984,338</td><td>2,107,671</td><td>35%</td></tr><tr><td>Transport, storage and communications</td><td>560,971</td><td>569,099</td><td>574,718</td><td>610,438</td><td>75%</td></tr></table>	Employment by sector	2008	2009	2010	2011	% of high mobility	Agriculture, Hunting, Forestry Fishing and Mining	811,567	823,326	890,018	945,336	25%	Wholesale and retail trade and restaurants and hotels	1,356,604	1,376,259	1,480,993	1,573,041	60%	Construction	565,557	573,752	607,764	645,538	25%	Electricity, gas and water	36,280	36,806	40,249	42,751	25%	Financial, insurance, real estate, and loans services	631,617	640,768	695,130	738,334	75%	Mining and quarry	100,024	101,473	114,374	121,483	25%	Manufacturing industries	849,260	861,564	875,489	929,904	25%	Community, social and personal services	1,828,529	1,855,023	1,984,338	2,107,671	35%	Transport, storage and communications	560,971	569,099	574,718	610,438	75%
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Employment information for 2009-2010 was obtained from the national statistics office. Percentages of workers who are high mobility are Deloitte assumptions based on benchmarks from previous studies and experience. Average high mobility is a weighted average.																																																													
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.																																																													

Table 14 Peru

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b> Data was obtained directly from Movistar, and annual report information from other operators</p> <p><b><u>Indirect employment</u></b> The operators were unable to provide information on employment in the wider ecosystem. Consequently, an estimate of this employment used benchmarks from surrounding countries combined with information on mobile operators' employment in Peru.</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><u>Direct value add of mobile operators</u></b> All data was obtained directly from mobile operators</p> <p><b><u>Indirect value add</u></b> These percentages are estimated based on interviews and a review of accounts of companies in Latin America. 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>49%</td></tr> <tr> <td>Network equipment suppliers</td><td>45%</td></tr> <tr> <td>Handset producers and dealers</td><td>91%</td></tr> <tr> <td>Other suppliers of capital items</td><td>43%</td></tr> <tr> <td>Suppliers of support services</td><td>68%</td></tr> <tr> <td>Airtime, SIM and commission</td><td>64%</td></tr> </table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	49%	Network equipment suppliers	45%	Handset producers and dealers	91%	Other suppliers of capital items	43%	Suppliers of support services	68%	Airtime, SIM and commission	64%
Margin on domestic revenues	% value add margin														
Fixed telecommunications operators	49%														
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Handset producers and dealers	91%														
Other suppliers of capital items	43%														
Suppliers of support services	68%														
Airtime, SIM and commission	64%														
Handsets	<p>An estimate of fixed interconnection and commission expenses was based upon a benchmark of similar economic impacts in neighbouring countries.</p> <p>Handset prices, percentage of handsets sold by mobile operators, proportion of illegal and second hand sales were estimated based on interviews and estimates from mobile operators.</p>														

Assumption	Value																																																																								
Productivity improvement	An annual productivity improvement of 5% for high mobility workers is assumed based on interviews and a review of similar studies.																																																																								
	The estimate of the percentage of high mobility workers in each employment activity is provided below. These are based on information from the national statistics office relating to urban and rural employment and workforce size, combined with Deloitte analysis.																																																																								
	<table><tr><th>Employment by sector</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>% of high mobility</th></tr><tr><td>Agriculture</td><td>1,791,267</td><td>1,806,345</td><td>1,817,972</td><td>1,829,682</td><td>25%</td></tr><tr><td>Fishing</td><td>194,071</td><td>195,641</td><td>196,770</td><td>197,905</td><td>25%</td></tr><tr><td>Mining</td><td>368,942</td><td>371,879</td><td>373,928</td><td>375,988</td><td>25%</td></tr><tr><td>Manufacturing</td><td>1,370,628</td><td>1,384,898</td><td>1,399,415</td><td>1,414,085</td><td>25%</td></tr><tr><td>Electricity and water supply</td><td>89,828</td><td>90,585</td><td>91,169</td><td>91,758</td><td>25%</td></tr><tr><td>Construction</td><td>566,028</td><td>571,809</td><td>577,573</td><td>583,397</td><td>25%</td></tr><tr><td>Retail</td><td>2,236,471</td><td>2,259,590</td><td>2,282,935</td><td>2,306,526</td><td>50%</td></tr><tr><td>Transport and Communications</td><td>961,028</td><td>970,977</td><td>981,038</td><td>991,205</td><td>75%</td></tr><tr><td>Restaurants and Hotels</td><td>865,271</td><td>873,922</td><td>882,352</td><td>890,868</td><td>75%</td></tr><tr><td>Government Sector</td><td>558,271</td><td>563,683</td><td>568,774</td><td>573,914</td><td>35%</td></tr><tr><td>Other Services</td><td>3,145,112</td><td>3,176,194</td><td>3,206,083</td><td>3,236,271</td><td>50%</td></tr></table>	Employment by sector	2008	2009	2010	2011	% of high mobility	Agriculture	1,791,267	1,806,345	1,817,972	1,829,682	25%	Fishing	194,071	195,641	196,770	197,905	25%	Mining	368,942	371,879	373,928	375,988	25%	Manufacturing	1,370,628	1,384,898	1,399,415	1,414,085	25%	Electricity and water supply	89,828	90,585	91,169	91,758	25%	Construction	566,028	571,809	577,573	583,397	25%	Retail	2,236,471	2,259,590	2,282,935	2,306,526	50%	Transport and Communications	961,028	970,977	981,038	991,205	75%	Restaurants and Hotels	865,271	873,922	882,352	890,868	75%	Government Sector	558,271	563,683	568,774	573,914	35%	Other Services	3,145,112	3,176,194	3,206,083	3,236,271	50%
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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 Latin American economy.</p> <p>This multiplier was selected following a literature review and interviews. This choice is discussed in more detail in Appendix J.1.1.</p>																																																																								

Table 15 Ecuador

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b></p> <p>Data was obtained directly from Movistar and from Wireless Intelligence for Claro, with an uplift methodology employed for Alegro.</p> <p><b><u>Indirect employment</u></b></p> <p>Employment figures for most segments of the value chain were estimated based on discussions with mobile operators. 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 mobile operators. Average wages was estimated by using assumptions on operator wage and average wage in Latin America.</p> <p>For retail employment, interviews with mobile operators' staff identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>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 mobile operators' 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><u>Direct value add of mobile operators</u></b></p> <p>Data was obtained from Movistar and Claro directly and via annual reports. Missing data including that for Alegro was estimated using an uplift methodology.</p> <p><b><u>Indirect value add</u></b></p> <p>These percentages are estimated based on operator interviews and a review of accounts of companies in Latin America. 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>37%</td></tr> <tr> <td>Network equipment suppliers</td><td>66%</td></tr> <tr> <td>Handset producers and dealers</td><td>87%</td></tr> <tr> <td>Other suppliers of capital items</td><td>37%</td></tr> <tr> <td>Suppliers of support services</td><td>56%</td></tr> <tr> <td>Airtime, SIM and commission</td><td>75%</td></tr> </table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	37%	Network equipment suppliers	66%	Handset producers and dealers	87%	Other suppliers of capital items	37%	Suppliers of support services	56%	Airtime, SIM and commission	75%
Margin on domestic revenues	% value add margin														
Fixed telecommunications operators	37%														
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Other suppliers of capital items	37%														
Suppliers of support services	56%														
Airtime, SIM and commission	75%														
Airtime commission	Commissions data was based on mobile operator accounts, interviews with operators and their supply chain.														
Handsets	Handset prices, the percentage of handsets sold by mobile operators, and proportion of illegal and second hand sales were estimated based on interviews and estimates with mobile operators.														

Assumption	Value																								
Productivity improvement	An annual productivity improvement of 5% for high mobility workers is assumed based on interviews and a review of similar studies.																								
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	<table><tr><th>Employment by sector</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>% of high mobility</th></tr><tr><td>Agriculture and Forestry</td><td>1,765,747</td><td>1,765,747</td><td>1,765,747</td><td>1,765,747</td><td>25%</td></tr><tr><td>Industry</td><td>1,115,494</td><td>1,115,494</td><td>1,115,494</td><td>1,115,494</td><td>25%</td></tr><tr><td>Services</td><td>3,228,350</td><td>3,228,350</td><td>3,228,350</td><td>3,228,350</td><td>75%</td></tr></table>	Employment by sector	2008	2009	2010	2011	% of high mobility	Agriculture and Forestry	1,765,747	1,765,747	1,765,747	1,765,747	25%	Industry	1,115,494	1,115,494	1,115,494	1,115,494	25%	Services	3,228,350	3,228,350	3,228,350	3,228,350	75%
	Employment by sector	2008	2009	2010	2011	% of high mobility																			
	Agriculture and Forestry	1,765,747	1,765,747	1,765,747	1,765,747	25%																			
	Industry	1,115,494	1,115,494	1,115,494	1,115,494	25%																			
	Services	3,228,350	3,228,350	3,228,350	3,228,350	75%																			
Employment information for 2008-2011 was obtained from the national statistics office. Percentages of workers who are high mobility are Deloitte assumptions based on benchmarks from previous studies and experience. Average high mobility is a weighted average. An informal sector of 35% of total employment is assumed, following the estimations of a paper by Charlot, Malherbet and Terra (2011).																									
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.																									
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 Latin American economy.</p> <p>This multiplier was selected following a literature review and interviews. This choice is discussed in more detail in Appendix J.1.1.</p>																								

Table 16 Uruguay

Assumption	Value
Employment levels	<p><u>Direct employment by mobile operators</u></p> <p>Data was obtained directly from Movistar and from the annual report of Antel, from which an estimate was based on total staff and mobile revenues. Estimates for Claro were calculated based on an uplift methodology.</p> <p><u>Indirect employment</u></p> <p>Employment figures for most segments of the value chain were estimated based on discussions with mobile operators. 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 mobile operators. Average wage was estimated by using assumptions on mobile and fixed operator wages, alongside minimum wages in Uruguay.</p> <p>For airtime employment, interviews directly with wholesalers identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>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 mobile operators' employment as a large amount of employment will already be captured by the first round flows.</p>

Assumption	Value																																																						
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 mobile operators</b></p> <p>All data was obtained directly from mobile operators</p> <p><b>Indirect value add</b></p> <p>These percentages are estimated based on interviews and a review of accounts of companies in Uruguay. 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>55%</td></tr><tr><td>Network equipment suppliers</td><td>75%</td></tr><tr><td>Handset producers and dealers</td><td>87%</td></tr><tr><td>Other suppliers of capital items</td><td>61%</td></tr><tr><td>Suppliers of support services</td><td>62%</td></tr><tr><td>Airtime, SIM and commission</td><td>64%</td></tr></table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	55%	Network equipment suppliers	75%	Handset producers and dealers	87%	Other suppliers of capital items	61%	Suppliers of support services	62%	Airtime, SIM and commission	64%																																								
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Productivity improvement	<p>An annual productivity improvement of 5% for high mobility workers is assumed based on interviews and a review of similar studies.</p> <p>The estimate of the percentage of high mobility workers in each employment activity is provided below.</p> <table><tr><th>Employment by sector</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>% of high mobility</th></tr><tr><td>Agriculture, Hunting, Forestry Fishing and Mining</td><td>146,297</td><td>154,088</td><td>133,095</td><td>132,746</td><td>25%</td></tr><tr><td>Manufacturing</td><td>186,024</td><td>204,560</td><td>191,932</td><td>192,579</td><td>25%</td></tr><tr><td>Electricity Water and Gas</td><td>12,142</td><td>13,489</td><td>12,468</td><td>12,515</td><td>25%</td></tr><tr><td>Construction</td><td>103,747</td><td>113,839</td><td>107,151</td><td>107,481</td><td>25%</td></tr><tr><td>Wholesale and Retail Trade and Restaurant</td><td>314,508</td><td>351,643</td><td>326,941</td><td>327,951</td><td>60%</td></tr><tr><td>Transport, Storage and Communication</td><td>86,400</td><td>91,849</td><td>85,255</td><td>85,503</td><td>60%</td></tr><tr><td>Other Activities</td><td>586,117</td><td>644,693</td><td>606,108</td><td>608,233</td><td>25%</td></tr><tr><td>Total Rural and Urban Employment</td><td>1,435,234</td><td>1,574,163</td><td>1,462,951</td><td>1,467,008</td><td>36%</td></tr></table> <p>Employment information for 2008-2011 was obtained from the national statistics office. Percentages of workers who are high mobility are Deloitte assumptions based on benchmarks from previous studies and experience. Average high mobility is a weighted average.</p> <p>The GDP contribution of these workers 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	2008	2009	2010	2011	% of high mobility	Agriculture, Hunting, Forestry Fishing and Mining	146,297	154,088	133,095	132,746	25%	Manufacturing	186,024	204,560	191,932	192,579	25%	Electricity Water and Gas	12,142	13,489	12,468	12,515	25%	Construction	103,747	113,839	107,151	107,481	25%	Wholesale and Retail Trade and Restaurant	314,508	351,643	326,941	327,951	60%	Transport, Storage and Communication	86,400	91,849	85,255	85,503	60%	Other Activities	586,117	644,693	606,108	608,233	25%	Total Rural and Urban Employment	1,435,234	1,574,163	1,462,951	1,467,008	36%
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Assumption	Value
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 Latin American economy.</p> <p>This multiplier was selected following a literature review and interviews. This choice is discussed in more detail in Appendix J.1.1.</p>

Table 17 Panama

Assumption	Value														
Employment levels	<p><b><u>Direct employment by mobile operators</u></b></p> <p>Data was obtained directly from Movistar, while estimates were used for Claro, Mas Movil, and Digicel Panama based on publicly available information, including market shares.</p> <p><b><u>Indirect employment</u></b></p> <p>Employment figures for most segments of the value chain were 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 mobile operators. Average wage was estimated by using assumptions on operator wage and average wage in Latin America.</p> <p>For airtime employment, interviews with mobile operators' staff identified the number of points of sale and distributors by type. Based on interviews, an appropriate level of employment was assumed for each type.</p> <p>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 mobile operators' 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><u>Direct value add of mobile operators</u></b></p> <p>All data was obtained directly from mobile operators</p> <p><b><u>Indirect value add</u></b></p> <p>These percentages are estimated based on interviews and a review of accounts of companies in Latin America. 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>39%</td></tr> <tr> <td>Network equipment suppliers</td><td>58%</td></tr> <tr> <td>Handset producers and dealers</td><td>83%</td></tr> <tr> <td>Other suppliers of capital items</td><td>33%</td></tr> <tr> <td>Suppliers of support services</td><td>59%</td></tr> <tr> <td>Airtime, SIM and commission</td><td>55%</td></tr> </table>	Margin on domestic revenues	% value add margin	Fixed telecommunications operators	39%	Network equipment suppliers	58%	Handset producers and dealers	83%	Other suppliers of capital items	33%	Suppliers of support services	59%	Airtime, SIM and commission	55%
Margin on domestic revenues	% value add margin														
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Assumption	Value																								
Airtime commission	Commissions data was based on interviews with mobile operators.																								
Handsets	Handset prices, percentage of handsets sold by mobile operators, proportion of illegal and second hand sales were estimated based on interviews and estimates from mobile operators.																								
Productivity improvement	<p>An annual productivity improvement of 5% for high mobility workers is assumed based on interviews and a review of similar studies.</p> <p>The estimate of the percentage of high mobility workers in each employment activity is provided below.</p> <table><tr><th>Estimated employment by occupation (total)</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>% of high mobility</th></tr><tr><td>Agriculture</td><td>229,595</td><td>231,763</td><td>233,347</td><td>234,870</td><td>25%</td></tr><tr><td>Industry</td><td>249,581</td><td>253,575</td><td>257,045</td><td>260,562</td><td>40%</td></tr><tr><td>Services</td><td>854,623</td><td>877,971</td><td>899,896</td><td>922,369</td><td>70%</td></tr></table> <p>Employment information for 2009 was estimated using data from the CIA World Factbook and ILO. Percentages of workers who are high mobility are Deloitte assumptions based on benchmarks from previous studies and experience. Average high mobility is a weighted average.</p> <p>The GDP contribution of these workers is estimated by calculating the total GDP relating to high mobility sectors and dividing by the total number of high mobility workers.</p>	Estimated employment by occupation (total)	2008	2009	2010	2011	% of high mobility	Agriculture	229,595	231,763	233,347	234,870	25%	Industry	249,581	253,575	257,045	260,562	40%	Services	854,623	877,971	899,896	922,369	70%
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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 Latin American economy.</p> <p>This multiplier was selected following a literature review and interviews. This choice is discussed in more detail in Appendix J.1.1.</p>																								



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