Arab States Mobile Observatory 2013

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Executive Summary

Mobile is a transformative technology that has had a significant economic and social impact upon the Arab States

Mobile is unlike almost any other technology in its ability to transform the way people communicate and to positively impact the economies and societies they live in. It is an enabling technology whose real power is in letting people across the economy conduct their business efficiently and with a universality that cannot be approached otherwise.

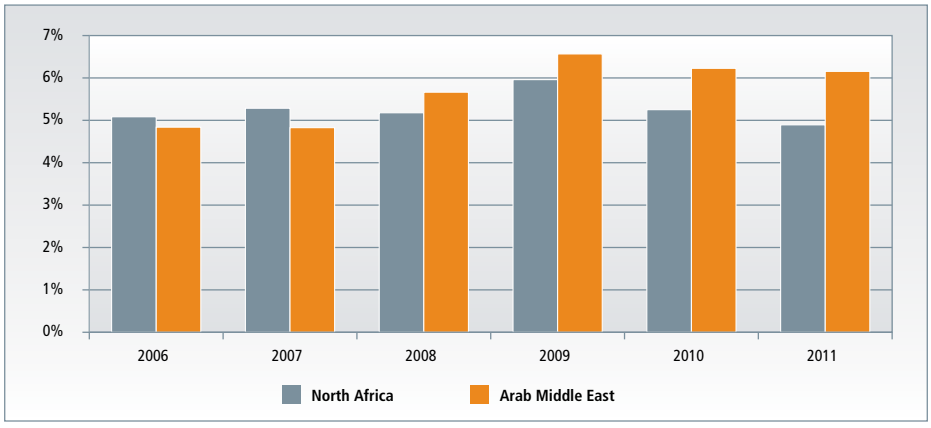
The Arab States comprise the more mature markets of the Arab Middle East,, including the oil-rich economies of the Gulf States, and the big and growing markets of North Africa, with populous nations such as Egypt and Sudan. The region is also home to a very large young population that has driven recent political changes and will be key in the adoption of new mobile technologies.

Mobile penetration[1] has increased greatly over the past few years and now reaches well above 100% in many countries of the Arab States. The telecommunications sector has been partially liberalised and competition has increased service affordability. This has generated a remarkable rate of growth in the mobile market across the region, the second highest worldwide after sub-Saharan Africa.

The increased access to mobile services has brought significant benefits to the populations of the Arab States, in terms of economic impact, support to employment, social development and productivity growth across the economy. In addition, the mobile industry represents a valuable alternative to oil-based activities in the Gulf States, contributing to diversification of the economy.

The estimated economic impact of the mobile sector has stabilised around 5–6% as a percentage of GDP across the Arab States in the past few years, with a peak in 2009 due to lower than usual GDP growth as a result of the global financial crisis[2].

Figure 1: Total economic impact of mobile in the Arab States as a proportion of GDP



Source: Deloitte analysis

The overall estimated economic impact of mobile included:

- The supply-side impact, consisting of the economic impact created by the mobile operators directly, by the players in the wider mobile ecosystem and by the multiplier effect that these activities generate in the wider economy. In 2011, these impacts were estimated at 2.9% and 4.2% of GDP in North Africa and the Arab Middle East, respectively.
- The impact of mobile technologies on improvements in efficiency and productivity that mobile technologies delivered to so called high-mobility workers. These benefits were estimated at 2% of GDP across the Arab States.

1 Throughout the report and unless otherwise stated, mobile penetration is defined as total mobile connections, i.e., SIM cards, as a percentage of population. Unique subscriber penetration is discussed in more detail in Section 2.

2 For details on the assumptions for the modelling of the economic impact of the mobile industry, the traffic projections and the impact of spectrum release, see Appendix D.

The employment created across the Arab States as a result of the availability of mobile technologies is estimated to be more than 1.2 million FTEs in 2011. This consists of direct employment by the mobile operators, employment across the mobile ecosystem and the multiplier effect, that is, the employment generated in the wider economy as a result of interactions with the mobile ecosystem. This is particularly compelling in the Arab States, in light of the recent statement by King Abdullah of Jordan at the World Economic Forum urging entrepreneurs, innovators, educators and policymakers to clear the path to 85 million new jobs that the region needs to create to accommodate new entrants to the job market[3]. As discussed below, the mobile industry has great potential to help achieve this goal, given an estimated fivefold increase in mobile-related employment in future years if additional spectrum is released.

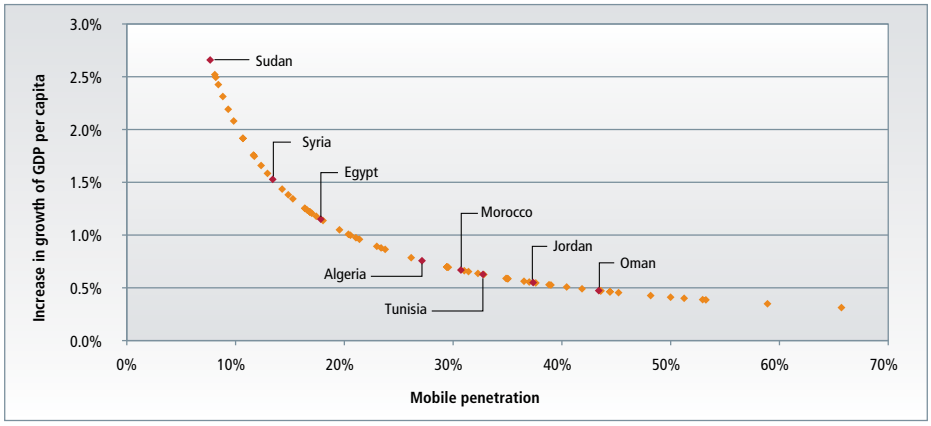
More widely, the industry has developed services aimed at supporting finance, health and education programmes across the region.

There is considerable literature on the impact of mobile telephony on economic growth and productivity, as development economists have come to recognise mobile as a core means by which societies and economies have transformed and grown. Countries where mobile has grown steeply in the past few years have experienced impressive growth. The figure below shows the effect of increased mobile penetration on a country's productivity.

"To widen the gate of opportunity, the region requires entrepreneurs, innovators, educators and policymakers to clear the path to 85 million new jobs."

H.M. King Abdullah II Ibn Al Hussein

Figure 2: Predicted effect of a 10% increase in mobile penetration on total factor productivity[4]



Source: Deloitte/GSMA, "What is the impact of mobile telephony on economic growth?", 2012.

The development of mobile broadband is critical to the next phase of development of the industry

With mobile penetration already high in the region, future growth will depend on the development of data services and mobile broadband. In order to achieve this, mobile operators will need to have access to additional spectrum, which should be released in a harmonised way. Existing spectrum assignments to mobile operators in the region may not be sufficient to accommodate the surge in mobile data traffic, which is expected to grow almost 20-fold even without additional spectrum release.

A release of spectrum in the Digital Dividend, 2.6GHz and 1.8GHz bands will contribute to the development of mobile broadband in the region, leading to greater coverage, capacity and mobile data traffic. For instance, in the period between 2015 and 2025, this release of spectrum is expected to lead to an average yearly increase in the number of connections[5] by over 26 and 34 million in the Arab Middle East and North Africa respectively[6] above the baseline scenario. As a result of increased traffic, under a series of plausible modelling assumptions as discussed in annex D.2, GDP per capita in the Arab Middle East and North Africa will potentially have an incremental growth rate of 2.5% and 4.4% respectively across the period[7]. This translates into an overall increase in GDP of over US$ 57.5 billion for the Arab Middle East, and US$ 50.5 billion in North Africa.

3 http://www.weforum.org/news/king-jordan-outlines-gateways-arab-prosperity-opening-world-economic-forum-meeting

4 Penetration rates are averages for the years 1996–2009.

5 Including dedicated mobile broadband connections

6 This increment is in addition to the baseline subscribers for the region, a yearly average of 121 million in the Arab Middle East and 136 million in North Africa.

7 Based on IMF projections, using average 2016–2017 GDP growth rates as baseline growth. This is based on aggregating the yearly average growth rate of the countries in the region across the periods.

As a result of this increased economic growth, it is expected that additional government contributions from the mobile ecosystem would reach US$ 528.7 million in the Arab Middle East and US$ 383.7 million in North Africa. Employment should also be positively affected, with an additional 5.9 million jobs across the Arab States created in the mobile sector and in the wider economy.

Figure 3: Spectrum and mobile broadband impacts (2015–2025)

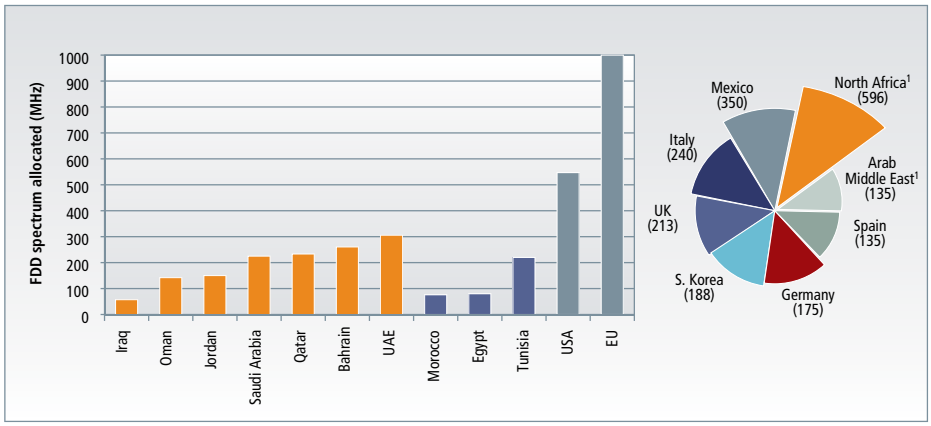
	Average increase in mobile connections	Average incremental GDP per capita growth (%)	GDP increase	Additional government contributions from mobile	Additional job creation
Arab Middle East	+26.4 million	2.5%	+US$57.5 million	+US$528.7 million	+1.9 million
North Africa	+34.5 million	4.4%	+US$50.5 billion	+US$383.7 million	+4.0 million

Source: Deloitte Analysis

A clear, consultative and transparent plan is required to deal with spectrum issues to deliver upon this opportunity

Governments in the region can realise these impacts by ensuring an adequate supply of spectrum, allocated in line with internationally harmonised bands. Current spectrum levels for mobile communications in the region are considerably lower than in more developed economies. This is particularly the case for North African countries, where high numbers of connections per MHz allocated make them more prone to network congestion.

Figure 4: FDD spectrum assignments to mobile and number of connections per MHz of FDD spectrum, in thousands (2012)

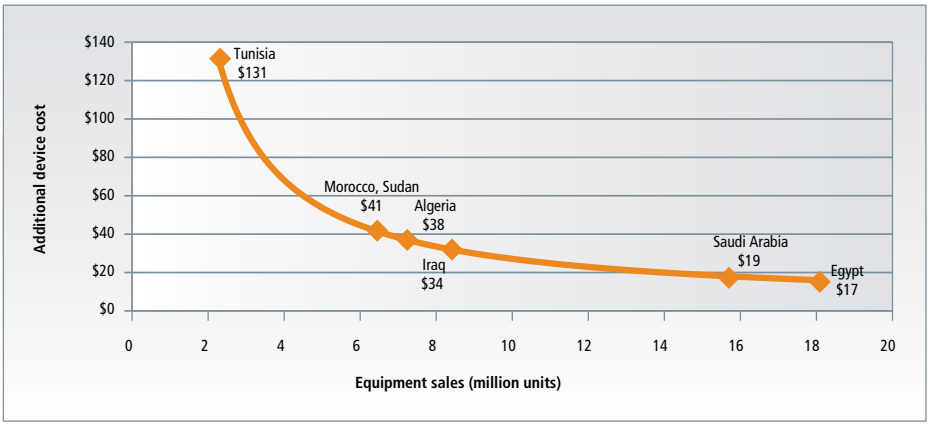


Deloitte analysis, GSMA. [1]North Africa: Morocco, Egypt, Tunisia. Arab Middle East: Iraq, Bahrain, Qatar, Jordan, UAE, Oman, Saudi Arabia.

Governments in the region will need to consider releasing additional spectrum across different bands, so that spectrum with different qualities is made available and a spectrum shortfall is avoided. The Digital Dividend band (700–800MHz) offers better indoor penetration and undergoes lower propagation losses, making it ideal to increase coverage and capacity in both urban and rural areas. The 1.8GHz band would benefit from liberalised spectrum licensing that would allow operators to maximise current spectrum use, with the offering of LTE services through refarming of current allocations. Additional bands such as the 2.6GHz band are deemed to be suitable for supporting increased network capacity.

Regional governments will need to work towards achieving band harmonisation across the region, as this is key to achieving scale economies in device and equipment manufacturing, thus extending service affordability. Failure to harmonise could result in additional costs for mobile devices of US$ 19 per device for Saudi Arabia and US$ 131 in Tunisia, due to additional production costs. Furthermore, nonharmonised band plans can lead to limited device interoperability, leading to lower device availability. Regional coordination is needed to ensure consumers can benefit from the latest technologies at more affordable prices.

Figure 5: Additional device cost in the absence of spectrum harmonisation



Source: Strategy Analytics, Deloitte analysis

A clear, consultative and transparent plan is required to deal with the spectrum issues highlighted above and deliver the expected economic impacts of additional spectrum release. This includes providing the regulatory certainty needed to promote investment in the region, particularly in the context of spectrum awards and associated requirements.

Effectively, to ensure successful outcomes for consumers, regulators need to ensure fair and transparent award procedures. This includes framing coverage obligations within the context of each country, taking into account the increasing competition levels found in the sector. In the context of spectrum pricing, regulators could benefit from considering the promotion of service demand and operator investment as desirable outcomes that support long-term revenue generation. Indeed, the region could benefit from an approach to licensing that focuses on long-term utility maximization for society rather than short-term price maximization for the treasury.

The wider regulatory agenda requires a clear, consistent and collaborative approach that fosters industry development

In many markets in the Arab States, regulators are taking a relatively transparent and objective approach to developing and implementing regulatory remedies. While the details of the remedies may be questioned by some, regulators in UAE, Bahrain and Qatar, among others, have been credited with creating a stable environment that encourages long-term investment.

However, other markets have experienced increased politicisation of the regulatory authority. When combined with the lack of long-term regulatory policy, this adds to market uncertainty, acting as a barrier to investment. This impacts consumers directly through reduced service availability and price competition, while also reducing foreign direct investment (FDI) and growth prospects.

The sustainability of the mobile industry and its contribution to the long-term growth of the economy is dependent on having a well-functioning regulatory regime. Governments should prioritise the development of coordinated comprehensive national ICT policies that lead to new regulatory frameworks to support the ever-increasing investment by mobile operators in support of next-generation data services. The following areas have been identified as enablers of further growth in the region:

- **Reduced taxation rates for mobile services:** A number of countries in the region have high taxes on mobile services, for example Jordan, Morocco and Egypt. In many cases, these are a result of the application of mobile-specific or 'luxury' tax rates and arise from governments finding mobile easier to collect taxes from than workers or industries that exist in the informal economy. However, this fails to recognise the positive externalities of mobile, the increased affordability of mobile technology and the decreasing margins that the industry faces. A general restructuring or rebalancing of the tax system could lead to no net decrease in taxation revenues while recognising those industries that make positive contributions to long-term growth.
- **Network infrastructure liberalisation:** In some countries, for example Egypt and Iraq, the government-controlled incumbent controls the fibre network, and other operators may be forced to pay a high price to access it. Liberalisation of the network is likely to prompt investment in capacity and higher-quality services at a lower price, overcoming the limitations of most national telecom regulatory frameworks, which were conceived at a time of legacy and depreciated copper networks.
- **Universal service funds (USFs):** Mobile operators are required to pay into these funds, often representing a significant proportion of revenue, for example up to 2% of revenues in Morocco and 3% in Algeria. However, it is not always clear that the funds are being spent on infrastructure projects, and often funds are targeted towards the fixed network operators. Consideration should be given as to whether USFs are still valid, given the high population coverage of mobile services in the region and, in cases where a further roll-out is required, this should be targeted at data services and mobile operators, given the opportunity to compete alongside fixed operators for funds.

The need to maximize the opportunity

The mobile telecommunications sector is already making a significant contribution to society and the economies of the Arab States. Furthermore, the potential for it to make an increasing contribution to the success and growth of the Arab States is clear with the provision of mobile data and mobile broadband services.

This report identifies a number of fundamental challenges, in terms of the availability of spectrum and the nature of regulation, that threaten to limit countries' ability to capitalise on this opportunity. The investment required to extend current networks and invest in more bandwidth-heavy technologies is only likely to occur with the creation of a transparent, predictable and stable environment.

1. Why Mobile Matters in the Arab States

1.1 Mobile is a transformative technology

Mobile is unlike almost any other technology in its ability to transform the way people communicate and to positively impact the economies and societies they live in. The impact of mobile on economic growth and productivity has been widely recognised in the literature; some recent findings include:

- Internationally, an increase of 10 mobile phones per 100 people increases the GDP per capita growth rate by up to 0.6 percentage points[8], with this impact being even larger for developing countries at between 0.8 and 1.2 percentage points[9].
- A 10% increase in mobile penetration increases the productivity potential of the economy by 1.2 to 5.7 percentage points[10].

An increase of 10% in fixed and mobile broadband penetration corresponds to a 1.38% increase in GDP in developing countries and 1.21% in developed economies[11]. As with many other technologies, mobile telecommunications has evolved and is increasingly focused on adding mobile broadband services to basic voice telephony. Internationally, this evolution has spread quickly, through the adoption of 3G/UMTS and now LTE. Recent research has shown that mobile data has a further impact on economic development over and above voice services such that[12]:

- For a given level of total mobile penetration, converting 10% of 2G subscribers to 3G/UMTS increases the GDP per capita growth rate by a further 0.15 percentage points.

A doubling of mobile data use leads to an estimated increase in the GDP per capita growth rate of 0.5 percentage points on average, ranging from 0.03% in the case of India to 1.4% for Russia. Perhaps the most interesting characteristic of mobile technology is that of being an enabler. While mobile itself forms a large sector of all economies, its real power is in letting people across the economy conduct their business efficiently and with a universality that can't be approached otherwise.

The social impact of mobile is similarly impressive. Mobile technology and services impact people from different backgrounds across the economy, ranging from providing a means of communication during conflicts to supporting urban professionals in the education of their children. Mobile is particularly relevant to the Arab countries for bringing new ways of participation and interaction to the large cohort of young, technology-savvy adults. As mobile broadband develops, the digital divide is reduced in a manner that would not be possible through fixed telephony alone. In many countries, mobile is the only potential route through which rural communities can obtain reliable access to the internet.

8 Waverman, Meschi and Fuss, "The Impact of Telecoms on Economic Growth in Developing markets", The Vodafone Policy Paper Series (2), 2005, pp. 10–23.

9 See, for example Qiang and Rossotto (with Kimura), "Economic Impacts of Broadband" in Information and Communications for Development: Extending reach and increasing impact (World Bank, Washington DC), 2009. Some of these results have been criticised recently, but there remains wide agreement on the significant and positive impact of mobile on economic growth.

10 See Deloitte/GSMA, "What is the impact of mobile telephony on growth?", 2012. This report considers the impact of mobile penetration on Total Factor Productivity, a measure of economic productivity that reflects an economy's long-term technological dynamism, and on GDP growth. The findings are used to estimate the impact of spectrum release in Section 4.

11 Qiang and Rossotto (with Kimura), "Economic Impacts of Broadband" in Information and Communications for Development: Extending reach and increasing impact (World Bank, Washington DC), 2009.

12 Deloitte/GSMA, "What is the impact of mobile telephony on growth?", 2012.

1.2 There are a number of building blocks for a successful mobile sector

The 19 countries comprising the Arab region[13] are characterised by significant economic and social differences, especially between Middle East and North African countries. In particular, it includes populous and resource rich countries, as well as the labour-scarce and oil-rich economies of the Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates), but also small and resource-poor countries such as Lebanon. While the average annual income per capita in the region stands at US$ 7,339, it varies from around US$ 1,100 in South Sudan, the poorest country, to US$ 100,378 in Qatar, the richest country.

The regulatory regimes are also at different levels of development. However, despite this, there are a number of key themes that have emerged in regulation across the region.

- Mobile network operators and the wider industry ecosystem expect the government to set a collaborative, transparent and long-term regulatory and policy framework that creates a predictable business environment, facilitating long-term business planning and investment. Policy and regulation need to acknowledge commercial realities in shaping the appropriate development path for the sector.
- Governments and regulators must recognise the positive externalities that are created by mobile and the sector's role in supporting government to meet economic objectives. As such, regulatory fees and taxation policies should be restructured to be long-term in nature with a focus on creating a level playing field, targeting those industries with negative externalities and bringing informal industries and workers into the formal tax system. Governments should take into account the cost of forgone benefits when evaluating charges applied to mobile, rather than relying on it as a cash-generating industry due to the ease of applying tax to this sector.
- As the demand for mobile services and data increases, mobile operators need to have access to additional spectrum, which should be released in a harmonised way. Otherwise, the region as a whole is set to experience a spectrum shortfall by 2020, with countries such as Saudi Arabia, Iraq and Algeria already being impacted by spectrum shortfalls. Spectrum is the lifeblood of a mobile business, and its availability is critical to network planning and investment decisions.
- As such, a coherent radio frequency plan, with associated timetable and mechanisms for the release of future spectrum, is needed. Furthermore, regional coordination, the release of harmonised spectrum and the issuing of technology-neutral licences would allow the region to take advantage of the latest mobile devices and avoid higher device costs. While this has been a challenge for the roll out of voice services, it is now the most important question for the development of mobile broadband over 3G/UMTS and LTE networks.

1.3 This report

This report is part of the Mobile Observatory series commissioned by the GSM Association ('GSMA'). It focuses, for the first time, on the Arab States of Middle East and North Africa, a region comprising 19 countries and a population of over 350 million people.
The report provides an overview of the mobile market in the region, highlighting the most recent developments and indicators, as well as an estimation of the economic and social impact of the mobile industry in the region. The impact of further spectrum release and of other mobile regulation is also discussed.

This report is based on publicly available information, data provided by the GSMA, Wireless Intelligence, as well as a series of country and regional reports prepared by Deloitte for the GSMA.

13 The Arab States are grouped as follows: Algeria, Egypt, Libya, Morocco, Tunisia, Sudan and South Sudan are included in North Africa; Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen, Palestine in Middle East. For completeness, South Sudan has been included in the study, as it was part of Sudan until its independence in 2011.

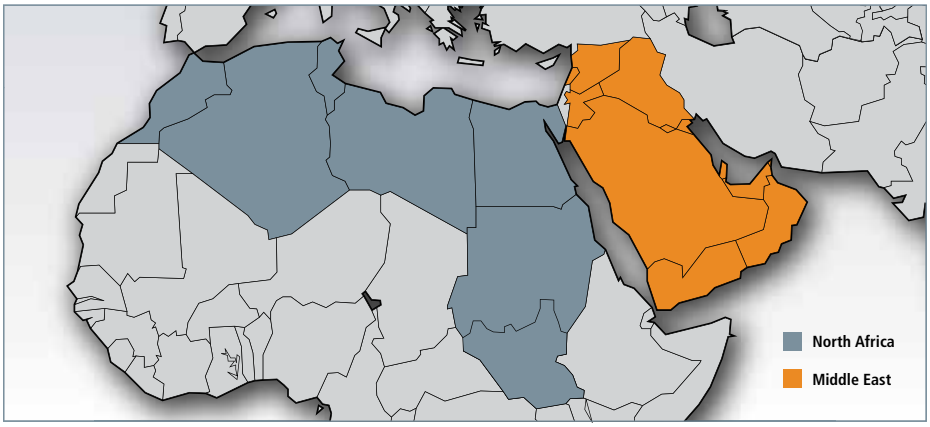
2. Mobile Markets in the Arab States

This section introduces the key features of the mobile markets in the Arab States, the development of 3G/UMTS and 4G/LTE and the growing importance of mobile broadband.

2.1 The Arab States comprise two distinct sets of markets

The 19 Arab States show significant economic and social differences, especially between the Middle Eastern and North African countries. In particular, the region includes populous and resource-rich countries, as well as the labour-scarce and oil-rich economies of the Gulf Cooperation Council (GCC), but also small and resource-poor countries such as Lebanon. While the average annual income per capita in the region stands at US$ 7,339, it varies from around US$ 1,100 in South Sudan, the poorest country, to US$ 100,378 in Qatar, the richest country. Egypt is the most populous country, with 20% of the region's population, followed by Algeria, Sudan, Morocco and Iraq, all with approximately 8% of population.

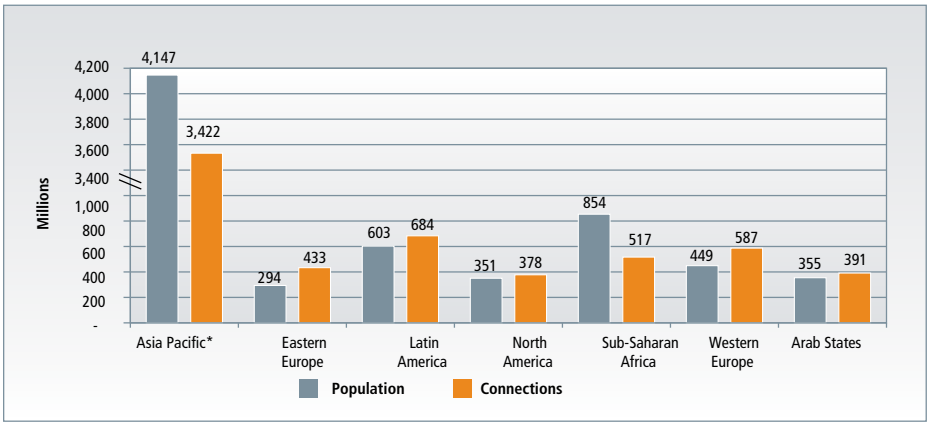
Figure 6: The Arab States sub-regions



Source: United Nations

Today the Arab States have approximately 6% of worldwide mobile connections[14]. The number of connections has grown at an average annual growth rate of more than 32% in the past 10 years, from 19 million in 2002 to 391 million in 2012, the second highest growth rate globally after sub-Saharan Africa. The trend is estimated to continue, driven by the demand of a large young population (one out of five in the region is aged 15–24, and more than 60% of the population is less than 30 years of age[15]).

Figure 7: Global population and mobile connections (2012)

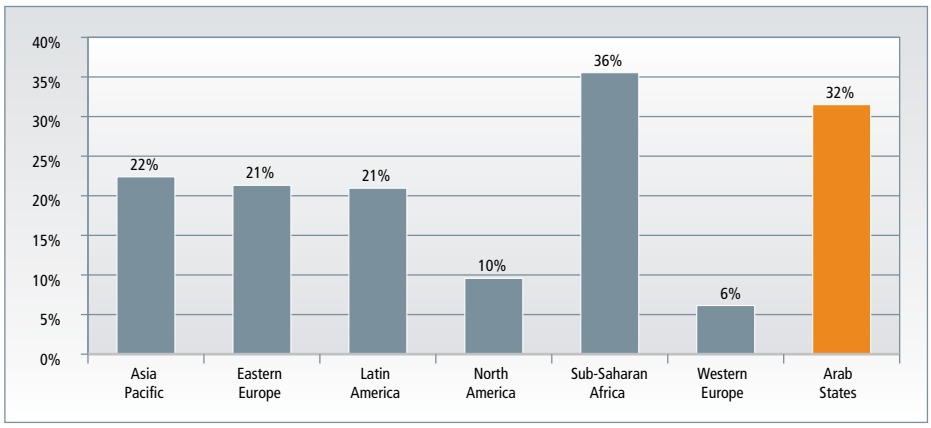


Wireless Intelligence. *Asia Pacific bars rebased to fit axis range.

14 Total mobile connections, i.e. SIM cards, rather than unique subscribers

15 Population Reference Bureau. http://www.prb.org/DataFinder/Topic.aspx?cat=3

Figure 8: Average annual growth in the number of mobile connections (2002–2012)

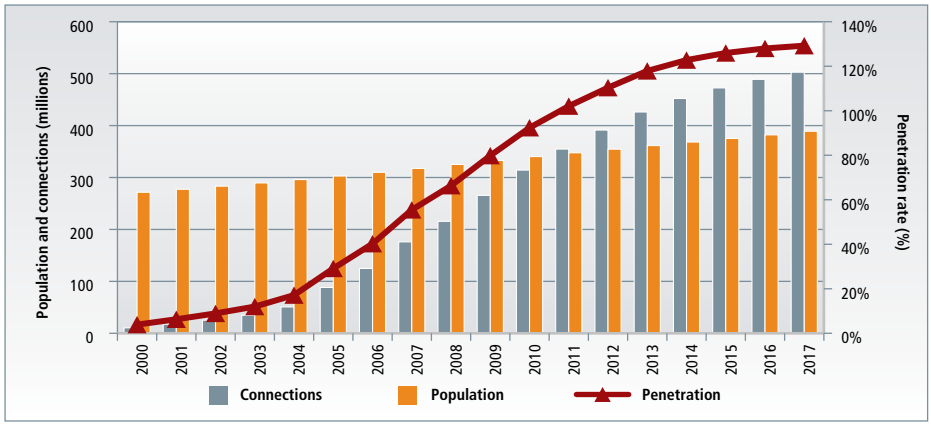


Source: Wireless Intelligence

2.2 High penetration and sustained growth in mobile connections

Mobile penetration has increased rapidly in the past 12 years, from just 3% in 2000 to 105% in 2012, representing an average annual growth rate of over 32%. As such, today there are more than 391 million connections in the region[16].

Figure 9: Mobile connections, population and mobile penetration in the Arab States (2000–2017)

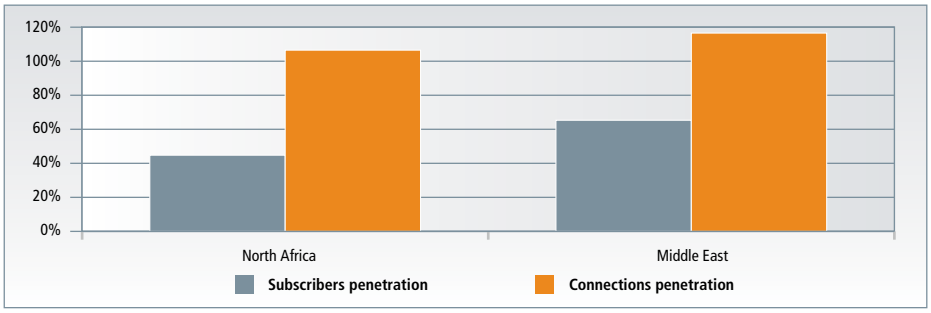


Source: Wireless Intelligence

The six countries of the Gulf Cooperation Council (GCC) have penetration rates well in excess of 100%, with Kuwait, United Arab Emirates (UAE), Saudi Arabia and Qatar nearer 200%. This is due to intense competition as subscribers aim to maximize special offers and different deals through multi-SIM ownership. Moreover, growth and competition are encouraged by the large and transient expatriate population in the Gulf States. This is apparent when comparing the penetration rate measured in total connections and the penetration rate measured in the number of unique subscribers, that is, excluding customers who have multiple connections. As shown in Figure 10, the latter is lower by a significant amount, which should be taken into account when assessing the potential uptake of new technologies and growth of the industry, as will be discussed later for the case of taxation policies.

16 Wireless Intelligence, 2012.

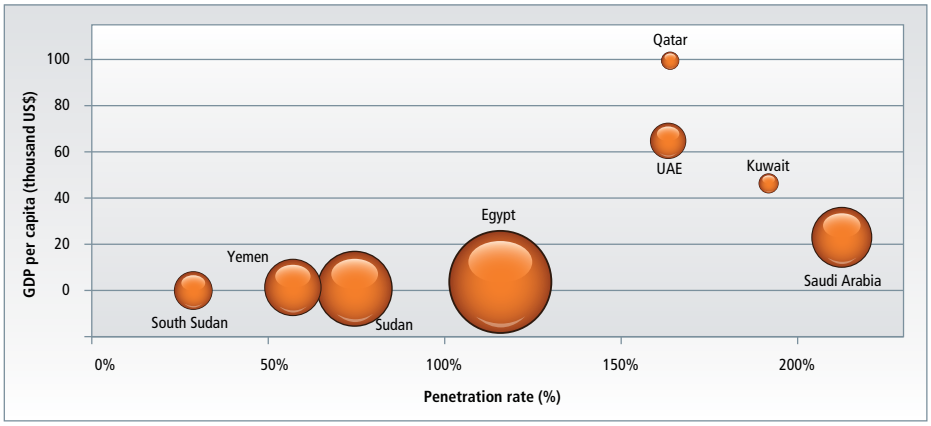
Figure 10: Comparison between connections and unique subscriber penetration (2012)



Source: Wireless Intelligence

Despite very high penetration rates in parts of the region, some markets remain underdeveloped. Examples include South Sudan and Yemen, with penetration rates of 28% and 56%, respectively. However, mobile connections have been growing rapidly in these countries and show great potential for further development. Sudan in particular is becoming very lucrative, due to its big market size and low but growing penetration rate.

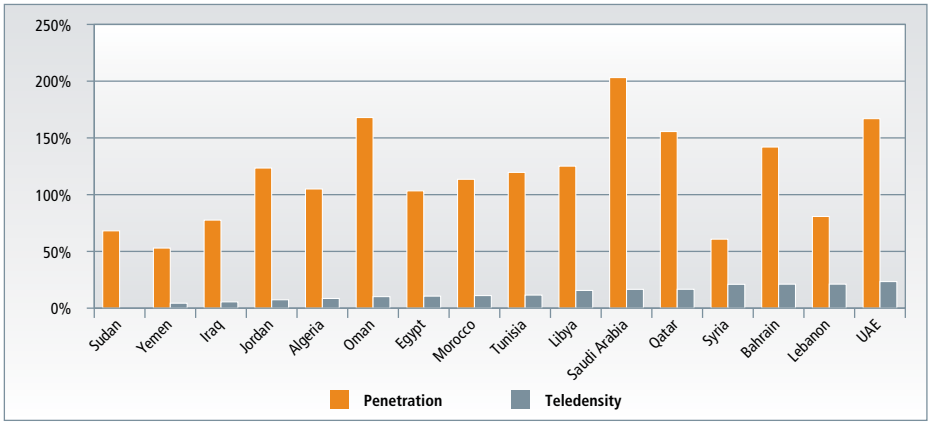
Figure 11: Penetration, GDP per capita and population in selected countries (2012)



Source: Wireless Intelligence. The size of the bubbles represents population.

While mobile penetration across the region is 120%, fixed teledensity is approximately 10%[17], highlighting the importance of mobile network infrastructure for voice, data and internet in the region.

Figure 12: Mobile penetration and fixed teledensity (2011)



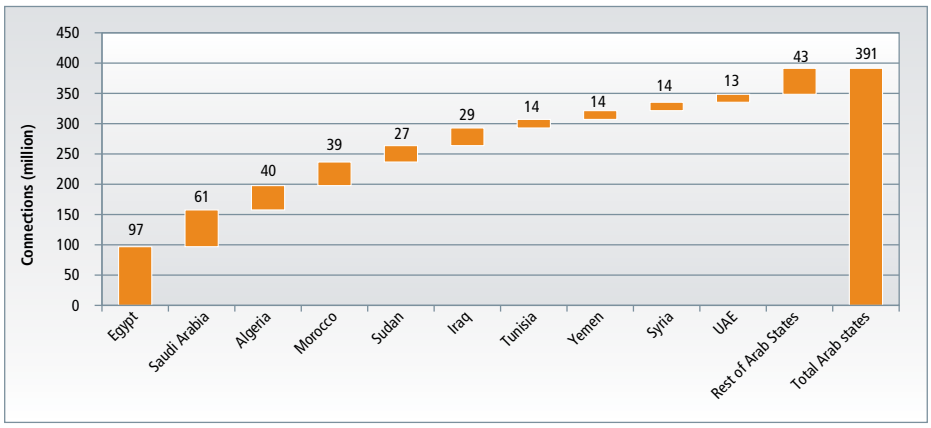
Source: Wireless Intelligence and ITU.

17 Data is for 2011 and does not include Kuwait, Palestine and South Sudan.

However, fixed teledensity figures can be misleading due to the larger household sizes compared with Europe or the USA (60% teledensity) and the large expatriate population living in hotels in the Gulf States. In fact, in many countries, household teledensity is at or near 100%, but several markets are showing a decline in fixed-line connectivity due to mobile substitution[18].

The biggest markets in terms of connections are Egypt and Saudi Arabia, which together account for 40% of total mobile connections in the Arab States.

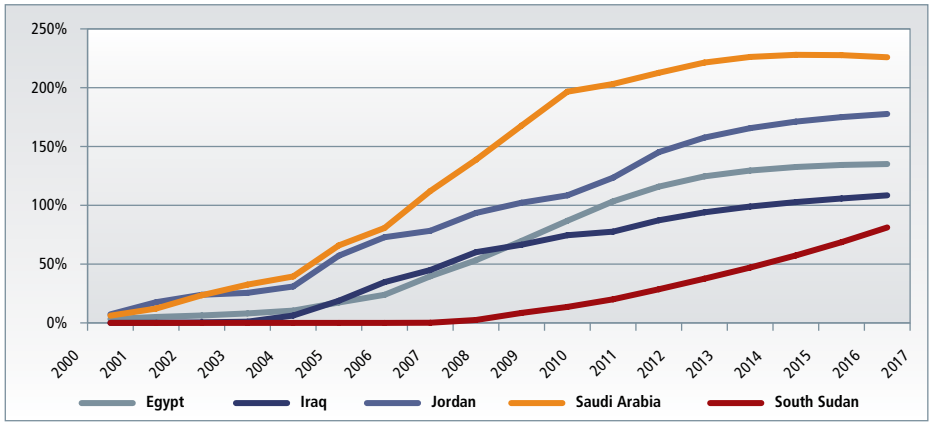
Figure 13: Number of connections, top 10 countries (2012)



Source: Wireless Intelligence

As shown in Figure 14, market maturity in the region varies from very low with growing levels of penetration, as in South Sudan (28% in 2012), to very mature markets where penetration is forecast to stabilise around 220%, as in Saudi Arabia. The remainder of the Arab States lie between these penetration rates.

Figure 14: Penetration in selected countries (2000–2017)



Source: Wireless Intelligence

18 BuddeCom, "The Middle East: Telecoms, internet, broadband and mobile statistics", July 2010.

2.3 Coverage and Urbanisation

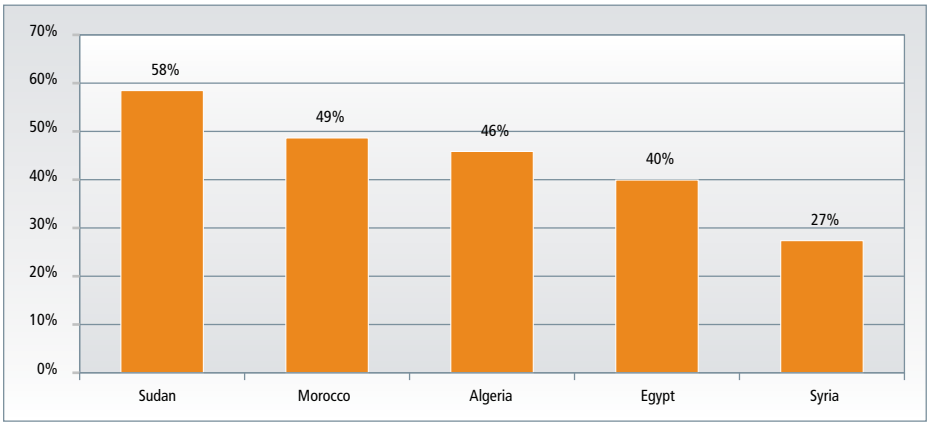
The growth in access and service availability has been made possible by mobile operators' investment in extending service coverage to an increased number of people. Population coverage is above 80% across the region and stands at 100% in many countries. The concentration of population in the densely populated metropolis of the Gulf States has contributed to the high levels of population coverage.

Land coverage is lower than population coverage because of the nature of many countries' geography. For example, with the Sahara desert making up most of Egypt's territory, coverage is provided to only 17% of the country's land area but reaches more than 99% of the population[19].

2.4 Price reductions have led to substantial usage increases

Market growth, scale economies in handset prices and increasing market competition have led to steady price reductions in the Arab States in recent years. Between 2008 and 2012, prices have decreased by as much as 58% in Sudan and 49% in Morocco. Similar declines in prices have been observed in UAE between 2010 and 2012, where prices fell by almost 70%.

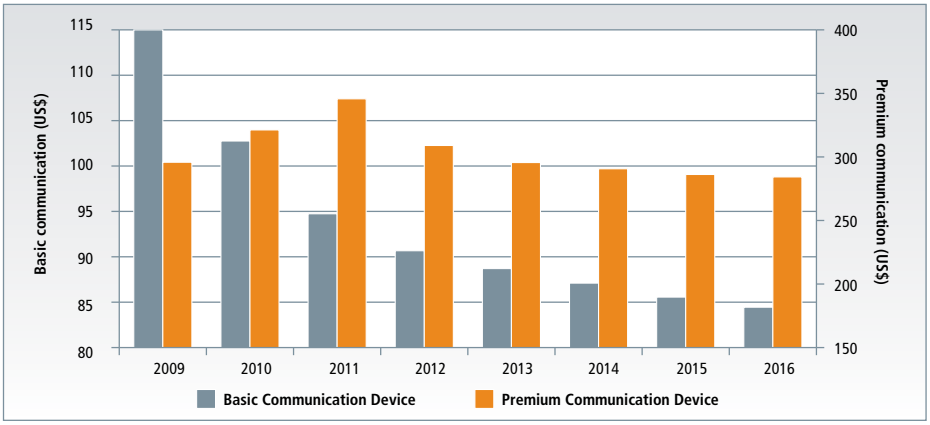
Figure 15: Reductions in effective price per minute in selected countries (2008–2012)[20]



Source: Wireless Intelligence

In the Arab States, prices of basic communication devices have decreased substantially in the past four years, while prices of premium devices have increased as higher-specification devices have come onto the market, but are expected to decrease in the next few years. Prices of utility devices used only for voice have been declining since the introduction of mobile telephony in the region, and have now stabilised at around US$ 30[21].

Figure 16: Reductions in basic and premium communication device prices (2009–2016)



Source: Gartner

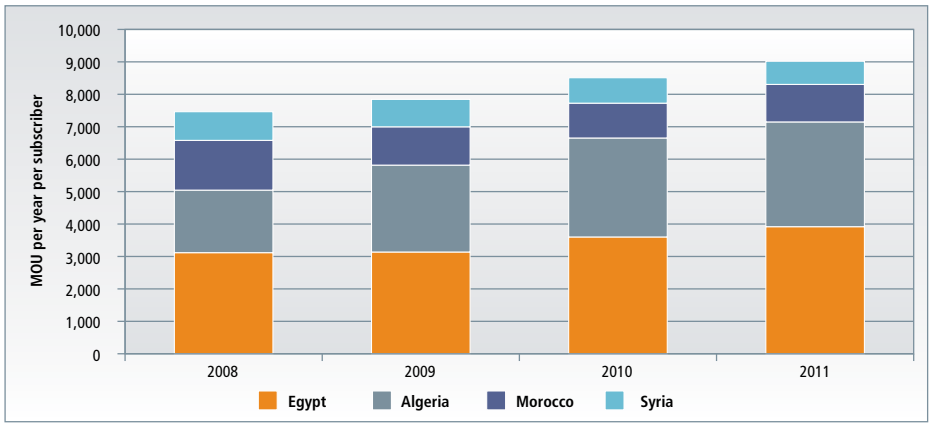
19 BuddeCom, "Egypt - Mobile Market - Overview, Statistics and Forecasts", June 2011.

20 Price per minute was calculated using total revenues (not only recurring) over minutes of use.

21 Gartner, Forecast: Mobile Devices, Worldwide, 2009–2016, 2Q12.

As a result of reductions both in handset prices and price per minute of use, usage has increased rapidly; Figure 17 shows the usage for each subscriber during a year.

Figure 17: Minutes of use per year and per unique subscriber in selected countries (2008–2011)

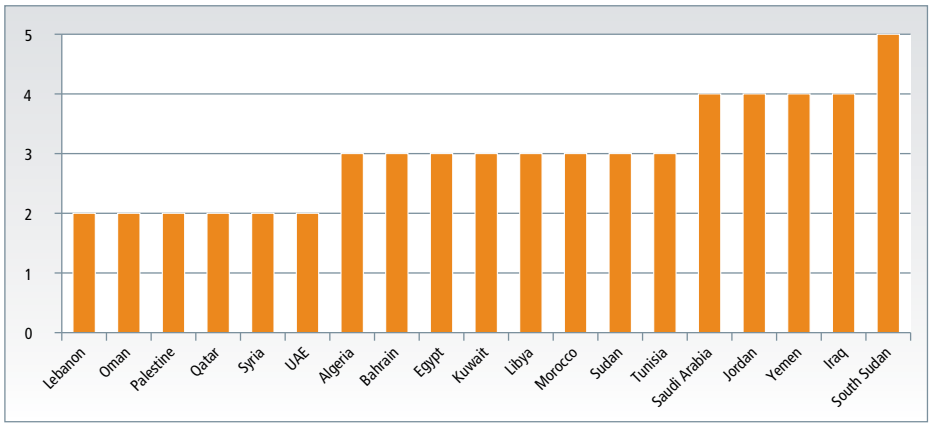


Source: Wireless Intelligence

2.5 Increased competition and outstanding investment

The region is home to very large telecom groups, such as Etisalat of the UAE, Qtel Group of Qatar, Zain of Kuwait, STC of Saudi Arabia and Batelco of Bahrain. Middle Eastern markets tend to have a national operator competing against a second and sometimes a third operator owned by one of the large international operators, for example Orange, MTN and Vodafone. In North Africa, most markets have a strong presence of the large international players, such as Orange, Orascom, MTN and Vodafone.

Figure 18: Number of operators per country in the Arab States (2012)

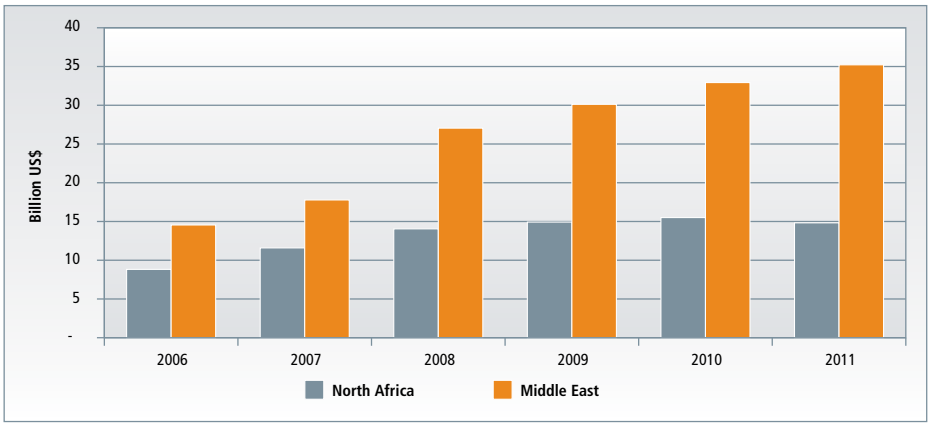


Source: Wireless Intelligence

The largest operator in the region by number of connections is Mobinil in Egypt, which is owned by Orange, followed by Etisalat and Zain. The other main operators by number of connections include MTN, Vodafone, Qtel, and Zain, most of them with a presence in more than three countries.

Mobile operators in the region reported over US$ 50 billion revenues in 2011, growing on average 16% each year since 2006. Countries in the Middle East accounted for US$ 35 billion and experienced the fastest growth. Since 2011, revenues have been slightly declining in North Africa. This can be attributed to the Arab Spring uprising, which started in December 2010 in Tunisia and has since then spread to other countries in the region.

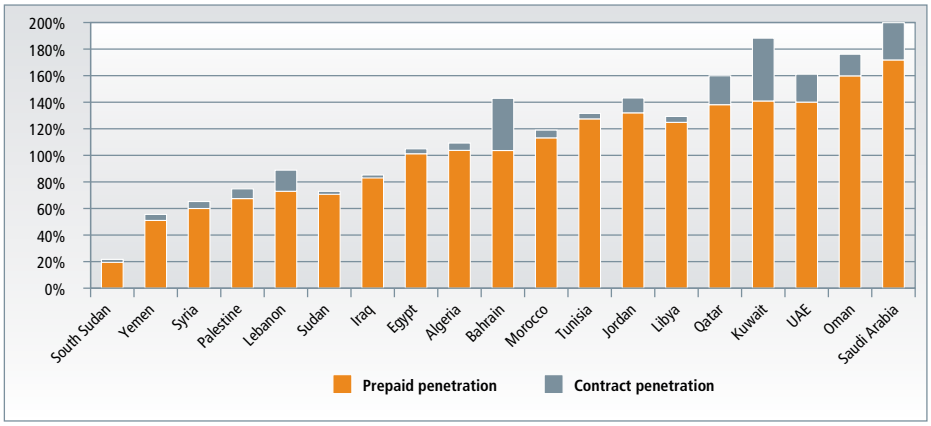
Figure 19: Total revenues in the region (2006–2011)[22]



Source: Wireless Intelligence

As shown in Figure 20, prepaid mobile is predominant, especially in North Africa, with contract penetration being highest in the GCC countries and Lebanon.

Figure 20: Prepaid and contract penetration (2012)

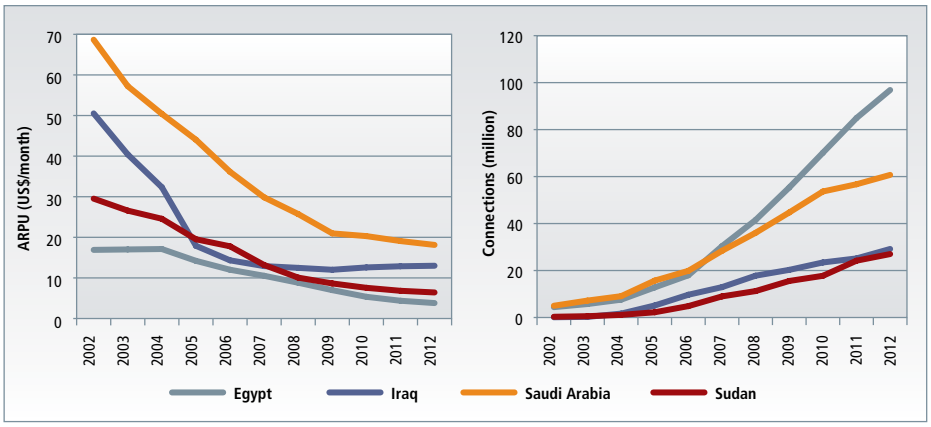


Source: Wireless Intelligence

Increased competition provides benefits to consumers as it allows for service variety, price reductions and increased consumer surplus. As lower income consumers gain access to mobile services, average revenue per user (ARPU) decreased between 2001 and 2011 by as much as 80% in some countries but total revenues increased due to higher connection growth.

22 When not available, revenue data is uplifted by market share of operators with available data.

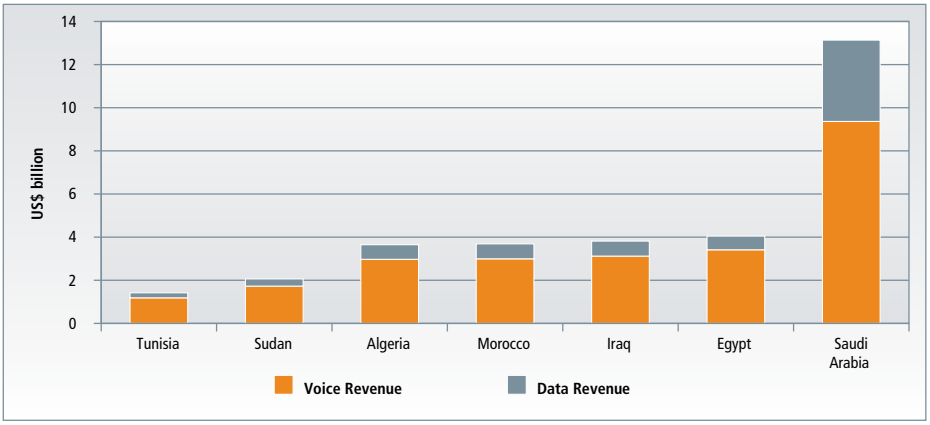
Figure 21: ARPU per subscription* and total mobile connections in selected countries (2002–2012)



Source: Strategy Analytics and Wireless Intelligence. *Includes voice and data.

In the more developed GCC markets and Jordan, growth in revenues may result from increased take-up of data services, provided that the anticipated explosion of data traffic is greater than the downward pressure on data charges. Already in Saudi Arabia, data revenues account for almost 30% of total revenues (close to other developed economies, such as the UK and United States, where data contributes 40% of revenues).

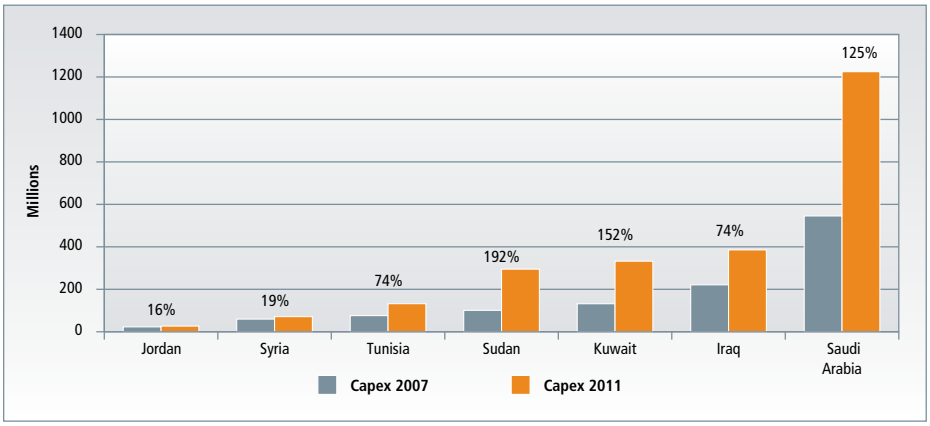
Figure 22: Revenue composition in selected countries (2012)



Source: Strategy Analytics

In some countries, investments have been growing exponentially, especially in the Gulf States where Saudi Arabian operators invested 125% more in 2011 relative to 2007. This investment includes not only mobile network expansion, but also core networks, billing systems, spectrum licences and handset subsidies. Often network investment covers access cost and roads, as well as power generation.

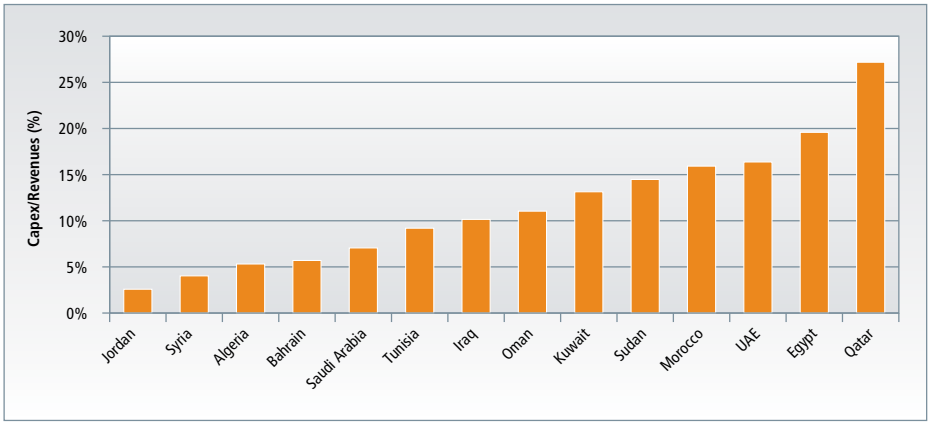
Figure 23: Annual mobile capex in US$ million and percentage growth rate (2007–2011)



Source: Wireless Intelligence. Growth of capex displayed.

Overall, operators in the seven countries included in Figure 23 invested US$ 2.5 billion in 2011, an increase of over 110% with respect to 2007. In other countries as well, operators have committed to numerous investment plans, some currently underway. For instance, in March 2011, Etisalat announced its plans to invest US$ 15 billion to overhaul its networks over five years in UAE[23] and to invest US$ 500 million to launch LTE in Egypt[24]; Zain Bahrain announced that it will invest US$ 100 million over two years to further modernise its network infrastructure to enable the company to adequately serve its growing customer base and demand[25].

Figure 24: Capex as a percentage of revenues in selected countries (2011)



Source: Wireless Intelligence

2.6 3G/UMTS and 4G/LTE rollout

With increased competition and high penetration rates, the mobile operators have focused on mobile applications and content to boost revenues, but have been constrained by the limitations of the 3G/UMTS network in the region. The Gulf States have been the first to introduce 3G/UMTS services and 3G/UMTS networks are now available in the whole region, with the exception of Iraq[26], Algeria and Palestine.

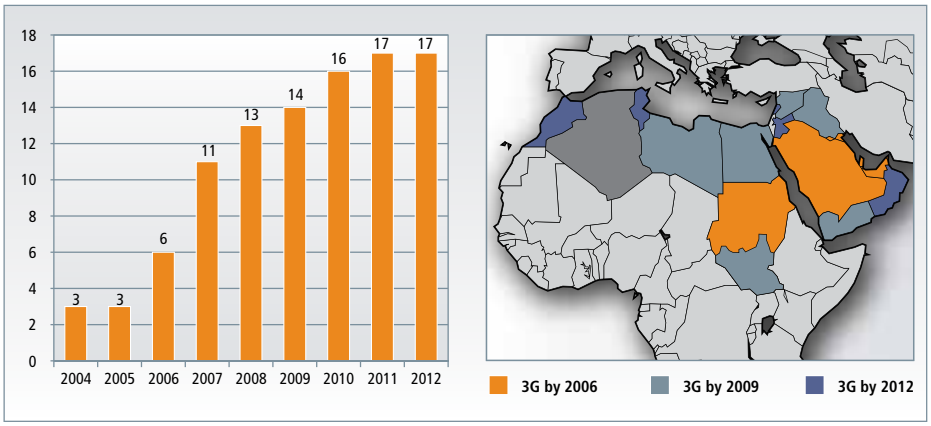
23 BuddeCom, "United Arab Emirates - Key Statistics, Regulatory and Fixed-line Telecoms Overview", October 2011.

24 Wireless Intelligence, "Global cellular market trends and insight", Q3 2012, September 2012

25 Comms MEA, "Zain Bahrain to invest $100m in network upgrade" , September 2012 https://www.google.com/url?q=http://www.commsmea.com/12663-zain-bahrain-to-invest-100m-in-network-upgrade/

26 In Iraq, Kurdish mobile operator Mobitel holds Iraq's sole 3G cellular licence; elsewhere in Iraq the jamming of mobile phone frequencies by the military to prevent insurgents from detonating bombs remotely remains a serious licensing stumbling block. See Telegeography, "GlobalComms Database: Iraq", 2012.

Figure 25: Number of countries with 3G/UMTS services (2004–2012)

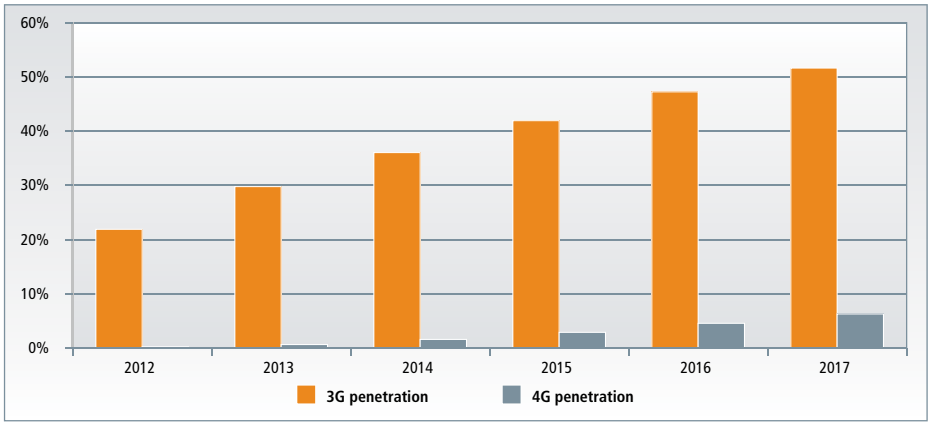


Source: Wireless Intelligence

Investment in 3G/UMTS network roll out is expected to continue, driving penetration to 51% in 2017, from 21% in 2012, a 136% increase.

4G/LTE networks are currently being introduced, but success in penetration is particularly dependent on spectrum availability and adequate ICT policies and regulations, as discussed in Section 5. 4G/LTE has been introduced in Oman and some Gulf States in 2012 (Bahrain, Kuwait, Saudi Arabia and UAE). By 2016, it is expected that all GCC states plus Jordan will offer 4G/LTE services.

Figure 26: 3G/UMTS and 4G/LTE penetration (2012–2017)



Source: Wireless Intelligence

Operators are rolling out investment plans to increase new-generation networks, and in many countries the governments are launching initiatives to sustain these efforts. For example, in Egypt the regulator is supporting 'eMisr', a national broadband plan with the objective of reaching 98% 3G/UMTS coverage by 2015 and 90% 4G/LTE coverage by 2021. In Qatar, the government has established a national broadband company to develop a fibre-optic network and is planning to invest more than half a billion dollars upgrading its broadband network over the next few years as it looks to boost capacity for new telecom operators[27]. It is expected that access will be granted to mobile and fixed operators on a fair and equivalent basis, but it is crucial to ensure that these plans are clear and achievable. In 2012, Oman launched a broadband plan with the aim of achieving 60% of broadband coverage by 2017, with support of the two mobile operators in the country[28].

27 Comms MEA, "Bahrain to establish a national broadband network", July 2012 http://www.commsmea.com/12488-bahrain-to-establish-a-national-broadband-network/

28 Oxford Business Group, Economic Update, "Oman: Spreading the net", July 2012. http://www.oxfordbusinessgroup.com/economic_updates/oman-spreading-net

2.7 Mobile internet will be a key growth area in the next years

In terms of mobile data traffic, Vodafone estimates that global mobile data traffic will increase 26-fold between 2010 and 2015. Mobile data traffic will grow at an average annual rate of 92% from 2010 to 2015. Within this total, the Middle East and Africa are expected to see the strongest growth of any region, growing at an annual rate of 129%. Cisco expects the Middle East and North Africa to have more mobile-only internet users than North America by 2015[29].

There are several regional factors that favour mobile broadband in the Arab States. The population distribution in these countries is concentrated towards the young, and there are large numbers of expatriates. Fixed-line penetration levels are generally low. In addition, there are several very dynamic regional mobile operators, whereas fixed-line operators are state-owned incumbents accustomed to little competition.

One of the key conditions for rapid internet and broadband subscriber growth, especially in the Middle East, is the development of sufficient content in Arabic for users, which has so far been modest. This will be discussed in more detail in section 3.

Mobile broadband prices in most countries have started to decrease with the introduction of some affordable, flat-rate pricing plans that have induced higher uptake levels. Saudi Arabia's second mobile operator, Mobily, said it could not cope with the level of demand when it introduced flat-rate price plans. In March 2009, it reported having 300,000 subscribers[30]. Moreover, Mobily recently revealed that mobile data traffic has grown more between January and June 2012 than from the entire period between 2006 and 2012.

Due to the limited coverage of fixed-line networks and the associated cost of computers, mobiles are quickly becoming the main platform for internet browsing. Eleven countries in the region rank above the world average in mobile web browsing.

Table 1: Internet browsing by platform, selected countries (2012)

Country	% Mobile	% Desktop
Sudan	45.32	54.68
Kuwait	27.02	72.98
Oman	24.3	75.7
Libya	22.96	77.04
Saudi Arabia	18.51	81.49
Bahrain	17.43	82.57
United Arab Emirates	12.75	87.25
Syria	11.81	88.19
Qatar	11.49	88.51
Yemen	10.59	89.41
Worldwide	**10.01**	**89.99**
Jordan	8.41	91.59
Lebanon	8.3	91.7
North America	7.96	92.04
Iraq	7.68	92.32
Morocco	5.29	94.71
Europe	5.13	94.87
Egypt	4.17	95.83
Tunisia	3.87	96.13
Algeria	2.51	97.49

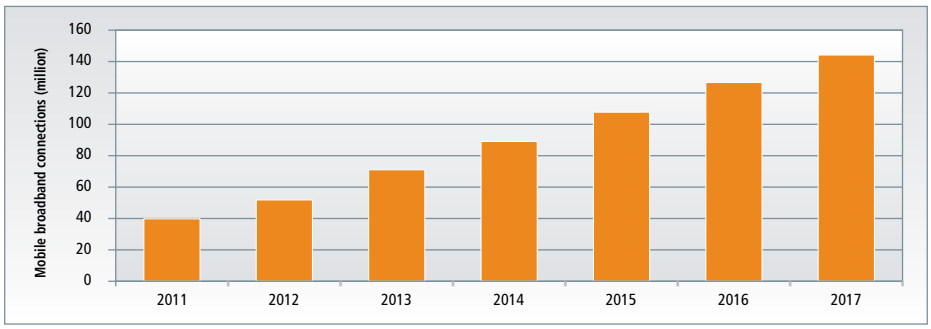
Source: StatCounter Global Stats

In 2011, mobile broadband connections in the region were 39.9 million compared to 11.1 million fixed broadband connections.

29 Vodafone, "Moving the debate forward", The Policy Paper Series Number 12, May 2011.

30 BuddeCom, "The Middle East: telecoms, internet, broadband and mobile statistics", July 2010.

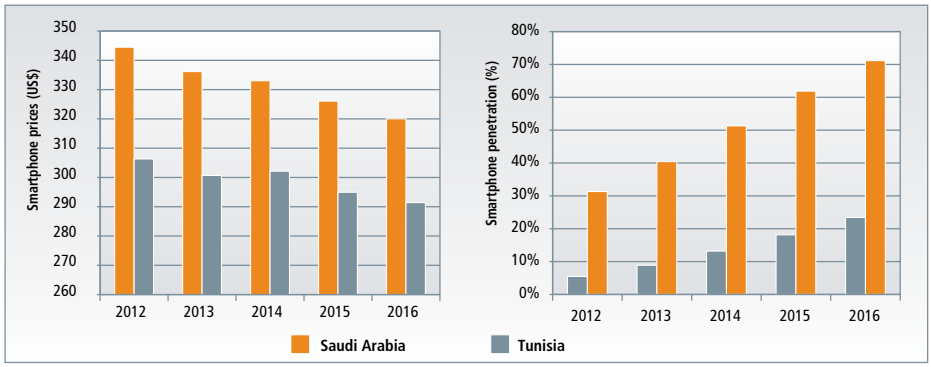
Figure 27: Total mobile broadband connections in the Arab States (2011–2017[31])



Source: Wireless Intelligence and Deloitte analysis

Mobile broadband will be driven in upcoming years by increased penetration of smartphones. Penetration is forecast to exceed 20% in most Arab States by 2016, with rates as high as 70% in Saudi Arabia. This will be possible due to expected decreases in smartphone prices: prices of premium communication devices are forecast to decrease in future years and, at the same time, entry-level smartphones priced at US$ 150 or lower are expected to gain increasing market share[32].

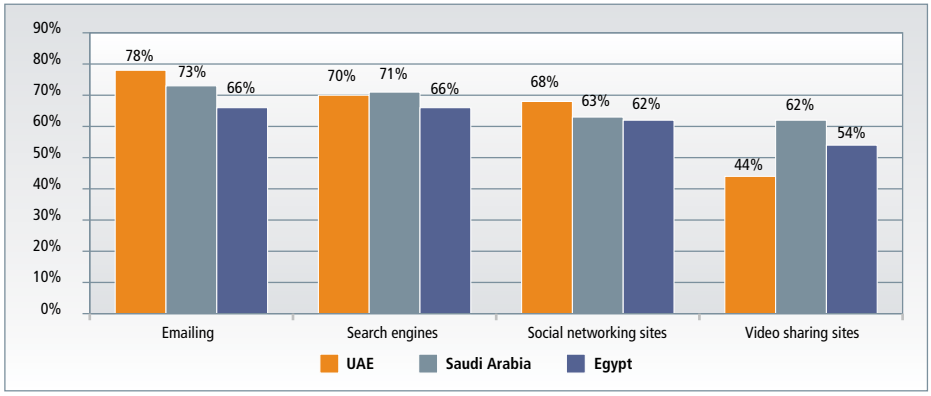
Figure 28: Smartphone price and penetration in selected countries (2012–2016)[33]



Source: Strategy Analytics and Gartner

Smartphones allow users to access entertainment content and be fully connected: a recent survey by Google in Egypt, Saudi Arabia and UAE found that 29%, 60% and 64% of respondents, respectively, access the internet on their smartphone at least once a day. The percentage of respondents that use mobile internet to access email, search engines, social networking sites and video sharing sites is shown in Figure 29.

Figure 29: Usage by type of website in Egypt, Saudi Arabia and UAE (2012)



Source: Google, Our mobile planet - Understanding the Mobile Consumer, May 2012

31 Broadband connections are assumed to be 100% of 4G/LTE connections and 50% and 75% of 3G/UMTS connections in North Africa and the Middle East, respectively.

32 Android Authority, "Cheap smartphones will dominate the market by 2017", December 2012. http://www.androidauthority.com/cheap-smartphones-dominate-138610/.

33 Smartphone prices displayed here are of premium communication devices.

3. The Economic and Social Contribution of the Mobile Industry

3.1 Summary

Mobile services have long been recognised for bringing significant economic gains by providing a structure that supports development and growth. These benefits are realised through the impact of revenues and expenditure generated by mobile operators and the related industries on the wider economy.

In particular, the sector plays a key role in supporting the development of the economy through:

- Economic activity and employment generation directly created by the mobile operators themselves;
- The indirect creation of similar effects across the wider mobile ecosystem and the remainder of the economy;
- Increased productivity for high-mobility workers and throughout the remainder of the economy;
- Contributing to the public finances through taxation, licence and regulatory fees paid; and
- Boosting social inclusion through factors as diverse as the efficient delivery of education, healthcare, banking and other socially advantageous services to the population.

As the previous chapter demonstrated, the mobile sector has been a dramatic success as demand has grown steadily due to increased coverage, improved affordability and the launch of new services. Increasingly, a mobile phone is now considered a necessity by the majority of the population and has transformed the way consumers and businesses communicate.

Overall, it is estimated that the total economic impact[34] of the mobile communication industry to the economy of North Africa was US$ 34.1 billion in 2011, an increase of 61% since 2006[35]. This amounts to 4.9% of GDP, highlighting the importance of mobile telephony to the productivity of economies in the region.

In the Middle East, the total economic impact is estimated at US$ 98.1 billion for 2011, representing a total contribution to GDP of 6.2% and an increase of 118% since 2006. In addition to the standalone economic benefits it brings, the mobile industry represents a valuable alternative to oil-based activities in the Gulf States, providing diversification of the economy.

Figure 30: Total economic impact in Arab States as a proportion of GDP (2006–2011)

Source: Deloitte analysis

34 For the remainder of this report, the term 'economic impact' refers to the total contribution made to economic output measured in terms of value add. Value add represents the value added by an activity at each stage of production and is analogous to Gross Domestic Product (GDP) contribution.

35 Data for the economic impact modelling has been taken from Wireless Intelligence as of October/November 2012.

The mobile sector also:

- Generated significant local employment in a number of professions, from engineering and accounting to advertising and sales, with an estimated total of over 750,000 mobile-related full-time equivalents (FTEs) in North Africa and 470,000 in the Middle East in 2011.
- Contributed approximately US$ 21 billion to the public purse through taxes and regulatory fees paid in 2011.

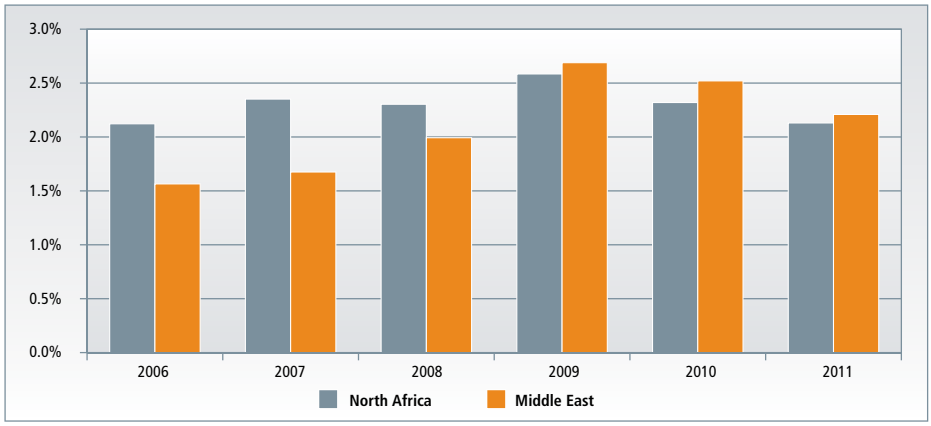
Going forward, the economic impact of the sector has the potential to expand as the industry's growth is linked to the success of the economy. In particular, the sector has the opportunity to further deploy data networks. Mobile broadband is the only route through which many residents will be able to access the internet. The use of mobile broadband also has the potential to substantially increase the productivity effects felt from the use of this technology. Furthermore, mobile access to the internet will help keep populations informed and connected, and meet the demand for active participation in society and self-expression, especially from the youth.

However, in order to achieve this economic and social potential, a number of spectrum and regulatory challenges (discussed in section 4) will need to be addressed.

3.2 Impact on the supply side of the economy

Mobile revenues were 2.1% of GDP in 2011 in North Africa and 2.2% in the Middle East. As discussed in Section 2, revenues as a proportion of GDP have declined recently due to the global economic crisis, the events related to the Arab Spring and to higher GDP growth since 2010.

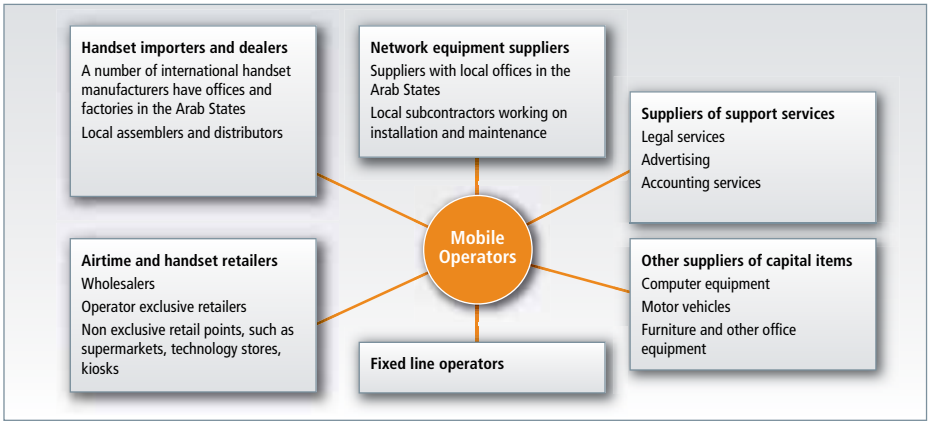
Figure 31: Mobile operators' revenues as a proportion of GDP in the Arab States (2006–2011)



Source: Wireless Intelligence

Mobile revenues affect the wider economy directly from the supply side through the expenditures of mobile network operators (MNOs) on wages, dividends paid, corporate social responsibility (CSR) programmes and taxes paid to governments, and indirectly through the monies paid by MNOs to a variety of local players in the wider mobile ecosystem, which include international equipment providers, providers of network services, providers of other support and commercial services, and the network of formal and informal points of sale throughout the country, such as distributors and sellers of handsets and airtime.

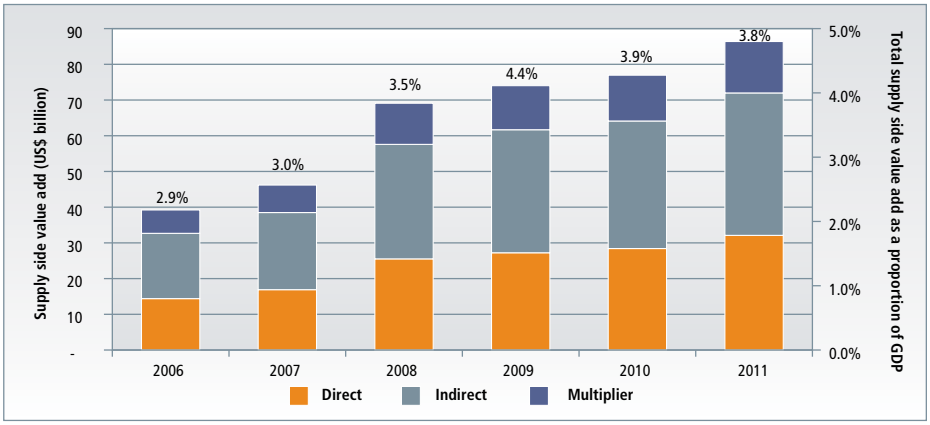
Figure 32: Mobile communications ecosystem considered for analysis



Source: Deloitte analysis

The economic benefits of the operations of the mobile industry are then transmitted more widely across the economy through the additional expenditures of those connected to the mobile ecosystem, including government spending that proceeds from MNO taxation. The total supply-side effects are summarised in Figure 33 for the whole region. These are estimated at almost US$ 90 billion in 2011 and have grown 120% in five years from US$ 39 billion in 2006.

Figure 33: Supply-side value add of mobile communications in the Arab States (2006–2011)



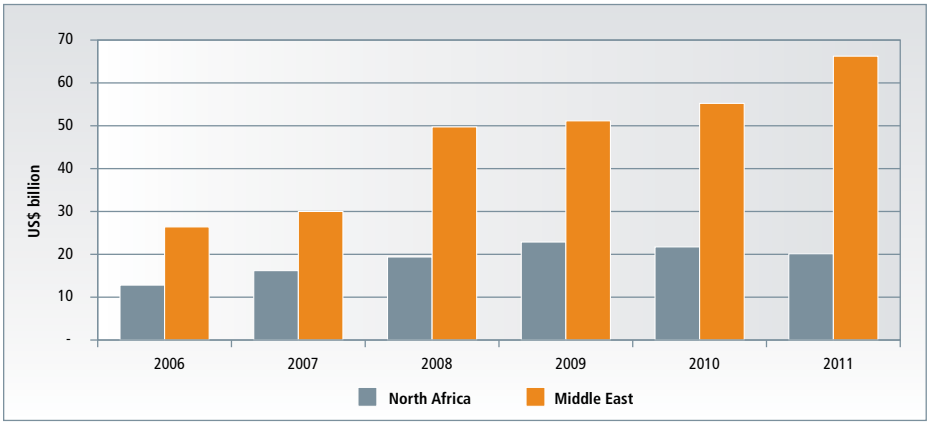
Source: Deloitte analysis

In 2011, the total supply-side impacts to the economy of North Africa are estimated at approximately US$ 20 billion, an increase of over 57% in the past five years. Of these, the mobile operators have provided a direct contribution of US$ 6.7 billion, close to 1% of GDP. The indirect impacts amounted to US$ 10.1 billion, while the multiplier effect from the wider economy consisted of US$ 3.4 billion; overall, a total US$ 6.9 billion were paid in taxes.

In the countries of the Middle East, the direct impacts are estimated to be US$ 25.4 billion in 2011 or 1.6% of GDP, and the indirect and multiplier effects were respectively US$ 29.8 and 11 billion. The overall supply-side contribution has grown 151% since 2006.

Figure 34 shows the comparison between the supply-side effects in North Africa and Middle East. The latter is bigger due to a higher absolute level of dividend payments that are benefiting local shareholders in the Gulf States and higher revenues of mobile operators. Many Gulf States apply significant royalty payments to MNO revenues or profits. These are similar to taxes in other countries — and will be discussed in more detail in section 3.4 — and contribute to raising MNOs' overall value add to the economy.

Figure 34: Supply-side value add of mobile communications in the Arab States (2006–2011)



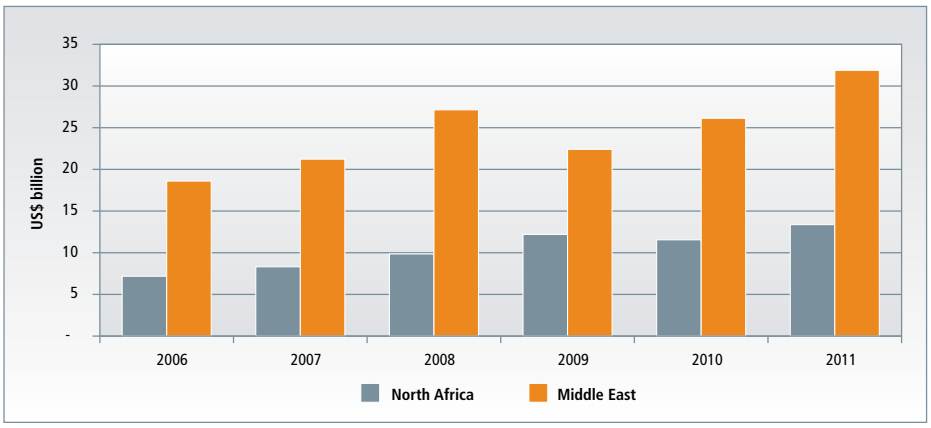
Source: Deloitte analysis

3.3 Impact on the demand side of the economy

In addition to the benefits to the supply side of the economy, the use of mobile telephony enhances the productivity of businesses and of the working population.
Among other advantages, mobile improves and increases information flows making businesses more efficient, enables people to connect and share, reduces travel time and costs, improves job search and encourages entrepreneurialism by providing the option to work remotely.

It is estimated that the total productivity impact of mobile telephony on the economy of North Africa was US$ 14 billion in 2011, an increase of circa 70% from 2006 and 160% from 2003. In the Middle East, this impact amounted to more than US$ 31 billion.

Figure 35: Economic impact of increased productivity among high-mobility workers in the Arab States (2006–2011)



Source: Deloitte analysis

The impact of the productivity improvements was approximated by considering high-mobility employees who undertake a moderate to high degree of travel in the course of their employment, e.g., taxi drivers, agricultural workers selling produce in town, salespeople and transport workers[36]. Details on the estimation are provided in appendix D.1.

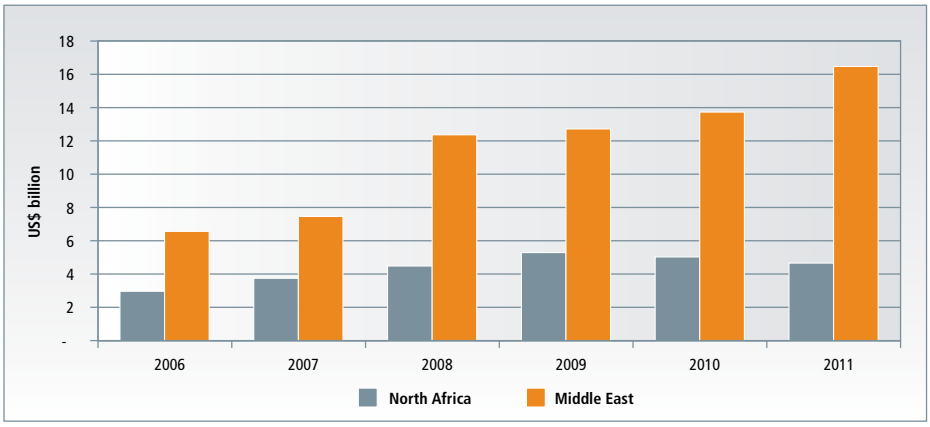
3.4 Contribution to public funding

The mobile sector makes a considerable contribution in terms of direct payments of taxes and regulatory fees to the government, thereby supporting the funding of public expenditure. Mobile consumer taxation (which is considerably high in the region) represents an indirect contribution to public expenditure. This type of taxation is discussed in Section 5.3.

Taxes and regulatory charges paid by MNOs include income tax, corporation tax, VAT and import taxes. In some Gulf States, a royalty is paid to the government on net profit or revenues. Moreover, a host of mobile-specific charges are applied to MNOs, such as licence fees, numbering fees, spectrum fees and contributions to the universal service fund (USF, often called USO of ICT fund[37]) or to social development. Most of these are paid as a percentage of revenues.

It is estimated that in North Africa mobile operators paid US$ 4.7 billion in taxes and regulatory charges in 2011, equivalent to 23% of revenues and to an increase of close to 160% from the US$ 2.9 billion paid in 2006. In the Middle East, taxes paid by MNOs were approximately US$ 16 billion, or 26% of revenues[38].

Figure 36: Taxes paid by MNOs in the Arab States (2006–2011)



Source: Deloitte analysis

This level of taxation can place a significant burden on telecom operators. For example, operators pay 15% corporation tax in Jordan and 20% in Egypt[39]; in the UAE, telecoms operators pay royalties to the government, with Etisalat paying half their annual net profit in royalties, whereas Du's royalty has been set at 15% of net profits, plus 5% of revenues[40]; in other countries, royalty payments are calculated as a percentage of revenues: in Oman, Omantel pays 7% of revenues as royalties, while in Qatar, Qtel pays the same plus a 12.5% industry fee on profits[41].

In 2011, the spectrum and numbering fees paid in total by Etisalat were over AED 208 million in 2011, an increase of nearly AED 30 million compared to 2010. This is largely due to the charges paid for use of recently allocated LTE spectrum. The proportion of royalty fees paid by Etisalat in the UAE can be estimated at AED 9 billion in 2010, and this amount is significantly higher than the spectrum and numbering fees.

36 Given the potential for all workers in the economy to use mobile at some point within their employment, such estimates may be thought of as a lower bound to the impact of mobile upon productivity.

37 Universal Service Obligation (USO) and Information and Communication Technology (ICT).

38 The amount of tax paid as a percentage of revenues is estimated based on operators' annual reports.

39 Deloitte/GSMA, "Global Mobile Tax Review", 2011.

40 According to Telegeography, the UAE government has established the royalty fee that the country's two telecoms operators, Emirates Telecommunications Corporation (Etisalat) and Du, must pay for the period 2012–2016. The incumbent operator Etisalat, is required to pay an annual rate of 35% of its net profit plus an amount equal to 15% of its revenue for 2012–15, followed by royalty of 30% of its net profit and 15% of revenue in 2016. The second national operator Du is required to pay a 17.5% royalty on profits and 5% on revenues in 2012, although the rates will steadily rise to 20% (profit) and 7.5% (revenue) the year after that, 25% and 10% in 2014, and 30% and 12.5% in 2015. Finally, in 2016 the profit royalty rate for Du will remain constant at 30%, although the revenue fee will increase to 15%.

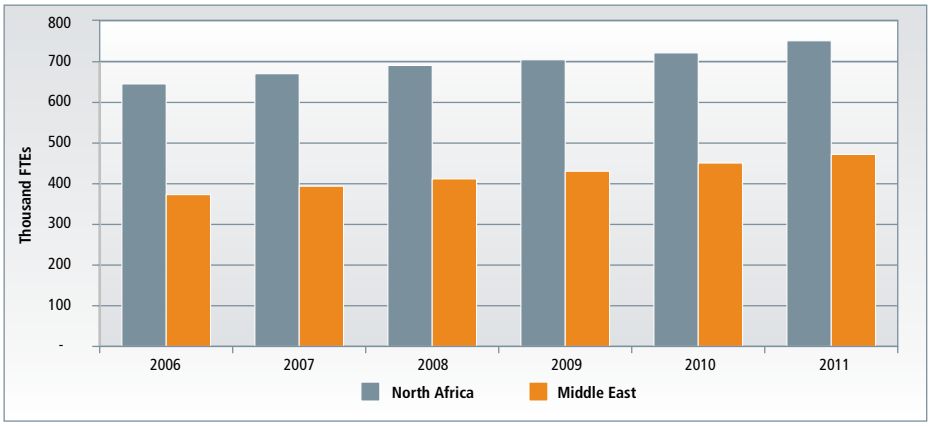
41 Operators' financial statements, 2012.

3.5 The contribution to employment

Mobile services contribute to local employment in several ways, including direct employment by the mobile operators, employment in related industries, and the support employment created by outsourced work.

It is estimated that, in 2011, across the ecosystem, the mobile communication industry employed more than 630,000 FTEs in North Africa. A further 120,000 FTEs are estimated to be generated in the wider economy as a result of interactions with mobile operators, such that the total contribution to employment in North Africa is approximately 750,000 FTEs[42]. In the Middle East, the total contribution to employment was above 470,000 FTEs, of which 390,000 were employed by the mobile industry. The difference in the absolute number of FTEs between the Middle East and North Africa is mainly due to total population numbers.

Figure 37: Industry contribution to employment in the Arab States (2006–2011)



Source: Deloitte analysis

This contribution proves particularly vital in the region, because 60% of the population is under 30 years old and youth unemployment is very high, especially due to a skills deficit[43]: this young population is overqualified for the low-skill jobs available, but not educated enough to be employed by the private sector. The mobile operators and the mobile ecosystem provide a stable source of employment and, through significant training and skill-transfer programmes, successfully train local employees.

The mobile sector has also spurred a variety of business and entrepreneurship opportunities in the informal sector; this is particularly true for North Africa[44]. As the majority of consumers use pre-pay cards, mobile operators rely on extensive phone credit distribution networks in partnership with the formal and informal sector[45].

A key contribution to employment is generated by formal and informal airtime and handset sellers. Small shops that have traditionally sold a variety of household goods also sell mobile phone airtime, particularly in small denominations. Young men and women are often found selling airtime cards in the streets. Numerous small-scale businesses have also opened shops to sell, repair, and charge mobile phones, either using car batteries or small generators. In the early years of mobile phone usage, entrepreneurial individuals started businesses to rent mobile phones, especially in rural areas.

42 Contribution to employment is estimated by assuming a fixed proportion of mobile to total employment using reasonable assumptions. A multiplier of 20% is then applied to the indirect employment to capture the support and induced employment.

43 GSMA/Analysys Mason, "The socio-economic benefits of allocating harmonised mobile broadband spectrum in the Kingdom of Saudi Arabia", 2012.

44 Jenny C Aker and Isaac M Mbiti, "Mobile Phones and Economic Development in Africa", 2010.

45 Mohammed Ibrahim, the Sudanese businessman who established Celtel, a pan-African mobile group now owned by Airtel, stated: "Mobile phones could not work in Africa without prepaid because it's a cash society" (The Economist, 2009).

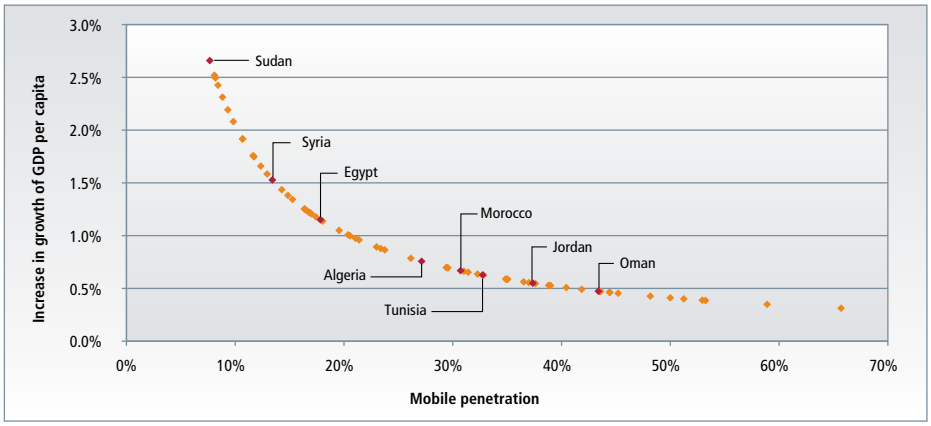
3.6 The long-term relationship between mobile penetration and economic growth

Many studies have investigated the relationship between mobile penetration and economic growth. A recent study by Deloitte and the GSMA[46] used statistical techniques to further understand the impact of mobile services on the growth of total factor productivity (TFP) and on GDP growth in 74 developing counties[47].

The study found that a 10% increase in penetration[48] would produce an increase in GDP growth of 1.5% and a 4.2% increase in TFP in an average developing country.

These effects vary across countries with the average level of mobile penetration, in particular, the lower the penetration rates the higher the impact. Figure 38 demonstrates the marginal effect of a 10% increase in mobile penetration for the Arab States included in the study.

Figure 38: Predicted effect of a 10% increase in mobile penetration on total factor productivity[49]



Source: Deloitte/GSMA, "What is the impact of mobile telephony on economic growth?", 2012.

Compared to the rest of the region, countries in the Middle East show very high penetration rates and the above analysis would not necessarily apply; nonetheless, growth is expected to be sustained by the spreading of data services and new generation technologies. Indeed, the aforementioned study finds a positive relationship between the amount of data used per 3G/UMTS connection and increases in economic activity, over a sample of 14 countries including mature western economies. On average, if countries had doubled their consumption of mobile data per 3G/UMTS connection over the period 2005–2010, they would have experienced a growth rate of GDP 0.5 percentage points each year.

46 Deloitte / GSMA, "What is the impact of mobile telephony on economic growth". 2012.

47 TFP is a measure of economic productivity which accounts for effects in total output not caused by traditionally measured inputs such as capital and labour and that often measures a country's long-term technological dynamism.

48 This is mobile services penetration measured by total connections.

49 Penetration rates are averages for the years 1996–2009.

3.7 The social contribution of mobile telephony

In addition to the economic benefits, one of the main effects of mobile phones is their impact on society. Economic and social development, including social inclusion, remains a key challenge in the region. While numerous economies in the area have experienced significant economic growth, political and social crises continue to affect the lives of local populations.

Mobile services impact positively on the living standards of people across communities in a practical manner, increasing social capital and cohesion through several mechanisms:

- **Giving a space of expression for a variety of community voices:** mobile telephony, by providing access to social media, has created a space for expression, self-identification and mobilisation around responsible behaviours in society, as a growing number people use social media platforms to share their experiences and make their voices heard.
- **Promotion of active citizenship:** mobile telephony, by providing access to social media, ensures greater participation of marginalised groups in the development process, with many governments using social media to raise public involvement and transparency in decision making. In Egypt, following the 2011 turmoil, the transition government has strongly increased its presence on social networks, which the population now considers a main source of information and dialogue.[50]
- **Extension of communications:** mobile phones — and text messaging in particular — require only basic literacy, so are therefore accessible to a larger segment of the population. A mobile-based adult literacy project in Egypt has shown that the use of mobile phones is a strong motivator, increasing the drive for students to enrol in literacy courses.[51]
- **Assisting in conflict relief:** mobile services allow families and friends to stay in touch in the event of conflict or war, which can also ensure that they obtain more rapid relief. Local mobile networks also launched fundraising campaigns, asking subscribers to donate via SMS[52]. Mobile technology was also used by the Tunisian Red Cross to allow people fleeing the recent conflict in Libya to call their loved ones.[53]
- **Promotion of digital inclusion:** mobile services universalise the use of computer and communication technologies to boost autonomous and continuous learning and enable citizens to access the internet.

While impacts on productivity have been discussed above, mobile services impact societies in numerous other ways by changing how people work:

- **Stimulating local content:** as discussed in section 2, mobile is quickly becoming the main platform for internet browsing in the region. However, a lack of sufficient content in Arabic has been identified as a barrier to further growth. In recent years however, there has been a significant increase in the production of local Arabic content across the Arabic world.[54] Apart from being a driver of growth in the economy, the production of local Arabic content provides an opportunity to help preserve countries' Arabic and Islamic identity. Critical mass is needed to sustain local content on local platforms, which highlights the role government organisations and large corporations play in promoting local content creation, as well as capital investment in new local content-focused companies.[55]
- **Creating low-carbon economies:** according to a GSMA forecast, mobile technology could reduce greenhouse gas emissions by 2% by 2020[56]. This reduction can be met through, among other things, the introduction of more energy-efficient infrastructure, along with reduced carbon consumption through more efficient communication and travel. In the region, renewable energy sources are increasingly being used to power mobile base stations, with mobile provider Tunisiana powering all of its base stations in Tunisia with solar power and Zain also powering 36% of its base stations in Sudan with solar power.[57]
- **Changing the way education, healthcare and financial services are provided:** mobile services have the potential to further impact economic and social development through the provision of high-value 3G/UMTS and 4G/LTE data services by generating a host of social and commercial services in areas such as education, healthcare and financial services.

50 UNESCO, ISOC & OECD, "The relationship between local content, internet development and access prices", 2011.

51 NetSquared, "Message Sent: Improving Basic Cell Phone Literacy in Egyptian Women", 2009.

52 Buddecom, "Lebanon – Telecoms, Mobile, Broadband & Forecasts", 2010.

53 GSMA, "African Mobile Survey", 2011.

54 Christidis, O., quoted in "Arabic digital content booming in Saudi Arabia", 2012.

55 Vodafone, "Making broadband accessible to all. Policy paper series", May 2011.

56 GSM Association, "Mobile's Green Manifesto", November 2009.

57 GSM Association, "Mobile and Development Intelligence", Accessed November 2012.

m-Education:

Mobile technologies are especially good at increasing both the level education and achieving the goal of education for all, as they can enable literacy development, promote student motivation, enhance access to teacher development opportunities and improve communication between parents, teachers and principals. Examples of m-Education programmes in the Arab States include a programme in Jordan, provided in both Arabic and English, to help recent graduates with career development and a mobile English-language programme in Tunisia with lessons covering a range of subjects including society, technology and the environment.

m-Health:

Mobile technologies provide a significant contribution to healthcare in the region and a World Health Organisation review of m-Health programmes worldwide found that the region has a number of established programmes. Examples include a programme in a number of countries that promotes HIV prevention skills and a mobile programme in Yemen that delivers medical advice via SMS.[59]

m-Money:

Mobile payments and mobile banking help with the transfer of remittances and transfers of money. This has a number of benefits including promoting tax transparency and combating corruption , acting as a gateway into the banking system which helps individuals to improve their money management, as well as improving the customer experience by speeding up payment process and cutting queues. Both m-Banking and m-Payment schemes are available in a number of countries including Jordan, Morocco and the United Arab Emirates, with Egypt and Tunisia also offering m-Banking services.

The social impact of mobile telephony and the development of local content are discussed in more detail in Appendix E.

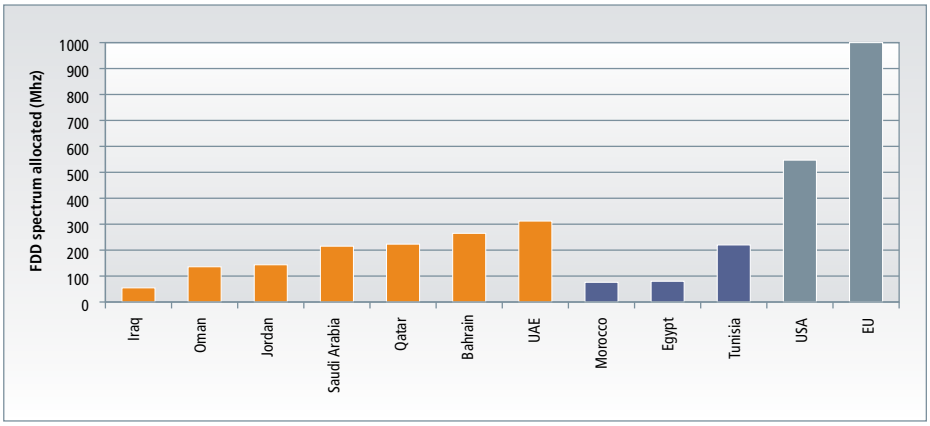
4. The Benefits from Additional Spectrum for Mobile Broadband

Spectrum is an important input for mobile operators, particularly against a backdrop of increased data consumption. Limited availability of spectrum is an issue that needs to be addressed, as spectrum must be allocated to those services that are most able to maximize the benefits of this resource to society as a whole. The allocation of harmonised spectrum to mobile will contribute to the development of the industry, as well as promote the development of broadband internet, which is central to economic and social development in the Arab States.

4.1 Mobile spectrum allocations

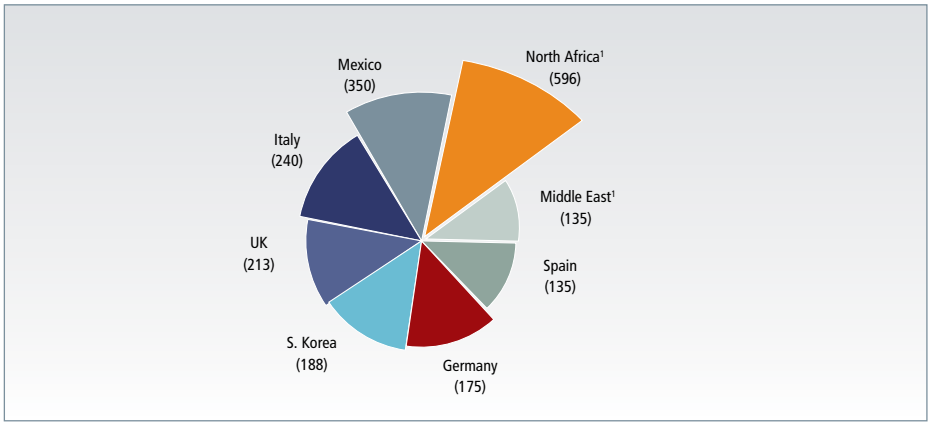
Current spectrum allocations in the region, particularly in North Africa, fall below those in more developed countries such as the US and EU Member States. While most Middle Eastern countries have over 200MHz allocated, countries in North Africa have considerably lower levels of spectrum. As a result, North African countries have relatively higher levels of connections per MHz, making them more prone to network congestion and quality-of-service issues.

Figure 39: FDD spectrum assigned to mobile in selected countries, in MHz (2012)



Source: Deloitte Analysis, GSMA.

Figure 40: Number of connections per MHz of FDD spectrum assigned to mobile, in thousands (2012)

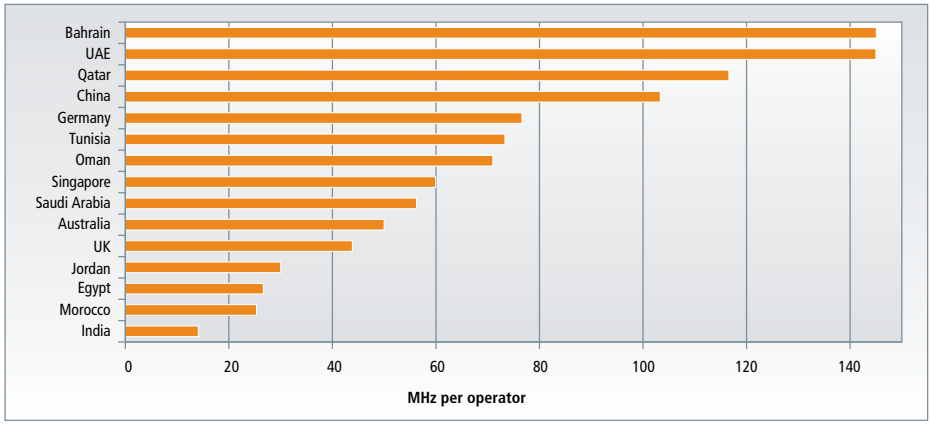


Source: Deloitte Analysis, GSMA. [1]North Africa: Morocco, Egypt, Tunisia. Middle East: Iraq, Bahrain, Qatar, Jordan, UAE, Oman, Saudi Arabia.

A similar situation is shown by the average spectrum allocation by operator across the different Arab States. Bahrain, the UAE and Qatar have allocated well above 100MHz of spectrum per provider, positioning them at the top of the sample — even above countries such as China. In contrast, Morocco, Egypt and Oman have less than 50MHz of spectrum per provider, which are levels comparable to India. Furthermore, high-income countries in the region typically have more spectrum available and in more bands than the middle income countries[58]. For instance, Egypt has spectrum in the 1.8GHz and 2.1GHz bands, while Saudi Arabia has these two bands as well as spectrum in 2.3GHz and 2.5GHz. Higher levels of spectrum allocation per operator across several bands allow for optimal network design, maximizing the propagation characteristics of each band to balance coverage and capacity needs.

58 Plum Consulting, "The economic benefits from deploying 1.4GHz spectrum for a mobile broadband supplemental downlink in the MENA region. A report for Ericsson and Qualcomm". October 2012.

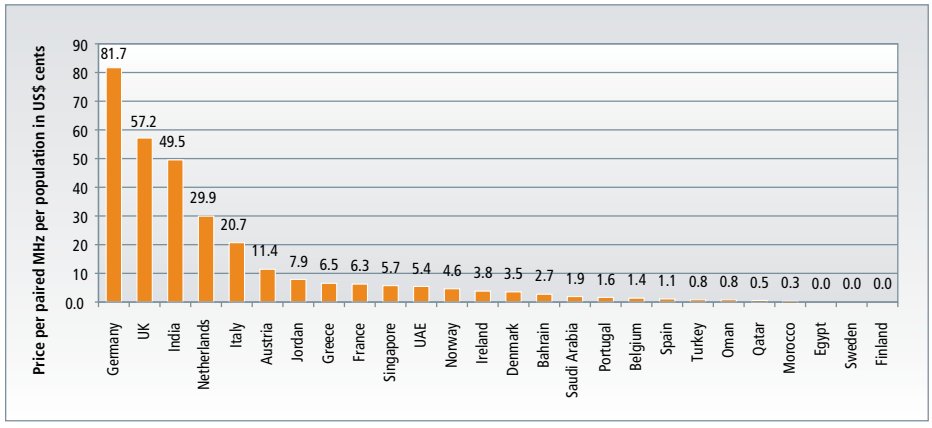
Figure 41: Average FDD spectrum allotted per operator, selected countries (2012)



Source: Deloitte Analysis, GSMA

Spectrum cost for the 2.1GHz band varies considerably, with Jordan and the UAE at the top of the region, below Germany, UK, Netherlands and Italy. Governments managing forthcoming auctions could benefit from considering the promotion of service demand and operators' investments as desirable outcomes that support long-term revenue generation. Operators have expressed concern regarding the high fees for spectrum set up by Iraq, ranging from US$ 3 billion to US$ 6 billion[59], which would be by far the highest in the region. This contrasts with Algeria's[60] price of approximately US$ 40 million per licence. Bahrain has also announced[61] it will release spectrum across a number of bands (including several technology-neutral licences), yet no price has been reported.

Figure 42: Spectrum pricing in selected countries (2011)



Source: Deloitte analysis

The mobile industry's current spectrum holdings in the region are operationally inefficient, due to the lack of harmonisation. There is also a risk that spectrum will be insufficient in the future, due to changing consumer habits leading to increased data traffic. These issues are analysed in turn.

59 Telegeography, "Govt slaps USD3bn price-tag on 3G licences", November 2012 http://www.telegeography.com/products/commsupdate/articles/2012/11/05/govt-slaps-usd3bn-price-tag-on-3g-licences/index.html

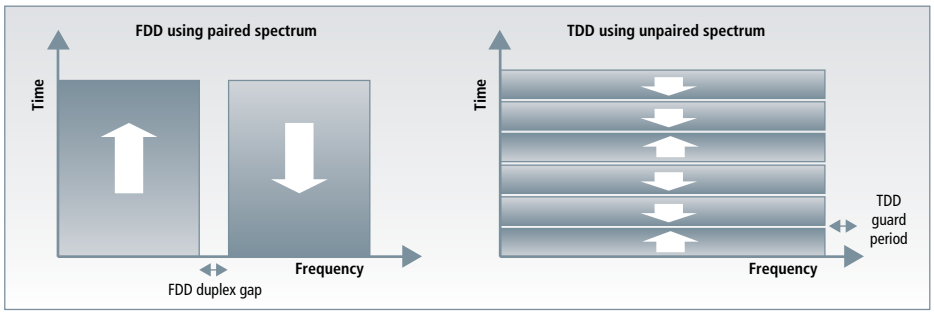
60 IT news Africa, "Algeria's 3G licence goes up for tender", August 2011. http://www.itnewsafrica.com/2011/08/algeria%E2%80%99s-3g-license-goes-up-for-tender/

61 Ameinfo, "Bahrain TRA announces the release of radio frequencies for advanced post 3G mobile services", March 2012 http://www.ameinfo.com/294078.html

4.1.1 Limited harmonised spectrum — the importance of harmonisation

While most of the spectrum in the region is allocated in paired frequencies, a number of countries have allocated fragmented, nonharmonised spectrum in unpaired frequencies. This includes authorities in Bahrain, Morocco, Jordan, Qatar and Saudi Arabia, which have used time division duplexing (TDD) technology. The difference between this technology and the usual frequency division duplexing (FDD) is that TDD allows both the uplink and the downlink to be carried using the same frequency band. In certain cases, the ratio of the uplink to the downlink can be adjusted to allow for asymmetric data consumption.

Figure 43: Difference in spectrum use between FDD and TDD



Source: Analysys Mason

Additional coordination is required when using this technology, as operators using adjacent blocks of spectrum need to synchronise their networks so that the uplink and downlink transmissions are sent at the same time in order to avoid interference between adjacent base stations or handsets. At present, synchronisation requires operators to put a separate network element aligning two networks' transmissions[62].

Harmonisation minimises interference coordination issues not only within countries but also across country borders, as some spectrum could be unusable in border areas of countries which have failed to harmonise their allocations. When this is the case, operators agree to reduce the power of transmission or tilt antennae which are closer to the border[63]. This is a costly operation as it implies reduction in the coverage radius, so this may imply the need of more base stations to provide the same coverage. An alternative method is adding filters, but estimations for Saudi Arabia have shown that this filtering could add a cost of up to US$ 60 million in a country with 15,000 sites[64].

An example of the TDD spectrum allocation is found in Saudi Arabia. LTE has been deployed over a fragmented, nonharmonised arrangement in the 2.3GHz and 2.5GHz bands in TDD mode[65], by operators STC and Mobily. Lack of harmonisation limits handset availability to operators; for example, the recently released iPhone 5 is not currently able to operate on either of those networks and is only available to the smallest operator in the country (Zain), which runs an FDD-LTE network over the 1.8GHz spectrum band[66].

Lack of spectrum harmonisation can also increase device costs due to reduced economies of scale in the production of handsets resulting from additional cost of nonstandardised chipsets. If frequencies are harmonised, operators can focus on deploying standardised equipment for the vast majority of countries in the region. These significant scale economies lead to reduced retail prices, and higher consumer take up. Without spectrum harmonisation, equipment vendors may not develop customised equipment or, if they do, they may charge higher prices for it, as they would be unable to spread fixed costs over a large enough consumer base. This, ultimately, would lead to higher prices for consumers. Furthermore, it is possible that without harmonisation, customised devices would have less functionality and lower performance, as a result of limited investment in R&D for devices being developed for an individual country[67].

62 Analysys Mason, "Unpaired spectrum and the promise of affordable capacity", 2012. http://www.analysysmason.com/About-Us/News/Insight/Unpaired-spectrum-article-Jun2012/

63 GSMA. "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the United Kingdom of Saudi Arabia", 2012. Analysys Mason

64 GSMA. "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the United Kingdom of Saudi Arabia", 2012. Analysys Mason

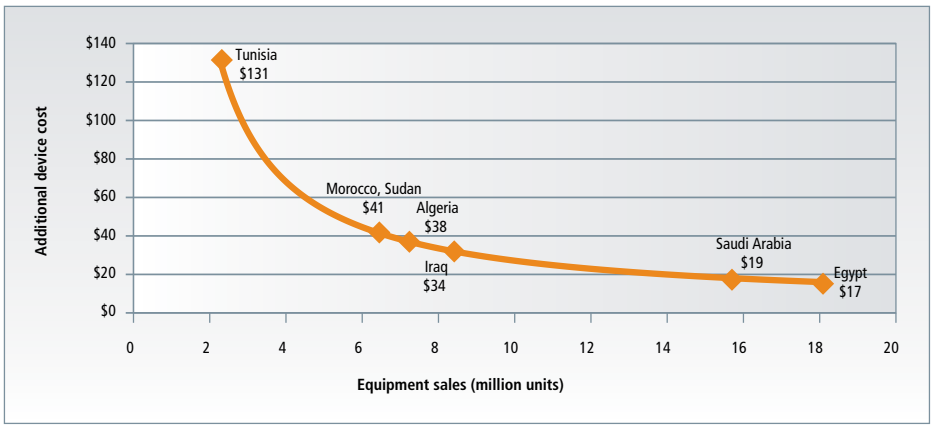
65 GSMA, "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the Kingdom of Saudi Arabia". 2012. Analysys Mason

66 Analysys Mason, "iPhone 5: winners and losers in the Middle East", 2012. http://www.analysysmason.com/About-Us/News/Newsletter/iPhone5-Middle-East-Sept2012/

67 GSMA. "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the United Kingdom of Saudi Arabia", 2012. Analysys Mason.

Estimates for Saudi Arabia[68] show that due to additional production costs, using nonstandard chipsets could lead to an additional cost for a device in LTE equipment of up to US$ 162 in 2013, or falling to US$ 17 in 2020. Applying these estimates to total handset sales in several countries in the region suggests that the cost of failing to harmonise spectrum allocations could add US$ 131 in Tunisia and US$ 17 in Egypt per device. Without harmonisation, handsets need a more complex radio design to incorporate extra band capabilities, which can reduce the available range and data rates, increasing the cost of service delivery[69].

Figure 44: Additional device cost in the absence of spectrum harmonisation



Source: Strategy Analytics, Deloitte analysis

Harmonisation facilitates international roaming, allowing countries to be more attractive to tourists and international corporations. Given that several operators work across countries in the region, failure to harmonise would limit the economic growth of their operations in the region, as well their ability to achieve economies of scale, which is an important element in driving service prices down.

4.1.2 Changing consumer habits and increased data traffic

The greater availability of smartphones is changing the way consumers access the internet. In the Middle East, over 60% of smartphone users access the internet on a daily basis on their devices. Furthermore, information for Egypt shows that 24% of smartphone users do not have internet at home, so their mobile devices are the only way they can access internet content[70]. The recent release of smartphones with Arabic language capabilities and a user interface in the local language will also contribute to increasing data demand[71].

Likewise, the significant growth of Arabic-language content is expected to increase data demand. YouTube is capitalising on this trend by launching localised versions of the platform in several Middle Eastern countries, which currently report over 167 million views a day. Saudi Arabia is already the country with the highest per capita use of YouTube in the world[72], with over 90 million views a day. Up to 93% of Egyptian internet users have indicated they use YouTube at least once per week, and 19% of smartphone users access the platform on their device[73].

According to the ITU, however, issues of speed and network congestion such as volume restrictions and lower speeds after a certain amount of data has been downloaded hamper more rapid growth of mobile broadband in the region[74]. As demand for data increases, the Arab countries could be faced with a shortage of spectrum by 2020 unless existing operators and new entrants undertake further investment in network infrastructure to support this traffic growth. Estimates by Plum Consulting[75] support this view and show that a spectrum shortfall would be more likely in urban[76] than in suburban areas, particularly during busy hour traffic peaks.

68 GSMA, "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the Kingdom of Saudi Arabia". 2012. Analysys Mason.

69 GSMA. "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the United Kingdom of Saudi Arabia", 2012. Analysys Mason

70 Google, "Our mobile planet - Understanding the Mobile Consumer", May 2012.

71 "Nokia Middle East launches new smartphone range in Arabic". http://www.arabnews.com/nokia-middle-east-launches-new-smartphone-range-arabic

72 "Saudi Satire Ignites YouTube's Massive Growth in Middle East" http://www.usnews.com/news/articles/2012/05/30/saudi-satire-ignites-youtubes-massive-growth-in-middle-east

73 Thinkinsights with Google, "YT Audience Measurement, Egypt", 2012

74 Susan Teltscher, head of the ICT Data and Statistics Division at ITU, quoted in "In Arab Countries, Mobile Internet and Social Media Are Dominant, but Disparities in Access Remain" http://www.prb.org/Articles/2012/arab-region-internet-use.aspx

75 Plum Consulting, "The economic benefits from deploying 1.4GHz spectrum for a mobile broadband supplemental downlink in the MENA region. A report for Ericsson and Qualcomm". October 2012.

76 Urban areas defined as those with a population density greater than or equal to 2000 people per sq km; suburban areas defined as those with a population density greater than 200 people per sq km and less than 2000 people per sq km. Rural areas, those with a population density of less than 200 people per sq km. Source: Plum Consulting, "The economic benefits from deploying 1.4GHz spectrum for a mobile broadband supplemental downlink in the MENA region. A report for Ericsson and Qualcomm". October 2012.

Table 2: Areas of likely spectrum shortfall, selected countries (2020)

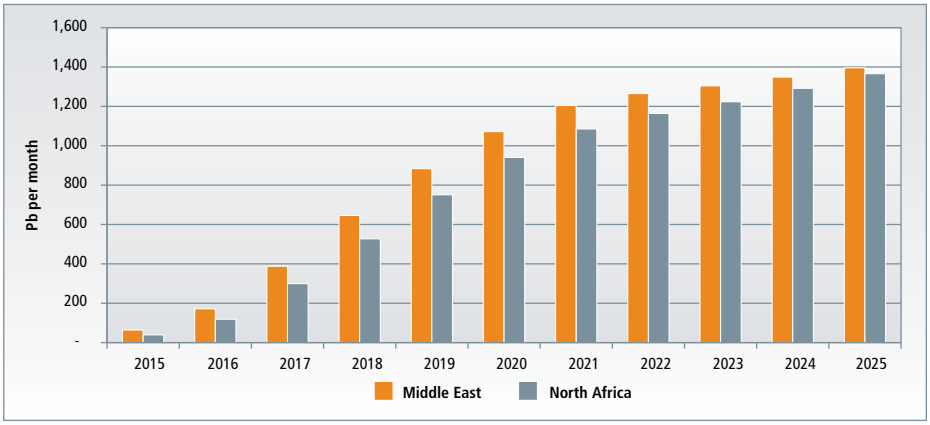
Country	Urban areas	Suburban Areas	Rural Areas
Saudi Arabia			
Qatar			
United Arab Emirates			
Algeria			
Egypt			
Jordan			
Morocco			

Shortfall No shortfall

Source: Plum consulting.

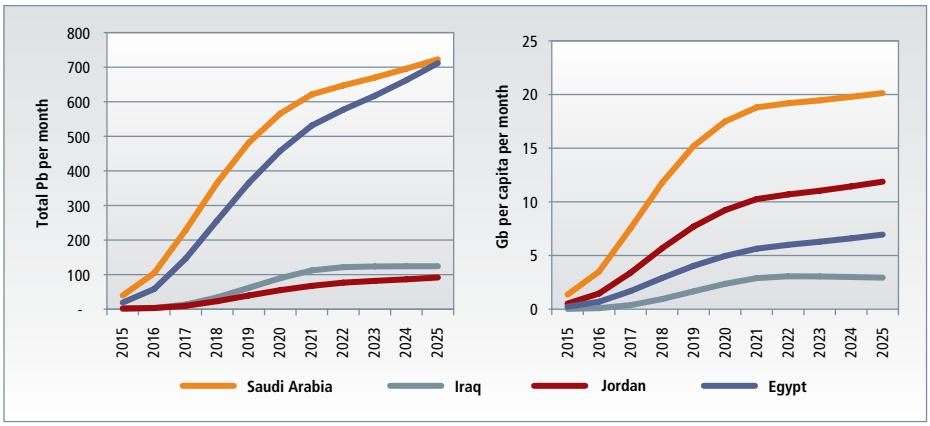
Deloitte[77] estimates that if spectrum were made available in a harmonised manner, data consumption could grow 25-fold between 2015 and 2025, from 103 Pb[78] per month to 2,700 Pb per month[79]. In countries such as Egypt and Jordan, data consumption is set to increase 37 and 40 times, respectively, compared to 2015 levels.

Figure 45: Traffic projections for the Arab States with additional spectrum (2015–2025)



Source: Deloitte Analysis

Figure 46: Traffic projections for selected countries with additional spectrum (2015–2025)



Source: Deloitte Analysis

77 For details of the assumptions behind these projections, see Appendix D.2. These assumptions and subsequent modelling are based on data from Wireless Intelligence as of October/November 2012.

78 Pb (petabytes), equal to 1,048,576 Gigabytes.

79 Compared to 2,000 Pb per month without spectrum release or almost 20-fold increase.

4.2 Releasing additional spectrum

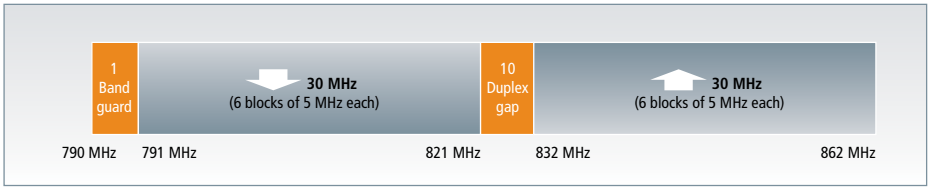
Governments in the Arab States can avoid this spectrum scarcity by releasing harmonised spectrum through the digital switchover in the Digital Dividend bands (700MHz and 800MHz), promoting spectrum liberalisation by refarming the 1.8GHz band, and promoting further release of the 2.6GHz band.

4.2.1 The Digital Dividend spectrum

The digital switchover from analogue television to digital television frees spectrum for alternative use. As digital TV requires less spectrum, the term Digital Dividend is given to this additional released spectrum, which can then be used for mobile broadband. Furthermore, digital television represents a considerable improvement in terms of programme availability, portable reception, embedded programme guide and picture quality for users.

Internationally, the 800MHz band (790–862MHz) and the 700MHz band (694–790MHz) are the frequencies that have been or will be allocated to mobile services following the switchover. Following the release of the 800MHz band in 2007, this band was allocated at the international level by the ITU to mobile broadband for Africa, Europe and the Middle East (ITU region 1). Technical work was finished in 2009, leading to the band plan outlined below, allocating sufficient bandwidth for three operators to provide LTE services[80].

Figure 47: 800MHz band plan



Source: ITU

In February 2012, the World Radiocommunication Conference (WRC) allocated the 700MHz band to mobile broadband services in Africa, Europe and the Middle East from 2015, to align it with the remaining ITU regions. This allocation was based on the commitment of all parties to seek harmonisation of the 700MHz and 800MHz bands worldwide; however, allocation of the 700MHz band to mobile will not come into force until end of 2015, giving time for technical studies and for countries to rearrange existing frequency use. The decision offers the unique opportunity for Arab States to achieve regional consensus in a harmonised band plan and free spectrum that operators need to deliver mobile broadband services. Furthermore, the WRC has committed to identifying future spectrum for mobile broadband, an issue to be addressed at the next conference in 2015.

As the spectrum in the 700–800MHz bands operates at lower frequencies than other bands used for mobile, it has lower propagation losses, which allows coverage of large areas. This makes these bands ideal for covering rural areas or those with lower population density. At the same time, lower frequencies have better indoor propagation. It is also important to penetrate the thick cement walls of buildings in the region, which makes these frequencies suitable for urban areas. Given these propagation characteristics, operators using the 700–800MHz bands are able to achieve coverage using fewer radio base stations, leading to more efficient investment, quicker network rollout, and lower capital, operation and maintenance costs.

Allocation of the Digital Dividend to mobile services requires clearing of spectrum of existing uses, which may include military systems and terrestrial television, as well as legacy CDMA 850 and/or iDEN networks. While the clearing process can be lengthy, it is worth noting that with the exception of Oman and Egypt, most countries in the region rely mostly on Free Satellite TV, with limited penetration of terrestrial television. The plans for the switchover to digital broadcasting are set to occur by 2015[81] in seven countries in the region following the ITU plan, while six countries have already made the transition[82]. The UAE, for instance, has set December 2013 for the analogue switch-off and has identified the 800MHz band as a priority band for switch-off[83].

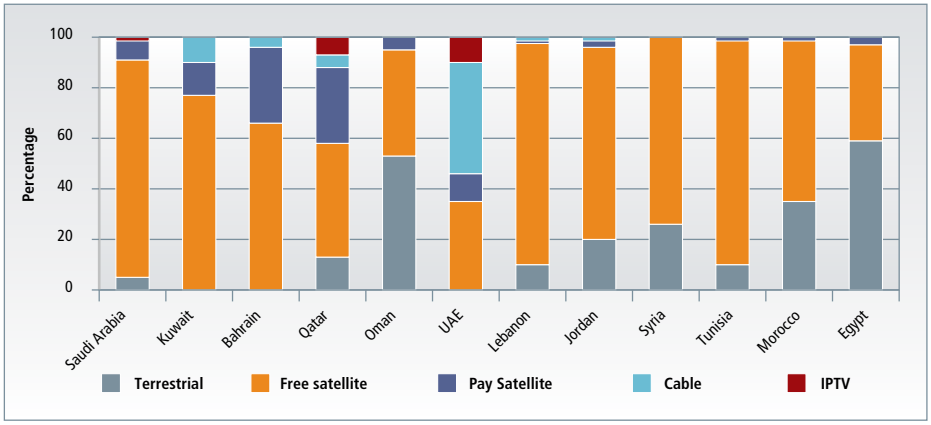
80 GSMA. "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the United Kingdom of Saudi Arabia", 2012. Analysys Mason

81 The VHF band (174–230MHz) is expected to be switched off by 2020 in 10 Arab States.

82 ITU news,"Arab Book 2012", November 2012. https://itunews.itu.int/En/2734-Arab-Book-2012.note.aspx

83 Comms MEA, "Barrier to LTE " August 2012 http://www.commsmea.com/12511-barrier-to-lte/1/print/

Figure 48: TV penetration by platform



Source: Arab Media Outlook 2009–2013

Furthermore, the 2.6GHz band has been internationally harmonised for LTE mobile services (ITU Option 1), and numerous countries have awarded it (and plan to award it in future) in parallel with the Digital Dividend. However, the current military use of this spectrum may pose difficulties to implementation in certain countries in the region[84], for instance in Saudi Arabia.

4.2.2 Spectrum refarming and spectrum liberalisation

Spectrum refarming has been identified by the ITU as 'essential' for the rollout of wireless broadband services in the region, particularly for Arab States[85]. Spectrum liberalisation and the issuance of technology-neutral licensing contribute to achieving the aim of providing coverage to remote and underserved areas. There are a handful of positive examples in the region.

- Saudi Arabia's technology-neutral approach of spectrum policy for universal service providers allowed the provision of high-speed internet in rural areas. This led to the deployment of 3G/UMTS services over the 900MHz band, previously allocated to 2G technology.
- Lebanon has also proposed that the 2.6GHz band be subject to refarming through its initiative for mobile broadband aiming at repackaging the band to be harmonised internationally.
- Other examples are Egypt and Tunisia, which awarded technology-neutral licences in 2007 and 2009[86].

Liberalising spectrum also could be an effective short-term means of avoiding network congestion while allowing operators to deploy technology for mobile broadband while they wait for the Digital Dividend to be made available. In fact, preliminary estimates[87] indicate that, given traffic demand increases, 5MHz of re-used spectrum in the 1.8GHz band can support traffic increases for between two and three years for each operator.

84 Telcoms.com, "Middle East operators facing problems over LTE spectrum, devices and pricing", May 2012. http://www.telecoms.com/43551/middle-east-operators-facing-problems-over-lte-spectrum-devices-and-pricing/

85 ITU news,"Arab Book 2012", November 2012. https://itunews.itu.int/En/2734-Arab-Book-2012.note.aspx

86 Telecomfinance, "Regulating WiMAX to Life in the Middle East and North Africa", November 2009.

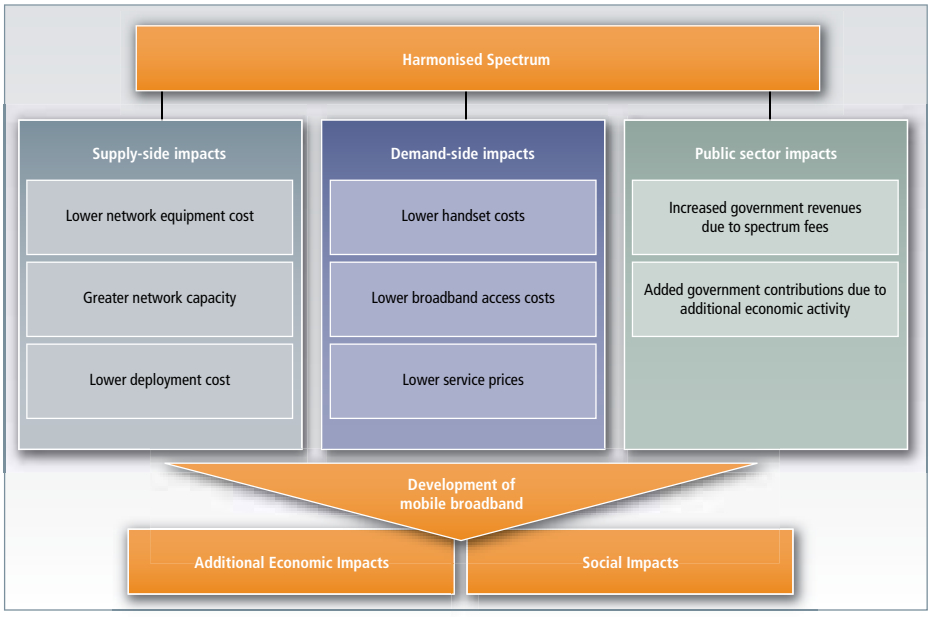
87 Developing Telecoms," Spectrum re-farming: getting ready for the LTE capacity crunch", September 2011. http://www.developingtelecoms.com/spectrum-re-farming-getting-ready-for-the-lte-capacity-crunch.html

4.3 The economic and social benefits of additional spectrum for mobile broadband

There are numerous positive impacts that could be obtained from increased availability of spectrum from the 700 and 800MHz bands, refarming of the 1.8GHz band and further release of the 2.6GHz band, for mobile broadband and mobile data in the Arab States.

- Increased investment on network capacity in the region, which would have a broader effect on the whole mobile ecosystem, due to purchases of network equipment, information systems and other infrastructure.
- Efficiencies would occur as a result of savings in network expenditures, which would likely be passed on to consumers through lower prices for broadband and mobile services.
- Lower retail prices and lower handset costs as a result of scale economies from spectrum harmonisation would increase market size and its economic impact.
- Other spillover and positive externalities in other economic sectors across the region prompted by mobile broadband. These effects would impact existing businesses that expand their online presence, advertisers and local service firms.
- Second order impacts of higher productivity in the wider economy are also generated as the region becomes more attractive to foreign investors and increased connectivity allows more efficient use of email and electronic file exchanges, as well as rapid access to information, customers and suppliers.

Figure 49: Economic benefits from harmonised spectrum release



Source: Deloitte analysis

These effects have the potential to lead to higher GDP growth and additional employment in the region. A recent Deloitte/GSMA study considers the medium-term impacts of mobile data consumption on economic growth. Using detailed information provided by Cisco Systems on mobile data usage between 2005 and 2010 in 14 countries for which historical disaggregated data is available, Deloitte has calculated the impact of mobile data usage for each 3G/UMTS connection on economic growth[88]. The study found that, on average, doubling mobile data use leads to an increase in GDP per capita growth of 0.51 percentage points.

88 Deloitte/GSMA, "What is the impact of mobile telephony on economic growth?", 2012. The study implies a linear relationship between data traffic and GDP growth.

Applying these results to the Arab States[89] and other modelling assumptions as discussed in annex D.2, the impact of released spectrum for mobile broadband across the Digital Dividend, 1.8GHz and 2.6GHz bands can be estimated for 2015–2025. Under these assumptions, North Africa would benefit of an average increase in GDP per capita growth of 4.4% across the period, while the Middle East would see an increase of 2.5%. As traffic growth per capita stabilises, these effects taper off over time. Other benefits are outlined below.

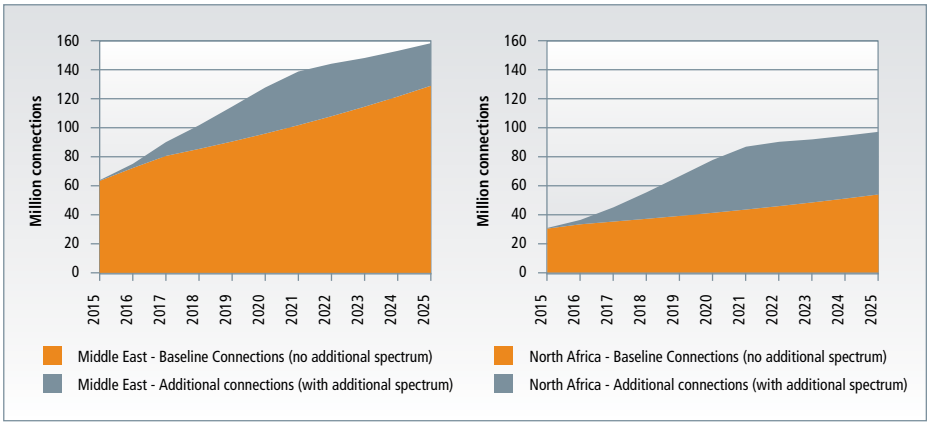
- Additional harmonised spectrum would provide necessary capacity to meet the demand for more advanced technologies, leading to an increase in connections in 3G/UMTS and 4G/LTE networks[90] — an average of 26.4 million per year for the Middle East and 34.5 million for North Africa[91].
- By 2025, this would represent an additional increase in mobile broadband connections of over 36 million across the Arab States.
- An increase in GDP by an extra US$ 108 billion between 2015 and 2025, including an additional US$ 912.4 million in government contributions from the mobile ecosystem.
- Additional employment of 5.9 million FTEs by 2025, of which 71,000 would be associated with the mobile ecosystem.

Figure 50: Impact of spectrum release for mobile broadband (2015–2025)

	Average increase in mobile connections	Average incremental GDP per capita growth (%)	GDP increase	Additional government contributions from mobile	Additional job creation
Middle East	+26.4 million	2.5%	+US$57.5 million	+US$528.7 million	+1.9 million
North Africa	+34.5 million	4.4%	+US$50.5 billion	+US$383.7 million	+4.0 million
Egypt	+1.6 million	3.1%	+US$10.9 billion	+US$82.9 million	+1.2 million
Iraq	+9.5 million	4.8%	+US$10.5 billion	+US$97.0 million	+727,400
Jordan	+1.4 million	2.8%	+US$1.3 billion	+US$12.2 million	+68,400
Saudi Arabia	+6.5 million	2.3%	+US$18.3 billion	+US$168.6 million	+354,700

Source: Deloitte analysis

Figure 51: Impact on mobile broadband connections in the Middle East and North Africa (2015–2025)



Source: Deloitte analysis

89 For a detailed description of the spectrum impact methodology, see appendix D.2.

90 The analysis assumes no 4G/LTE deployment between 2015 and 2025 in Iraq and Algeria.

91 Including dedicated mobile broadband.

Other studies have estimated the impacts of spectrum release for the region. A report by GSMA / Analysys Mason for Saudi Arabia[92] shows that releasing harmonised spectrum for mobile broadband in the 800MHz and 2.6GHz bands by 2013 would generate employment of 420,000 by 2020, with an increased GDP of US$ 95 billion between 2013–2025. Furthermore, a report from Plum Consulting[93] estimates that the release of a 1.4GHz Supplemental Downlink[94] in the region would provide benefits (represented in improved service quality and savings on infrastructure costs) of US$ 26 billion between 2015 and 2020.

Spectrum release and the development of mobile broadband have also a number of social impacts, which are outlined in the following section.

4.3.1 Social impact of mobile broadband in the Arab States

There is a general consensus about the potential benefits that mobile broadband involves, particularly in low- and middle-income countries with large rural populations. The prospective impacts of further mobile broadband developments are larger, since these countries generally suffer from a shortage of fixed infrastructure. In this context, mobile is seen as the most cost-effective way to deliver broadband internet services.

For high-income Arab States, until now, mobile broadband has been a complementary service to fixed broadband, given that fixed networks have been able to offer broadband at relatively affordable prices. Nevertheless, mobile broadband is a substitute to fixed services in middle income Arab States, such as Morocco, Algeria, Egypt and Jordan. In these countries mobile broadband may often be the only way of providing an acceptable level of coverage, particularly in rural areas. These services are also usually more readily available and affordable. Thus, social benefits are likely to be greater in those countries where mobile broadband is the primary source of broadband internet services. In this context, mobile broadband acts as a catalyst not only for economic growth but also social development through the impact on health, education and financial and social inclusion.

- **Health:** Mobile broadband can help to provide better services in telemedicine and mobile healthcare, reducing response times and costs, and providing better elderly care. For remote areas, it may counteract the lack of local doctors and specialists by linking patients with urban experts through mobile apps. For instance, Egyptian ministries and telcos have developed a service to provide tele-dermatology specialist consultation to remote clinics where specialists are not present by using 3G/UMTS mobile broadband[95]. In addition, mobile broadband can enable rural health issues monitoring by facilitating two-way communication. This is particularly relevant for the treatment of chronic (noncommunicable) diseases such as diabetes, as Arab States have the highest adult prevalence of the disease in the world (11%)[96]. Recently, an mDiabetes initiative has been launched by the GSMA, aiming to develop clinically meaningful solutions using wireless mobile technology and mobile broadband services[97]. On the other hand, increasing mobile broadband speed helps promote better e-health service. Normally, faster connections are required for medical procedures such as teleradiology, tele-ultrasound and teleconsultation. Services such as telemonitoring or telemedicine involving videoconferencing also require high-speed internet.
- **Education:** Mobile broadband connections can improve education by enhancing remote communication and the delivery of teaching or training materials. This could help ease long standing problems deriving from of the lack of teachers, facilities and resources and could enable students in rural areas to access online learning materials via mobile phones outside the classroom. On the other hand, mobile broadband connection can improve the quality of education by expanding the range of learning opportunities through online services and applications. These include email, discussion boards, live webcasts, podcasts, wikis and blogs that leading online eLearning platform such as Coursera. As a result, greater mobile broadband penetration and high-speed connections will make e-learning more accessible, particularly in rural areas. Improving mobile broadband will spread educational services with associated high cost savings and will allow the development of flexible educational services irrespective of social status or geographical location. An example of an innovative service is Jordan Personalised Learning via 3G/UMTS. The project was launched in December 2011 by the Jordan Education Initiative (a non-profit educational organization) and Qualcomm's Wireless ReachTM initiative, a programme that brings wireless technology to underserved communities globally. The pilot project gives students 3G/UMTS connected mobile devices to learn in and out of the classroom. The project intends to demonstrate student advancement and engagement when given access to advanced mobile technology. Project results aim to assess a large-scale technology integrated education model for public and private schools in Jordan and other countries[98].

92 GSMA. "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the United Kingdom of Saudi Arabia", 2012. Analysys Mason

93 Plum Consulting, "The economic benefits from deploying 1.4GHz spectrum for a mobile broadband supplemental downlink in the MENA region. A report for Ericsson and Qualcomm". October 2012.

94 This technology allows the bonding of the usual downlink with a supplemental downlink channel(s), in a different band, into a single wider downlink channel. This provides an efficient way of using spectrum because consumption of rich content and other data heavy applications is asymmetric. It enables faster downloads and supporting a much greater number of users with mobile or portable wireless devices.

95 Qualcomm. Wireless Research "Egypt Teledermatology Project: Using 3G Mobile Broadband to Bring Dermatology Specialists to Low-Income Areas Virtually". October 2012

96 International Diabetes Federation, "Diabetes Atlas 2012"

97 "GSMA announces Grand Tour cycle ride from Brussels to Barcelona to raise awareness of diabetes and to highlight the benefits of mHealth", November 2012. http://www.gsma.com/newsroom/gsma-announces-grand-tour-cycle-ride-from-brussels-to-barcelona-to-raise-awareness-of-diabetes-and-to-ighlight-the-benefits-of-mhealth

98 Ken Bunck. National Geographic "Wireless Learning: How Mobile Technology is Transforming Classrooms and Empowering Young Women in Jordan". July 18 2012.

- **Financial inclusion:** Mobile broadband can help address financial exclusion and improve economic and employment opportunities in rural areas. Internet-enabled mobile terminals would bring banking — and therefore convenience, security, low costs and access to credit — within the reach of many of those who are now excluded. Alternatively, micro-insurance via mobile accounts can provide protection against financial shocks. On the other hand, bringing banking through affordable mobile broadband and devices can help promote transparency and fight corruption. An example of the potential of these initiatives is in Iraq, where Iraqi company Amwal Electronic Banking Services entered into a partnership with Asia Cell and two commercial banks to launch MobiCash. This is a mobile banking platform enabling customers to purchase airtime, buy goods and services from registered merchants, check bank account balances, and make mobile-to-mobile and bank account-to-bank account money transfers[99].
- **Political participation:** Mobile broadband could greatly increase efficiency in the provision of government services, especially in rural areas. Mobile services could also improve the quality and availability of government services, reducing processing times and thus improving institutions performance. For rural residents, access to online voting and online citizen services would reduce transaction costs, while businesses and entrepreneurs would also benefit from access to services like tax return, online procurement, paperless trade and online customs[100]. Mobile broadband can benefit rural institutions, empowering them with mobile inclusion services like online document handling and local e-Learning which require high-speed internet connection. Across the Arab States, Bahrain and Saudi Arabia are ranked as world emerging leaders in mobile government services by the UN[101]. For instance, both countries have developed a mobile app in order to communicate with all government entities and access their services using mobile broadband.
- **Social media:** Social networking sites facilitate interaction at all levels. This is highly relevant for the Arab States with a large cohort of young technology-savvy adults. The development of mobile broadband is particularly important for the provision of these services, since they are increasingly accessed through mobile devices. For example, some Arab countries such as Iraq have more Facebook users than internet users, which indicate that many users rely on mobile access[102]. Furthermore, social media has contributed to the rise of social entrepreneurship given their potential for facilitating outreach, awareness, mobilization and crowd-sourcing funds and volunteers.[103]

Additional harmonised spectrum can contribute to the achievement of digital inclusion and broadband strategies set out by governments in the region. Indeed, the Arab States have recognised the need for developing and improving access to broadband services, as shown in Figure 52 opposite.

99 USAID TIJARA. "A report on Mobile Banking Pilot Initiative for Microfinance Service Delivery in Iraq", July 2011

100 Boston Consulting Group ,"Socio-economic impact of allocating 700MHz band to mobile in Asia Pacific" October 2010.

101 United Nations. "E-Government Survey 2012"

102 Dubai School of Government. "Arab Social Media Report "Vol 1, No.1 January 2011

103 Dubai School of Government "Social Media, Employment and Entrepreneurship. New Frontiers for the Economic Empowerment of Arab Youth". October 2012

Figure 52: Broadband plans in selected Arab States

Egypt

eMisr is a National Broadband Plan launched in 2011 that proposes different strategic directives to meet Egypt's broadband service needs. The key objectives of the eMisr Plan aim to achieve short term targets of 75 % of households having access to fixed broadband and 98% of population with 3G/UMTS coverage by 2015. The plan also includes penetration targets across households subscribed to fixed broadband services and citizens subscribed to mobile broadband of 22% and 10% respectively. eMisr also covers social inclusion aims including with the deployment of Public Access Points. More ambitious long-term targets have been established regarding the availability, penetration and social targets of high-speed fixed broadband and 4G/LTE mobile broadband for 2021.

Iraq:

In August 2011, Asiacell announced the roll out mobile voice, broadband and SMS services across remote communities in Iraq using the Altobridge lite-site™ solution, a solar powered BSS/Radio access network that allows mobile network operators to affordably deliver mobile broadband connectivity to remote locations. In November 2011, Zain Iraq signed a USD 650 million five-year outsourcing agreement, which includes an upgrade of its network with a view to launching and supporting 3G/UMTS services.

Lebanon:

MTC Touch (Zain group) launched its 3G/UMTS services in November 2011, limited to certain locations, such as Beirut, Saida or Zahle. MTC Touch has an ambitious roll out plan to cover all Lebanon by beginning of 2012, as well as future plans to equip 50 sites with Long Term Evolution (LTE) technology (4G/LTE).

Morocco:

INJAZ programme, financed by the Telecommunications Universal Service Fund provides mobile broadband internet access and laptops to master's students in engineering, sciences, and information and communication technologies. By December 2010, around 11,646 students had been equipped.

Saudi Arabia:

In 2011, ICT company Zain Saudi Arabia won the bid for the Universal Service Fund project launched by Saudi Communications Commission. As a result, it has started to execute projects to deliver voice and mobile-broadband services to 500 residential compounds both north and south of the country.

Syria:

STE (Syrian incumbent operator) is running since 2006 "The third rural project". The project aims to deliver fixed-telephone services and broadband internet services to 4,300 villages. Currently, mobile broadband technologies are used in order to reduce the usage of copper wires. By end 2010, there were 123,000 subscribers to these services.

Source: Deloitte analysis[104]

104 ITU. "ICT adoption and prospects in the Arab Region", 2012

5. Regulatory Challenges

5.1 Overview of the regulatory environment

There is a need for transparent and proportionate regulation, even in markets as clearly developed as some of those in the Arab States. Given the pivotal role the sector plays in the continued rapid development of economies, it is critical that regulatory frameworks and interventions are designed to stimulate competition and investment, while providing the necessary protection to consumers.

A well-functioning regulatory environment:

- Is independent, clearly separated from short-term political agendas, and supported by robust economic analysis to determine the markets where regulation is required and the appropriateness of remedies;
- Provides a stable and open framework for investment decisions;
- Resolves any conflicts between the interests of individual licensees, or between the interests of licensees and consumers, transparently and definitively; and
- Enhances, rather than degrades, the contribution the sector can make towards economic growth and consumer benefits.

All regulatory authorities have a range of sometimes competing objectives, which need to be balanced carefully. It is particularly important that achieving this balance in prioritising objectives occurs transparently.
This chapter considers the state of the regulatory environment in the Arab States with reference to a series of critical issues that currently, and will continue to, influence the rate of development of the sector and its contribution to the broader economy. Key conclusions from this analysis are:

- **Some markets feature considerable politicisation of the regulatory authority.** When combined with a lack of a long-term regulatory direction this adds to market uncertainty, acting as a barrier to investment.
- **High rates of taxation of mobile services fail to recognise positive externalities.** A number of countries in the region have high taxes on mobile services, for example, Jordan (due to an airtime excise of 8% in addition to a VAT of 16%), Morocco and Egypt. In many cases, these are a result of the application of mobile specific or 'luxury' tax rates and arise from governments finding it easier to collect taxes from mobile than workers or other industries in the informal economy. However, this is a myopic view and fails to recognise the positive externalities of mobile, the increased affordability of mobile technology and the decreasing margins that the industry faces. A general restructuring or rebalancing of the tax system could lead to no net decrease in taxation revenues while recognising those industries that make positive contributions to long term growth.
- **Network infrastructure liberalisation would increase investment.** In some countries, for example Egypt and Iraq, the government-controlled incumbent controls the fibre network and other operators may be forced to pay a high price to access it. The private sector is likely to be best placed to own, build and manage the infrastructures required to support the demand forecasts for connectivity and internet usage of the future and liberalisation of the network is likely to prompt investments in capacity and higher quality services at a lower price, overcoming the limitations of most national telecom regulatory frameworks, which were conceived at a time of legacy and depreciated copper networks.
- **Universal service funds (USFs) should be appropriately targeted.** Mobile operators are required to pay into these funds and they often represent a significant proportion of revenues, for example up to 2% of revenues in Morocco and 3% in Algeria. However, there is often uncertainty regarding the underlying legal framework, the structure and management of the funds and the type of services that can be commissioned from the funds, e.g., mobile, fixed or broadband. Consideration should be given as to whether USFs are still valid given the high population coverage of mobile services in the region and, in cases where further rollout is required, this should be targeted to data services and mobile operators, given the opportunity to compete alongside fixed operators for funds.
- **Spectrum should be harmonised.** The allocation of fragmented, nonharmonised spectrum has limited device interoperability in the region, which in turn leads to limited device availability and higher prices. Regional coordination is needed to ensure consumers can benefit from the latest technologies at more affordable prices. More widespread spectrum liberalisation, promoting technology-neutral licences will contribute to maximise the use of available spectrum, as well as allowing for the rollout of LTE services throughout the region.

- **Transparency of roaming tariffs should be encouraged.** Competition in the roaming market and innovation in roaming tariffs should be encouraged by the regulators and barriers to the development of the service, such as nonharmonised spectrum, should be removed.
- **Monitoring and censorship of communications in Middle East place further uncertainty on investment.** Regulators have often placed bans on some mobile services or technologies. For example, the UAE regulator imposed a ban on the use of devices of Blackberry manufacturer Research In Motion (RIM) due to their highly encrypted data system[105]. Regulators in Oman, Jordan and Qatar have all at some point outlawed VoIP services such as Skype, while states like the UAE continue to make Skype and other similar VoIP calls illegal[106]. The restrictions could be due to various reasons, including concerns about national security, but these should be carefully balanced with the constraint they represent for growth and uptake of new technologies and the significant costs for mobile operators, such as those incurred during the disruption of telecommunication services in Egypt during the revolution that began in January 2011[107].

5.2 Politicisation of the regulatory regime

In many markets in the Arab States, regulators are taking a relatively transparent and objective approach to developing and implementing regulatory remedies. While the details of the remedies may be questioned by some, regulators in UAE, Bahrain and Qatar amongst others have been credited with creating a stable environment which encourages long-term investment.

In some markets, additional market uncertainty has been brought about by increased politicisation of the regulatory authority and a lack of long-term regulatory agenda. Two examples stand out, in Jordan and Egypt. Recently, Jordan's Telecom Regulatory Commission (TRC) had its licensing powers revoked, and transferred to the Council of Ministers. Since then, the TRC has seen its budget reduced, salaries cut, and institutional capacity diminished, with an effective loss of independence. In Egypt, Telecom Egypt is expected to be granted a mobile licence pending a decision of the regulator, without any formal competitive bidding process. The licensing decision is conditional on a number of issues, including the possibility of licensing use of the fixed-line network; however, no clear timeframe for this has been indicated by the regulator[108].

The impact of this politicisation is being felt both by consumers and the government:

- Consumers are impacted, through reduced service availability, in terms of types of products and services, geographical coverage and less price competition.
- Governments and the wider economy are impacted through reduced foreign direct investment (FDI) and growth prospects.

As such, the creation of an independent regulatory authority that is separate from government with determinations driven by robust economic analysis is likely to benefit all concerned.

105 Telegeography, "GlobalComms Database: Jordan", 2012.

106 Cankorel, Aryani, "A Spectrum of Regulations: Mobile Telecom Regulation in the Middle East and North Africa", 2009.

107 Telegeography, "GlobalComms Database: Egypt", 2012.

108 Reuters, "Egypt to grant Telecom Egypt a mobile license", December 2012. http://www.reuters.com/article/2012/12/26/egypt-telecomegypt-idUSL5E8NQ3JU20121226

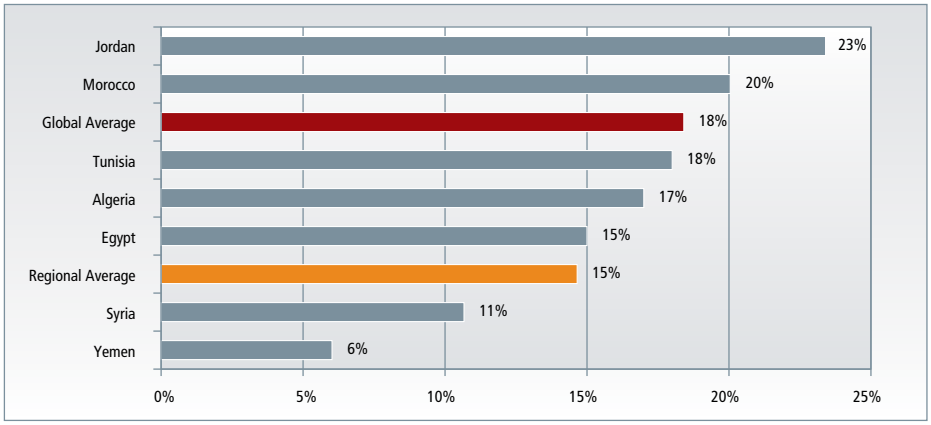
5.3 Consumer taxation

High consumer taxes on mobile products and services hold back the growth of the sector, decreasing affordability and therefore both penetration and usage levels. This denies the poorest in the population access to this life-changing technology as well as reducing both the social and economic impact of mobile.

North Africa and some Middle East countries, such as Jordan, Syria and Yemen, impose high taxation on mobile services, at similar levels to those seen in Sub-Saharan Africa[109]. In many of these countries, mobile phones are treated as 'luxury items' or are subject to the same excise taxes that are applied to the alcohol and tobacco industries. Such policies are typically driven by the ease at which mobile services can be taxed compared to other industries / workers which exist in the informal sector. However, this fails to recognise the significant positive externalities that are created by the mobile sector and that due its transformational role, mobile telephony has become a necessity rather than a luxury in the Arab States.

The countries with highest taxation as a proportion of a user's total cost of mobile ownership (TCMO)[110] are Jordan and Morocco, as shown in Figure 53[111]. Jordan ranks as the highest in the Middle Eastern region, with tax as a proportion of TCMO of 23%. This is due to an airtime excise tax of 8% in addition to a VAT of 16%. Similarly in Morocco, VAT is 20% and custom duty on imported handset is 2.5%. In Egypt, mobile services attract a special VAT, 5% higher than other goods and services and 10% higher fixed telephony services. Figure 53 shows the tax incidence of taxation on the cost of mobile in selected Arab States.

Figure 53: Tax as a share of TCMO in the Arab States, 2011



Source: Deloitte Analysis[112]

It is sometimes questioned whether high taxes on mobile services deter consumer take-up, since penetration rates are often high in countries even where high taxes are imposed. This question can be answered by reviewing unique subscriber connections in a market, as discussed in Section 2: subscribers differ from connections such that a unique user can have multiple connections (multiple SIMs). In countries with high taxation such as Jordan, Egypt and Morocco the percentage of unique subscribers over total connections varies between 40% and 50%[113], meaning that high penetration is driven by users holding multiple SIMs. The lower income and most price-sensitive consumers might then remain unconnected due to unaffordable mobile services. Thus, relieving the burden of high mobile taxation may boost demand from the poorest in society, often in rural areas where the benefits of mobile may be at their highest.

109 Deloitte/GSMA, "Sub-Saharan Africa Mobile Observatory", November 2012.

110 TCMO includes handset costs, connection costs, rental costs (typically for post-pay services), and call and SMS usage costs.

111 The following refers to Deloitte/GSMA, "Global Mobile Tax Review", 2011.

112 Deloitte/GSMA, "Global Mobile Tax Review", 2011.

113 Wireless Intelligence.

Furthermore, evidence suggests that high taxation, by reducing demand, can also result in lower tax intake. This is apparent when measuring the impact on consumer uptake and usage after the removal of taxation on handsets or airtime[114]. Therefore, high mobile taxes benefit neither the consumer nor the government in the longer term. This is gradually being recognised by governments, for example, in August 2011, with the intention of increasing the country's internet users, Jordan's government chose to remove the sales tax levied on smartphones, reducing the price to end users by approximately JOD 88 to JOD 100 (US$ 141 to US$ 124)[115]. However, countries such as Morocco and Egypt are still imposing heavy taxes on mobile.

While reducing taxes on mobile may lead to long-term increases in growth, employment and tax intake it must be recognised that in the short-term such a reduction could reduce overall tax collection to governments. Therefore, any reduction in mobile taxes needs to be undertaken within a broader restructuring / rebalancing of taxation.

Governments and regulators must recognise the positive externalities that are created by mobile and the sector's role in supporting the government to meet economic objectives. As such, regulatory fees and taxation policies should be restructured to be long term in nature with a focus on creating a level playing field, targeting those industries with negative externalities and bringing informal industries and workers into the formal tax system. Governments should take into account the cost of forgone benefits when evaluating charges applied to mobile, rather than relying on it as a cash-generating industry due to the ease of applying tax to this sector.

5.4 Network infrastucture liberalisation

In some countries, for example Iraq and Egypt, the government-owned incumbent controls the fibre optic backbone network and other mobile operators often pay a high price to access it. These policies are detrimental to competition and have the potential to create a number of negative implications for mobile operators existing and future investment.

- Models for state or public ownership, or even public-private partnership (PPP) with a dominant role for the state, create investment uncertainty and could limit the adoption and deployment of future innovative infrastructures by creating the risk of expropriation of private networks.
- Traditional regulatory frameworks are primarily based on copper networks and are becoming increasingly burdensome to the telecom industry, to the point where they are creating disincentives for investment. As such, it is imperative that these regulatory frameworks are revised and updated to meet the needs of the future.
- Creating wholesale monopolies for the provision of fibre access may have negative consequences on service prices and on service innovation.
- Forced sharing of fibre or requirements to use the incumbent's fibre network may raise costs for operators, creates dependency on other operators and ultimately affects investment and restrains capacity.
- The monopoly position over the fibre network may cause operational inefficiencies and reduce service quality and create concern for historical investments in access and core infrastructures giving rise to stranded assets from which a reasonable return on investment is significantly impaired.

Liberalising the fibre network and attracting private investment is likely to lead to greater capacity which will support additional and higher quality service provision supporting national objectives around well-functioning telecommunications infrastructure and aid the deployment of mobile broadband which is becoming the connection medium of choice since high capacity networks are no longer limited to fixed connectivity.

114 Deloitte/GSMA, "Mobile telephony and taxation in Kenya", 2011 and Deloitte/GSMA, "Taxation and the Growth of Mobile in East Africa", 2007.

115 Telegeography, "GlobalComms Database: Jordan", 2012.

The Iraqi government has justified the state's monopoly position with issues of security, e.g., the potential for interception of sensitive information by a foreign intelligence agency. Nonetheless, the revenues extracted from operators to lease access to fibre may represent a much higher cost than would be increasing security measures. However, a number of governments are currently looking at methods for encouraging investment in fibre networks. For example, the Government of Bahrain is seeking investors in a national broadband network and Qatar has already established a national broadband company to develop a fibre-optic network in order to boost capacity for its telecoms operators[116]. European countries have developed a number of best practices to address these issues, such as increasing the allowable return on capital employed for these types of investment [117] as well as providing subsidies in those geographic areas where operators are not expected to invest on a commercial basis[118]. Other regulatory initiatives that could encourage fibre investment include[119]:

- Deferring ex ante price regulation or setting retail-minus price regulation rather than setting cost-oriented prices;
- Allowing a price premium in an ex ante price control to compensate for the demand risk; and
- Allowing a volume reward whereby any return on higher than expected demand is retained by the operators.

When developing a network, it is important that mobile and fixed operators can compete to provide the network on a level playing field and that access to infrastructure is provided to all on a fair and reasonable basis. Appropriate investment incentives are required to ensure the efficient use of capital. As such, it is essential that market-based commercial principles are maintained in the arrangements between access and capacity providers, services and applications providers and end-users.

5.5 Impact of spectrum and licence regulations on investment and mobile broadband

In a number of countries, including Saudi Arabia[120], current spectrum licensing regulations have led to fragmented, nonharmonised spectrum allocations. Effectively, given the limited spectrum band offering for LTE, operators had to deploy the more expensive LTE-TDD technology in 2.3GHz and 2.5GHz bands[121]. Due to these nonharmonised band plans, these operators are now unable to release highly-sought devices such as the iPhone5[122].

Limited or lack of availability of devices is only one of the consequences of nonharmonised spectrum. Lack of spectrum harmonisation implies higher device prices due to the additional cost of nonstandardised chipsets, a cost that has been estimated to exceed US$ 100 in countries such as Saudi Arabia and Tunisia. Lack of harmonisation makes it difficult for consumers to roam in other countries and also exacerbates cross-border interference, forcing operators to invest in costly filtering and antennae tilting, which reduces coverage.

Spectrum management by regulators needs full commitment to a transparent, duly consulted long-term plan, minimising investment uncertainty for operators. The case of Algeria, where the privatisation of incumbent Algerie Telecom was called off, followed by the delay in the licensing of 3G/UMTS mobile spectrum[123] is an example of how regulatory uncertainty can be a stumbling block for investment in telecommunications.

116 Comms MEA, "Bahrain to establish a national broadband network", July 2012. http://www.commsmea.com/12488-bahrain-to-establish-a-national-broadband-network/

117 In the Netherlands, investors are compensated for asymmetric regulatory risk trough the addition, in the calculation of their cost of capital, of 3.5% regulatory risk premium. Refer to Deloitte, "Batelco's regulated cost of capital", 2012.

118 In UK as part of the Digital Britain initiative, a fund to invest in high speed NGA was established which is available on a tender basis to any operator to deliver. The fund provides a part-subsidy for the deployment of next-generation broadband to the 'final third' of homes and small businesses, bringing the cost of the initial deployment to the same level that operators face in the commercially economic parts of the market. Refer to Deloitte, "Batelco's regulated cost of capital", 2012.

119 Willliamson, B. Black, D. and Wilby, J: "Costing methodology and the transition to next generation access", March 2011.

120 Analysys Mason, The socio-economic benefit of allocating harmonised mobile broadband spectrum in the Kingdom of Saudi Arabia, 2012.

121 Comms MEA, "Barrier to LTE", August 2012. http://www.commsmea.com/12511-barrier-to-lte/1/print/

122 Analysys Mason, "iPhone 5: winners and losers in the Middle East", 2012. http://www.analysysmason.com/About-Us/News/Newsletter/iPhone5-Middle-East-Sept2012/

123 Developing Telecoms, "Fibre investment on the way in Algeria", May 2012. http://www.developingtelecoms.com/fibre-investment-on-the-way-in-algeria.html

Furthermore, operators have expressed concern due to high levels of reserve prices set up by regulators for awarding of mobile licences. Instead, the region could benefit from an approach to licensing that focuses on long term utility maximization for society rather than short term price maximization for the treasury. This is the case in Iraq[124], which is expected to charge operators between US$ 3 billion and US$ 6 billion to upgrade to new 3G/UMTS licences. Operators claimed the licences awarded in 2007 were already technology-neutral, and would allow for 3G/UMTS and 4G/LTE deployment. This steep price for the upgrade could lead to higher tariffs and limited investment[125], delaying deployment of 3G/UMTS in the country.

In order to maximise spectrum use with the best available technologies, more regulators should consider issuing technology-neutral licences, which would allow the refarming of 1.8GHz and 900MHz bands to support UMTS/LTE. In many countries these bands are still restricted to GSM for licensees, but Tunisia and Egypt are already experimenting with this solution. In 2006, Egypt awarded a technology-neutral licence (its third overall licence) to Etisalat Egypt. Tunisia awarded its first technology neutral licence in 2009.[126]

Excessive spectrum fragmentation across operators is a problem, as operators need larger, continuous blocks of spectrum to achieve higher network speeds[127]. Moreover, with an excessive number of operators, providers are unable to reach the scale economies needed to operate efficiently, and provide optimum service prices.

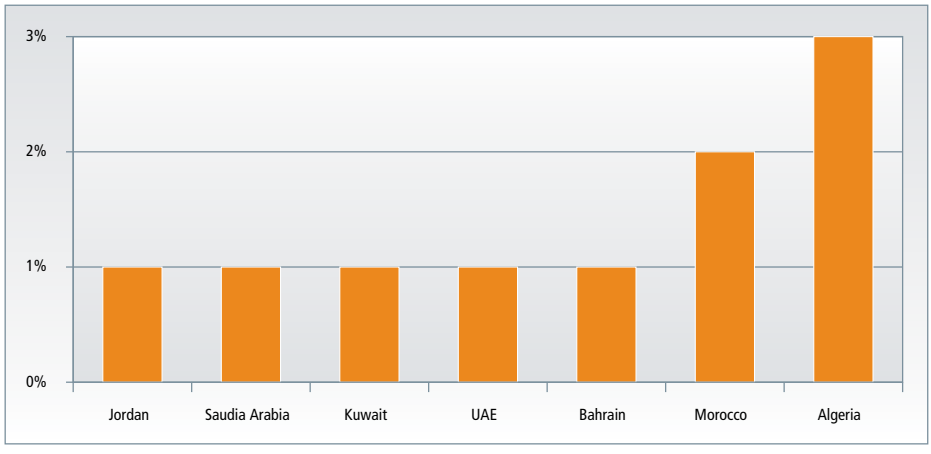
5.6 Universal service fund and other fees

In most countries, mobile operators are required by the regulator to pay contributions to the universal service fund. These payments are often a significant percentage of operator revenues, ranging from 1% to up to 3% in Algeria.

USFs have been created as policy tools for liberalised markets to provide financial assistance to meet universal service requirements, to support users and start-up businesses with ICT equipment and for various initiatives directed at social and economic development, such as creating national and local content[128].

In addition to USF contributions, operators are required to pay annual ongoing licences fees as a percentage of revenues and annual spectrum fees, either as a percentage of revenues or depending on bandwidth, frequency and quantity of spectrum acquired. Some countries also impose other types of contributions such as Morocco, where operators are required to pay annual 1% contributions for training and research, in addition to the 2% USF[129]. USF contributions as a percentage of revenues are shown in Figure 54.

Figure 54: USF contribution rates



Source: Deloitte analysis based on BuddeCom reports, Telegeography 2012, and operators.

124 TMT finance, "3G fee angers Iraqi telcos" November 2012. http://www.tmtfinance.com/news/3g-fee-angers-iraqi-telcos

125 Comms MEA, "Korek still waiting for 3G frequency", March 2012. http://www.commsmea.com/12045-korek-still-waiting-for-3g-frequency/

126 Cankorel, Aryani, A Spectrum of Regulations: Mobile Telecom Regulation in the Middle East and North Africa, 2009.

127 Bocquet, W. "Addressing Spectrum for Mobile Broadband -Challenges for Spectrum Management", June 2012. http://www.itu.int/ITU-D/tech/events/2012/ResultsWRC12_CIS_StPetersburg_June12/Presentations/Session6/S6_1.pdf

128 GSMA, "Universal Access - How Mobile can Bring Communications to All", 2006.

129 BuddeCom, "Morocco: Key Statistics, Regulatory and Fixed -Line Telecoms Overviews", 2011.

Most of the contributions accrued to the USFs are distributed through subsidies of fixed amounts that are designed to meet specified service targets in specified areas and are competitively tendered. Nonetheless, the funds are easily subject to the risks of not being allocated, misused or used inefficiently. In fact, a recent study by the GSMA[130] found that among the 64 funds surveyed around the world, 27% are inactive and another 19% report limited activity. Often, fixed operators are provided with incentives to act as universal service providers and given competitive advantage with respect to mobile operators. However, MNOs have often better reaching networks and with the roll out of mobile broadband they can provide as good, if not better services.

As a result, USFs may create uncertainty and hinder investment. Particular areas of concern relate to:

- Underlying legal/regulatory framework and related governance;
- Structure and manner in which the fund is operated;
- Services that can be provided by the fund, e.g., fixed, mobile, broadband; and
- Degree of industry participation (if any) in determining structure or use of the USF.

An example of USF management and spending is Saudi Arabia; the USF fund started a trial period in 2010 when a seven year Strategic Operating Plan was established. The expected expenditure for the seven-year plan is US$ 1.3 billion[131]. Until 2011, US$ 35.9 million worth of projects had been tendered which constitutes only 10.5% of the projected USF funding. These low utilisation problems could be avoided through the setup of transparent rules governing the funds, through favouring market mechanism in the awarding of subsidies. The unused part of the fund could be returned to the operators or used to subsidise the purchase of handsets and SIMs to boost penetration. In particular, large amounts dedicated to universal service seem unreasonable in many countries of the Arab States, where network coverage even in rural area is already high.

5.7 Roaming

The roaming market in the region is highly competitive and has developed greatly in recent years thanks to tourism and the large population of expatriates living in the GCC. Roaming services imply a big financial effort from the operators' side, in terms of:

- Technical implementation and maintenance costs, including system upgrades and expansion of prepaid roaming;
- Enforcement and monitoring costs, such as for fraud and diagnostics; and
- Consumer communication and marketing costs, to promote roaming and ensure transparency.

Nonetheless, the region has seen positive roaming initiatives driven by operators. For example, Zain's 'One Network' offers roaming at local rates across many of its operations and Du launched its 'One World, One Rate' to remove any confusion from the cost of roaming for its subscribers.

In response to increased competition, many other operators have reacted by reducing roaming charges: Etisalat launched reduced-cost roaming fees in July 2008 across its three operations in the UAE, Saudi and Egypt[132]. Indeed, the cost of outgoing roaming calls from UAE to Egypt from 2007 to 2011 fell by 48%, while the same service from Saudi Arabia to Kuwait decreased by 82% in the same timeframe.[133]

130 GSMA, "Survey of Universal Service Funds: Key Findings", October 2012.

131 Dymond, Andrew. "Universal Broadband service in rural Saudi Arabia. Innovations by USF & Operators close the Access Gap". Intelecon. 2012

132 BuddeCom, "Middle Eastern Mobile Voice and Operators Market", 2010.

133 Comms MEA, "Right path for roaming?", February 2012. http://www.commsmea.com/11894-right-path-for-roaming/

In addition to reducing tariffs, the industry is taking steps to increase the transparency of roaming tariffs and to address the likelihood of 'bill shock' by mobile customers. In the Arab States, as part of the GSMA's Data Roaming Transparency Initiative, Qtel, France Telecom-Orange and Vodafone have agreed to adopt these measures locally to help customers manage their roaming charges — implementing a 'welcome' SMS message with roaming tariff information, establishing monthly financial or usage-based roaming limits, and temporarily cutting off service when limits are exceeded.

This favourable competition environment and innovation in roaming tariffs should be encouraged by the regulators and barriers removed. Some difficulties encountered in roaming regulations are as follows.

- Different GSM and 3G/UMTS spectrum allocations prevent many low-cost handsets from roaming and pose challenges for interoperability.
- Imposing regulations on roaming prices could distort competition in this growing market; nonetheless, the GCC issued a decision in January calling on Gulf telecoms regulators to enforce a decrease in mobile phone roaming charges to consumers by at least 50% from 1 February 2012.

Positive developments have been seen throughout the region, but instances of government intervention in competition matters are still common. For example, in February 2010 the Saudi Arabia regulator requested the three main mobile firms to end their policies of not charging a roaming premium for incoming calls made from abroad using Saudi-registered phones and imposed fines totalling SAR 5 million. The regulator took the decision after claiming that many customers of Zain, STC and Mobily had subscribed to the Saudi mobile services despite living abroad[134].

5.8 A roadmap to deliver mobile broadband and economic and social development

The mobile industry provides significant benefits to society in many ways. In the future, the sustained growth of mobile voice services and the development of mobile broadband will further increase opportunities for economic growth and for social development.
In recognition of these increasing social and economic effects, governments and regulators worldwide see mobile services, and in particular mobile broadband, as an opportunity for social and digital inclusion, and realise that mobile telephony is a key enabler for the whole economy. Public broadband policies are sometimes framed in the context of a national vision document or broader information society strategy.

Against this background, the ITU and the United Nations Educational, Scientific and Cultural Organization (UNESCO) have created the Broadband Commission, with the objective to monitor progress on broadband development and to identify a set of guidelines to foster the development of broadband. In their more recent progress update review[135], they set out two key 'advocacy targets':

- 'Making broadband policy universal by 2015', whereby supportive broadband regulatory strategies should be put in place.
- 'Making broadband affordable by 2015', whereby broadband costs should amount to less than 5% of average monthly income in developing countries.

For these opportunities to materialise in the economies of the Arab States, governments and regulators need to ensure that hurdles for mobile operators and mobile consumers are minimised.

134 Telegeography, "GlobalComms Database: Saudi Arabia", 2012.

135 ITU/UNESCO, Broadband Commission, "The State of Broadband 2012: Achieving Digital Inclusion for All", September 2012.

5.8.1 Harmonising spectrum allocation plans across the region, allocating the Digital Dividend to mobile services and liberalising spectrum licences

Radio spectrum will increasingly become the key to the success of both the mobile industry and the governments' digital and social inclusion programmes. In light of the large economic benefits generated by mobile spectrum as shown in section 4, regional governments could consider a set of common actions to enhance spectrum availability and standardisation in the region:

- Band plan harmonisation across the region remains the key objective, as this provides scale economies, leading to reduced smartphone and service prices and thus extending service affordability.
- The Digital Dividend band should be allocated for mobile broadband service after sufficient progress has been made in the upgrade of incumbent systems.
- Liberalised spectrum licensing, allowing operators to determine the technology that best suits a particular market, helps to maximise the efficiency of spectrum use. This could, for example, allow operators in the most congested markets to start offering LTE in the 1.8GHz band.

5.8.2 Implementing a transparent, predictable and supportive regulatory regime

As noted previously, in many markets in the Arab States, regulators are taking a transparent and objective approach to developing and implementing regulatory remedies. However, predictability of the regulatory regime in the region lags behind that which would be considered the norm in developed markets, including those within Europe where the market is driven by the European Comminsion guidelines.

To ensure that investment in the sector continues and foreign investment is attracted to the region, increased transparency and certainty in regulatory frameworks is vital and should be addressed in the following ways.

- Competition policy should take precedence over regulation. Where competition is healthy, regulation should be kept to a minimum and only address those circumstances where market competition has not delivered a beneficial outcome. Any regulatory intervention should be based on the 'economic benefit' principle.
- All regulatory decisions, such as spectrum award procedures, should be adopted through a transparent and consultative process, allowing stakeholders an equal opportunity to provide feedback in a transparent way, as an efficient, fair and transparent award design contributes to a successful outcome for consumers.
- Spectrum prices and other regulatory decisions should be considered with a view to promoting service demand and operators' investment in the network and to sustaining long term revenue generation.
- Coverage obligations should be framed in the context of the country and recognising the increasing competition that exists within the sector.

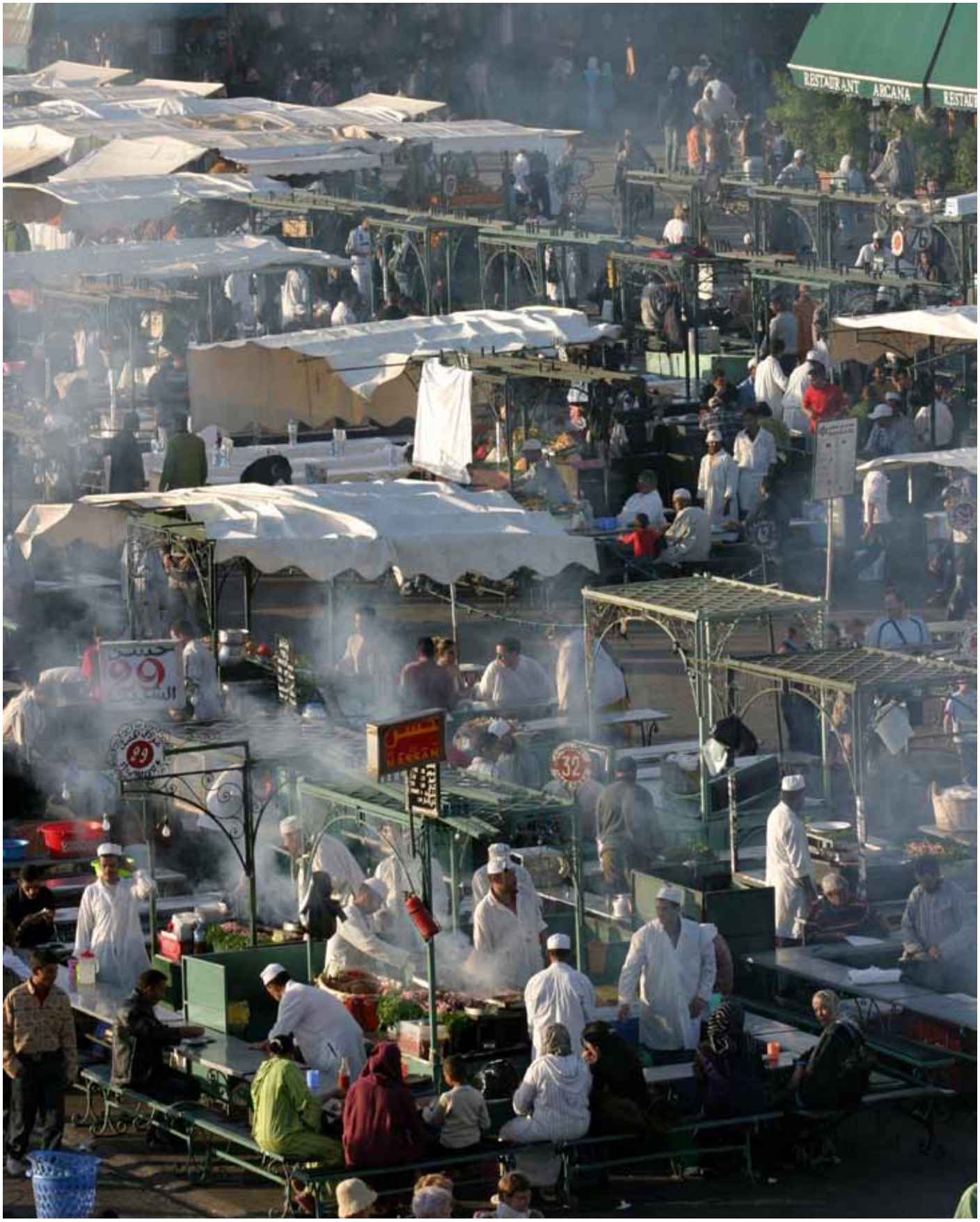
5.8.3 A collaborative approach can maximise the benefits from growth

The mobile industry in region promotes economic and social development. Affordable mobile services and broadband will bring significant advantages to all economies of the region, boosting productivity and GDP growth, contributing to alleviate the high unemployment rates and diversifying the oil-based economies. Moreover, mobile telephony fosters digital and social inclusion and provides useful and innovative solutions to healthcare and educational programmes.

Additional coordination between policymakers and regulators could ensure that robust policy frameworks support changes in the regulatory enviroment. For example, there is a need for ICT regulations to appropriately reflect the national ICT policies and strategies, ensuring objectives are aligned.

By working in partnership, mobile operators, the regulators and the governments can continue the remarkable success story of this industry and extend its unique benefits across all income levels. Operators have increased national coverage and extended 3G/UMTS networks to a sizeable amount of the population, and 4G/LTE network investments will play a crucial role in bringing mobile broadband to all mobile customers in the region. This must be sustained by the allocation of mobile spectrum, and in particular the Digital Dividend, to mobile operators and by refarming of existing spectrum for LTE in the short run.

Continuing along this path, governments and regulators could consider easing existing taxation and regulation policies to release the full potential of this industry.


RESTAURANT ARCANA

Appendix A About This Study

The Arab States Mobile Observatory is a joint research study between the GSMA, Deloitte and Wireless Intelligence. Any questions about the content of this document can be directed to the authors of the study.

About the GSMA
The GSMA represents the interests of mobile operators worldwide. Spanning more than 220 countries, the GSMA unites nearly 800 of the world's mobile operators, as well as more than 200 companies in the broader mobile ecosystem, including handset makers, software companies, equipment providers, internet companies, and media and entertainment organisations. The GSMA also produces industry-leading events such as the Mobile World Congress and Mobile Asia Congress.

For more information, please visit GSMA's corporate website, **www.gsma.com.**

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Appendix B Mobile penetration and population by country

Country	Penetration 2012	Population 2012
Algeria	109%	36,359,419
Bahrain	143%	1,350,497
Egypt	105%	83,602,969
Iraq	85%	33,443,536
Jordan	143%	6,425,487
Kuwait	188%	2,873,175
Lebanon	89%	4,283,640
Libya	129%	6,457,815
Morocco	119%	32,517,145
Oman	176%	2,889,564
Qatar	161%	1,921,575
Saudi Arabia	209%	28,549,485
Syria	65%	21,029,776
Tunisia	132%	10,677,225
United Arab Emirates	161%	8,052,135
Yemen	56%	25,376,917
Palestine	75%	4,241,185
Sudan	73%	36,384,466
South Sudan	22%	8,146,486

Source: Wireless Intelligence

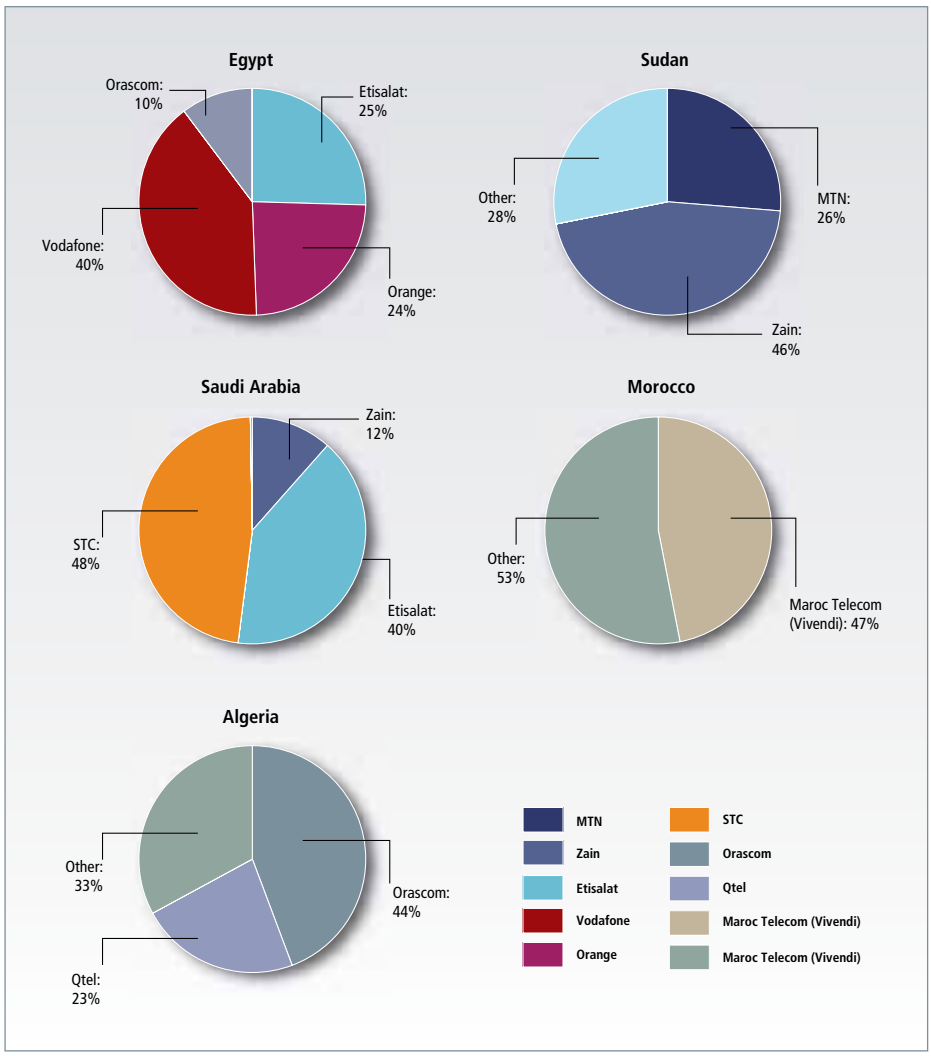
Appendix C Operator information

C.1 Top operators in the Arab States by number of connections (2012)

Operator	Country	Connections
Etisalat	**Total**	**53,932,563**
	Egypt	22,320,562
	UAE	7,030,435
	Saudi Arabia (Mobily)	24,581,566
Zain	**Total**	**42,399,360**
	Bahrain	620,029
	Iraq	13,999,442
	Jordan	3,518,482
	Kuwait	2,250,548
	Saudi Arabia	6,999,888
	South Sudan	674,886
	Sudan	12,311,158
	Lebanon (Touch)	2,024,927
Orange	**Total**	**40,900,205**
	Tunisia	1,987,951
	Jordan (Jordan Telecom)	3,396,287
	Iraq (20% Korek)	870,078
	Morocco (40% Meditel)	4,607,413
	Egypt (Mobinil)	30,038,477
Vodafone	**Total**	**36,349,248**
	Egypt	35,344,544
	Qatar	1,004,704
Qtel	**Total**	**33,378,093**
	Qatar	2,147,804
	Oman (Nawras)	2,162,466
	Algeria (Nedjma)	9,150,726
	Tunisia (Tunisiana)	7,181,543
	Palestine (Wataniya Mobile)	639,028
	Kuwait (Wataniya)	2,050,658
	Iraq (Asia Cell)	10,045,869
STC	**Total**	**30,831,146**
	Saudi Arabia	28,964,844
	Kuwait (Viva)	1,205,395
	Bahrain (Viva)	660,908
MTN	**Total**	**18,608,203**
	South Sudan	567,259
	Sudan	7,100,929
	Syria	6,305,270
	Yemen	4,634,745
Orascom	**Total**	**17,775,686**
	Algeria (Djezzy)	17,775,68

Source: Wireless Intelligence

C.2 Market shares in selected markets (2012)



Source: Wireless Intelligence

Appendix D Economic impact assessment methodology

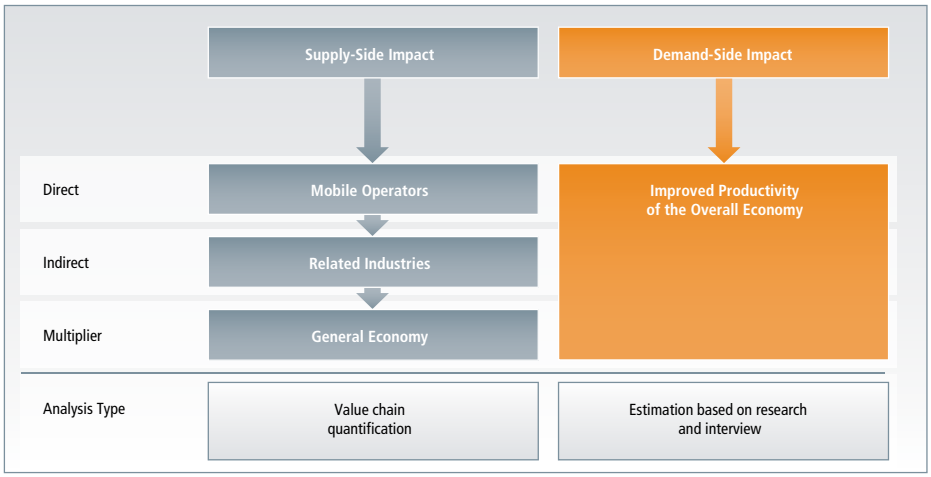
D.1 Economic impact of the mobile industry

Detailed bottom-up analysis of the value-add generated by mobile telephony has recently been undertaken by Deloitte for Kenya and for East Africa[136]. Based on publicly available statistics, company accounts and interviews with operators such as Safaricom, Airtel and MTN, benchmarks on the value-add generated by the mobile ecosystem as a proportion of market revenues have been determined.

These benchmarks have applied to the current study. As a result of the differences between North African and Middle Eastern economies[137], two different sets of assumptions have been applied to estimate the economic contribution of mobile telephony to the regions. Data was collected from the IMF's World Economic Outlook database and from Wireless Intelligence as of October/November 2012.

The following figure illustrates the framework for the estimation.

Figure 55: Framework for the estimation of the economic impact of mobile telephony



To estimate the economic impact of this ecosystem a number of calculations steps are required:

- The revenue created by the mobile operators is converted to economic impact to give the direct economic impact. This is measured in terms of value add in order to reflect the creation of value to the economy rather than simply recording revenue.
- The economic impact of the remaining parts of the ecosystem, the indirect economic impact, is estimated in a similar fashion.
- The direct and indirect economic impact created is multiplied up by 20% to reflect the way in which other parts of the economy service the mobile ecosystem.

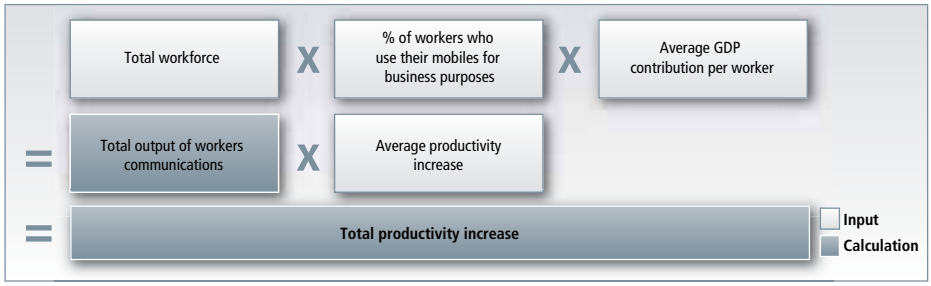
The demand-side impact was estimated by calculating the improved productivity of the overall economy. This can be estimated as a lower bound by considering the productivity improvements that will be experienced by high-mobility employees within the economy. High-mobility workers are those who undertake a moderate to high degree of travel in the course of their employment, including taxi drivers, agricultural workers selling produce in town, salespeople and transport workers.

The figure opposite shows the steps for the calculation.

136 Deloitte/GSMA, "Mobile telephony and taxation in Kenya", 2011 and "Taxation and the growth of mobile in East Africa", 2008.

137 The countries included in the two regions are respectively: Algeria, Egypt, Libya, Morocco, Tunisia, Sudan and South Sudan for North Africa and Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen, Palestine for the Middle East.

Figure 56: Calculation of economic impact of productivity improvements[138]



In particular, the number of high-mobility workers — that is, the number of workers who would use their mobile phones for business purposes — was estimated based on a country's income levels and with reference to data from the national statistics and international labour databases. The productivity gain of high-mobility workers with access to a mobile phone was based on recent analysis from Kenya[139].

D.2 Economic impact of spectrum release

The economic impact of spectrum release has been calculated based on the following framework.

Step 1: Benchmark of subscriber impacts. Using data from recent reports for the GSMA regarding spectrum release impacts[140] it is possible to obtain a benchmark for the maximum proportion of subscribers resulting from additional capacity. This is set up as 5.3% for North African countries (based on Nigerian impacts) and 7.1% for Middle East (based on Saudi Arabia impacts). A bell-shaped curve is constructed to reflect the variable yearly impacts.

Step 2: Input projections. Data was collected on GDP, GDP per capita and population growth from the IMF's World Economic Outlook database[141], covering period 2010 to 2017. Data on total connections, 3G/UMTS connections and 4G/LTE connections was collected from Wireless Intelligence as of October/November 2012. Figures for the period 2018–2025 have been extrapolated using the average annual growth rate from 2010–2017. The analysis excludes Palestine and Syria due to lack of macroeconomic data.

Step 3: Traffic calculations. Additional connections are split 50%-50% between 3G/UMTS and 4G/LTE services for most countries excluding Algeria and Iraq, where all additional connections are allocated to 3G/UMTS services. Following discussions with the GSMA, broadband connections are assumed to be 100% of 4G/LTE connections. In addition to this, 50% and 75% of 3G/UMTS connections in North Africa and Middle East respectively are dedicated to mobile broadband. Mobile broadband traffic per connection is assumed to grow in a sigmoid curve from 1GB per month in 2014 to 10 GB per month in 2025. Total yearly traffic growth per country is then derived using these assumptions.

Step 4 Economic impacts. Impact on GDP per capita growth is based on the results of a previous Deloitte study[142], where a doubling of mobile data use leads to an increase in the GDP per capita growth rate of 0.51 percentage points. Total traffic growth from step 3 is multiplied by 0.51 percentage points to calculate the increased growth in GDP per capita. Additional GDP and jobs are calculated based on the rate of growth of GDP per capita. Mobile ecosystem jobs are calculated based on the ratio of mobile ecosystem jobs to total jobs from the economic impact methodology outlined above. The government contribution impacts from the mobile industry are calculated as the average ratio of government contributions to total GDP between 2006 and 2011 from the economic impact methodology, with separate assumptions for Middle Eastern and North African countries.

138 In the figure: Total workforce is the total employed population aged 15+ taken from the African Development Bank, Average GDP is GDP per capita and the % of workers using mobile for business vary by income levels as explained below.

139 This is assumed to be homogeneous across the region and equal to 10%.

140 The reports consulted are the following: Deloitte, "Sub-Saharan Africa Mobile Observatory 2012", November 2012. GSMA. "The socio-economic benefit of allocating harmonised mobile broadband spectrum in the United Kingdom of Saudi Arabia", 2012. Analysys Mason.

141 http://www.imf.org/external/pubs/ft/weo/2012/02/weodata/weoselgr.aspx

142 Deloitte and GSM Association "What is the impact of mobile telephony on growth?", 2012. The study implies a linear relationship between data traffic and GDP growth.

Appendix E Social impact

As technology develops, mobile services have the potential to further impact economic and social development through the provision of high value 3G/UMTS and 4G/LTE data services accessed via smartphones, tablets and dongles that deliver mobile data services to businesses and consumers. Mobile phones in the region are evolving from simple communication tools into service delivery platforms. This has shifted the development paradigm surrounding mobile phones from one that simply reduces communication and coordination costs to one that could transform lives through innovative applications and services[143].

Digital services and mobile broadband reinforce education and people's digital technology knowledge. Mobile broadband and mobile phone-based applications will generate a host of social and commercial services in areas such as financial services, agriculture, healthcare, and education.

The rest of this section discusses examples of how mobile impacts healthcare, education, financial services and local content/innovation in the region.

E.1 m-Health

A World Health Organisation[144] review of m-Health programmes worldwide found that the Arab States have a number of established programmes in several categories, ranging from emergency toll-free telephone service, appointment reminders and patient records, among others.

Table 3: Established mHealth initiatives, by type

Categories	Sub categories	Established initiatives*
Communication between individuals and health services	Health call centres/Health care telephone help line Emergency toll-free telephone services	60 67
Communication between health services and individuals	Treatment compliance Appointment reminders Community mobilization Awareness raising over health issues	20 39 42 26
Consultation between health care professionals	Mobile telemedicine	12
Intersectoral communication in emergencies	Emergencies	51
Health monitoring and surveillance	Mobile surveys (surveys by mobile phone) Surveillance Patient monitoring	33 25 5 (pilot stage)
Access to information for health care professionals at point of care	Information and decision support systems Patient records	30 12

Source: WHO, includes Sub Saharan Africa

143 Aker et al, "Mobile phones and economic development in Africa", Journal of Economic Perspectives, 2010.

144 World Health Organisation, "mHealth: New horizons for health through mobile technologies", 2011.

Examples of initiatives in the region include[145]:

- **Medical advice:** There are a number of mobile initiatives across the region that offer medical advice from qualified practitioners. The Royal Scientific Society of Jordan has developed a mobile forum, with a focus on maternal and early childhood health, which allows users in rural areas to send questions via SMS and receive answers from partner doctors. This service also provides reminder services for mothers to keep track of when their children need vaccinations. In Qatar, mobile provider Qtel, in partnership with the Mobile Health Company launched a service that allows customers to receive mobile health related advice along with consultations[146]. In Yemen, mobile provider MTN offers a service that provides medical advice delivered through SMS.
- **Promoting good health practices:** Mobile services that offer information on good health practises are available across a number of countries in the region. Asiacell provides customers in Iraq with a mobile health SMS service which provides subscribers with information on good health practises across a broad range of topics including women's health, men's health, mental health, weight management, and diabetes.
- **HIV/AIDS programmes:** Mobile provider Zain provides customised awareness and prevention programmes in a number of countries including Iraq, Jordan, Lebanon and Sudan.

As mobile broadband expands, further help can be provided through tablets and smartphones, in particular for doctors and practitioners.

E.2 m-Education

Mobile technologies are especially good at increasing education and achieving the millennium development goal of 'education for all', as they can enable literacy development, promote student motivation, enhance access to teacher development opportunities and improve communication between parents, teachers and principals[147]. Mobile broadband can act as a step change in the way education is provided in the region. Examples of m-Education programmes in the Arab States include[148]:

- Career development for graduates in Jordan: Mobile provider Umniah has developed a mobile learning platform to help recent graduates and professionals with career development. Content is available in both Arabic and English and includes courses on decision making, leadership skills, financial management, managing teams, customer care and interpersonal skills.
- Improving English literacy in Tunisia: Local mobile provider Tunisiana in partnership with Edupartage and the US Embassy in Tunisia has developed a mobile based English language learning programme, which offers interactive questions for beginner and intermediate speakers. Apart from just teaching English, the lessons cover a range of subjects including society, technology and the environment.
- Edutainment in Egypt, Saudi Arabia & UAE: Etisalat, in partnership with Rubicon Group Holding, is providing 'edutainment' services for mobile phones, cable TV and the internet. Educational games, cartoons and applications for children are being distributed as a part of the service.

145 GSM Association, "Mobile and Development Intelligence", Accessed November 2012.

146 BuddeCom, "Qatar – Telecoms, Mobile, Broadband and Forecasts", 2011.

147 Unesco 2012, "UNESCO Mobile Learning Week Report".

148 GSM Association, "Mobile and Development Intelligence", Accessed November 2012.

E.3 m-Money

Mobile payments and mobile banking help to transfer remittances and money, which can improve lower income workers' ability to contract micro-loans, enabling them to withstand financial shocks. Mobile payments can also contribute to promoting transparency and combating corruption, as electronic payments are easier to trace[149].

Mobile platforms have evolved to include services such as mobile finance (credit, insurance, savings), mobile banking (transactional and informational), and mobile payments (including person to person, government to person and business to business) [150].

Examples of m-Education in the region include:

- **Mobile payments in the United Arab Emirates[151]:** Local mobile providers Du and Etisalat have worked in partnership with MasterCard to provide contactless payment services using Near Field Communicationswhich allows users to pay for purchases of up to US$ 50 by swiping their mobile phone at Mastercard purchase points. In addition to this, the Dubai government also offers a mobile payment service for payment of government fees. This service is used by the Roads and Transport Authority, the Dubai Police and the Dubai Electricity and Water Authority and in 2011 these departments collected a combined total of AED 4.4 million in mobile payments – a 50% annual increase.
- **Mobile banking in Egypt[152]:** There a number of mobile banking initiatives in Egypt. Vodafone Egypt, in co-operation with HSBC, launched 'Vodafone Cash' in 2007. This service is designed to give customers with no bank account an easy way to deposit, transfer and withdraw cash. Customers of four other local banks can also access their account information and carry out limited transaction services using Vodaphone's mobile banking service. Mobinil also offers an SMS based service that allows customers to view their account balances and other financial information via their mobile phones.
- **Mobile payments and banking in Morocco[153]:** Maroc Telecom, in co-operation with Attijariwafa Bank and Banque Centrale Populaire, launched Morocco's first mobile payments service which encrypts transactions using Near Sound Data Transfer (NDST) and works with any phone. Without the need for a bank account, this service also enables money transfers, international remittances, bill payments, as well as cash deposits and withdrawals at Maroc Telecom outlets.
- **Offering micro loans in Jordan[154]:** Mobile operator Zain, in partnership with micro credit company Tamweelcon, launched a new service whereby Tamweelcon's clients can now use Zain's m-Wallet mobile payment service to pay instalments on Tamweelcon's loans. Customers can now also apply for loans with Tamweelcon on their mobile.

149 The Broadband Commission, "The state of Broadband 2012: Achieving digital Inclusion for all", ITU/Unesco 2012.

150 World Bank, "Information and Communications for Development. Maximizing Mobile", 2012.

151 BuddeCom, "United Arab Emirates – Mobile Market – Overview and Statistics", 2011.

152 BuddeCom, "Egypt – Mobile Market – Overview and Statistics", 2011.

153 BuddeCom, "Morocco – Mobile Market – Overview and Statistics", 2011.

154 BuddeCom, "Jordan – Telecoms, Mobile, Broadband and Forecasts – Overview and Statistics", 2011.

E.4 Local content and innovation

Mobile Web Content (MWC) is an important driver of mobile demand and as such, the World Bank recommends that policy makers foster the development of mobile broadband apps and content, through the creation of a 'mobile broadband innovation ecosystem'[155].

Critical mass is needed to sustain local content on local platforms, which highlights the role government organisations and large corporations play in promoting local content creation, as well as capital investment in new local content-focused companies[156]. This institutional support allows MWC to move from a preliminary phase, characterised by international content on global internet platforms, to localising content available on these platforms, finally leading to the development of local content on local platforms.

As more local content is generated, revenues remain in the local ecosystem and the sector can become more developed and formalised. However, the development of local content on international platforms is an important step as it contributes to promote usage while driving down costs.

The potential of the development of creative and local content industries in the region is significant. A recent Middle East survey[157] reported that there is significant optimism among companies operating in the region for all mobile content and commerce categories, with 88.3 percent of correspondents feeling confident about the future of the industry. Low barriers to entry, as well as the ability to supply apps directly to the market, promote entrepreneurship in local content and applications. An example of this is the growth of the creative industries in Lebanon with the creative industries now accounting for 4.75 percent of Lebanon's GDP. This places Lebanon in the top ten countries globally in terms of contribution of the creative industry to GDP.[158]

Countries with the need to develop online directories, maps, mixed media (films, music games and applications) to fulfil this demand for content will provide a boost to local industries:

- **Mobile messaging services[159]:** Most operators in the Middle East offer SMS based news and information services in both Arabic and English. Apart from news content, popular services include information on prayer time schedules for major cities and translation services.
- **Arabic music and entertainment[167]:** Rotana, a major Arab art production company, has gone into partnership with a number of mobile providers including Zain in Kuwait, Qtel in Qatar, Du in the UAE and Umniah in Jordan to create a service that allows users to download Arabic music and videos to their mobile phones.
- **eGovernment in the United Arab Emirates[160]:** Government portals are important contributors to local content. Many government services in the United Arab Emirates are now mobile-enabled, including visa applications and the government has also developed a mobile payments system to provide a way of paying government fees.

155 World Bank, "Information and Communications for Development. Maximizing Mobile", 2012.

156 Vodafone, "Making Broadband accessible to all. Policy Paper Series", May 2011.

157 MEF, KPMG, "Middle East Content and Commerce Survey", August 2011.

158 MENAFN, "Lebanon's creative industries account for 4.5% of GDP", 2010.

159 BuddeCom, "United Arab Emirates – Mobile Market – Overview and Statistics", 2011.

160 BuddeCom, "Middle East – Mobile Market – Overview and Statistics", 2011.

Appendix F Acronyms and Abbreviations

Acronym/Abbreviation	Description
2G	Second-generation mobile telephony
3G	Third-generation mobile telephony
4G	Fourth-generation mobile telephony
ARPU	Average revenue per user
CDMA	Code Division Multiple Access
Capex	Capital expenditure
CSR	Corporate Social Responsibility
FDD	Frequency Division Duplexing
FDI	Foreign direct investment
FTE	Full-time equivalent
GB	Gigabyte
GCC	Gulf Cooperation Council
GHz	Gigahertz
GSM	Global System for Mobile
ICT	Information and communication technology
iDEN	Integrated Digital Enhanced Network
ITU	International Telecommunication Union
LTE	Long-Term Evolution Mobile Telephony
MHz	Megahertz
MNO	Mobile network operator
MOU	Minutes of use
MWC	Mobile web content
PB	Petabyte
PPP	Public-private partnership
SIM	Subscriber Identity Module
SMS	Short Message Service
TCMO	Total cost of mobile ownership
TDD	Time Division Duplexing
TFP	Total Factor Productivity
TRC	Telecom Regulatory Commission
UAE	United Arab Emirates
USF	Universal Service Fund
USO	Universal Service Obligation
UMTS	Universal Mobile Telecommunications System
VAT	Value-added tax
VoIP	Voice over Internet Protocol
WHO	World Health Organization
WRC	World Radiocommunication Conference

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