هيئة الاتصالات وتقنية المعلومات
Communications and Information Technology Commission

ICT Report

Mobility in Saudi Arabia

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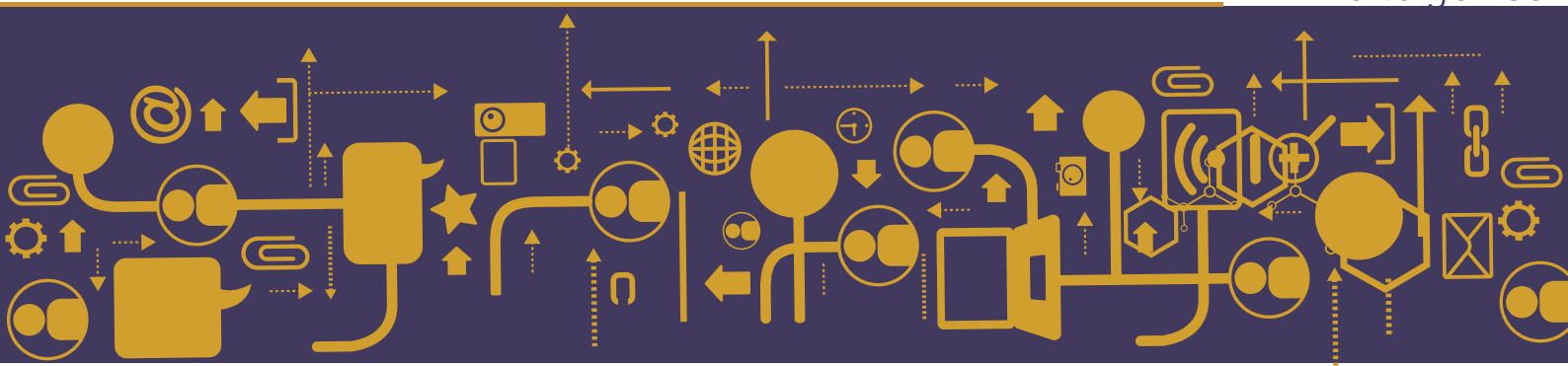

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FOREWORD BY THE GOVERNOR OF CITC

Under the leadership of the Custodian of the Two Holy Mosques – may God protect him, the Crown Prince and the Deputy Crown Prince - may God protect them, the government of the Kingdom of Saudi Arabia is committed to information and communications technology as a vital tool to develop the nation's economy and society in all their aspects. The government's policies encourage not only improvement of the Kingdom's ICT infrastructure, but equal service quality across regions regardless of their stage of development.

Consistent with these goals, the government has developed a roadmap to ensure that ICT industry developments achieve the maximum benefits for all Saudi citizens. Citizens will enjoy easier interactions with the government through e-government services as well as increased electronic business opportunities and richer personal interactions. Government policies also encourage a transparent and non-discriminatory investment environment that will, in turn, contribute to the development and diversification of the national economy. The private sector will enjoy increasing investment opportunities in ICT, increase ICT's contribution to Saudi GDP, and adopt electronic transactions in different sectors.

The Communications and Information Technology Commission (CITC) is pleased to introduce the latest edition in the series of "CITC Reports on the State of ICT in Saudi Arabia," the purpose of which is to highlight the country's efforts to develop the overall ICT sector. The reports issued by the Commission during the past years were warmly received and formed a base for public discussion on the opportunities in and barriers to ICT adoption and ICT industry development.

Each report presents an update on a standard set of indicators and then explores a selected topic in depth. CITC identified mobility as the focus of this year's study. As the most dynamic area of ICT, mobility connects all aspects of Saudi life, from government to national and international commerce.

A mature mobility ecosystem can provide substantial benefits. It can make government and business services more easily available to consumers. It can increase efficiency and revenues for enterprises. It can create new business opportunities for small and large businesses. It can empower users with new information and capabilities. Finally, it can enhance family ties and employee productivity.

As part of the year-long process of producing this report, CITC surveyed a large number of individuals and businesses on their attitudes toward mobility. It also carried out in-depth interviews with business and government stakeholders about the challenges and benefits of mobility. Additionally, it analyzed a set of technology and usage benchmarks in relation to Saudi Arabia's neighbors and select nations around the world. Together, these exercises create a comprehensive source of data about mobility in the Saudi context. CITC looks forward to collaborating with organizations across the country to strengthen economic development, education, communities, families, services, and information.

To conclude, I wish to thank all of those who shared their valuable thoughts and experiences with CITC as it researched this report.

Eng. Abdullah bin Abdulaziz Al Dharrab
Governor, Communications and Information Technology Commission (CITC)

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Mobily

Zain

Ericsson

BlackBerry

Microsoft

Almarai

Lulu Hypermarkets

Arab National Bank (ANB)

Riyadh Bank

Credit Suisse

Designers Den

FedEx

Intigral

Merck Sharp & Dohme Scientific

Almoammar Information Systems

Mjalati Company

Qualcomm

Saudi Business Machines (SBM)

Tawasol IT

ZeeSofts

Zuhair Fayez Partnership

Wipro

Tawuniya

SANAD

Schlumberger

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EXECUTIVE SUMMARY

The Saudi ICT sector has expanded significantly over the past ten years and remains on a strong growth trajectory; in 2012, ICT sector spending reached SAR 94 billion, recording 13.9% annual growth, and reached approximately SAR 102 billion in 2013, recording approximately 14% annual growth. Over the next five years, the ICT market is expected to expand at a compound annual growth rate (CAGR) of 8.1% to exceed SAR 138 billion in 2017.[1]

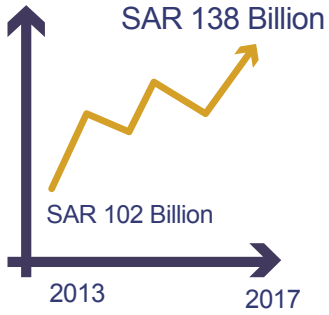
Telecommunications services accounted for 64% of total ICT spending in 2013.[2] This report focuses on mobility, which is one of the most dynamic aspects of ICT. It presents key findings from CITC's research and outlines a set of recommendations for further development of this market. The key findings of this report are summarized below:

• High Penetration and Usage:
Mobile broadband subscriptions have been growing tremendously over the past five years; this trend remains positive due to the high penetration of mobile phones, increasing interest in smart devices (smartphones and tablets), and the launch of LTE, the next-generation wireless data standard. Saudi Arabia has one of the world's highest percentages of total Internet traffic consumed on mobile devices.

• Changed Consumption and Interaction Models:
Smart devices have changed the way that consumers interact and deal with businesses, government, and society. As prices fall, smart devices will become the primary device type in the country over the next few years. This growing installed base will increase usage of mobility, expand the target market for advanced services and applications, and place demands on security and network capacity.

• Content, Applications, and Services:
One of the primary attractions of mobility for consumers is to stay in contact with others; Saudi Arabia leads the region in services penetration, availability of advanced technologies, the use of social media, etc. Smart device applications have become commonplace, although the survey conducted by CITC highlighted the need for more applications with local and religious content, as well as content in the Arabic language generally. In the private and public sectors, the use of enterprise mobility is still mainly dominated by basic communication functions like voice calls and email. Many parts of the ecosystem are conducive to, and are supporting, the development of applications and content.

Strong Growth Trajectory for Saudi ICT Sector



Saudi Arabia has one of the world's highest percentages of total Internet traffic consumed on mobile devices

Smart devices will become 'the primary device type in the country over the next few years

CITC survey highlights the need for more **applications** with local and religious content

1 CITC studies and analysis 2013
2 CITC ICT Indicators Report, End of 2013

• Security and Privacy of Mobility:
The importance of security and privacy of mobility requires the implementation of mobile security measures, such as those related to bring-your-own-device (BYOD) policies. Large companies lead the private sector in addressing the security vulnerabilities associated with mobility.

The survey revealed that the awareness of the best practices associated with mobile security and privacy should be increased.

CITC survey highlights that the awareness of the best practices associated with mobile security and privacy should be increased

• Cost:
CITC has implemented several measures to encourage competition among communications service providers (CSPs) and to lower tariffs. Device manufacturers and CSPs are working to make smart devices less expensive. Businesses are calling for innovative tariffs to enable them to use mobile services more efficiently.

CITC has implemented meaures to boost competition and lower tariffs

Structure of the report:
Chapter 1 of this report presents an update of key Saudi ICT indicators; each subsequent chapter of this report focuses on a different facet of mobility in Saudi Arabia. Chapter 2 analyzes mobility in general and its expression in the country. Chapter 3 takes a more detailed look at the demand for and adoption of mobility products and services, with findings from the survey and interviews that CITC conducted for this project. Chapter 4 changes the perspective to focus on the supply side of mobility. Chapter 5 then examines the enablers and inhibitors of mobility services in the country and recommends actions to encourage the growth of these services.

1. Overview of the ICT Market in Saudi Arabia

1.1 ICT Spending in Saudi Arabia

The Saudi ICT sector has expanded significantly over the past ten years and remains on a strong growth trajectory. In 2013, the ICT sector recorded 14% year-on-year growth.[3] The rapid growth of this sector is fueled by a number of factors, including continuous investments into the ICT infrastructure, increased spending on tablets and smartphones, implementation of e-government projects, and increased interest in ICT services.

The ICT market in the Kingdom is the biggest in the Middle East in terms of capital value and volume of spending, and accounts for more than 70% of the Gulf Cooperation Council (GCC) ICT market, with capital investment of more than SAR 135 billion in the past ten years.

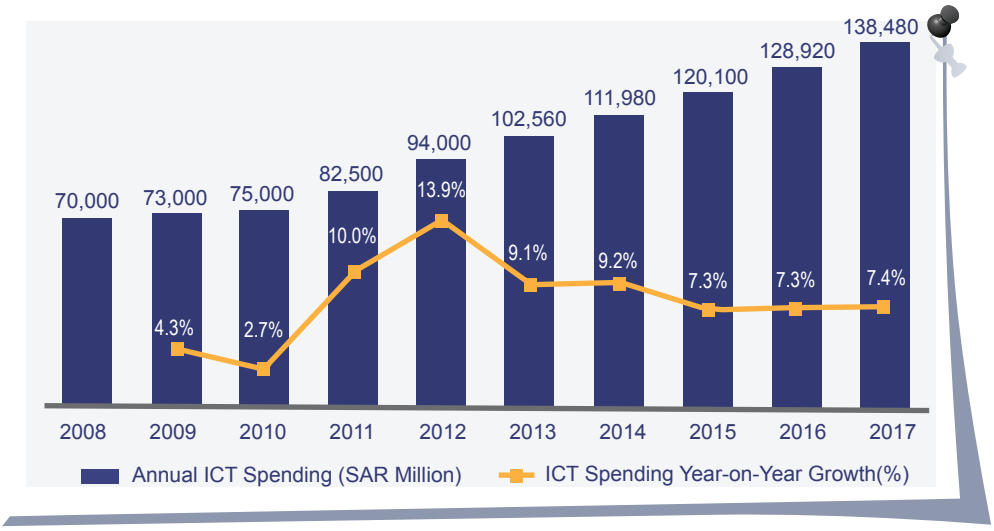
In addition to its indirect positive effects, such as increased efficiency of productive sectors in the economy, the liberalization of the telecommunications market and increased competition have led to a rise in capital investments and the expansion and development of communications networks, which in turn resulted in a significant increase in the contribution of the ICT sector to the country's GDP. The contribution of the telecommunications sector to the country's GDP was estimated at 2.75%, which is equivalent to a contribution of some 8% to non-oil GDP.[4] In addition, huge investments in infrastructure and networks, especially in broadband services, will support further contribution of the telecommunications sector to the GDP; a 10% increase in penetration of broadband will lead to approximately 1.3% growth in GDP.[5]

As illustrated in Figure 1, spending on ICT products and services increased from SAR 70 billion in 2008 to SAR102 billion in 2013, representing more than a 37% increase.[6] Over the next four-year forecast period, the ICT market is expected to expand at a CAGR of 8.1% to exceed SAR 138 billion in 2017.[7]

ICT spending per capita in Saudi Arabia is among important positive drivers for growth in ICT sector. In 2012, it reached SAR 3,252[8] – higher than in other comparable countries, including Turkey (SAR 1,054), Egypt (SAR 323), and Malaysia (SAR 2,252), and above the G-20[9] average (SAR 2,456). While demand and spending in the Kingdom are higher compared with other countries in the region, there remains the possibility for more growth to reach the per capita ICT spending levels of more advanced countries, such as Singapore (SAR 11,095).

In terms of the Networked Readiness Index (NRI), which measures the level of ICT usage to enhance competitiveness, Saudi Arabia ranked 31st in 2012,[10] an improvement over its 34th place in 2011. According to a report published by the World Economic Forum, this improvement was driven mainly by the reduced costs of using ICT and strong e-government efforts. The key strengths seen in the report include high mobile phone penetration (ranked 2nd in the world), the government's success in ICT promotion (3rd) and the high importance of ICT to government vision (7th). However, skills development was identified as the key future priority for expanding the local pool of talent and for the transition toward a more knowledge-intensive economy (59th).

Figure 1: Saudi Arabia Annual ICT Spending and Year-on-Year ICT Spending Growth, 2008–2017[11]



3 CITC ICT Indicators Report, End of 2013
4 CITC ICT Indicators Report, End of 2013
5 http://siteresources.worldbank.org/EXTIC4D/Resources/IC4D_Broadband_35_50.pdf
6 CITC ICT Indicators Report, End of 2013
7 CITC ICT Indicators Report, End of 2013
8 CITC studies and analysis 2013
9 Group of Twenty Finance Ministers and Central Bank Governors
10 The Global Information Technology Report 2013, World Economic Forum
11 CITC studies and analysis 2013

1.2 Key Technology Markets

The Saudi ICT sector has expanded significantly over the past ten years and telecommunications services accounted for 64.9% of the total ICT spending in Saudi Arabia, followed by spending on ICT hardware (23.1% of the total ICT spending), IT services (8.4%), and packaged software (3.6%). Over the next five years, the share of telecommunications services in ICT spending is projected to decrease to 58.4%, while hardware spending is expected to increase to 24.5%, and the fastest-growing market segments – IT services and software – are set to increase to 12.1% and 5.0%, respectively, as illustrated in Figure 2.

Contribution of technology markets to ICT spending (%)

64.9% Telecommunications

23.1% ICT Hardware

8.4% IT Services

3.6% Packaged Software

1.2.1 Telecommunications Services

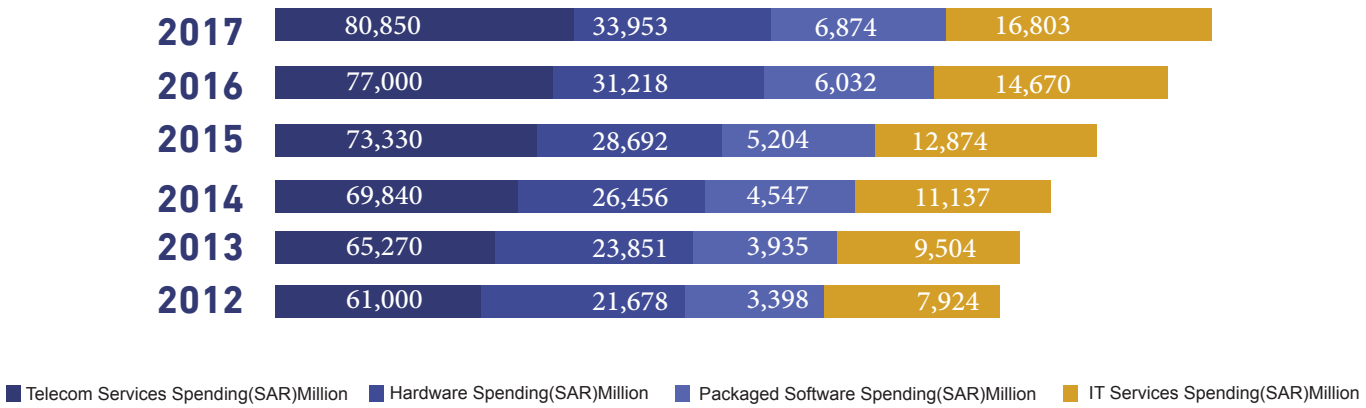
Spending on telecommunications services increased 5.5% year-on-year in 2012 to SAR 61 billion. CITC expects the market to expand to SAR 80.9 billion in 2017, representing a CAGR of 5.8%.

Telecommunications operators in Saudi Arabia have taken significant measures to provide better value to customers in terms of expanding their network coverage, improving the quality of services, and introducing new products.

On the fixed services side, telecommunications operators continued to focus on broadband through bundling fixed voice, fixed broadband, IPTV, and mobile broadband in 2012. They also invested in an extensive fiber deployment throughout Saudi Arabia, including rolling out fiber-to-the-home (FTTH) services.

In terms of mobile services, mobile broadband subscriptions have grown tremendously over the past five years, and this trend remains positive due to the high penetration of mobile phones, increasing interest in smartphones, and the launch of next-generation Long Term Evolution (LTE) services.[13]

Figure 2: Saudi Arabia ICT Market 2013–2017 Forecast and 2012 Spending[12]



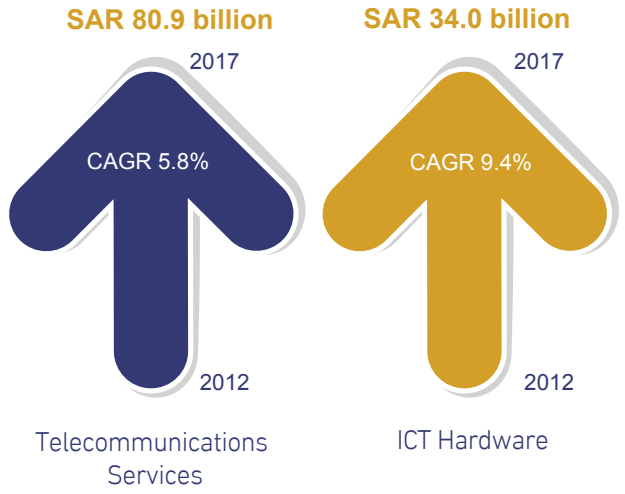
12 CITC studies and analysis 2014

13 CITC ICT Indicators Report, End of 2013

1.2.2 ICT Hardware

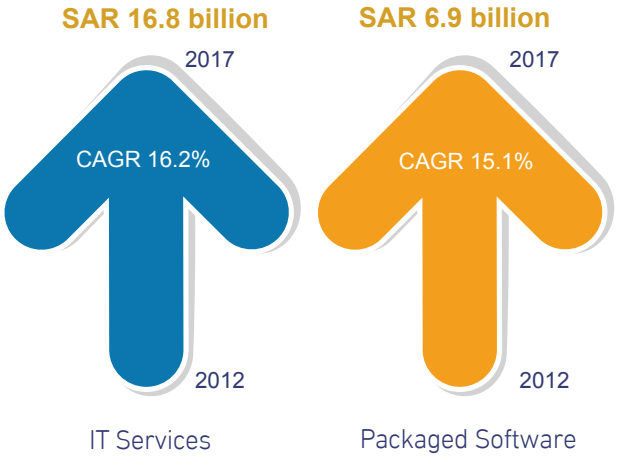
ICT hardware spending totaled SAR 21.7 billion in 2012, representing a 28.7% year-on-year growth. The ICT hardware market is projected to expand at a CAGR of 9.4% over the next five years and is forecast to total approximately SAR 34.0 billion in 2017. Demand for PCs was driven mainly by the consumer segment, with steady expansion recorded for the private sector as a whole. Traditional notebooks held the highest share of the PC market, with a healthy uptake of ultra-slim notebooks recorded in 2012. Sales of mini notebooks continued to decline in 2012.[14]

Both the demand for tablets and the competition between vendors has increased, fueled by an increasing demand for Internet services. This impressive growth was also driven by a number of traditional PC vendors entering the tablet space, along with a number of low-cost brands aggressively penetrating the market. Given the shift in demand from portable PCs to tablets, the tablet market is expected to overtake the portable PC market in terms of number of items sold in Saudi Arabia by the end of 2014.[15]



1.2.3 IT Services

Spending on IT services increased 45.7% year-on-year in 2012 to SAR 7.9 billion. CITC expects this spending to grow at a CAGR of 16.2% to total SAR 16.8 billion in 2017.[16]
Large-scale infrastructure upgrades to improve organizations in Saudi Arabia's healthcare, education, and transportation verticals are driving demand for project-based IT services such as network and systems integration. The convergence of technology and different business functions is driving demand for the highest level of operational efficiency, and organizations in Saudi Arabia have started looking at managed services as a feasible modus operandi for their IT operations. Managed infrastructure services, including network and desktop management, are among the most popular IT services in the country as organizations look to outsource non-core IT activities to third-party providers to focus on more value-added IT functions.



1.2.4 Packaged Software

Software spending grew 40.5% year-on-year in 2012 to SAR 3.4 billion. Spending in this category is expected to grow at a CAGR of 15.1% from 2012 on to total SAR 6.9 billion in 2017.[17]

With the expansion of e-government services, the business sectors and individual users will be more dependent upon the availability of such services. A rise in the demand for security software for functions including vulnerability management, security event and incident management, and the need for business continuity and recovery software is expected in the coming years.

14 IDC Research
15 IDC Research
16 CITC studies and analysis 2013
17 CITC studies and analysis 2013

1.3 ICT Market Drivers and Inhibitors

1.3.1 Key Indirect (Economic) Drivers

1.3.1.1 Rapid Economic Growth

Saudi Arabia's economy continued its impressive growth of 6.8% in 2012,[18] motivated by increased public spending and oil revenues, as well as other positive local and global developments. The government continued its structural and organizational reforms to achieve sustainable economic growth through diversification of the economic base, increasing job opportunities for the citizens, and increasing the contribution of non-oil verticals. To reach such goals, government spending on economic and social projects continued, coupled with a strong push towards the development of a knowledge economy, and increased spending on education, training, and science and technology. Undoubtedly, such drivers have had a positive effect upon creating a favorable economic environment with a positive impact on ICT spending.

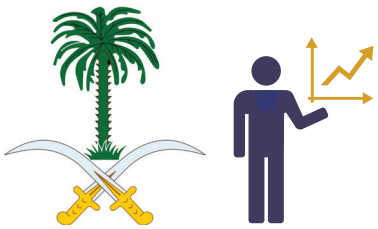
Rapid economic growth through increased spending on education, training, and science and technology

Economic growth of 6.8% in 2012[18]

1.3.1.2 Increased Government Spending and Private Investments

Government spending has increased gradually over the past couple of years, with another SAR 820 billion in expenditures budgeted for 2013.[19] These investments are distributed across different verticals and will drive ICT spending significantly in the short term.

Government spending has increased gradually over the past couple of years



In tandem with government investments, the private sector is showing impressive investment activities. Private sector investments contributed to the increased demand in ICT services and products. Examples of important projects spurring private investments include the construction of four new economic cities (King Abdullah Economic City in Rabigh, Prince Abdulaziz bin Mousaed Economic City in Hael, Knowledge Economic City in Medinah, and Jazan Economic City in Jazan).[20] These economic cities are a new concept that combines the economic basics of industrial cities and special economic zones, to form integrated cities which provide integrated services, facilities and logistical residential areas, and competitive work environment that attracts national and foreign investment. Partnership between the public sector and the private sector is embodied in the economic cities, which will attract international companies in various verticals, and will contribute to the transfer of knowledge and technology from these companies to the Saudi private sector. In addition, economic cities will also improve the national infrastructure networks, and will improve the Kingdom's competitiveness, regionally and internationally.

The private sector is showing impressive investment activities

18 Central Department of Statistics and Information (CDSI)

19 Ministry of Finance Statement about the National Budget for 2013

20 Saudi Gazette (http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentid=20130923181342)

1.3.1.3 Increased Focus on Economic Diversification

The diversification of the productive base of the Saudi economy, horizontally and vertically, and expanding productivity, has always been a goal for development planning in the Kingdom. Successive development plans realized the risks inherent in depending heavily on oil production and export as the dominant source of income for the Kingdom. The importance of diversifying the economic base can be viewed as a prerequisite for building a stable, modern and integrated economy. The implementation of this approach requires achieving significant increases and quality improvements in the contribution of non-oil sectors–production and service sectors–in the country's GDP, enhancing competitiveness, maximizing the returns of relative advantages, as well as improving the working environment and creating an investment environment that attracts capital. Saudi Arabia ranked 22nd in the World Bank's Ease of Doing Business Index for 2013, which highlights the government's efforts to support foreign investment and local entrepreneurship and create a favorable business environment in the country.

Government efforts to support foreign investment and local entrepreneurship and create a **favorable business environment** in the country

1.3.1.4 Increased Employment of Saudi Nationals

The Kingdom needs to further develop its national ICT manpower to face upcoming developmental challenges, and tackle international competition, ranging from the offshoring of technical requirements to other countries, to the employment of such skilled manpower to meet the growing domestic ICT demands. Recent government measures to increase employment opportunities for Saudi nationals (i.e., the Nitaqat Program) are further expected to augment economic growth. This will help the country to develop a local pool of talent and reduce dependency on expatriate workers in many industries, including ICT.

The Nitaqat program is expected to increase saudi national employment opportunities

1.3.1.5 Continuous Investments in Education Reforms

Education remains a top priority for the Saudi government, and 25% of the 2013 government budget is allocated to education and training.[21] Among the highlights of the national budget includes major investment projects for a new phase of education development, such as 18 university cities and academy complexes, the construction of 539 new schools, the development of 1,900 existing school construction projects, and investments in expanding the Saudi Electronic University. These initiatives will further increase the availability of ICT skills and stimulate investments into education in various ICT segments.

25% of the 2013 government budget is allocated to education and training

21 Ministry of Finance Statement about the National Budget for 2013

1.3.2 Key Direct Market Drivers

1.3.2.1 Investments in ICT

The investment environment in the Kingdom of Saudi Arabia is characterized by its continuous development and high rate of return, benefiting from increasing public and private investments. Saudi Arabia continues to invest in telecommunications with the aspiration to develop a state of the art telecommunications infrastructure supporting the provision of different types of Internet-enabled services. The number of fixed broadband subscriptions reached 2.92 million in 2013, which represents a 15% year-on-year growth and 45.5% household penetration. On the mobile broadband side, the number of subscriptions totaled 14.27 million at the end of 2013, representing 47.6% population mobile broadband penetration. The total capacity of international connectivity increased from 440Gbps in 2011 to 814.2Gbps in 2013.[22] These investments are directed toward fiber-optic networks (FTTx), upgrading mobile networks to 3.5G and 4G technologies, and international connectivity infrastructure (through the Regional Cable Network).

Fixed broadband subscriptions reached 2.92 million in 2013

45.5% household broadband penetration

CITC expects that the introduction of three Mobile Virtual Network Operators at the end of its current selection process will improve market efficiency, reduce prices, provide better services to subscribers and increase job opportunities for citizens by introducing more targeted tariffs and services. MVNOs create new demand for existing network capacity by targeting user populations that are not generally the center of existing marketing efforts. The most common segments served by MVNOs are expatriates (who enjoy low calling rates to their home countries and native language support), and youth (media content, high SMS allowances, and lower tariffs to circles of friends). In time, other MVNOs may emerge around M2M connectivity, fleet management, religious content, or other models.

The number of mobile broadband subscriptions totaled 14.27 million at the end of 2013

47.6% mobile broadband penetration

1.3.2.2 e-Government Initiatives

The Saudi public sector is fully aware of the potential benefits of implementing e-government services; its current imperative is e-government transformation. These transformation efforts, driven by the Yesser e-government program, are focused on achieving better operational efficiencies, as well as changing the way the government communicates with citizens and businesses. Saudi Arabia is among the world's e-government leaders, and was ranked 41st out of 193 countries in the United Nations E-Government Survey 2012.[23] The survey, which focused on measuring progress in online service delivery, positions Saudi Arabia among the leaders in e-government development.

Saudi Arabia is among the world's e-government leaders, and was ranked **41st out of 193 countries** in the United Nations E-Government Survey 2012.

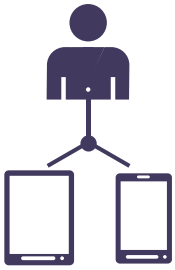
برنامج التعاملات الإلكترونية الحكومية
e-Government Program

22 CITC ICT Indicators Report, End of 2013
23 United Nations E-Government Survey 2013

1.3.2.3 Growing Adoption of Smartphones and Tablets

Smartphone and tablet penetration is growing at an unprecedented rate in Saudi Arabia (selected statistics are provided in Chapter 2 of this report). Increased device penetration has driven up usage of mobile applications, social networking, multimedia content, and entertainment content among individuals. Organizations are leveraging mobility platforms to enable a more mobile workforce and improve customer service. Some are also considering implementing BYOD strategies. Some of these mobility developments are discussed in more detail in the following chapters.

Smartphone and tablet penetration is growing at an unprecedented rate in Saudi Arabia



1.3.3 Key Indirect (Economic) Inhibitors

1.3.3.1 Oil Price Volatility

Oil revenues are the main source for financing development programs and the main driver of economy. Any major decline in oil prices could impact Saudi Arabia's economic growth negatively, and would have an impact on government spending and investments across verticals, including ICT investments.

Oil price volatility would have an impact on government spending and investments across verticals, including ICT investments

1.3.4 Key Direct Market Inhibitors

1.3.4.1 Information Security Concerns

All previously published CITC Reports on the State of ICT in Saudi Arabia have concluded that security concerns are perceived as one of the key inhibitors to the adoption of many ICT services. This is particularly true for remotely delivered and Internet-enabled services, including managed, hosted, and cloud services. After recent cyber attacks in several countries of the world, including the Kingdom, information security is not only perceived as an ICT problem but as a serious business challenge with long-lasting repercussions.

Information security is not only perceived as an ICT problem but as a serious business challenge with long-lasting repercussions

1.3.4.2 Keeping Pace with Developments in International Markets

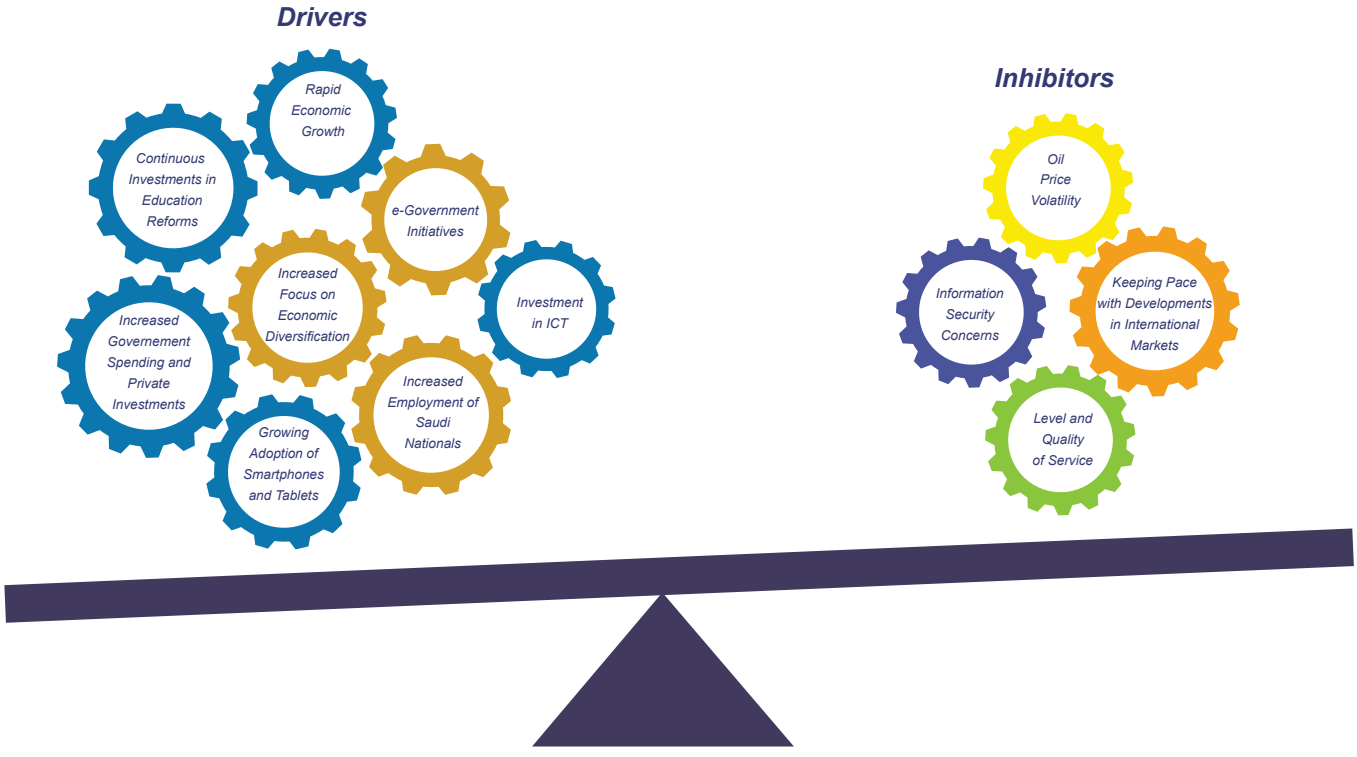
Nowadays, developments and innovations in international ICT markets are advancing rapidly, changing the ways business is conducted across verticals. It is important that countries create flexible mechanisms for the improvement of management, design, production, marketing, and all other aspects of the ICT industry. The pace of adoption of new technologies in the Saudi business sector has a direct impact on productivity and operational efficiency.

The pace of adoption of new technologies in the Saudi business sector has a direct impact on productivity and operational efficiency

1.3.4.3 Level and Quality of Service

The quality of products and services has become an important issue and a prerequisite to empower local products to compete in the global markets. Meeting the growing expectations and aspirations of more demanding customers requires the abandonment of outdated management concepts and patterns. Through its first national ICT plan, Saudi Arabia has sought to enhance the quality in this sector and raise the level of standards through specific initiatives and projects, such as the development of ICT hardware specifications, and the development and adoption of quality indicators and criteria of dominant service providers. CITC has already developed and applied such indicators and criteria.

The improvement to ICT infrastructure and expanded penetration of networks in the Kingdom has contributed to the significant increase of subscribers and the use of the Internet. However, some users feel that the level of ICT services is weak, and that service providers should adhere to the quality standards set by CITC. In addition, several service providers do not provide dependable service level agreements (SLA),[24] and when they do, they sometimes do not adhere to them. This situation could lead to lack of confidence in service providers among users, and may make the user reluctant to adopt more services, which may limit growth of local products, and consequently minimize competitiveness of service providers. Service providers are seeking to develop and improve methods of service delivery. However, this situation is expected to improve as the ICT market matures.



24 CITC Mobility Survey 2013

2. Introduction to Mobility

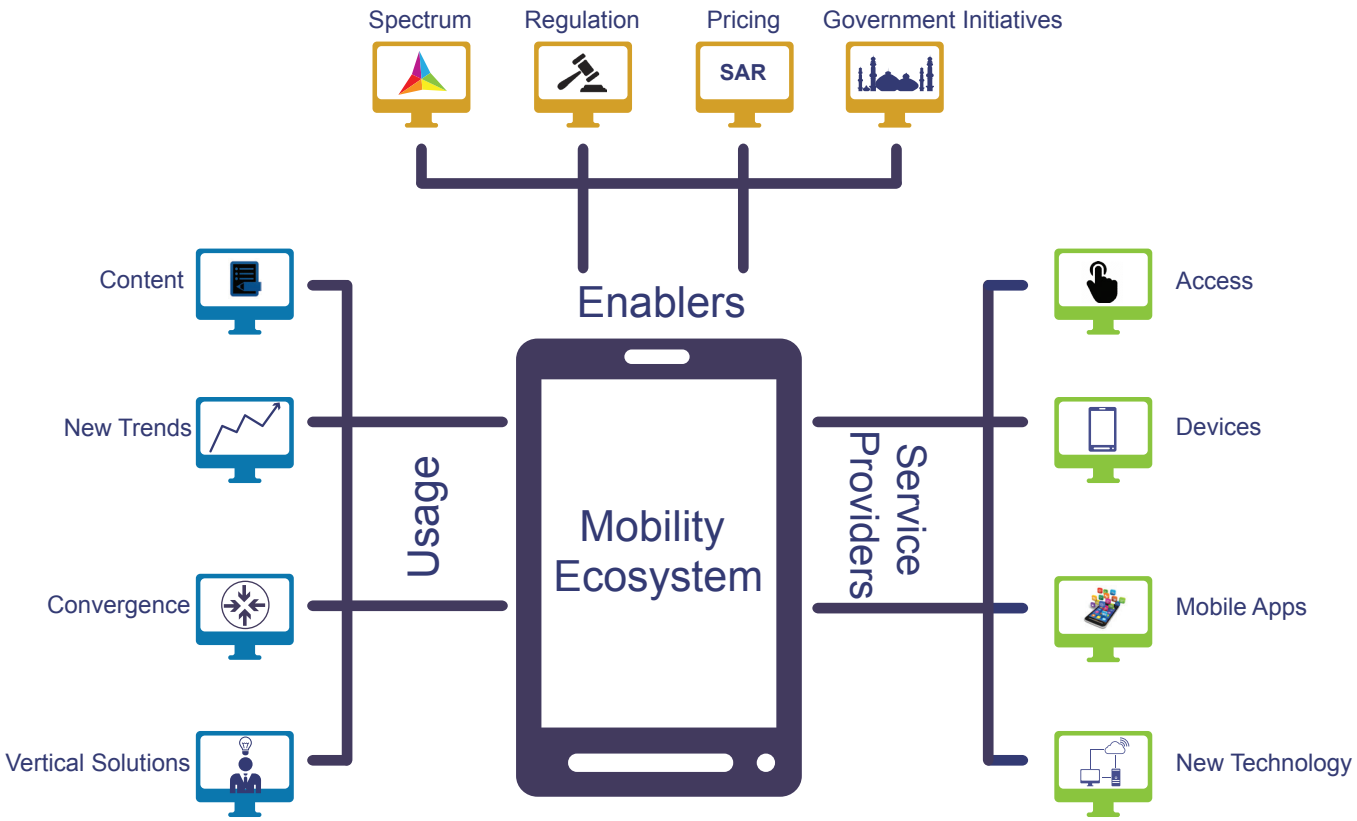
This report examines the mainstream adoption and benefits of mobility in the Kingdom of Saudi Arabia. It addresses the consumer segment and the private and public sectors.

For the purposes of this study, mobility is defined as the ability to use easily portable devices to access services and content, irrespective of changes to location or technical environment. This study focuses on data services and smart device applications, and will not include traditional voice and messaging. These data services are generally consumed via smart devices–tablets and smartphones, almost always with a touchscreen, that are able to run applications featuring graphic interfaces, on-device processing, and rich media.

On a global level, increasing mobile usage tends to increase access to critical information and services, in tandem with generating positive economic effects. A recent study estimates that, for a given level of total mobile penetration, shifting 10 percent of 2G users to 3G increases GDP-per-capita growth by 0.15%.[25] This change corresponds to the progression from voice and SMS to usable mobile broadband. It is likely that a similar effect will become evident with the change from 3G to 4G services.

Mobility is enabled and encouraged by a number of factors, ranging from government regulatory policies to available mobile devices to the price and quality of network connectivity and innovative uses (see Figure 3). The greatest benefits of mobility occur when the ecosystem as a whole is efficient and when each element increases the value of the whole.

Figure 3: Mobility Ecosystem



25 Deloitee/GSMA, "What is the Impact of Mobile Telephony on Growth?", 2012

2.1 Mobility in Saudi Arabia

Mobility is evolving rapidly and changes lives everywhere it is introduced. Only ten years ago, mobile access to the Internet essentially meant using a notebook over a wireless connection.

Since then, the mobile experience has improved dramatically, on both the device and the network sides. The year 2007 saw the introduction of modern smartphones, with large screens, multiple sensors, multi-touch interfaces, and media capabilities. These devices opened new possibilities for rich content and services, while their open application programming interfaces (APIs) and a limited set of dominant operating systems created platforms for myriad third-party applications. In early 2010, the tablet computer market exploded; in turn, tablets significantly expanded the demand for dedicated mobile broadband connections.

Smart devices have changed the way users interact with the Web. Access has become truly personal, rather than tied to a shared family PC or the office connection. In addition to being mobile, this access is instant, which has opened up a world of possibilities to consume or create information where it is most needed, or at least most convenient. Smart device features, including cameras, Global Positioning System (GPS), and compasses, have led to an explosion of uses unavailable with a standard laptop. All these capabilities have revolutionized communications, entertainment, and work. The smart device has become the center of everyday life for an ever-increasing percentage of the world's population. As device prices continue to fall, the point when most mobility users will have a smart device is only a few years away.

With this increasing penetration of smart devices, enterprise mobility is becoming increasingly widespread. Meanwhile, businesses are struggling with consumerization; not only the BYOD paradigm, in which employees want to use their own smart devices rather than a company-approved but perhaps less capable terminal, but also the assumption that company applications will match common consumer offerings in both functionality and behavior. Government services are starting to take advantage of smart devices as well, introducing new services in mobile government, as well as the related areas of m-health and m-education.

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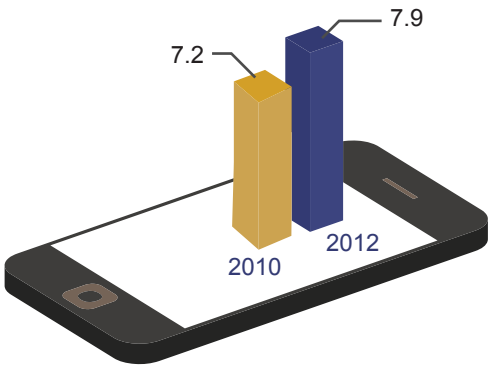
Smart device applications that take advantage of these new uses and capabilities have become a new segment of the economy. Within five years of the launch of the first application store, application usage became ubiquitous. More than 2.5 million applications are available for download across OS-affiliated and independent storefronts.[26] Furthermore, customers' use of applications continues to grow. According to U.S.-based applications analytic firm Flurry Analytics,[27] in Q4 2012, 7.9 applications were launched per day by consumers, compared to 7.2 in Q4 2010, which is a significant growth considering the rapid increase in the number of smart device users.

As Chapter 1 demonstrates, Saudi Arabia is fully in line with many of these trends and on the leading edge of some (especially in terms of mobile phone penetration and e-government initiatives). From 2007 to 2012, the number of wireless connections grew from 28.4 million to 53.0 million, which amounts to 1.82 connections for every resident. In terms of mobile broadband, the growth is even more dramatic: from 0.2% penetration in 2007 to 42.1% in 2012. Over the same period, the revenues attributable to the mobile sector grew 68% to SAR 55.91 billion in 2012.[28]

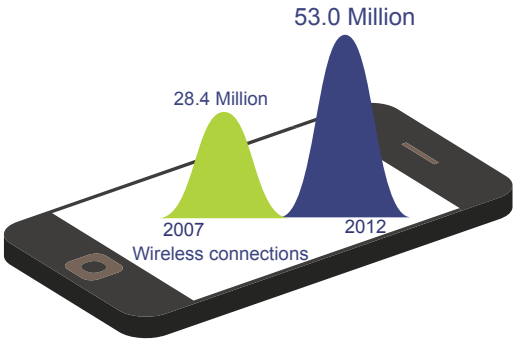
Mobile data usage is also growing exponentially. Mobile users in Saudi Arabia are expected to consume 1.1 exabytes, or 1.1 billion gigabytes, of mobile bandwidth by 2017, which represents a CAGR of 75% between 2013 and 2017.[29] Over-the-top (OTT) services, a category that includes most smart device applications, are playing a pivotal role in this exponential increase in data traffic.

Many of the local users are above the global average in their use of mobility. More than in other countries, Saudi consumers use their mobile devices to remain connected with family and friends. In addition, CITC's consumer mobility survey for this report shows that 65% of those surveyed use connectivity applications on their smart devices, while third-party research shows that the country is a regional leader in the use of social media.[30] Saudi users also show a strong preference for Arabic content, an area that still has room for development. Carriers, application developers, and government agencies are picking up on this demand for Arabic contents and the possibilities offered by a high installed base of smart devices.

According to U.S.-based applications analytic firm Flurry Analytics, in Q4 2012, 7.9 applications were launched per day by consumers, compared to 7.2 in Q4 2010, which is a significant growth considering the rapid increase in the number of smart device users



From 2007 to 2012, the number of wireless connections in Saudi Arabia grew from 28.4 million to 53.0 million, which amounts to 1.82 connections for every resident



26 http://mobiforge.com/research-analysis/global-mobile-statistics-2013-section-e-mobile-apps-app-stores-pricing-and-failure-rates#toomanyappstores
27 http://blog.flurry.com/?Tag=Usage%20Statistics
28 CITC ICT Indicators Report 2012
29 Cisco Wi-Fi for Saudi Mobile Service Providers, report 2013
30 Arab Social Media Report, July 2012, Dubai School of Government

Chapters 3 and 4 outline the specific preferences of the Saudi market, as well as many of the ways in which businesses and government organizations are taking advantage of mobility.

On the business side, mobility has fundamentally transformed business models, practices, and environments across sectors in the Kingdom. The convergence of telecommunications and IT through mobility is helping businesses to virtualize processes to enhance productivity and improve resource utilization. The surveys and interviews CITC conducted for this study confirm that businesses in the country are eager to utilize mobility solutions to become more agile, reduce overhead, and serve their customers better by enabling new customer touch points through smart phone applications.

Results further suggest that Saudi Arabia's businesses are at the beginning of a growth cycle in mobility adoption. While less than one-half of employees in Saudi companies currently use mobile devices or applications for work, enterprises are aware of the operational and productivity improvements that they (the enterprises) can realize via mobility solutions and are actively evaluating such solutions for future use. The consumerization of enterprise mobility policies is proceeding in line with global trends: 37% of the companies surveyed reported having a BYOD policy in place, while an additional 43% reported that they would evaluate a BYOD policy in the next three years. For more results from CITC's research, see chapters 3 and 4.

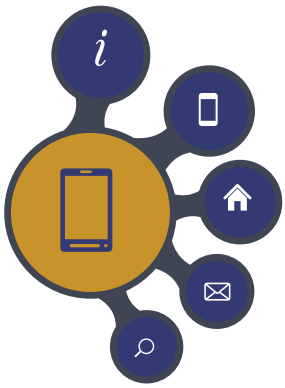
Regarding e-government, Yesser's e-Government Second Action Plan (2012–2016) places strong emphasis on mobile services, encouraging mobile channels for public communications and e-government services. Several ministries and significant public institutions in the country have already launched mobile services (see Chapter 4 for more details).

This growth in usage requires a commensurate improvement in connectivity, and the government has taken steps to ensure that wireless networks can support the demands of modern mobility. Saudi Arabia had a telecommunications monopoly until 2005, when CITC licensed a second mobile operator, followed by a third one in 2008. It is commonly accepted that at least three national operators are needed to ensure innovation and price competition in a mobile market. To encourage additional market efficiency, in 2014, CITC awarded two new licenses for mobile virtual network operators (MVNOs).

In part as a result of these measures, the speed and capacity of wireless networks has increased. As Chapter 1 notes, all three operators announced in September 2011 that they had launched LTE networks. The LTE standard offers faster connections, easier interoperability with traditional fixed Internet connections, and more possibilities for differentiated network performance. This improved mobile broadband experience has thus far led to improved revenues for the operators and increased usage from their customers.

In sum, Saudi Arabia's mobility infrastructure is mature: networks are modern and continue to develop; device penetration is high; and device capabilities are modern. What is next? Usually, the access phase precedes the innovation phase: Now that networks, their installed base of terminals, and user sophistication are all present, consumers, government, and businesses should expect increased innovation in mobile content and uses. The remainder of this report presents data on that shift and suggests ways to increase the speed of change.

Saudi Arabia's mobility infrastructure is mature: Networks are modern and continue to develop; device penetration is high; and device capabilities are modern



2.2 Selected Mobility Indicators

In order to assess the current maturity level of Saudi mobility, CITC collated a set of indicators. Table 1 compares Saudi data with data from other countries.

Table 1: Selected Mobility Benchmarks for 2012-2013

	SAUDI ARABIA	UAE	KUWAIT	EGYPT	TURKEY	MALAYSIA	GERMANY	USA
Mobile data subscriptions as a % of total mobile subscriptions	48%	32%	56%	9%	18%	33%	35%	50%
Smartphone shipments ('000) [31]	4,717	1,766	478	887	5,369	3,416	21,554	120,064
Tablet shipments ('000s) [32]	792	620	97	87	978	1,243	5,040	50,225
Mobile data spending as a % of total telecommunications spending [33]	19.0%	16.7%	22.2%	25.4%	17.6%	38.1%	20.1%	28.0%
% of Internet browsing done on mobile device [34]	21.1%	14.6%	28.0%	4.5%	5.1%	11.0%	4.5%	10.1%
Introduction of mobile number portability	2006	2013	2013	2011	2008	2008	2002	2003

The share of Internet browsing on a mobile device in Saudi Arabia is near the top of the global range and above the global average of 10%. This indicates that devices and networks in the country are advanced enough to support this heavy usage and that users are familiar with mobile browsing. This figure should increase over the next few years, providing an additional means for mobile operators to realize a return on their network investments.

31 IDC Worldwide Mobile Phone Tracker, Q1 2013
32 IDC Worldwide Telecommunications Services Database, H1 2012
33 IDC Worldwide Telecommunications Services Database, H1, 2012
34 StatCounter Global Stats, January 2012 to December 2012.

3. Adoption of Mobility Products and Services in Saudi Arabia

In order to understand the adoption of mobility products and services in Saudi Arabia, CITC carried out a representative survey of 1,324 individuals and 1,324 organizations.[35] The results of the survey are presented below.

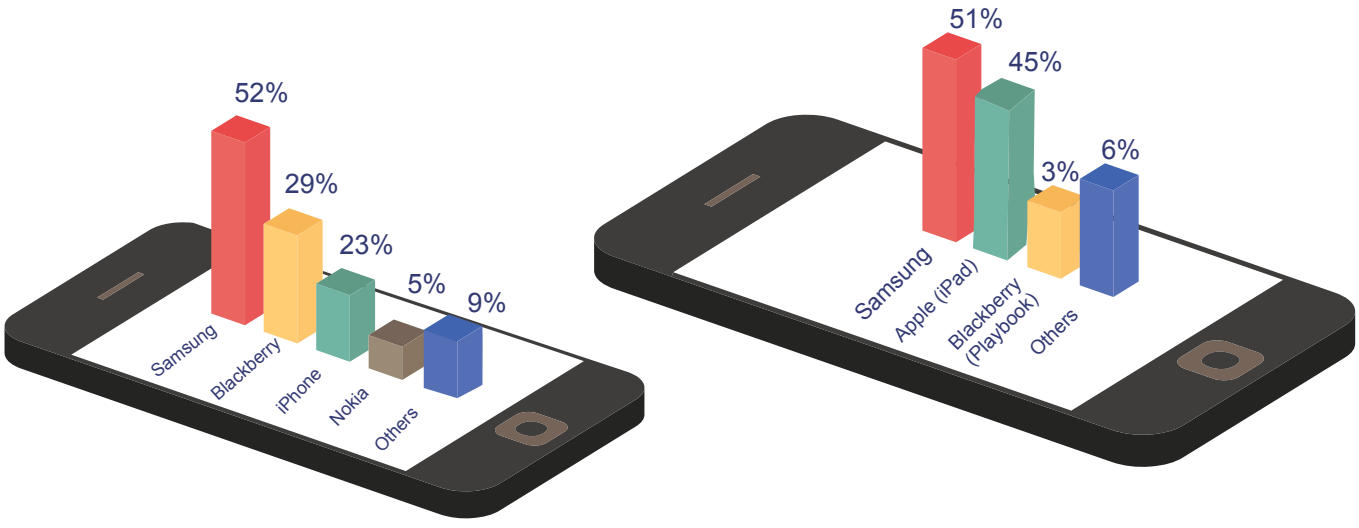
3.1 Consumer Adoption of Mobility Services

CITC's research found that consumer attitudes to mobility services in Saudi Arabia are shaped by three fundamental factors:

• High Adoption of Smart Devices:
CITC's mobility survey of individuals using mobile voice and data revealed that a significantly high proportion (82%) of mobile users have access to smart devices. Among individuals who use smart devices, 47% have access to both smartphones and tablets; 33% use smartphones exclusively; and only 2% have access to tablets but not smartphones. According to IDC data, Saudi Arabia was the top country in the Middle East and Africa (MEA) in terms of tablet sales in 2012.[36] The country's demographic trends will support continued growth in smart device penetration: CITC's survey found that 91% of the individuals between the ages of 15 and 35 use smart devices, while the corresponding figure among individuals aged 45 and above is 56%.

The survey revealed that 17% of smartphone users use more than one smartphone. In terms of tablet users, only 4% of them use more than one tablet. When looking at preferred brands, Samsung smartphones showed the highest penetration among the smartphone users (52%), followed by Blackberry (29%) and iPhone (23%). Similarly, Samsung tablets are used by 51% of tablet users, compared to 45% iPad users (see Figure 4).

Figure 4: Preferred Smart Device Brands (% of Users Using the Brand)[37]



Smartphones

Tablets

35 More details about the research methodology can be found in Appendix A
36 IDC Handset and Tablet trackers, Q1 2013
37 CITC Mobility Survey, 2013.

- **Availability of High-Speed Wireless Internet:**

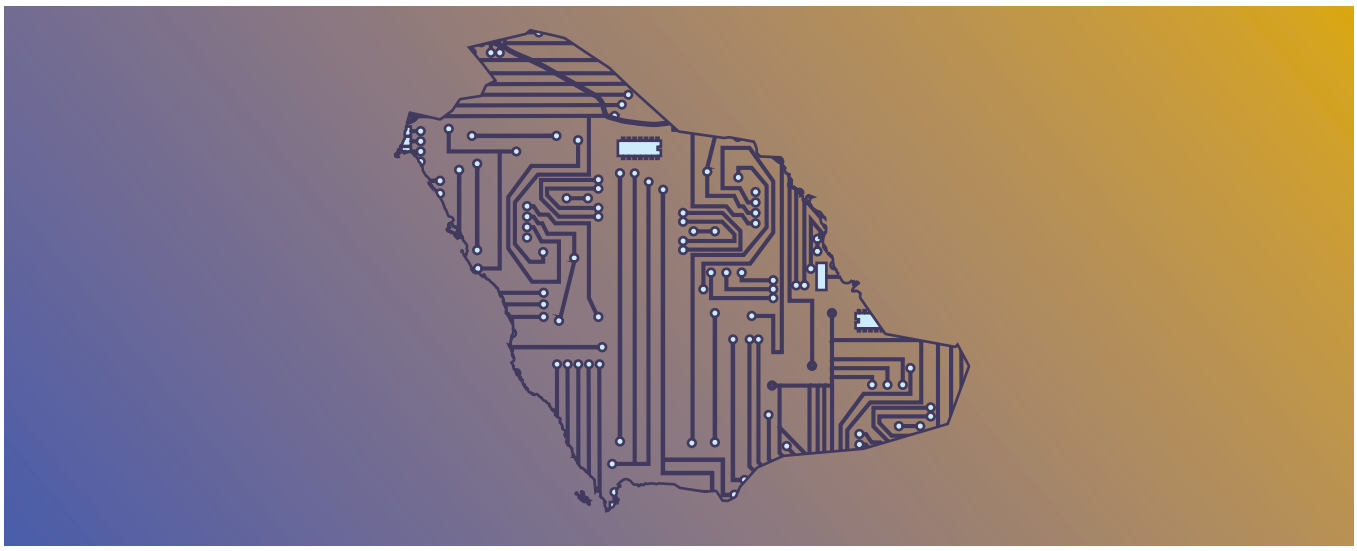
Saudi Arabia remains at the forefront of technological development in the Middle East. In 2004, it became one of the first countries in the region to license 3G services, and, in September 2011, it was one of the first countries to introduce LTE services. Over 95% of the country's population is now covered by 3G services,[38] and operators are progressively expanding their LTE network coverage. The 3G and LTE (4G) networks accelerate the adoption of rich mobile content and applications.

In 2004, Saudi Arabia became one of the first countries in the region to license 3G services, and, in September 2011, it was one of the first countries to introduce LTE (4G) services

- **Availability of Applications:**

As covered later in this chapter, CITC's mobility survey confirms that the ability to download applications directly influences perceived value and customer satisfaction with devices. A 2012 Google study of 500 smartphone users in Saudi Arabia revealed that, on average, 36 applications are installed on a smartphone, of which only 5 are paid applications. Of these 36 installed applications, 11 had been used by the user within the last month.[39]

The CITC survey confirms that the ability to download applications directly influences perceived value and customer satisfaction with devices



38 CITC Mobility survey 2013
39 Google Our Mobile Planet: Saudi Arabia, 2013

3.1.1 Drivers of Smart Device Usage

The CITC Mobility Survey has revealed several reasons Saudi individuals use smart devices (see Figure 5):

3.1.1.1 Ability to Connect to the Internet

Saudi individuals regard smart devices as portals to online content and applications. While basic Internet connectivity is the top driver, other factors drive smart device usage as well.

3.1.1.2 Ability to Download Applications

The study revealed that more Saudis, especially those among the youth, are using social media as a main tool for communication, and to express their opinions, learn new things, as well as for shopping and entertainment. Such usage requires advanced applications. Often, the user's choice for a specific device depends upon its ability to download advanced applications offered by content providers globally.

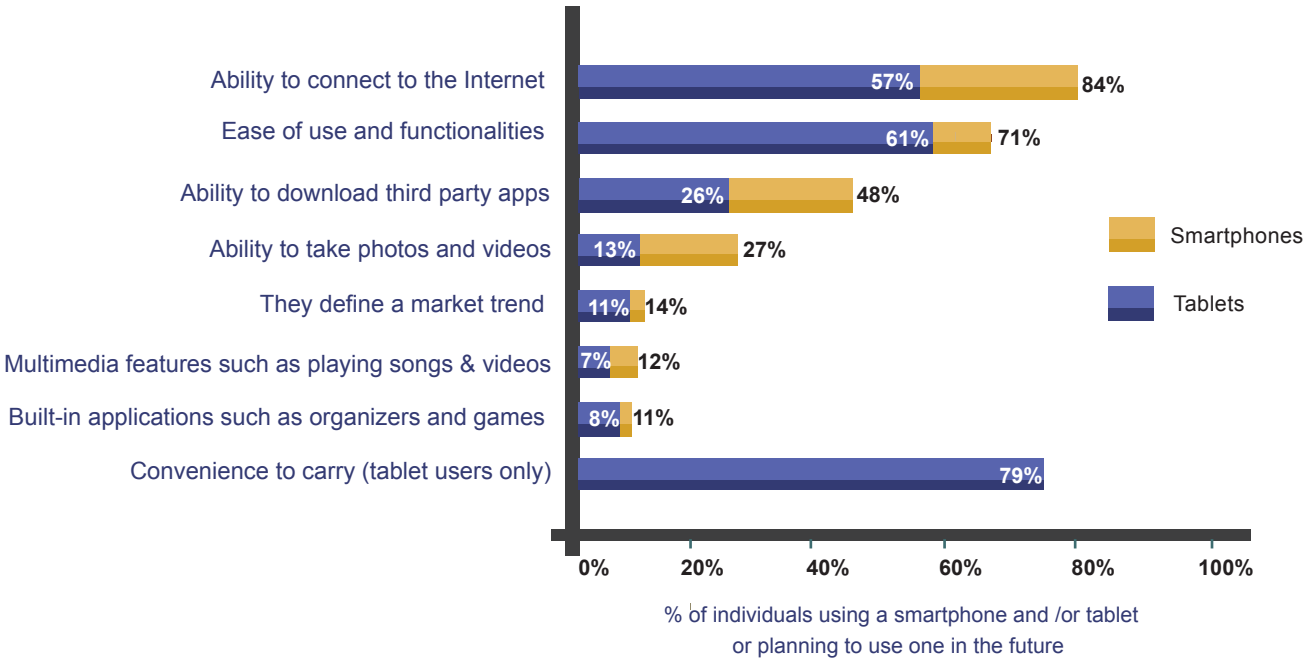
3.1.1.3 Cameras and Sensors

The smartphone camera is a powerful tool that enables users to capture moments through images and videos and then share them with friends and family. Advances in smartphone camera technology are making separate digital cameras redundant for casual photography. Likewise, compass and GPS chips are replacing dedicated devices in casual usage. Accelerometers enable motion-based interfaces and games that are impractical on the PC platform.

3.1.1.4 Multimedia Features/Entertainment

Statistics show that Saudi Arabia accounts for the world's highest per capita usage of YouTube, with 90 million views per day.[41] Another study confirms that 91% of smartphone users in Saudi Arabia consume video on their devices, while 58% watch video at least once a day.[42]

Figure 5: Drivers for Smart Device Usage [40]



40 CITC Mobility Survey, 2013. Unless otherwise stated, all statistics in this section come from this survey.
41 Arab Social Media Report, July 2012, Dubai School of Government
42 Google Our Mobile Planet: Saudi Arabia, 2012

3.1.2 Application Usage on Smart Devices

Application usage can be grouped into four main themes, as highlighted in Figure 6 and described below:

3.1.2.1 Social Media

Social media platforms that enable users to generate content and share it with their family and friends are the most commonly used application types on the mobile platform, displacing email, which was the most commonly used Internet application in 2010.[44] The desire to stay in touch with friends and family was the most common theme for application usage.

3.1.2.2 News and Information

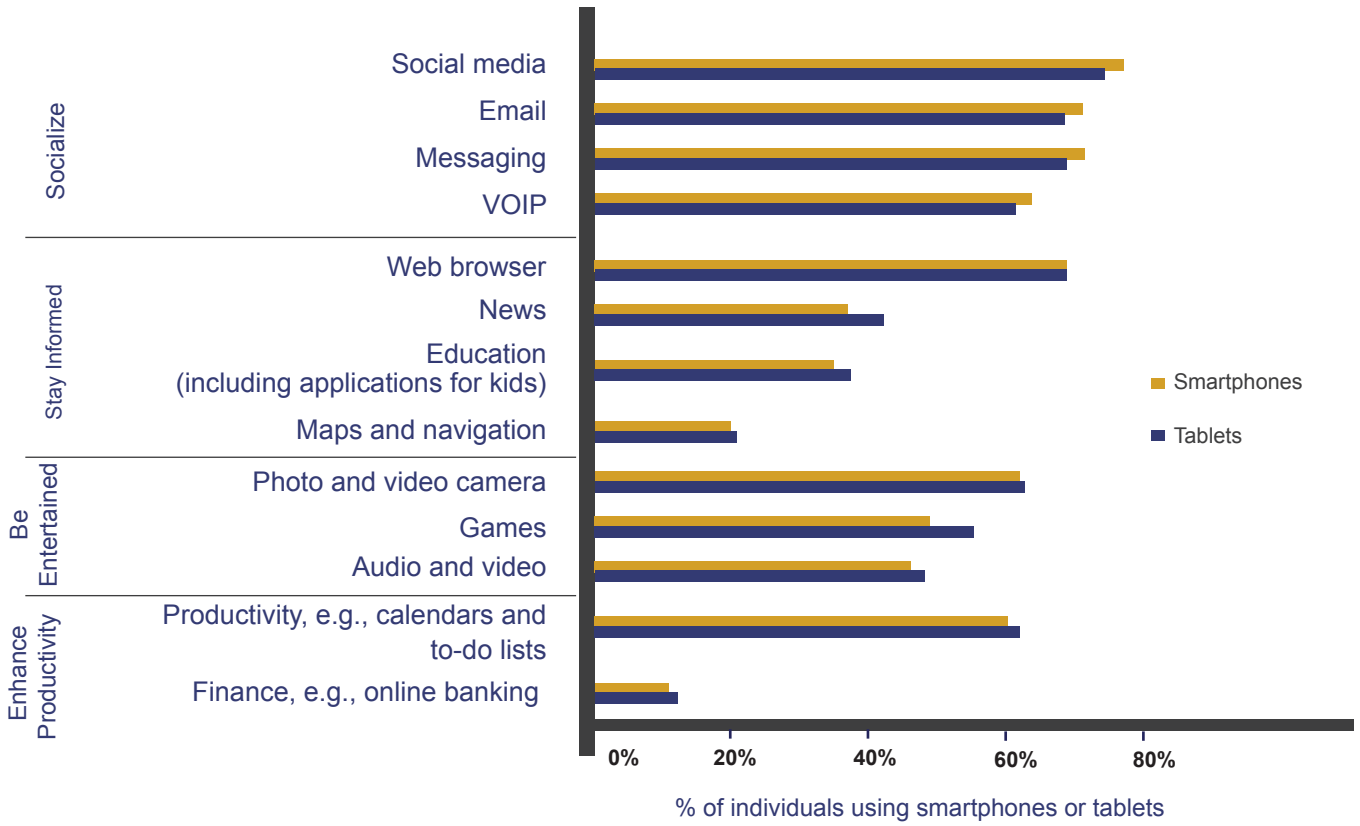
Since most users were introduced to the Internet via Web browsers, it is not surprising that browsers are the most commonly used tool to access information and online content.

Currently, the usage of other applications to access news and educational content remains low, although ongoing efforts to digitize content both in Saudi Arabia and throughout the region suggest that the prominence of these applications will grow in the future. The use of mapping and navigation applications remains lowest in the news and information category.

3.1.2.3 Entertainment

On average, approximately half of tablet and smartphone users access entertainment applications in Saudi Arabia. According to the survey, the most popular entertainment feature is photo and video camera applications on both device types. Audio and video playback application usage is also popular, with a slightly higher preference to use these apps on tablets, rather than smartphones. Another study conducted in Saudi Arabia found that, of the smartphone users surveyed, 28% would rather give up their TVs than their phones.[45]

Figure 6: Application Usage Trends on Smart Devices [43]



43 CITC Mobility Survey (Individuals), 2013. Unless otherwise stated, all statistics in this section come from this survey.
44 CITC IT Report for 2010 on the Internet Ecosystem in Saudi Arabia
45 Google Our Mobile Planet: Saudi Arabia, 2012

3.1.2.4 Productivity

Smart devices enable individuals to manage their time and work via scheduling or collaboration applications. These productivity applications, which include, for example organizers, calendars, task managers, and applications to access office documents, are more popular for use with tablets for 54% of the users, compared to 48% of users who prefer smartphones.

Productivity applications are more popular for use with tablets for 54% of the users, compared to 48% of users who prefer smartphones.

Although financial applications offer the convenience of carrying out major banking and payment-related activities, the penetration of these applications is still very low in Saudi Arabia.

In CITC's survey of individual users, respondents expressed a desire for additional applications beyond the four groups described above: 42% of the respondents would like to use more Islam-related applications, such as prayer timing, Kiblah direction finders, and festival information. The same percentage asked for more healthcare-oriented applications. More than one-third (37%) wanted more applications oriented toward families and children, and 36% asked for more e-government applications.

3.1.3 Language Preference

The survey showed that over 90% of smart device users prefer to use their devices in Arabic. CITC's consumer survey found that, when asked what smart device content they wanted to have more of, 46% of the respondents wanted more applications in the Arabic language, more than any other option (Table 2).[46]

CITC believes that digital content in the Arabic language in the Kingdom will grow throughout the few next years, alongside the growth of applications in the Arabic language. Accordingly, applications and software providers have made Arabic language localization one of their priorities. The number of Arabic speaking Internet users grew 2,500% between 2000-2011, making Arabic speaking users the fastest growing language community on the Internet.[47]

Table 2: Language Preference [48]

Language	% of users preferring the language when using a smartphone	% of users preferring the language when using a tablet
Arabic	92%	91%
English	8%	9%

46 CITC Mobility Survey (Individuals), 2013.

47 As per internetworldstats.com: http://www.internetworldstats.com/stats7.htm

48 CITC Mobility Survey (Individuals), 2013; Other languages combined showed less than 1% preference

3.2 Enterprise Adoption of Mobility Services

3.2.1 Enterprise Usage of Mobility

CITC's research confirms that businesses in Saudi Arabia are well aware of the operational and productivity improvements that can be achieved through the use of mobility solutions. Many businesses across the country are actively considering investments in mobility technologies to transform employee performance, refine processes, enhance productivity, and improve customer services. The key findings of the survey appear below.[49]

3.2.1.1 Mobile Internet Usage

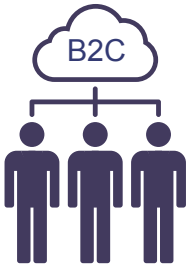
Access to wireless broadband is a prerequisite for enterprise mobility. However, CITC's survey of businesses in the country found that only 36% of the organizations in Saudi Arabia provide mobile Internet access to their employees. Of the companies using mobile Internet services, the proportion of ICT budgets allocated to mobile communications is around 20%; however, over 60% of these organizations plan to increase their spending on mobile services in the next two years.

60% of these organizations plan to increase their spending on mobile services in the next two years

3.2.1.2 Mobility Application Adoption

The study showed that, among the companies using mobile broadband, over 65% stated that they had enabled at least one application for employees to be accessed over smart devices. The study revealed that business-to-consumer (B2C) applications in service sectors, such as banking, retail, communications, airlines, and public facilities sectors, are growing more quickly in priority among Saudi businesses than business-to-business (B2B) or business-to-employee (B2E) projects.

Business-to-consumer (B2C) applications in service sectors, such as banking, retail, communications, airlines, and public facilities sectors, are growing more quickly in priority among Saudi businesses than B2B or B2E Projects



3.2.1.3 Devices Enabling Mobility

The study revealed that access to mobility applications and services over smartphones totaled 54% in Saudi Arabia in 2012, while businesses across the country were increasingly deploying applications to support tablets. It is noticed that the private sector has become more oriented towards lowering costs and increasing operational efficiency, and is leveraging various mobility solutions to execute upon this strategic aim. In the coming years, the penetration of mobile business applications is expected to double.

Mobility applications have become highly important among businesses in the Kingdom. Large enterprises tend to be more advanced in adopting mobility and providing mobile services to their staff, in comparison with SMBs. SMBs are expected, however, to catch up with large businesses over the next three years; in CITC's survey, they stated ambitious plans to enable mobility applications.

Mobility applications have become highly important among businesses in the Kingdom. Large enterprises tend to be more advanced in adopting mobility and providing mobile services to their staff

49 CITC Mobility Survey (businesses), 2013. Unless otherwise stated, all statistics in this section come from this survey.

3.2.2 Enabling Mobility on Employee-Owned Devices

As noted in Chapter 2, the functionality of consumer devices and applications has evolved more quickly than their enterprise equivalents. Part of this is due to slower enterprise device standard setting, security and management concerns, and longer device replacement cycles. Smart device and application functionality is so compelling, however, that some of the employees are using their own devices and connectivity to perform their jobs. Businesses of all sizes are thus forced to come to terms with BYOD.

The survey revealed that Saudi businesses are currently formulating BYOD policies, spelling out which of an organization's applications and information can be accessed by employees via their own devices. More than one-third (37%) of businesses using mobility state that they already have a BYOD policy, while an additional 43% plan to deploy one in the next three years. The survey also found that interest in allowing employees to use their smart devices for business-related functions is approximately equal in companies of all sizes. Mobile device management (MDM) solutions, which address some of the security risks created by the use of employee-owned devices, have achieved a penetration of 33% among the surveyed organizations using mobility.

More than one-third **(37%)** of businesses using mobility state that they already have a BYOD policy, while an additional **43%** plan to deploy one in the next three years

3.2.3 Departments Using Mobility

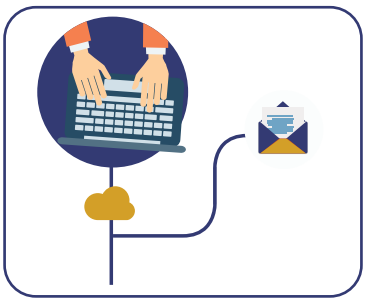
The research conducted among organizations in the Kingdom found that field force and sales force employees are generally the first to gain access to mobility applications, in addition to senior management. Over the next three years, many organizations plan to extend mobility solutions in their organizations to other departments and functions, including finance, IT, human resources, and procurement. The mobility solution deployment plans put comparable focus on smartphones (24% of organizations are planning to support the smartphone platform) and tablets (21% of organizations on average).

3.2.4 Application Usage for Enterprise Mobility

3.2.4.1 Email

In line with global trends, email is the main mobility application for businesses in Saudi Arabia, with average usage of 34% on tablets and smartphones among organizations (see Figure 7). The businesses surveyed expected email to remain the key mobility application in the future, compared with other mobility applications.

Email is the main mobility application for businesses in Saudi Arabia, with average usage of 34% on tablets and smartphones among organizations

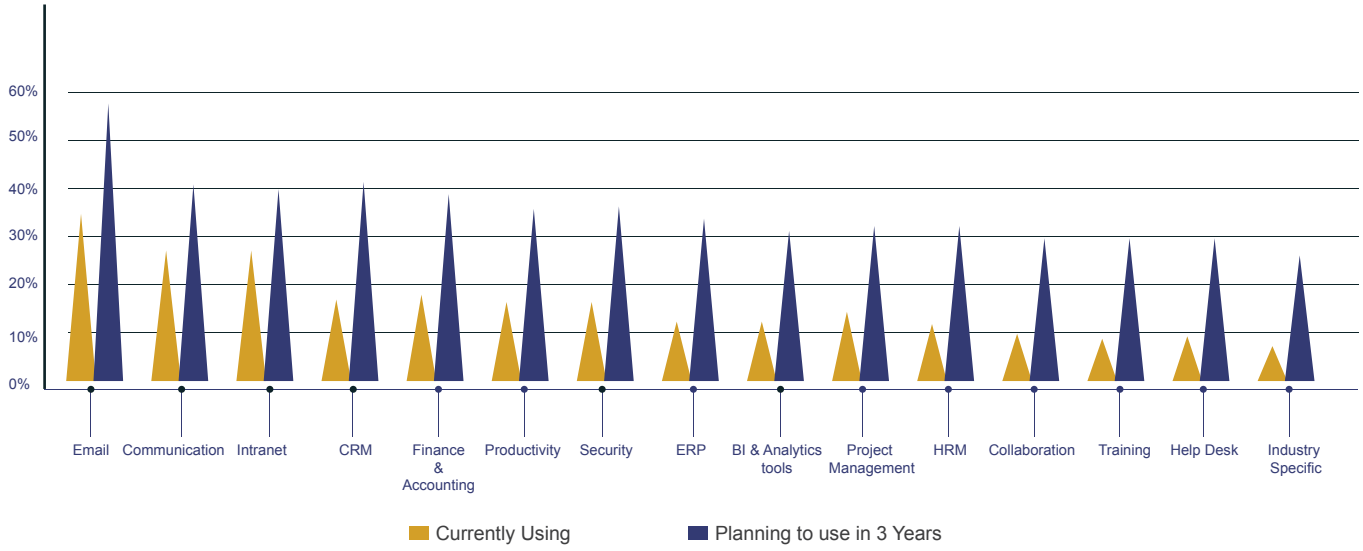


3.2.4.2 Communication and Collaboration Applications

Communication and collaboration are closely related; communication applications enable the exchange of information and interaction via voice, video, or text (for example through voice-over-internet-protocol (VOIP), messaging applications, or video conferencing applications). Collaboration applications (examples of which include document sharing or business dashboard applications) provide tools to pool resources and carry out tasks collectively.

Saudi companies, as declared in CITC's survey, are interested
in applications that enable geographically dispersed employees to do both. These applications enable better resource utilization and help to increase employee productivity. Although the current usage of communication applications (an average of 23% among companies) is higher than the usage of collaboration applications (an average of 11% among companies), nearly equal percentages of businesses are interested in supporting these applications in the next three years.

Figure 7: Average Application Usage on Smart Devices[50]



% of businesses currently using mobility or planning to use it in the next three years.
(Average usage on a smartphone or tablet for individual applications considered)

3.2.4.3 VPN / Intranet

VPNs enable employees to access internal IT resources and applications (intranet) from remote locations using a secure and encrypted connection. Once the VPN has been established, employees can access internal resources via either a Web browser or dedicated mobile applications. The survey results indicate that dedicated applications are more popular among large businesses, while SMBs are more likely to use Web browsers instead of VPNs in order to avoid incurring additional costs.

3.2.4.4 Security Software

CITC research indicated that businesses have increased their focus on network and device security, especially since the cyber-attacks of 2012; 20% of organizations using smartphones and 11% of those adopting tablets are using security solutions capable of safeguarding against intrusions, malware, viruses, and Trojans; an additional 22% of these organizations plan to deploy security software for smartphones over the next three years; the figure for organizations interested in deploying security software for tablets is 20%.

Once the VPN has been established, employees can access internal resources via either a Web browser or dedicated mobile applications

3.2.4.5 Business Intelligence Tools

In this era of ever-changing and developing technology and applications, businesses are beginning to focus on using information systems to support the process of decision making, through business intelligence (BI) tools. Business intelligence tools provide access for decision makers to the right business data at the right time, and help them gain competitive advantage, and practical insights through information analysis to the organization's employees. Examples include financial dashboards, data mining applications, decision supporting system, or business performance analysis.

Although currently low in usage among businesses in the Kingdom, with only 12% usage of BI on smartphones and 8% on tablets, business intelligence tools are expected to gain prominence in Saudi organizations' enterprise mobility strategies in the near future, as an additional 23% of companies will implement them over the next three years.

50 CITC Mobility Survey (businesses), 2013

3.2.4.6 Business Applications (ERP, CRM, and HRM)

Organizations interested in mobilizing core business applications, including enterprise resource planning (ERP), customer resource management (CRM), and human resource management (HRM), are also increasing in Saudi Arabia. CITC's survey found that CRM is the most widely used business application on smart devices (20% on smartphones and 12% on tablets), while HRM and ERP have been mobilized by only 10% of businesses. However, interest is fairly consistent in mobilizing all three business application types, with an average of 24% of organizations surveyed wanting to mobilize each of them over the next three years.

Organizations interested in mobilizing core business applications, including enterprise resource planning (ERP), customer resource management (CRM), and human resource management (HRM), are also increasing in Saudi Arabia

3.3 Public Sector Adoption ofMobility Services

3.3.1 Public Sector Usage of Mobility

CITC's research found that, although the adoption of mobility services and solutions among public sector organizations lags behind adoption in the private sector, these organizations exhibit a high degree of similarity in their attitudes to the current and planned usage of mobility. The adoption of mobile Internet in public sector organizations is higher (43%) than in the private sector (30%), yet the allocation of ICT budgets to wireless communications is lower.

The level of enthusiasm shown among public sector organizations is higher than that among private businesses, indicating the growing importance of m-government services in the country. The number of organizations likely to deploy mobility solutions over the next three years is higher in the public sector (33%) than among the private businesses surveyed (23%). Government-to-citizen (G2C) applications (m-government) will continue to take precedence over government-to-government (G2G) applications in the public sector.

The number of organizations likely to deploy mobility solutions over the next three years is higher in the public sector (33%) than among the private businesses surveyed (23%).

3.3.2 Enabling Mobility on Employee-Owned Devices

Public sector organizations are not shielded from the impact of consumerization, with employees demanding access to work-related applications on their own devices. More than one-third (38%) of public sector entities with mobility deployed declared having a formal BYOD policy, while another 44% of organizations are likely to define and implement BYOD policies within 36 months of the survey. To address the security risks associated with BYOD, over 45% of public sector organizations have deployed MDM solutions, which is much higher than the deployment level of these solutions within the private sector.

More than one-third **(38%)** of public sector entities with mobility deployed declared having a formal BYOD policy, while another **44%** of organizations are likely to define and implement BYOD policies within 36 months of the survey

3.3.3 Departments Using Mobility

Public sector trends are very similar to private sector trends in terms of mobility. Within the public sector, the highest level of mobility penetration on smartphones was reported in public relations departments (33%), followed by senior management (25%) and IT departments (20%). The penetration of tablets for access purposes in various government departments was found to be approximately 10%.

Within the public sector, the highest level of mobility penetration on smartphones was reported in public relations departments **(33%),** followed by senior management **(25%)** and IT departments **(20%)**

3.3.4 Application Usage for Enterprise Mobility

Email-, intranet-, communication-, and security-related applications remain among the most mobilized applications in the public sector. However, penetration of these applications in public sector organizations was found to be much lower than their penetration within private businesses.[51]

Over the next three years, in addition to the applications mentioned above, public sector organizations are likely to mobilize applications related to finance and accounting, as well as business applications (ERP, CRM, and HRM). The growing interest in ERP and CRM is seen especially among education and healthcare institutions. In addition, a few public sector organizations reported interest in mobilizing IT help desk, training, and collaboration applications.

Email, intranet, communication, and security related applications remain among the most mobilized applications in the public sector

51 CITC Mobility Survey (businesses), 2013

3.4 Inhibitors to Adoption

Inhibitors to the wider adoption of mobility products, services, and applications also exist in Saudi Arabia. It is worth noting that, in some ways, the top story is a lack of inhibitors: Among businesses with mobile Internet services, more respondents said that they had no concerns about mobility (36%) than those who identified any specific inhibitors.

3.4.1 Network Performance and Availability

With any network upgrade, the bulk of the work comes after launch announcements are made. Newer, faster mobile broadband tends to be deployed first in areas of high population density. By its nature, however, mobility requires relatively even coverage and performance across a given territory. Anytime-anywhere connectivity is the foundation of the rapid penetration of mobility. Moreover, mobility applications are designed with certain technical parameters such as speed, latency, and quality of service. Video communications require higher performance than Web browsing, for example, which is normally kept in mind when designing wireless networks.

The survey respondents identified network concerns as major inhibitors. Among individuals, low mobile Internet speed was the number one inhibitor; to be fair, it must be noted that handset capabilities and application design also play roles in perceived speed. Business respondents mentioned low network performance as a major inhibitor, along with cost and security.

3.4.2 Security and Control

As ICT networks further develop and expand, both average users and businesses are increasingly focusing on information security. Saudi businesses are aware of the security risks involved in mobilizing corporate data and functions, especially on devices owned by employees. The research revealed that cost is the major concern among businesses that have deployed mobility, followed by security risks, employee abuse of services, and loss of control. Fortunately, the survey also indicates that businesses are increasingly implementing policies and management solutions to counter these risks.

Data on security and privacy management among individuals indicates a possible area for improvement.[52]

3.4.3 Cost

Device and connectivity costs constitute among the most important elements that determine the rate of mobility adoption. The study revealed that device expense represents the most important criteria in mobility-related purchasing among individuals in the Kingdom, followed by device quality and fragility.

The purchase of mobile devices, particularly smartphones, is expected to rise in the near future, as device manufacturers compete heavily to market their latest and most advanced versions, thereby leading to a decline in device prices, even as users develop further need for certain software that such devices provide.

3.5 Summary and Future Outlook

On the consumer side, connected culture is becoming a reality among the Saudi population, with smart devices used to go online and stay connected. Service providers, application providers, and device manufacturers should all continue working to increase affordability and improve ease of use, especially since consumerization is such a potent force in driving usage.

On the business side, CITC's research confirms that employees in Saudi organizations are increasingly demanding access to their corporate applications and resources on their own devices, which, in turn, is fueling the BYOD trend. For businesses, mobility is creating opportunities as well as challenges. Opportunities with mobility can be found in new capabilities and applications that can reshape business models, empower workers, improve collaboration, and help to improve customer relationship management. The challenges of mobility include service provisioning, security, and ongoing management of the devices.

Although organizations are likely to start small, mobilizing one or two applications, as they realize the benefits, they will mobilize more applications, which will provide additional opportunities to all players in the ecosystem. Hence it is important for all players to take a collaborative approach.

52 CITC Mobility Survey (businesses), 2013

4. The Provision of Mobility Services in Saudi Arabia

In Chapter 3, the report examined consumer, business, and government usage of mobility services. In this chapter, we will focus on factors that enable the development of the mobility ecosystem in Saudi Arabia.

4.1 Global Trends: The Evolving Mobility Landscape

With increasing wireless data speeds, increasingly more sophisticated devices, and progressively tighter integration with different Internet business models, the mobility ecosystem has become much more extensive and has evolved into a rich delivery platform for solutions and services. The number of services has expanded dramatically as has the number of providers. Across the globe, several major trends are shaping the development of mobility:

• OTT Service Providers Are Increasing the Speed of Innovation:
Unlike telecommunications companies, OTT service providers provide their services over the Internet but do not operate the network themselves. In most cases, providing OTT services requires less capital than operating network services. This often means that OTT service providers (e.g., Google and Amazon) can innovate quickly and develop services while preserving their margins. Startups and Internet giants alike are introducing new mobile functionalities and business models.

• Wireless Broadband Networks Support Mature Internet Functionality:
Until late in the first decade of this century, wireless networks were too slow and unreliable to support anything close to the fixed-line Internet experience. That situation has changed; service providers worldwide have spent billions on increasing speed, expanding coverage, and boosting reliability. This more robust infrastructure supports richer applications and services.

• Application Usage on Smart Devices Is Growing:
With the growth in demand for smart devices, usage of applications also increased significantly. Smart-device applications are the most common way to take advantage of smart-device capabilities. Within just five years of the launch of the first application store, the number of applications available for download across OS-affiliated and independent storefronts globally has grown to over 2.5 million. Application providers and developers continue to develop new types of applications, which in turn will increase customers' interaction via their devices and the Internet.

Service providers worldwide have spent billions on increasing speed, expanding coverage, and boosting reliability. This more robust infrastructure supports richer applications and services

Within just five years of the launch of the first application store, the number of applications available for download across OS-affiliated and independent storefronts globally has grown to over 2.5 million

• Network Operators, Device and Platform Vendors, and OTT Service Providers Are Increasingly Competing with Each Other:
As content and application services have increased in importance, all four player types are aiming to leverage their relationships with end users and become their primary sources for content, applications, services, billing, and management capabilities. The potential for collaboration among and between these player types is also increasing.

• Businesses Are Struggling with the Opportunities and Challenges of Mobility:
For businesses, mobility improves accuracy, increases the amount of data collected and used, and increases efficiency. CIOs also deal with increased complexity, however, as enterprise mobility systems require integration scenarios with multiple interfaces, technologies, and processes. In addition, government agencies and private businesses alike need to allocate more resources to internal mobility as well as to solutions that target mainly partners and customers.

4.2 The Saudi Mobility Ecosystem

Mobility in Saudi Arabia is developing in line with global trends. Increased demand for data services has produced significant growth in the rate of smart devices usage. CSPs have evolved from being voice-centric to being data-centric, and have increased their investments in expanding networks to meet demand of their clients and to maintain their market share. OTT services are gaining prominence as well and are playing a pivotal role in this increase in data traffic. Operators are forming partnerships with OTT providers as well as challenging OTT services with their own offerings. Even though the OTT space in Saudi Arabia is currently dominated by international providers, including Google and Facebook, a growing number of regional and domestic companies are developing applications to cater to the needs of the Saudi population.

On the enterprise mobility side, mobility is increasingly becoming a prime technological consideration for CIOs. Benefits, including process improvements, lower cost, better resource utilization, and increased productivity, are driving this change. However, information security and the difficulty of justifying return on investments are seen as major impediments to mobility adoption.[54]

For businesses, mobility improves accuracy, increases the amount of data collected and used, and increases efficiency

According to CITC's research, large businesses in retail, and oil and gas, and services sectors (e.g., aviation and logistics) have invested heavily in mobility

A striking contrast is seen in the level of maturity among businesses with respect to the usage of mobility solutions, which roughly correlates to vertical market and company size. According to CITC's research, large businesses in retail, and oil and gas, and services sectors (e.g., aviation and logistics) have invested heavily in mobility; however, for the majority of businesses—SMBs in particular—mobility means access to corporate email and other corporate resources via a mobile browser, generally using a secure VPN connection.[55]

54, 55 Based on CITC's face-to-face interviews with organizations using mobility in Saudi Arabia

4.3 Supply-Side Developments in the Saudi Mobility Ecosystem

4.3.1 Network Operators

Mobile network operators in Saudi Arabia are at the center of the mobility ecosystem, supporting both consumer and enterprise mobility through mobile data offerings and application development initiatives. To compete, operators are providing special packages, including the provision of smart devices against monthly subscriptions.

Mobile network operators in Saudi Arabia are at the center of the mobility ecosystem, supporting both consumer and enterprise mobility through mobile data offerings and application development initiatives

4.3.1.1 Investments in Network Infrastructure to Support Mobility

The 3G coverage in the populated areas of the Kingdom amounts to 95% of the population. The nation's operators have embarked upon large-scale investments to upgrade their 3G networks to progressively support higher throughput speeds and expand LTE coverage.

The nation's operators have embarked upon large-scale investments to upgrade their 3G networks to progressively support higher throughput speeds and expand LTE coverage

To further boost network capacity, operators in the Kingdom are deploying WiFi hotspots across the country, particularly in busy locations across the main cities of Riyadh, Jeddah, Dammam, and Khobar. WiFi is generally used to serve mobile broadband users in crowded locations like shopping malls and airports. Mobile data traffic offload to fixed networks through WiFi can ensure better spectrum utilization and lower costs.

4.3.1.2 Flexible Pricing for Mobile Broadband and Smart Devices

Mobility's cost structure clearly influences its usage. The level of spending depends greatly upon price flexibility. The liberalization of the Saudi telecommunications sector has lowered the prices of services significantly. Operators compete with each other to offer various promotions that attract the maximum number of subscribers. This has resulted in widening the demand base for services; for instance many individuals own more than one mobile communication chip, and maintain multiple subscriptions to services, particularly data and Internet packages. Demand for such services has increased along with the growth in usage of social networks in the Kingdom. Subscribers are now looking for even higher speeds and larger download capacities.

In this context, operators in the Kingdom are seeking to offer diversified 3G and 4G data packages to meet customer needs. The increasing competition and diversification of services has led to the creation of a new bundling approach to deliver services, such as including a range of voice call minutes, text messages, Internet services and other services within one monthly subscription at a discounted price when compared with the prices for each single service. Certain packages may also include smart devices for free or at specific discounts, which provide subscribers an added value in terms of service integration and enhances penetration of smart devices in the Kingdom. CITC's survey revealed that certain organizations prefer multi-user packages, compared with special single-user packages.[56]

56 Based on CITC's face-to-face interviews with organizations using mobility in Saudi Arabia

4.3.1.3 Network Operators' Application-Related Initiatives

CSPs contribute to the Saudi application landscape in a number of ways. First, they foster application development communities. Second, they use applications to create new value-added services. Third, they enable customers to manage their accounts via mobile applications.

CSPs foster application development communities, use applications to create new value-added services, and enable customers to manage their accounts via mobile applications

Both STC and Mobily have launched universal application storefronts and are offering local and Arabic-language applications through them, while Zain KSA has an infotainment portal that provides local and other Arabic content. Operators have also added the mobile channel to their customer service operations: all three use applications that allow subscribers to manage their accounts, view bills, and even report network performance issues from their smart devices.

Operators are interested in applications that provide additional revenue opportunities, improve customer experience, and challenge the growing prominence of OTT services. STC's My InVision application extends video-on-demand (VoD) services to mobile platforms; Mobily's Easy Charge application allows users to add credit to their prepaid accounts by scanning prepaid cards; Zain's cross-platform Hala messenger application emulates popular OTT messaging services.

4.3.2 Device and Platform Providers

As one of the biggest markets in the Middle East, Saudi Arabia is the subject of increased focus from device manufacturers and platform developers. Their activities concentrate on two major areas:

Saudi Arabia is the largest market for smartphones and tablets in the Middle East, but it has a lower penetration of smart devices than mature markets.

4.3.2.1 Strengthening Distribution and New Device Penetration

Saudi Arabia is the largest market for smartphones and tablets in the Middle East, but it has a lower penetration of smart devices than mature markets.[57] Device vendors are thus working to drive demand for smart devices in the country.

To this end, global device manufacturers are expanding retail and distribution networks in Saudi Arabia. Several such companies have opened new offices in the country and are announcing new LTE smartphones. Regional competitors have also taken the opportunity to venture into the smart device segment. Touchmate, a UAE-based consumer electronics vendor, recently entered the smartphone market and will start selling products in Saudi Arabia and the UAE.

57 IDC Smartphone Tracker, Q1 2013 and IDC Tablets Tracker, Q1 2013

4.3.2.2 Supporting Local Application Development

As discussed below, application development in the country is still at an early stage of maturity. Local developers require training as well as financial assistance to support their business models. Device and application developers are trying to jump-start the process by providing software development kits (SDKs) and instituting competitions and incubators.

The Saudi Arabian General Investment Authority (SAGIA) has partnered with BlackBerry to establish the BlackBerry Entrepreneurship Academy, which will accelerate the development. of localized mobile apps and content. Nokia and Microsoft have established an application development competition for university students across the Middle East and Africa to provide training in the latest mobile and application development technologies. In January 2013, Google organized a workshop for women developers in Dhahran, with special emphasis given to entrepreneurship and technology. Device and application developers are also providing support to telecommunications network operators in the country in their application development initiatives.

4.3.3 Content and Application Development in Saudi Arabia

While application development has gained traction in the country over the last couple of years, the number of application developers, however, is still small. Lack of skills, unclear business models, and high business risk have somewhat restricted the growth of the local application developer industry. Nevertheless, many regional developers operate in Saudi Arabia's market, focusing mainly on project-based custom application development services for B2E or B2C applications. Often these companies have marketing offices in Saudi Arabia, while the software development itself happens mainly in other countries (e.g., Egypt, Jordan, and the Indian subcontinent). The most popular applications are not developed in the country. Many of these applications, specifically those developed by regional companies, support Arabic interfaces but do not contain Saudi-specific content.

While application development has gained traction in the country over the last couple of years, the number of application developers, however, is still small

4.3.3.1 Saudi-Specific Applications

Some international application developers focus on Saudi-specific needs. For example, Info2Cell, a value-added services provider based in Jordan, has developed the Al-Dawri mobile application specifically for Saudi iPhone users. Meant for soccer fans, the application tracks Saudi soccer leagues in addition to the Italian, Spanish, and English premier leagues.

Local telecommunications operators are a major source of Saudi applications. Through its subsidiary, Intigral, STC has developed an application called STC-Hajji, which provides step-by-step advice and guidance for performing Hajj and Umrah. STC's Asrar application is targeted at women in the country and offers beauty, health, fashion, and home decoration tips. Mobily has developed an application called Islamy, which provides prayer times in all Saudi cities, as well as religious wallpapers and audio files. Mobily's Governmental Guide application helps users find the contact numbers of most government departments. Mobily Mubasher provides live information from the Saudi Stock Market. Zain has an application called Store n Share, which enables users to share centrally stored files using their mobile numbers.

Mobile government applications are a natural source of Saudi-specific content. Government departments have been active in this area:

• The Ministry of Education:
The ministry operates Noor, a mobile application for its educational management system, which enables users to receive elementary, middle, and high school results and grades. In addition, the Noor service allows parents to follow their children's academic performances.

• Ministry of Higher Education:
The ministry's mobile application extends its e-services to a mobile platform. The application, compatible with iOS and Android, provides access to the latest news from the ministry and enables students to view the status of their grant/scholarship applications under the Custodian of the Two Holy Mosques educational grant program. The application also provides students access to a list of worldwide universities recommended by the ministry.

• King Abdullah bin Abdulaziz Arabic Health Encyclopedia (KAAHE):
This encyclopedia, downloadable as a mobile application, was developed by King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) in collaboration with the Saudi Association for Health Informatics (SAHI). The initiative, which aims to provide reliable medical and health information, is supported by National Guard Health Affairs (NGHA), the World Health Organization (WHO), and Health on the Net Foundation (HON).

• Ministry of Commerce and Industry:
The ministry operates a consumer price index (CPI) application. This application provides daily prices for consumer goods from several retail outlets in different cities nationwide. It also provides information for comparing the prices of necessary commodities from different retail outlets within a city. The application can also be used by consumers to report any violations or price abuses.

• Riyadh Municipality:
A new application called "Municipality 940" automates violation reporting. This application enables a person to send pictures of violations to the Municipality Emergency Center. The sender is also provided with an acknowledgement, while the violation is referred to the competent department for rectification. Another application, Riyadh Directory, integrates digital maps and geographical information for locating sites such as hospitals, parks, government agencies, mosques, restaurants, hotels, universities, malls, and banks in the city.

• Capital Market Authority (CMA):
CMA's mobile application supports both Arabic and English and enables 24x7 usage of CMA tools and information. The application also contains content related to investor awareness to increase awareness and educate citizens on economic and legal issues. Users can communicate with CMA and inquire about rules and regulations using the application.

وزارة التعليم العالي
Ministry of Higher Education

وزارة التجارة والصناعة
Ministry of Commerce and Industry

الرياض

وزارة التعليم
Ministry of Education

King Abdullah bin Abdulaziz
Arabic Health Encyclopedia
Ministry of National Guard Health Affairs - Kingdom of Saudi Arabia

هيئة السوق المالية
Capital Market Authority

4.3.3.2 Application Development Communities in Saudi Arabia

Both STC and Mobily have created independent application developer communities that are supported by device and platform providers including Blackberry, Google, Microsoft, and Nokia. These communities are aimed at providing skills training and support for the development of applications.

Developers are also provided with marketing and publishing support for their applications through these communities and, in some cases, even opportunities to co-brand the applications with the network provider. Applications developed under these programs are published by the network providers on OS-affiliated storefronts or their own storefronts, and the revenue split is mutually agreed with the developer. In some cases, network providers also offer billing integration with these applications, where the application fee is directly charged to the customer's prepaid balance or postpaid bill.

Developers can also participate in various events to gain knowledge and training about the latest SDKs and APIs. These forums in Saudi Arabia are supported by CSPs and device and platform vendors. In May 2012, Qualcomm and Mobily partnered to organize a developer forum to provide technology resources, development tools, and training in order to encourage the creation of new mobile applications for Saudi Arabia. Similarly, STC hosted the first Sports Hackathon in January 2013, which provided amateur and professional developers a chance to develop sports applications.

STC and Mobily have created independent application developer communities aimed at providing skills training and support for the development of applications

4.3.3.3 Financial Support and Recognition for Applications Development

Badir, the technology incubator program launched by King Abdulaziz City for Science and Technology in 2007, has been funding and supporting many projects related to mobile apps development. The program has funded, for example, a startup called Enwani,[58] which has developed a mobile application for use by delivery services that provides addresses and directions based only on the mobile number of the person who places the order. Badir also organizes Startup Weekend events, at which it recognizes entrepreneurial efforts in technology. Examples of applications presented in one such event in April 2013 inlcude Zefaf, a wedding-planning website and application, and Adrs Me, a mobile application that helps customers order goods online by creating a reference number for each location submitted.[59]

In January 2013, Badir also organized a workshop for women application developers in the country though a partnership with the Google Developers Group.[60] Around 350 women interested in programming and technological entrepreneurship participated in the event. Badir has also partnered with STC to establish digital development centers throughout the country to provide developers with the latest information related to application development, as well as a forum for exchanging expertise.[61]

Furthermore, network operators and device manufactures are supporting application developers by providing seed funds and awards, either directly or by sponsoring events that recognize developers' projects. STC has set aside SAR 700,000 to recognize locally developed applications, while Mobily provides support to a few developers with promising ideas but limited financial resources. In December 2012, Zain and Samsung sponsored a contest that recognized applications developed by local developers.[62]

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58 https://enwani.com/about

59 http://www.wamda.com/2013/04/meet-the-winners-of-startup-weekend-jeddah

60 http://ameinfo.com/technology/archive-technology/google-organises-seminar-for-saudi-female-developers/

61 http://www.arabnews.com/%5Btermalias-raw%5D/stc-launches-applications-award-support-developers-0

62 http://www.eyeofriyadh.com/news/details/smartphones-applications-competition-counts-200-saudi-finalists-for-a-remarkable-arabic-contribution

4.4 Summary and Recommendations

Saudi Arabia has a dynamic mobility market. Some elements are well developed, while others require additional maturation. Among the former are the availability of high-speed wireless broadband, growing smart device usage, and consumer and business enthusiasm for mobile applications. As for the less-developed elements, local mobile developers have unclear business models, limited financing, and a lack of skills. Developers, mobile network operators, device manufacturers, and government entities can collaborate in a number of ways to accelerate the pace of development and foster sustainable business models for all players in the ecosystem.

• Application Development Ecosystem:
Active support of and participation in developer communities and forums will provide exposure to industry trends and ideas for innovation. These communities and forums should be established throughout the country. Entertainment, religion, gaming, and social media are promising areas for application development. In addition, developers should actively consider co-branding opportunities with network providers and publishing apps on operator-owned storefronts, as this offers visibility to users and support in sales and marketing efforts, which can help developers, especially small and part-time developers.

• Network Operators and Device and Platform Providers:
CITC recognizes the efforts of mobile network device and platform providers in the holistic development of the mobility industry in the country. Collaboration between these players remains central to the success of mobility services in Saudi Arabia. Network operators, for example, can make mobile data services more affordable and easier to manage for businesses; this in turn would further stimulate smart device usage. Introducing devices at different price points would help low income subjects to acquire mobility capabilities. Device and platform providers' efforts to educate and train local developers go a long way toward helping the development of innovative solutions and services, as well as the discovery of sustainable business models.

• Government Support:
The government can help the mobility ecosystem by mobilizing all government services, which is already happening under the aegis of the Yesser program. Furthermore, it can support mobile development initiatives financially to accelerate the pace of local content and application development in Saudi Arabia, such as the Badir program.

5. Enabling Mobility

This chapters looks into a set of the most important mobility ecosystem enablers identified through this report. Enablers help or hinder existing functions of the mobility ecosystem and mobility business models, and therefore require attention from different mobility ecosystem stakeholders.

5.1 Networks and Devices

As the uses of mobility continue to expand and more people take advantage of them, the enabling networks will have to evolve to support increased demands on coverage, capacity, and speed.

Saudi CSPs are addressing this need by implementing modern mobile broadband technology. Chapter 3 of this report discusses their current rollout of LTE, which uses spectrum more efficiently than previous standards, provides higher broadband speeds and quicker session setup, and enables closer integration with IP applications.

CITC expects that demand for mobile data services will increase to the point at which CSPs will be motivated to increase the density of their networks as well as the speeds, especially in urban areas. This densification will likely include smaller base stations such as femtocells or picocells and carrier WiFi, which shifts traffic from spectrum bands licensed for mobile data to unlicensed, public-use bands. In their capacity planning exercises, Saudi CSPs should keep in mind the needs of the various content and application types that run across their networks. Since the download speed drops in proportion to the distance from the base station, video communications, for example, generally require shorter distances than does Web browsing. As video usage grows, therefore, networks will need to have larger coverage. In-building coverage is another complicating factor.

Devices are clearly another important consideration: Without smart devices, users will miss out on an increasingly important channel for government services, business communications, and content of all types. Without relatively modern smart devices, users are unable to access the highest data speeds provided by the network. In addition to providing a sub-par user experience, outdated devices increase support costs and operational complexity for the network operator. A high penetration of modern smart devices will also create the biggest potential user base for innovative mobile content and services.

Device manufacturers and Saudi CSPs should continue their efforts to get smart devices into as many hands as possible. In recent years, both sides have cooperated to increase the marketing of and subsidies for these devices. In addition, device and chip manufacturers continue to decrease smart device costs.

5.2 Enterprise Mobility

Enterprise mobility improves employees' access to information and job functions, thereby boosting productivity. As Chapter 3 of this report demonstrates, Saudi enterprises and government agencies are currently extending job functions and content to their employees.

By extending the reach of corporate functions and data, organizations inevitably incur additional security risks. They should address these dangers by implementing clear usage policies for their employees and by considering mobile device management solutions that control access to specific functions, separate corporate data from personal data, and provide the possibility of remote device locking and/or data wipes. Properly implemented MDM solutions substantially lower the risk of malfunction and information leakage and can be combined with application administration that includes remote wipe/lock on the application level.

IT organizations in the private and public sectors must also contend with consumerization: Employees expect to be able to use functions in their jobs that match what is available in their personal lives, including social media, file sharing, and video communications. If developers of enterprise applications use interface and functionality models that are familiar from consumer applications, they will see the benefits of faster learning cycles and increased employee adoption.

The BYOD paradigm is also well established, but to address the security dangers that result from the use of consumer devices for business purposes, organizations should establish BYOD policies that spell out permitted access and procedures in case of lost devices or security breaches.

The research conducted for this report indicates that SMBs lag behind larger organizations in implementing such policies. Since security breaches can be dangerous to organizations of all sizes, CITC recommends that all businesses develop BYOD policies. This development need not be complicated nor time consuming: Templates and advice for most situations are readily available on the web. CSPs and technology services companies should also consider developing mobility management solutions for the SMB market that are affordable and easy to administer.

Organizations should also consider the various audiences for their mobility development. Employees are generally the first stakeholders to be served by enterprise mobility, but global trends see businesses increasingly developing mobility applications for partners and customers alike.

5.3 Content and Applications

While advances in technology will make it progressively easier to optimize Web content for mobile devices, dedicated applications will be the preferred way to present content on smart devices for the next several years. Applications can provide content and functionality even when the device has no access to wireless connectivity and can take advantage of native smart device capabilities like touch screens, GPS, accelerometers, and other sensors.

Mobility applications create opportunities for all players in the mobility ecosystem. Businesses should think of applications as potential new revenue streams, sources of new efficiencies, or both. For governments, they represent a new channel for citizens to access public services and information. Applications have also created a new market for developers, expanding the user segments, devices, and usage cases they can serve with their programs. CSPs can benefit in two ways: First, more applications leads to more network usage. Second, CSPs are natural channels to market for these applications and can capture a percentage of the proceeds.

CSPs should thus pay close attention to the ways they can enable the application ecosystem. Application stores which can be co-branded and co-developed with partners are the most important option in achieving this goal. Another is to encourage developer communities, whether by sharing knowledge or by providing financing.
Another is to encourage developer communities, whether by sharing knowledge or by providing financing. Such developer outreach can result in competitive differentiation for the CSP via unique content and functionality.

STC and Mobily have both launched application stores, offering thousands of applications. In addition, CSPs are starting to provide billing options for applications available through their stores, processing application fees through their regular billing systems. This capability is vital to the development of small application providers, since acquiring their own transaction processing capability is time consuming and expensive. In addition, because carrier billing is easy for the consumer, it encourages more application purchases.

As we pointed out in Chapter 4, Saudi users have expressed the need for more local-language content and Saudi-specific applications, including religious applications. Government, enterprises, and CSPs can all encourage the development of content and software engineering skills via contests, seed funding, co-promotion, development platforms, and direct support. Chapter 4 presents examples of these efforts by Saudi Arabia's government and other Middle Eastern governments. Saudi CSPs are also partnering with application developers to generate unique content. STC and Mobily have co-developed applications that offer local sports and religious content, and STC has partnered with Future Workshops to develop the MySTC account management application.[63]

63 http://www.futureworkshops.com/case_studies/saudi-telecom.html

5.4 Security and Privacy

As discussed in Chapter 3, fears about the security of personal or business data are one of the biggest inhibitors to mobility adoption. In addition to the general data security concerns related to Internet usage, some concerns are specific to smart devices: because they are mobile, they are more likely to be lost; they can provide access to, and misuse of, the owner's personal information. Meanwhile, on the infrastructure side, mobile networks are critical systems that must be protected from intrusions.

Security and privacy concerns affect all participants in the mobility ecosystem. Enterprises must secure their own data as well as that of their partners and customers. As organizations adopt mobile device and application management functionality, they must also keep their devices and systems updated and patched. For their part, CSPs are seeking to safeguard customer data, and maintain robust networks.

Just as important is user education, including best practices regarding software updates and patches, the use of lock screens and passwords, the installation of "find my device" applications, and regular and automatic backups. These best practices require regular reiteration and reinforcement, to go side by side with the technological developments.

5.5 Costs

Whether actual or perceived, costs are one of the primary determinants of mobility adoption. Many of the considerations in this report have a cost component: Smart devices continue to drop in price but are still unattainable for low-income residents. Businesses incur additional operational costs in managing their mobile solutions, employees, and device bases. The potential costs of a security breach must be balanced against the current costs of usage restrictions and mobility management solutions.

The most obvious ongoing cost factor for users is connectivity fees paid to network operators. To support growth in the use of mobility, costs per unit of bandwidth mobile communication services will have to continue to drop. Fortunately, modern network technology and IT systems should continue to lower costs for Saudi CSPs by lowering support costs and by increasing the efficiency of spectrum usage. In turn, as usage increases, elasticity of demand for connectivity should ensure that CSPs realize higher profits on their connectivity services.

Beyond basic connectivity costs, CSPs can lessen the impact of cost on mobility adoption through intelligent billing and tariff design. A large perceived risk among individual subscribers is "bill shock," when a user receives a much higher bill charge than anticipated. Such shocks most commonly derive from international roaming, but they can also happen when mobile data usage within a specific period exceeds the quota included in the subscriber's postpaid tariff.

Bill shock can be lessened or eliminated by proactive alerts, usage and expenditure caps, and intelligent tariff design. The European Union, for example, has implemented strict regulations against bill shock: Since July 2010, EU subscribers have been unable to use more than 50 Euros' worth of mobile data roaming services unless they have previously selected a different cost limit. EU CSPs are also required to send alerts to their subscribers when they have used 80% of that allotment. Once anti-bill shock measures are in place, CSPs should educate their user bases about them; fear of excessive charges is a powerful usage inhibitor.

Credit limit policy is currently applied in the Kingdom, and certain service providers apply the alert messages service. In 2013, CITC approved several tariff packages to cut roaming costs for Saudi citizens, including packages for students studying abroad and families on vacation, and further encouraged Saudi CSPs to provide promotional discount offers. CSPs also limit roaming bill shock directly by selling international data services on a prepaid basis.
Competition generally leads to lower prices, and CITC has also taken several measures in this regard. Most notably, to expand the market beyond the three licensed mobile network operators, CITC has licensed in 2014 MVNOs, who will lease capacity from the network operators and apply to it new customer segmentation and service design. In 2013, CITC approved mobile number portability policy, which will also decrease carrier lock-in, thus increasing competition on price and customer experience.

Finally, the structure of tariff plans can significantly affect both connectivity expenses and the associated management costs. CITC's interviews show that Saudi businesses would like their CSPs to offer enterprise-level mobile tariffs rather than individual tariffs for each employee. Tying mobile data usage to an individual increases the management burden on the company and may result in unnecessary overage charges and unused allocations. Similarly, families and businesses alike could benefit from "bucket plans" that spread a data allocation across multiple devices, including smartphones and tablets, and/or multiple users. This group-based usage makes capacity planning more efficient for the purchaser.

5.6 Summary and Future Outlook

Saudi Arabia has a high penetration of smart devices and is deploying state-of-the-art mobile broadband networks. Users are familiar with mobile applications and use their devices extensively. As we pointed out above, however, room for improvement remains in terms of content, security, management, penetration, ease of use, awareness, and best practices.

The Saudi government can encourage the mobility ecosystem in several ways. In addition to regulatory measures, it can boost mobile application development by encouraging the use of mobility applications in area such as education and healthcare, thereby creating a critical mass of skilled developers and educated users. The Yesser program has already made good progress in this area.
It can also institute public-private partnerships at all tiers of government to identify and fund innovative mobile development initiatives.

In its surveys, CITC asked businesses and individuals what CSPs and the government could do to encourage the adoption of smart devices. The results are displayed in Figure 8 and Figure 9. Business users strongly supported a government role, voicing the need for supporting skills development, mobile extensions of e-government services, and adopting mobility within government. Other options that scored highly were increasing data security and privacy by implementing and enforcing regulations, improving network quality and availability, and incentivizing local companies to develop applications for smart devices.

Among individuals, desires were more diverse, but the cost of mobile Internet topped the list, followed by network concerns and device security.

Figure 8: Initiatives Recommended by Businesses[65]

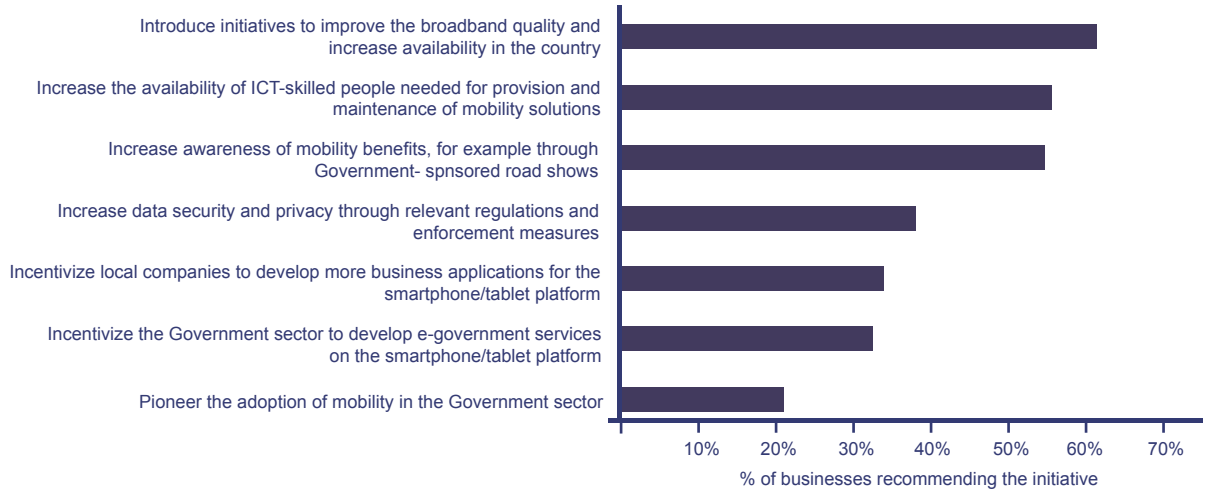
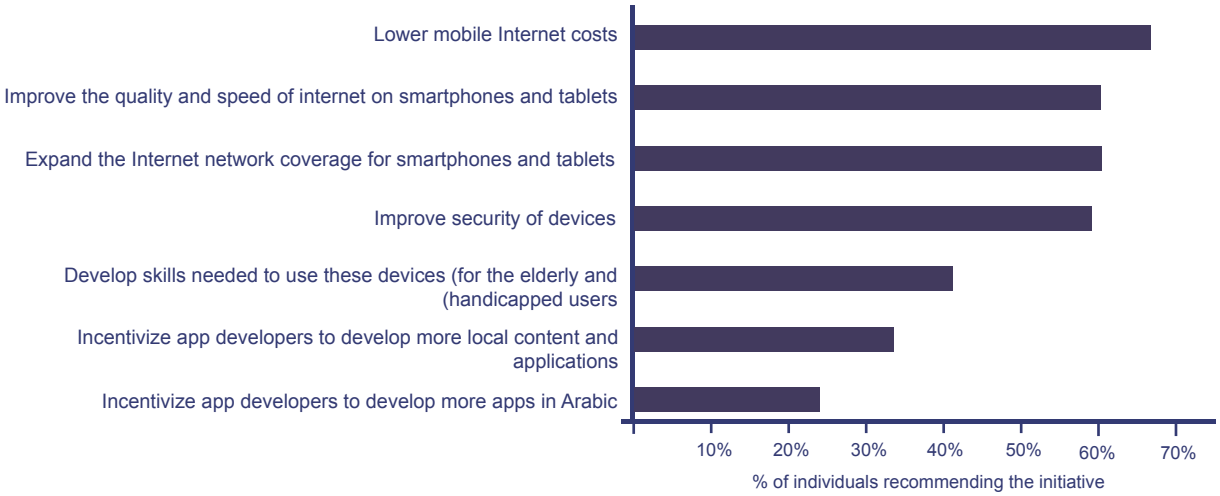


Figure 9: Initiatives Recommended by Individuals[66]



65 CITC Mobility Survey (businesses), 2013

66 CITC Mobility Survey (individuals), 2013

Appendices

Appendix A: Methodology

In order to map the current state of ICT in Saudi Arabia and to assess the current developments and challenges related to the mobility ecosystem, CITC conducted extensive primary and secondary research.

Primary Research

CITC conducted 1,324 interviews with private companies and government organizations to measure the penetration of mobility technologies in Saudi Arabia. The survey was undertaken in April 2012 on a representative sample of organizations using the Internet. CITC also conducted 1,324 interviews with Saudi residents to measure the penetration of smart devices and mobility services used by individuals in the country.

In addition, CITC carried out 493 in-depth interviews with Saudi public and private organizations to collect quantitative data about adoption, drivers, and inhibitors related to mobility services; the interviewed organizations included only companies using a mobility solution. Furthermore, 642 full in-depth interviews were conducted with individuals who use smart devices to explore their usage and attitude patterns. The data was collected in April 2012.

CITC also conducted in-depth face-to-face interviews with 33 organizations representing telecommunications companies, application developers, large public and private companies, and regulatory bodies to understand their views and to collect quantitative insights into the mobility ecosystem in Saudi Arabia.

Secondary Research

CITC performed in-depth and wide-ranging secondary research and examined a number of existing studies on the ICT sector in Saudi Arabia, as well as international sources documenting the progress similar countries have made and the best practices they have adopted.

Appendix B: Definitions

The following definitions are only for the purpose of this report.
Telecommunications Services: Telecommunications services, in the context of this report, are defined as the delivery of voice and data networking capabilities via access to the network infrastructure operated by service providers. Typically, this takes the form of subscription and usage fees paid by individuals and organizations to telecommunications operators for access to fixed-line and wireless network services. This can include traditional voice services, Internet access, and mobile connectivity services.

ICT Hardware: Any technological equipment used for voice communications or in the processing of information in the form of data (input, process, output, communication, and storage). It includes computer systems (client and server devices), system peripherals (printers, handheld devices and smartphones, and other add-ons), storage hardware, and network equipment.
IT Services: The provision of labor-based services, which assist individuals and organizations in the implementation, management, and operation of computer systems, peripherals, storage, network equipment, and software. Organizations providing IT services typically deliver some or all of a variety of services ranging from support to complete IT operations, management, and outsourcing.

Packaged Software: Packaged software covers programs or codesets of any type commercially available through sale, lease, or rental or as a service. Packaged software includes application software, system infrastructure software. and application development and deployment tools. Packaged software also includes the implicit value of software included in a service that offers software functionality via a different pricing scheme.

Smart Devices: Tablets and smartphones, almost always with touch screens and able to run applications featuring graphic interfaces, on-device processing, and rich media.

Mobility: Mobility is the ability to use easily portable devices to access services and content, irrespective of changes of the location or technical environment.

Mobility Applications: Mobility applications are the software installed on smart devices, through which services and content could be reached.

Over the Top (OTT) is a delivery of IP based voice, video and text services utilizing the connectivity network infrastructure of fixed or mobile communications service providers (CSPs), but without any involvement of CSPs in the service creation and distribution. In general, OTT services are delivered over the internet utilizing web-based and/or mobile applications.

Service Level Agreement (SLA): An SLA is a legally binding document detailing the level of services provided by a service provider to a customer.
examined a number of existing studies on the ICT sector in Saudi Arabia, as well as international sources documenting the progress similar countries have made and the best practices they have adopted.

Appendix C: Abbreviations

BYOD: Bring your own device

CAGR: Compounded annual growth rate

CITC: Communications and Information Technology Commission

CRM: Customer relationship management

ERP: Enterprise resource planning

GDP: Gross domestic product

GPS: Global Positioning System

HRM: Human resource management

ICT: Information and communications technology

MDM: Mobile device management

NRI: Network Readiness Index

OTT: Over the top

SLA: Service level agreement

VOIP: Voice over internet protocol

Appendix D: Table of Indicators

	Indicators	Value	Source
1	ICT spending in KSA (2012)	SAR 94 billion	ICT Indicators 2012, CITC
2	ICT spending year-on-year growth (2011–2012) in KSA	13.9%	ICT Indicators 2012, CITC
3	Telecommunications service spending in KSA (2012)	SAR 61 billion	ICT Indicators 2012, CITC
4	Hardware spending in KSA (2012)	SAR 21.7 billion	CITC studies and analysis, 2013
5	Packaged software spending in KSA (2012)	SAR 3.4 billion	CITC studies and analysis, 2013
6	IT services spending in KSA (2012)	SAR 7.9 billion	CITC studies and analysis, 2013
7	ICT spending as % of GDP in KSA (2012)	2.75%	ICT Indicators 2012, CITC
8	ICT spending per capita in KSA (2012)	SAR 3,219	CITC studies and analysis, 2013
9	ICT spending forecast for KSA (2017)	SAR 138 billion	CITC studies and analysis, 2013
10	ICT spending CAGR forecast for KSA (2012–2017)	8.1%	CITC studies and analysis, 2013
11	Total number of mobile subscriptions in KSA (2012)	51 million	CITC ICT Indicators 2013
12	Total number of internet users in KSA (2012)	16.5 million	CITC ICT Indicators, 2013
13	Internet penetration in KSA (2012)	55%	CITC ICT Indicators, 2013
14	Number of fixed broadband subscriptions in KSA (2012)	2.92 million	CITC ICT Indicators, 2013
15	Fixed broadband penetration KSA (2012)	45.5%	CITC ICT Indicators, 2013