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GSMA MOBILE ECONOMY ASIA-PACIFIC 2013

Author / organisation	GSMA / Boston Consulting Group
Year recorded	2013
Region	Asia-Pacific
Category	Economic
Archive page	kiwanja.net/mobile-database/gsma-mobile-economy-asia-pacific-2013/

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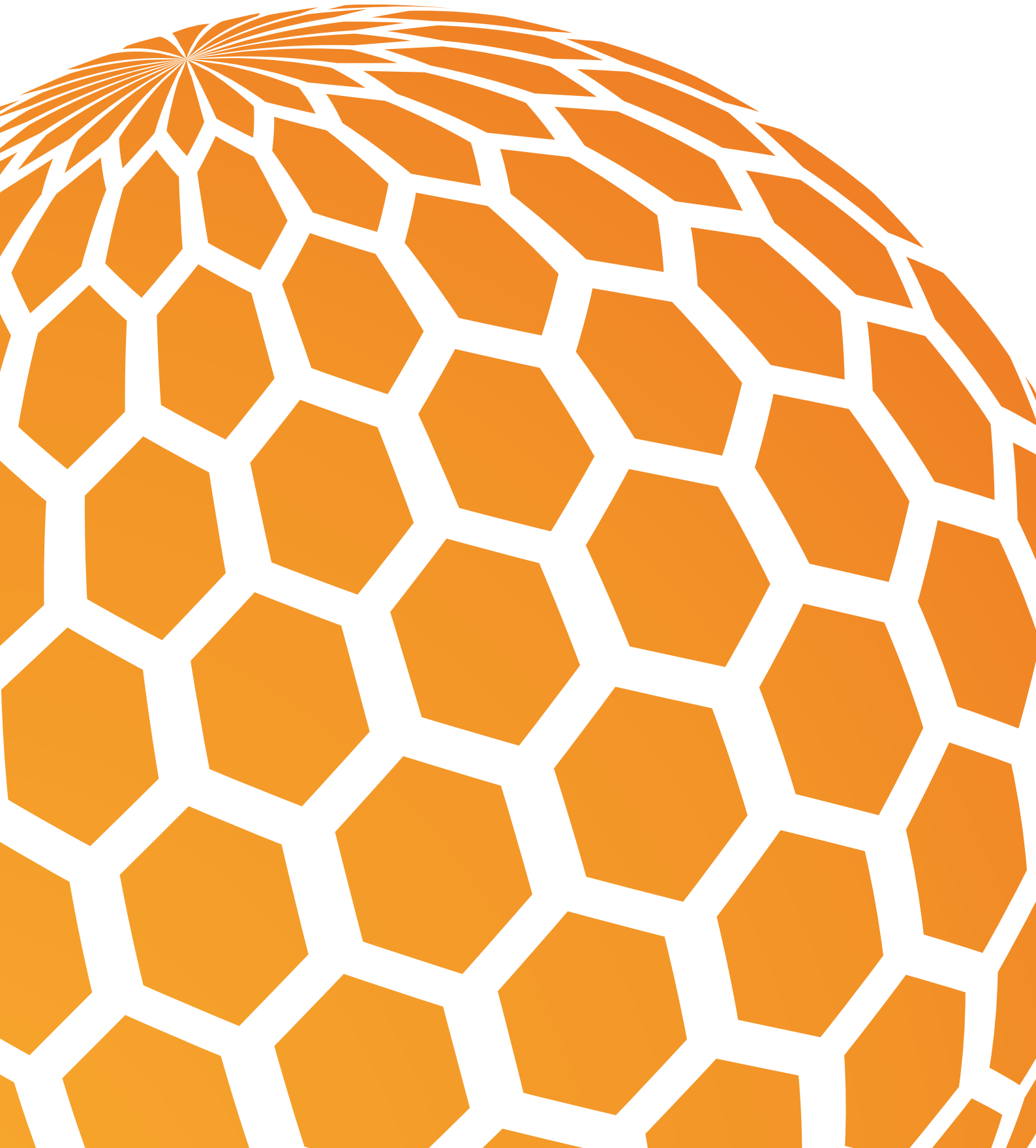
The Mobile Economy Asia Pacific 2013



The **GSMA** represents the interests of mobile operators worldwide. Spanning more than 220 countries, the **GSMA** unites nearly 800 of the world's mobile operators with more than 230 companies in the broader mobile ecosystem , including handset makers, software companies, equipment providers and Internet companies, as well as organisations in industry sectors such as financial services, healthcare, media, transport and utilities. The **GSMA** also produces industry-leading events such as the Mobile World Congress and Mobile Asia Expo.

For more information,
please visit the **GSMA** corporate website
at www.gsma.com

or **MOBILE WORLD LIVE,** the online portal for the mobile communications industry,
at www.mobileworldlive.com

This report has been prepared by the Boston Consulting Group and the opinions and conclusions expressed are those of BCG alone and do not represent official GSMA viewpoints.

In this report we provide an overview of the situation in Asia Pacific with some numbers used from GSMA Intelligence amongst others and reflect the situation as of March 2013.

GSMA

MOBILE ASIA EXPO

亚洲移动通信博览会

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Introduction and key messages

The rapid spread of mobile technology across the Asia Pacific region has had a profound socio-economic impact on the economies of these countries.

Not only is this impact profound—it is also broad, spanning many aspects of economic, policy and social life in the region, making a striking contribution to everything from gross domestic product (GDP) growth, job creation and the generation of tax revenues. Contribution of the mobile ecosystem to the Asia Pacific GDP (in 2012) was nearly US $1 trillion, generating nearly 16 million jobs across the mobile industry. Further, mobile technology played a key role in improving quality of life through improved access to key services such as healthcare and education.

Sustainable Development - Today and Tomorrow

Looking towards 2020, the mobile ecosystem's contribution keeps building

Figure 1

GDP

2012 **1Tn** US $**1 trillion** GDP impact

2020 **3.3Tn** US $**3.3 trillion** GDP impact

EMPLOYMENT

2012 **16M** **16 million** jobs created by mobile industry and points of sale

2020 **22M** **22 million** jobs created in mobile industry and points of sale

PUBLIC FUNDING

2012 **100B** US $**100 billion** contribution to public funding, in addition to spectrum licenses

2020 **300B** US $**300 billion** contribution to public funding, in addition to spectrum licenses

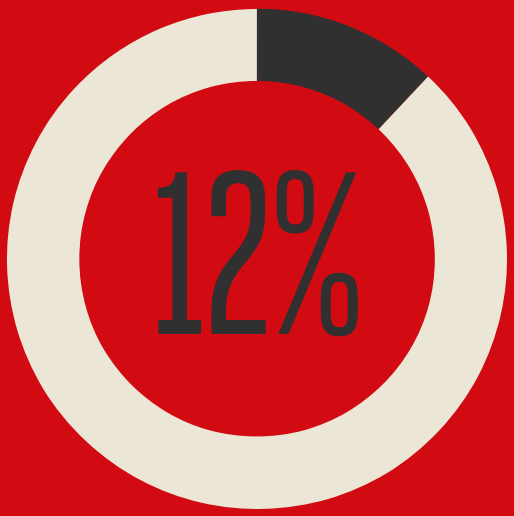
EDUCATION

2012 **50%** proficiency improvement in key subjects[1]

2020 **+20%** employable students from improved grades[2]

1. Based on previously unbanked baseline 2020 estimates: India 12%, Bangladesh 10%

PERSONAL FINANCE



2012 **1%** financial inclusion in developing countries[1]

2020 **12%** financial inclusion for 2020[1,2]

1. Based on previously unbanked baseline 2020 estimates: applicable for cluster C countries
2. NASSCOM digital survey, WSJ, AICTE; NASSCOM digital survey, Microsoft Learning, BCG analysis

CIVIL SOCIETY

2012 1.5B **1.5 billion** connected people by mobile

2020 2.1B **2.1 billion** connected people with mobile

ENVIRONMENT

2012 600M CO2 reduction from **600M** high-mobility workers and farmers

2020 1 Billion CO2 reduction from **1 Billion** high-mobility workers and farmers

INFRASTRUCTURE

2012 80B US $**80 billion** investments in infrastructure

2020 240B US $**240 billion** investments in infrastructure

Yet, what is also notable is the diversity of impact across different Asia Pacific countries.

On one hand, in emerging markets such as India and Bangladesh, the impact of mobile technology is concentrated around the provision of access to previously excluded sections of population i.e. in making a service such as healthcare, education or finance accessible and affordable to all.

On the other hand, the impact for many industrialised countries like Japan, South Korea and Australia is instead focused around greater convenience to the consumer via services such as mobile banking and also on improved quality of life and reduced costs to the end user through services such as remote healthcare and remote learning.

CLUSTER A	CLUSTER B	CLUSTER C
Industrialised markets	**Other emerging markets**	**Gradually emerging markets**
SUCH AS JAPAN, AUSTRALIA AND KOREA	SUCH AS MALAYSIA AND INDONESIA	SUCH AS INDIA AND BANGLADESH

EDUCATION

50%

PROFICIENCY IMPROVEMENT IN KEY SUBJECTS

In this report we have closely examined the impact of mobile solutions across four key sectors: Agriculture, healthcare, education and financial services.

Additionally, to capture the diversity of impact across different countries, we have divided the region into three clusters

For, lower socio-economic income groups (in cluster B and C countries), mobile solutions are improving economic prospects by improving financial inclusion, reducing mortality rates, increasing access to healthcare and education and improving the quality of education.

Socio-economic impact of mobile technologies

DEVELOPING COUNTRIES

FINANCIAL SERVICES

- 12% increase in financial inclusion in developing countries[1]
- Reduce income uncertainty
- Ease expense shocks
- Reduce fraud and economic leakage

HEALTHCARE

- Save lives through improved healthcare information and education
- Expand twofold the access to healthcare in rural areas
- Improve treatment of communicable diseases by 70%[2]

AGRICULTURE

- Lower price volatility with 50-60% benefit[3]
- 10-15% increase in farmer income[4]
- 5% lower consumer prices[3]
- Improve farm production

EDUCATION

- Up to 50% increase in student proficiency[5]
- Up to 65% cost reduction of education[6]
- Improve employability

1.India and Bangladesh | 2. up to 70% improved compliance for TB | 3. Source: Overview of ICT in Agriculture – InfoDev World Bank Group | 4. Source: "Mobile Applications in Agriculture" (2011) – Syngenta Foundations; GSMA mAgri Nokia Case Study; GSMA Nokia Case Study | 5. Source: Indian Express; HIWEL web portal; Khan Academy Web portal | 6. Source: Literature research, analyst Report, cram school for undergrads who plan to enter Medical (MEET) or Dental (DEET) graduate program

Figure 2

For the higher income groups (clusters A and B), mobile devices deliver a richer set of services more through a convenient and accessible platform, often lowering the cost of healthcare, improving the quality of both healthcare and education and making financial services available at the touch of a keypad.

DEVELOPED COUNTRIES

FINANCIAL SERVICES

- Increases convenience
  - Alternative transaction methods
  - Contactless payments
- Reduces fraud
- Potential to reduce costs
  - 70% reduction in merchant fees[3]

HEALTHCARE

- Potential to reduce costs of healthcare system
  - 25% savings in elderly care[1]
  - 60% reduction in hospital nights[2]
- Improves quality and efficiency of healthcare
- Empowers public to prevent and manage non-communicable diseases

AGRICULTURE

- Improve tracing of organic products through supply chain
- Remote monitoring of crops in isolated locations
- Access agronomy information via smart-phone apps

EDUCATION

- Improves teaching methods
- Reduces cost of private tutoring and supplemental courses
- Skill improvement via collaborative platforms

1.In elderly assisted homecare via remote monitoring trial in Scotland from Healthier Scotland 2. Based on Chronic Obstructive Pulmonary Disease (COPD) home rehabilitation trial in Nordics 3. According to Raiffeisen Bank on their Cardmobile service, source: NFC world

Figure 3

Private sector investments key to delivering future impact.

However, mobile network operator investments have flattened recently after many years of sustained increases. Regulators and governments therefore need to consider how to create a conducive regulatory environment as this directly relates to the attractiveness of a given market and influences an operator's ability and willingness to invest in the region.

Regulatory changes are key to unleashing potential.

Three regulatory themes are pivotal to the creation of a conducive regulatory environment.

Firstly, there is a need for creating a transparent and stable regulatory regime that engages all stakeholders in policy making. Such a regime provides the stability and confidence needed for making long-term investments. Within Asia Pacific, New-Zealand provides a good case study for stakeholder engagement and road-map stability.

Secondly, there is a need to create a robust spectrum management approach. This involves decisions on multiple aspects of spectrum management, ranging from the pricing of spectrum to the availability of spectrum to operators. Furthermore, approaches to technology-neutrality and decisions around trading, sharing and spectrum consolidation are all additional considerations for spectrum management. In this report we have looked at best practices across Asia Pacific countries as well as countries outside the region in order to articulate suggestions for regulators. In summary, best practices include the alignment of spectrum prices to revenue per user, making large chunks of spectrum available across bands so as to ensure seamless roll-out of next generation technologies, the promotion of technology-neutral spectrum licensing and the continued support of trading, sharing and consolidation of spectrum.

Thirdly, there is a need to ensure that the regulatory costs of doing business do not get out of hand. Firstly, there is a need to align taxes to global benchmarks and revisit sector-specific taxes. While some countries, such as Bangladesh and Pakistan, have very high tax rates others such as Myanmar, have disproportionately high consumer-facing taxes (for example, SIM taxes) that are holding back the growth within the sector.

Similarly, there is a need to revisit commitments to the Universal Service Obligation Fund (USOF) in the wake of un-utilised funds, progress made in improving voice connectivity in rural areas and the unprecedented pressure on margins that network operators are facing. There is an opportunity to explore alternate constructs such as public-private partnerships that have worked well in other parts of the world. Furthermore, within the construct of the USOF, it is important to calibrate funding commitments (as a percentage of overall revenue) following best practices from other parts of the world (e.g. Columbia).

Norms for radio frequency (RF) exposure is another area of regulation that has seen ever-increasing compliance costs in recent times. Given the scientific evidence available regarding the adequacy of current norms to protect health of consumers, further step up is not warranted and could adversely impact cost and quality of service.

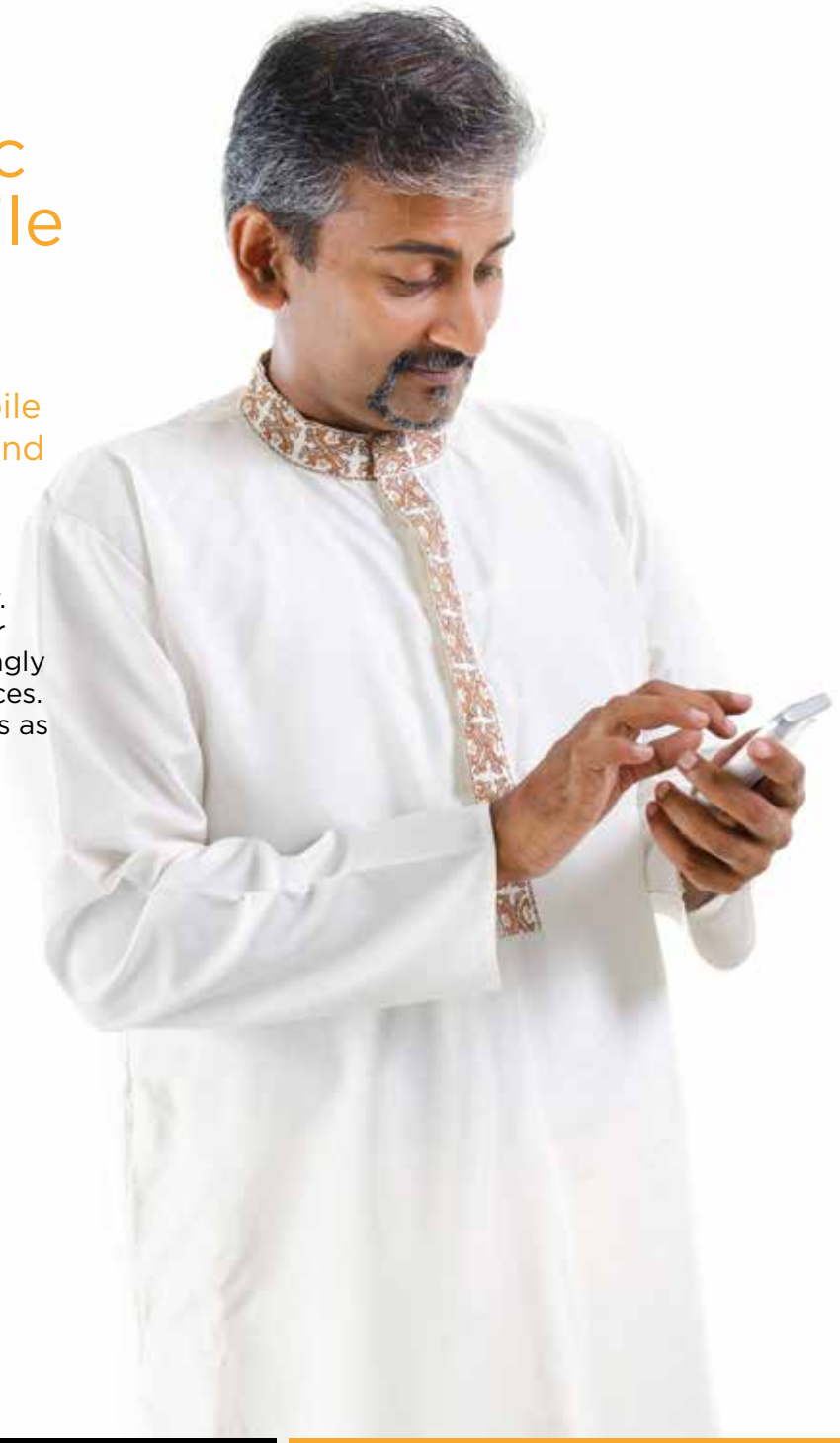
Lastly, there is also a need to take a judicious stance on addressing the customer's concerns around privacy. Global best practice suggests that a mix of self-regulation with light touch policing could hold the answer.

Why mobile matters in the Asia Pacific region

A. The overall socio-economic impact of mobile

Mobile is now at the heart of communication today – from personal communication, mobile commerce, to entertainment and professional productivity.

Furthermore, mobile has become an integral part of everyone's lives today. At work or at home, while traveling or looking for information – we increasingly rely on mobile applications and services. This is true both for smartphone users as well as feature phone users.

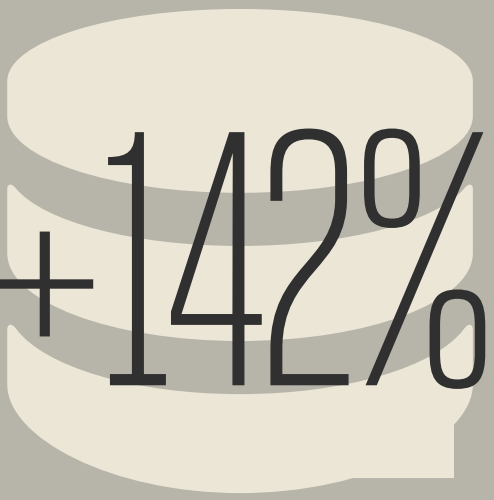


WHY MOBILE MATTERS IN THE ASIA PACIFIC REGION

The key trends emerging in the mobile ecosystem include:

A STRONG GROWTH OF DATA AS VOICE TRAFFIC SLOWS DOWN ACROSS THE ASIA PACIFIC REGION

Voice traffic growth slowing down to around 6% p.a. across Asia Pacific



...while **data** is increasing significantly

B GREATER AFFORDABILITY OF MOBILE SERVICES

Reduced price per minutes sharply across Asia Pacific

... and increasing number of subscribers

C MUCH GREATER SOCIO-ECONOMIC IMPACT THROUGH COLLABORATIVE PLATFORMS AND MOBILE-ENABLED SERVICES

FINANCIAL SERVICES | HEALTHCARE | EDUCATION | AGRICULTURE

D ENTRY OF NON-TRADITIONAL PLAYERS IN THE ECOSYSTEM

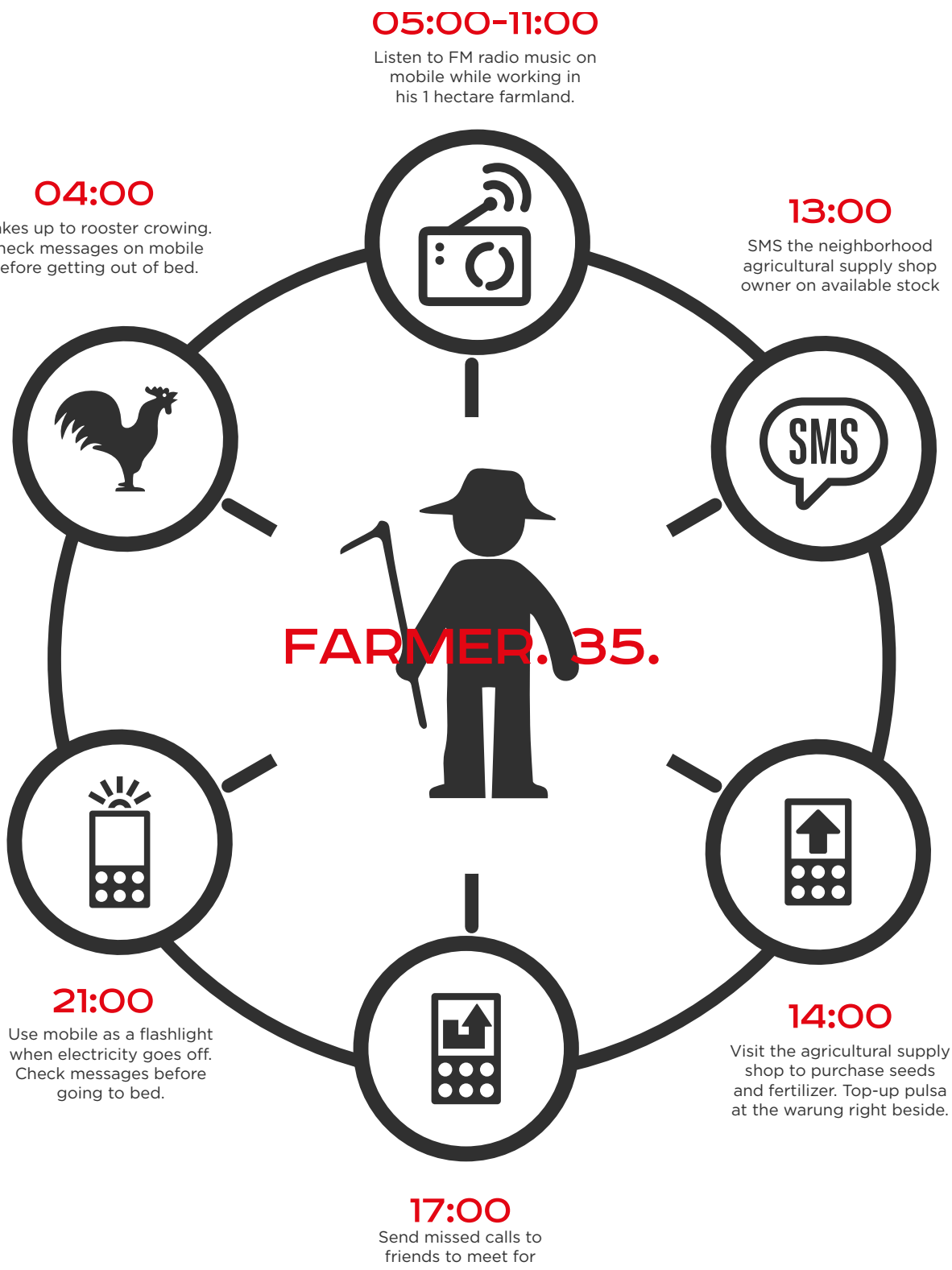
Emergence of many 'new' competitors with strong capabilities bodes well for innovation and end customers

CREATE CONTENT	NHK, Adobe, Star World, detikcom, Yahoo!, Universal
DEVICE, HOME NETWORK & LAN	Apple, Motorola, Samsung, HTC smart mobility, Nokia, Lenovo, BlackBerry, Sony
END USER SERVICES & APPLICATIONS	Melon, Google, YouTube, Mode, Microsoft, Skype, SAP, facebook
ENABLING SERVICES & PLATFORMS	Sybase, PayPal, VISA, MasterCard
NETWORK	SK telecom, NTT docomo, maxis, So-net, Telstra
DATACENTERS	IBM, hp

Mobile in the Middle

Our lives are becoming more connected, more mobile.

ROLE OF MOBILE IN FEATURE PHONE USERS' LIFE



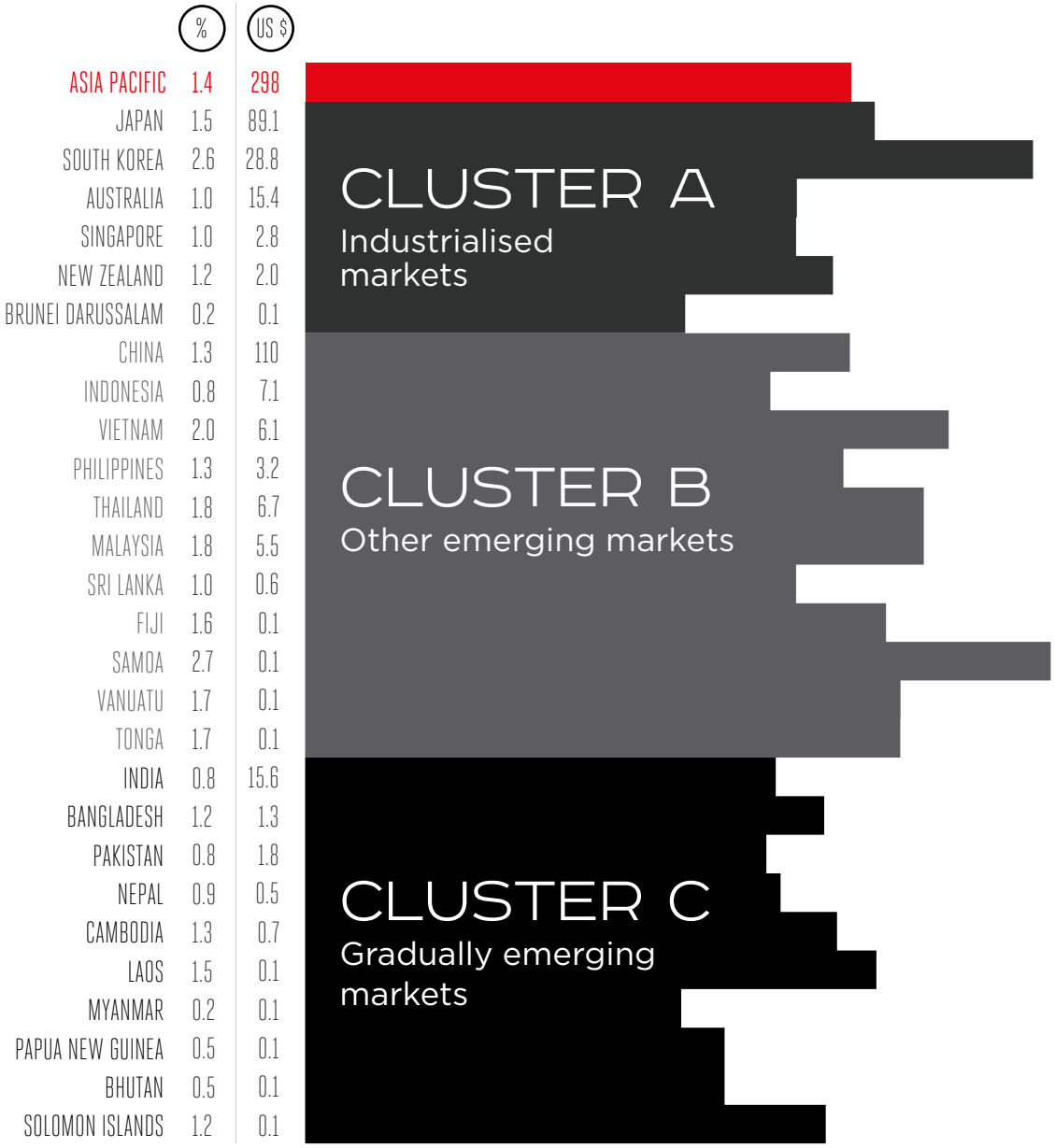
Source: BCG

Figure 5

GDP Impact

In 2012, mobile operators contributed 1.4% to GDP across the Asia Pacific region. This included a direct mobile operator value added of US $298billion. The full mobile ecosystem contributed 1.6% or US $351 billion to GDP across Asia Pacific.

IMPACT OF MOBILE ECOSYSTEM IN ASIA PACIFIC



1. Mobile operator value add is approximated as Revenue - Cost of sales for selected operators in South Korea, Indonesia, Malaysia and India, and extrapolated using total country revenues. Note: Consistent data missing for Afghanistan, Cambodia; Maldives, Iran and Vietnam. Source: GSMA Intelligence; BCG Analysis

Figure 6

In addition to direct contributions through mobile network operators and the extended ecosystem, mobile plays a key role in improving productivity of workers in the formal and informal sectors. This is through a combination of reduced commuting time, better connectivity, and improved access to pricing and market information, enabling cost reductions and profit maximisation.

Our analysis indicates that an additional 3 percent in GDP was accrued in 2012 to Asia Pacific countries from the increased productivity brought on by mobile technology, with a US $641 billion contribution across formal and informal sectors.

For the formal sector, the improvement is an additional 2.6 percent in GDP, with high-mobility users found to experience most productivity gain from use of mobile phones (4% productivity improvement in developed countries, and as much as 8% for emerging countries). With nearly 34.4% of Asia Pacific workers classified as mobile workers in 2012, this translates to a 7.5% productivity improvement for mobile workers.

For the formal sector, the productivity improvement translates to an additional 0.4 percent of GDP, with a 5 to 10 percent productivity improvement assumed in smallholder agriculture, 5 percent from improved production in clusters B and C and 5 percent from reduced waste in cluster C.[1]

Total GDP Impact

This translates to a total GDP impact from mobile of nearly US $1.1 trillion, which is 5% of Asia Pacific's GDP.

TOTAL GDP IMPACT OF MOBILE ECOSYSTEM 2012

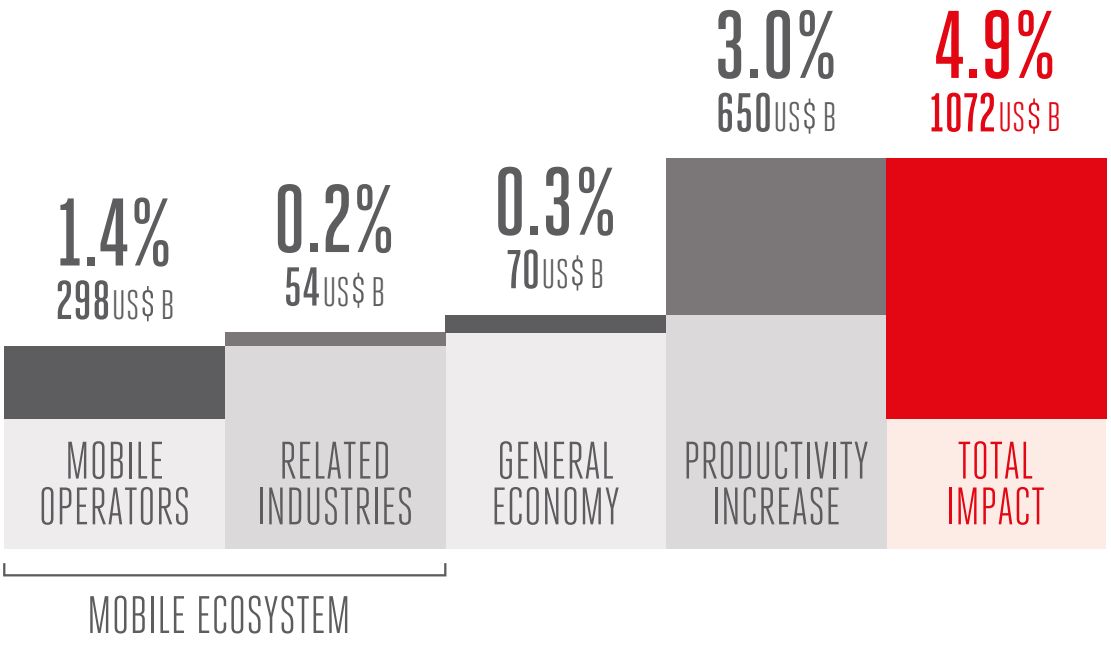


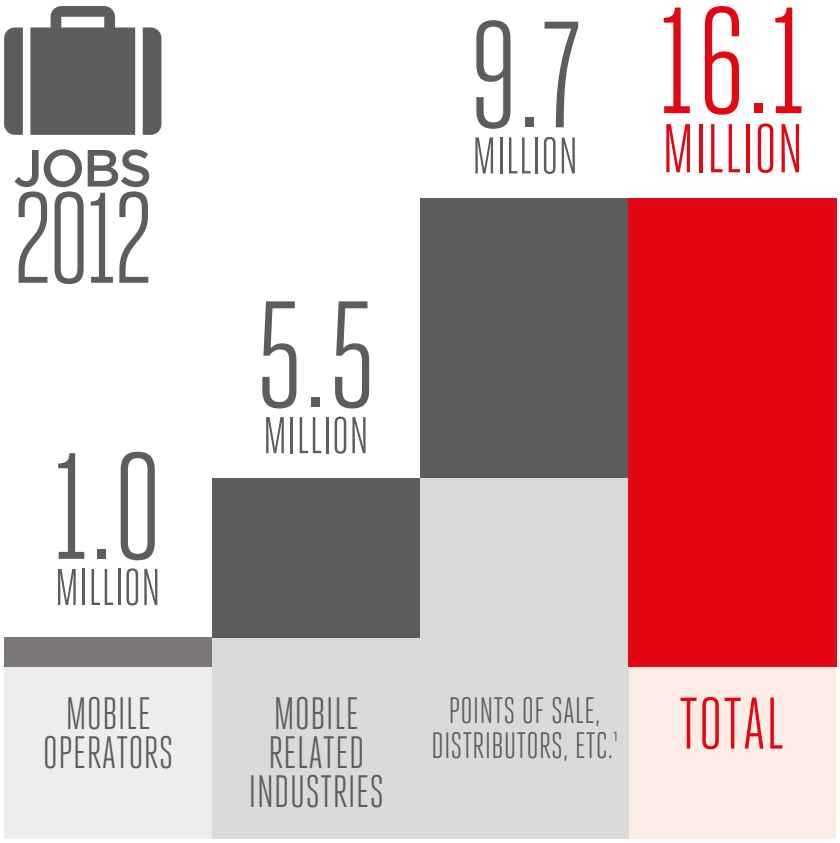
Figure 7

1. Total waste reduction, including supply chain wastage, wastage in harvest etc.

Jobs

The mobile ecosystem is also expected to contribute approximately 16 million jobs across Asia Pacific. This includes 6.4 million jobs directly attributable to the mobile ecosystem and an additional 9.7 million jobs across points of sale, distributors etc.

CONTRIBUTION OF MOBILE ECOSYSTEM TO JOBS



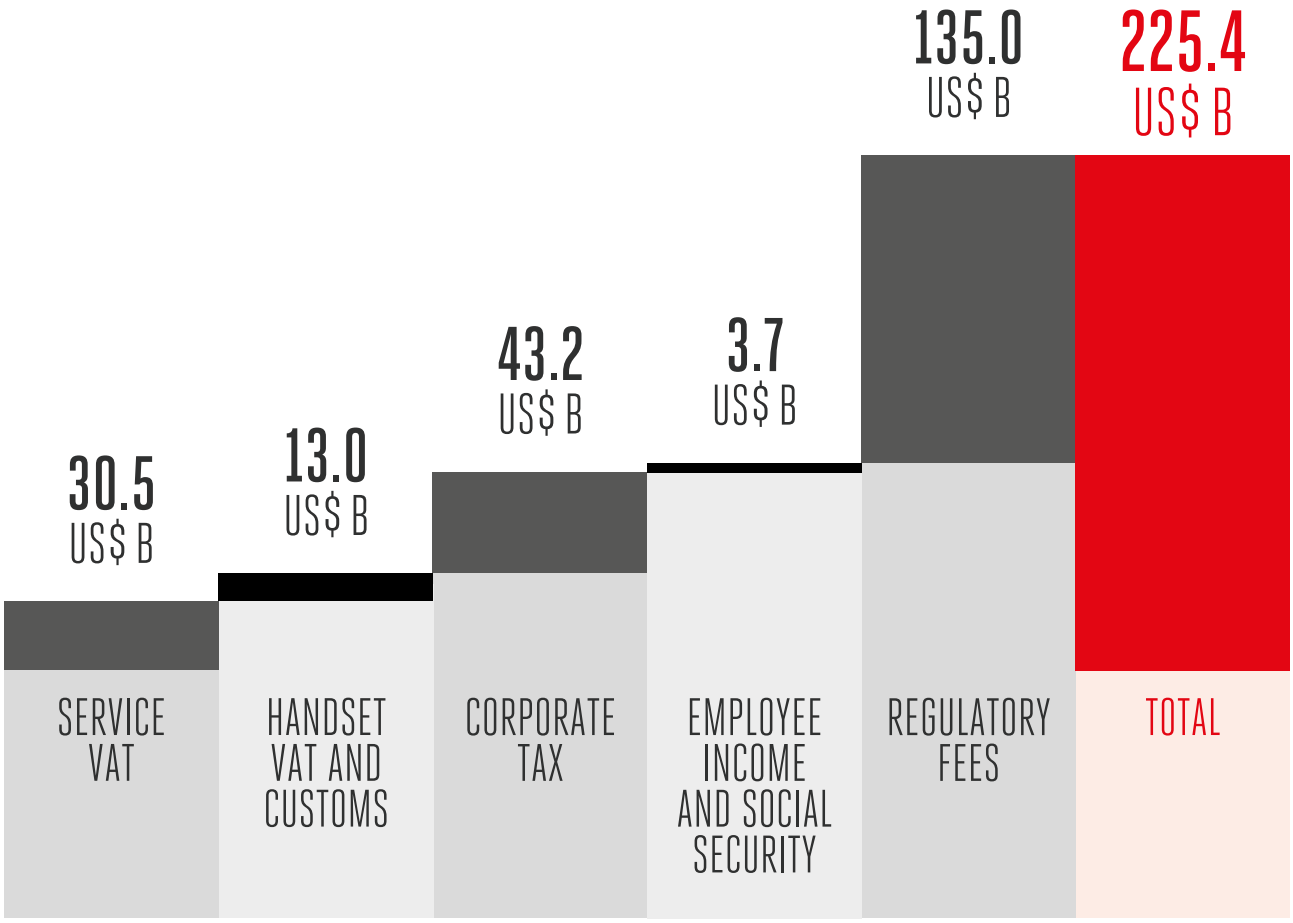
1. Assuming an average 1.5x multiplier between mobile ecosystem employees and indirect jobs from points of sale, distributors etc - GSMA. Source: GSMA Intelligence; EIU; GSMA; BCG analysis

Figure 8

Public Funding

The mobile ecosystem contributes significantly to public funding. This includes value-added tax (VAT) on mobile services[2], VAT, import duties and other special taxes on handsets, corporate taxes applied to the mobile ecosystem revenues, employee taxes applied to the people working in mobile ecosystem and regulatory fees. The overall contribution in 2012 is estimated to have exceeded US $225 billion.

CONTRIBUTION TO PUBLIC FUNDING BY MOBILE ECOSYSTEM



Note: 2012 estimates. Excluding US $135B annual regulatory fees, in addition to lump sum payments from spectrum auctions
Source: GSMA Intelligence; Annual Reports; Factiva; GSMA; BCG Analysis

Figure 9

2. Including post-paid subscriptions and pre-paid customers

B.

Overall trends, the ecosystem and new business models

The dawn of a new mobile ecosystem

As a wide range of new business models emerge, the mobile ecosystem is undergoing a rapid transformation, with the traditional network operators expanding their business models and new players rapidly emerging and successfully competing in the battle to attract new consumers and end users.

THE KEY TRENDS EMERGING IN THE MOBILE ECOSYSTEM INCLUDE

- Strong growth of data as voice traffic slows down across the Asia Pacific region
- Greater affordability of mobile services
- Entry of non-traditional players in the ecosystem (including technology companies and content providers), that challenge the status quo of traditional network operators
- Much greater socio-economic impact through collaborative platforms and mobile-enabled services (including mobile payments, educational and information services)

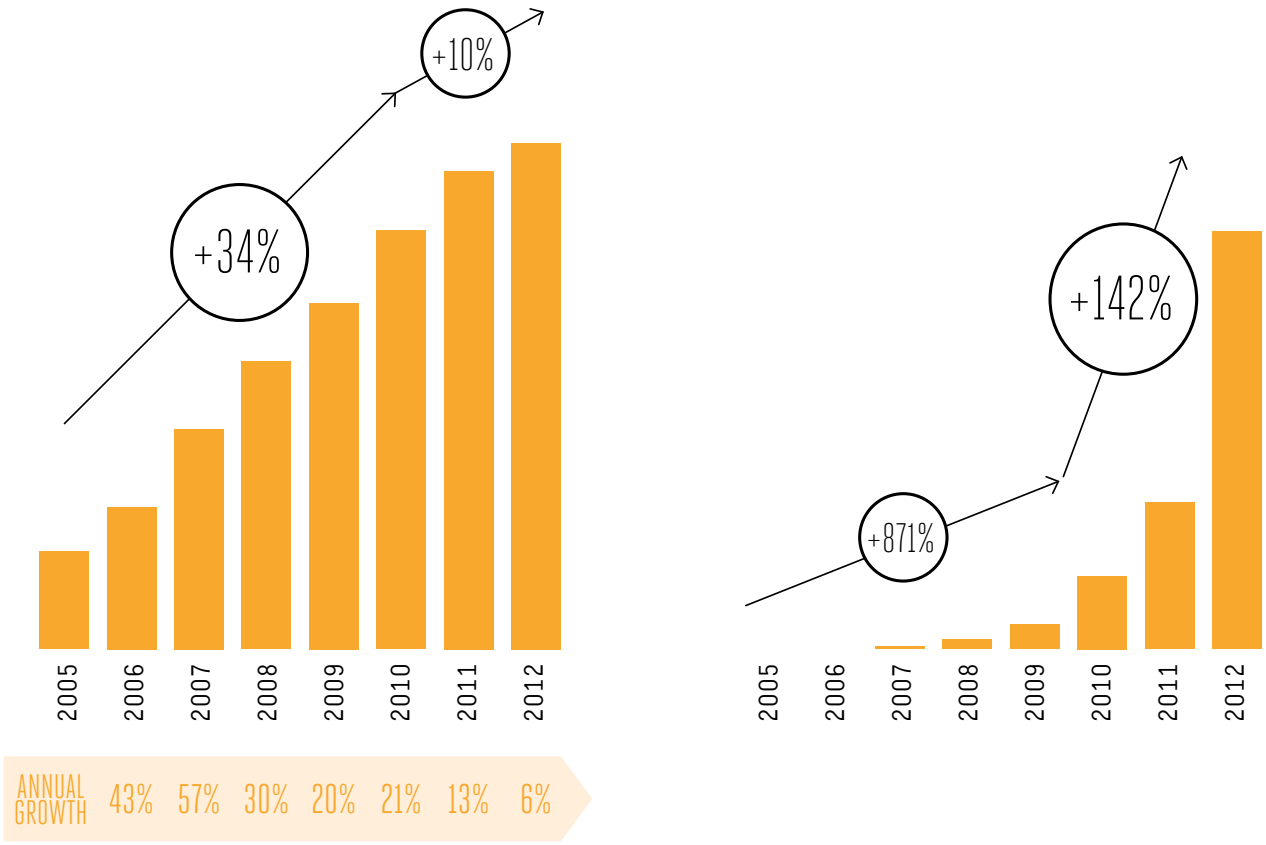
Strong growth of data

On a large base, voice traffic has seen a slowdown in growth, with usage of minutes down to nearly 6% per annum in 2012. However data usage has grown tremendously at nearly 142% CAGR growth from 2010 to 2012.

VOICE AND DATA TRAFFIC GROWTH IN APAC

Voice traffic growth slowing down to around 6% p.a. across Asia Pacific...

... while data is increasing significantly



1. GSMA Intelligence Q4 number from selected operators and countries to show trend
Source: GSMA Intelligence

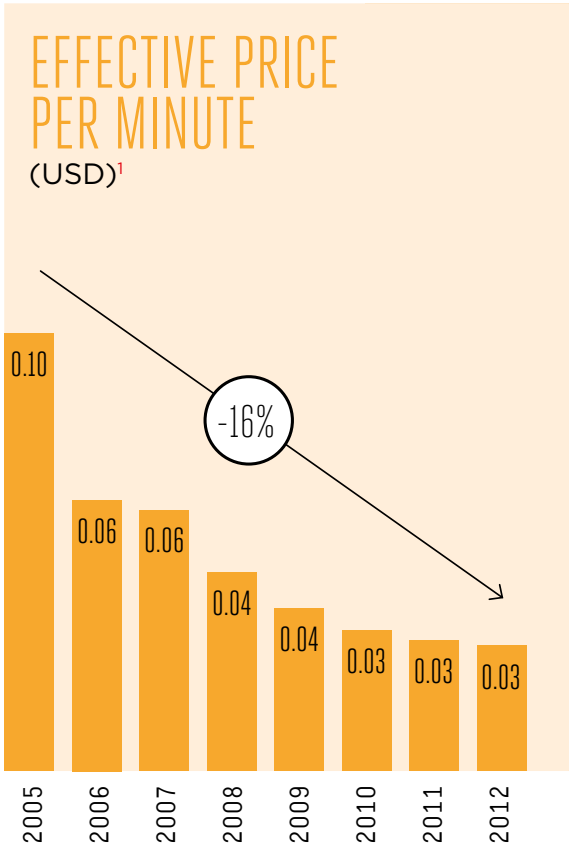
Figure 10

Greater affordability of mobile services

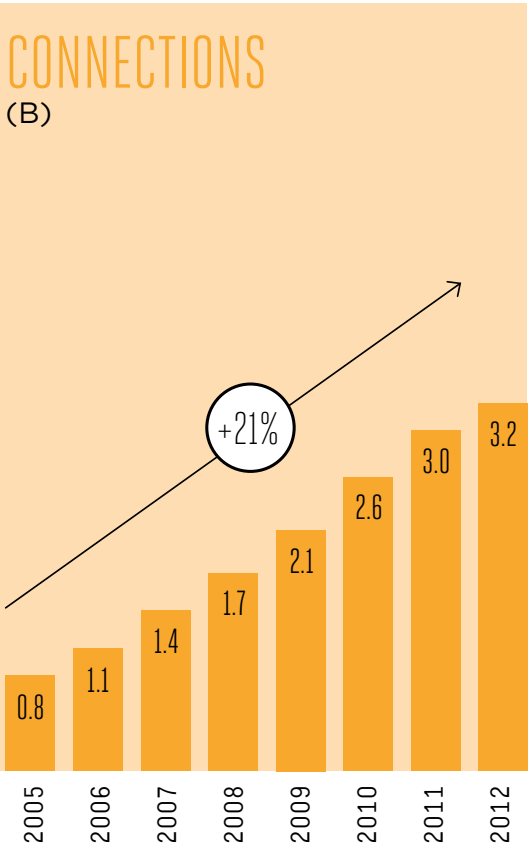
MNOs in in the Asia Pacific region have demonstrated a deep commitment to making mobile affordable for all. This is reflected in the consistent reduction in price per minute and average revenue per user (ARPU) across Asia Pacific.

MOBILE SERVICES COST FOR APAC

Reduced price per minute sharply across Asia Pacific...



... and increasing number of connections



1. GSMA Intelligence 2012 Q4 number from selected operators and countries to show trend
Source: GSMA Intelligence

Figure 11

Emergence of non-traditional players

Globally, mobile technology has emerged as a platform to deliver new value-added services and applications. While network operators are expanding into new segments of the value chain, technology companies are now moving into the provision of services that traditionally have been the remit of network operators.

This scenario can be seen clearly with established players such as Vodafone and Bharti Airtel offering financial services via smartphones whilst new entrepreneurial start-ups—such as India's inMobi and China's Youku, China's largest online video site—are new entrants to the market. Additionally, companies such as Apple and Yahoo!, are expanding their mobile businesses, from the establishment of "big data" centers, to the development of end user applications and the provision of mobile-enabled content.

The emergence of many of these new market entrants, many of whom come with strong credentials and are highly technically capable is good news for innovation, which ultimately benefits the consumer.

Most importantly, many of these players are able to aggregate content across their services (something that is a relatively new field for mobile network operators), providing an integrated customer experience under a unified brand strategy.

Already, the mobile content development sector is thriving, with low barriers to entry and growing demand, creating countless business and employment opportunities in both industrialised and emerging markets.

Many of these companies are becoming increasingly global. In India, for example, the value-added service (VAS) industry sources roughly half of its revenues internationally.[3] And since scale is not necessary for app development, businesses of varying sizes can participate—even enterprises with only a handful of employees.

3. Source: Livemint

GREATER SOCIO-ECONOMIC IMPACT THROUGH INNOVATIVE BUSINESS MODELS

As the mobile ecosystem evolves, it is also inspiring innovative and socially relevant business models that go far beyond communications and into the provisions of essential services such as energy and healthcare.

When it comes to energy, great potential exists to extend electricity services to the 1.6 billion people worldwide that have no access to electricity because they have low and volatile sources of income, little or no savings or lack access to formal credit.

For these communities, mobile micro-payments extend access to energy services. In India, for example, low income communities can afford to install a small home solar power system if payments can be made over time in small, user-defined increments via their mobile, mirroring the way they pay for traditional sources of power such as kerosene, candles, batteries and phone charging.[4]

With minimal upfront installation costs, the pay-as-you-go consumption model allows users to top up their account when they have the funds available, with the funds eventually covering the cost of the equipment and giving them access to free clean energy.

Mobile and internet platforms are also important social tools, with anyone able to create content and instantly disseminate information worldwide via blogs as well as social media sites such as Facebook and Twitter.

Sharing content is also very easy with fast growth in sharing services such as Facebook and Instagram, which allow users instantly to take a picture and share it globally.

This has societal implications that go beyond entertainment since social media can facilitate civic activism and participation in the political process, allowing a far greater number of individuals a voice for their opinions via sites such as Twitter.

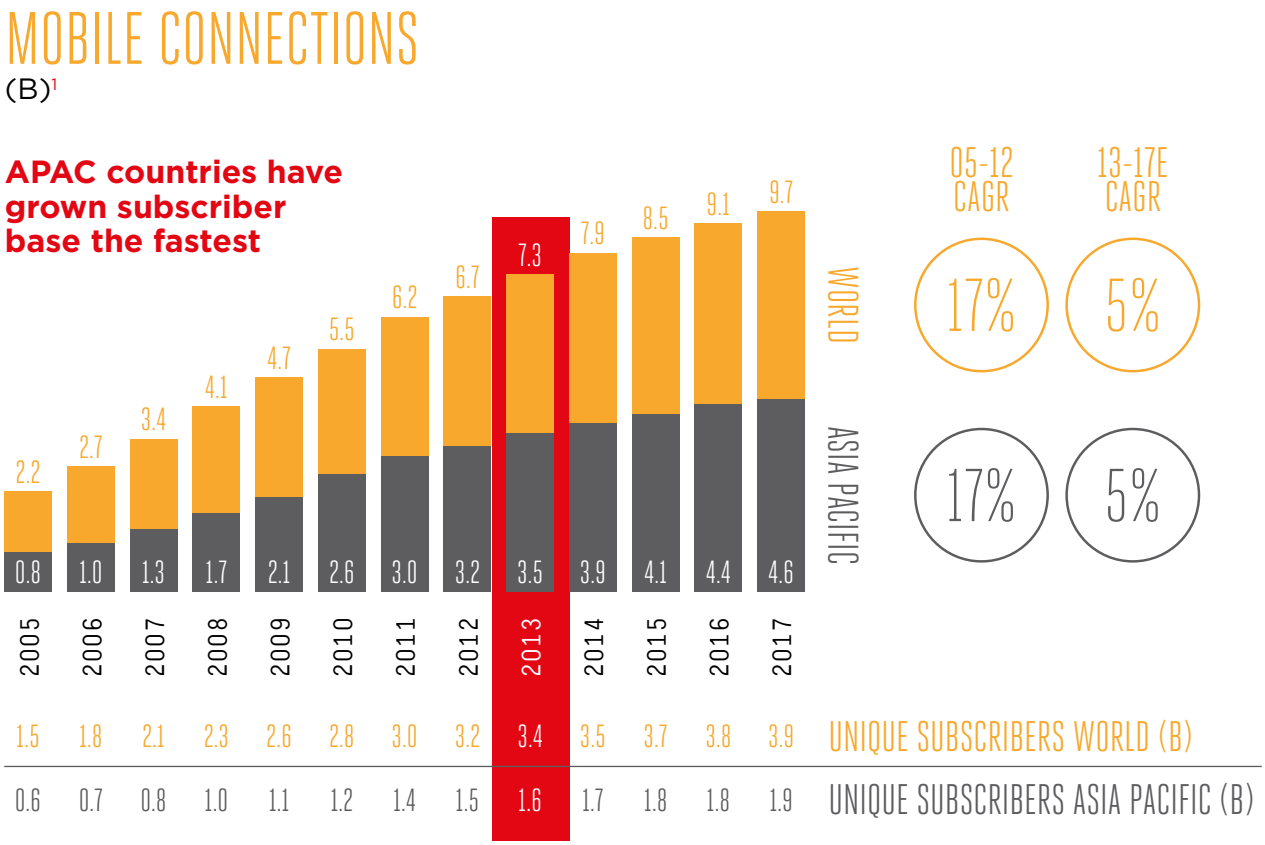
4. Source: Simpanetworks.com

C.

Differences across the region

Roughly half of the world's mobile connections are now in Asia Pacific, with some 1.6 billion unique subscribers. However, significant differences in market penetration exist across the region, with varying levels of investment across different countries.

MOBILE CONNECTIONS IN APAC



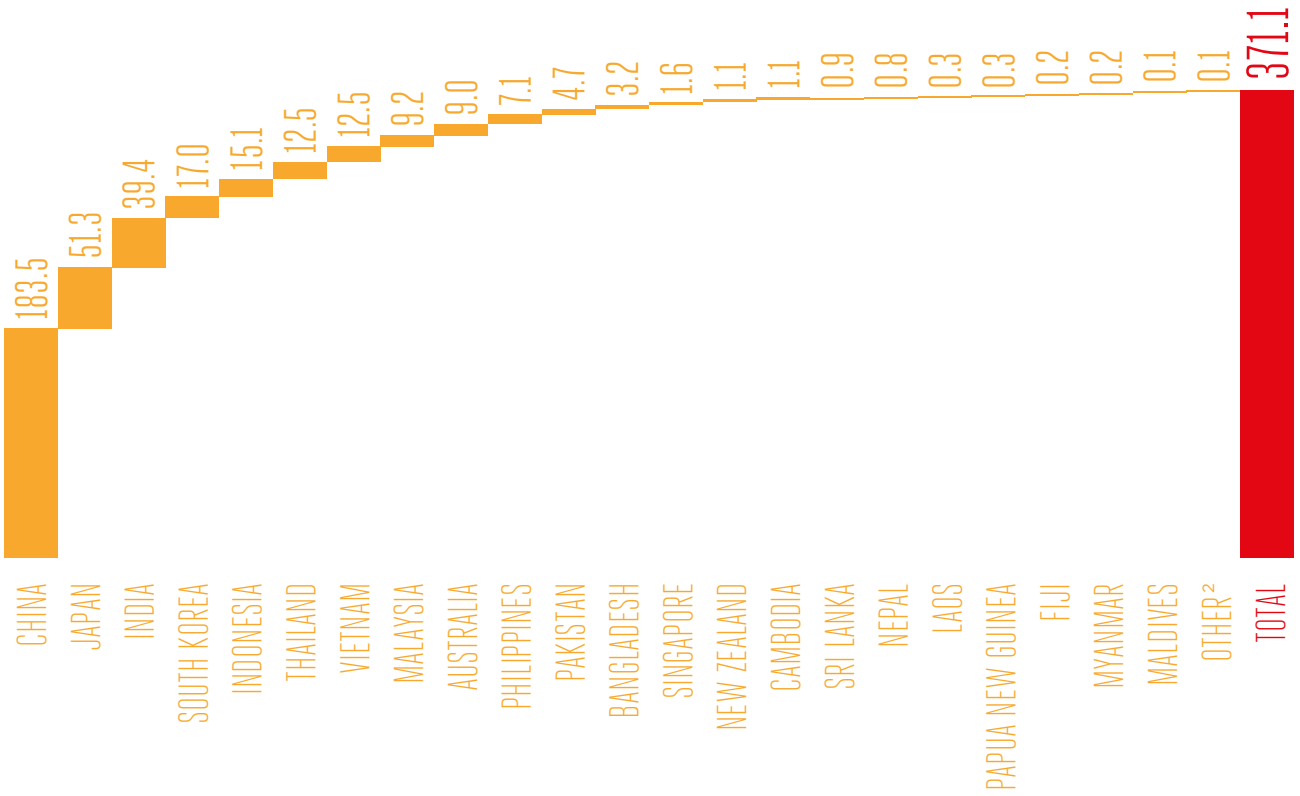
Source: GSMA Intelligence

Figure 12

INVESTMENT LEVELS IN TELECOM ACROSS APAC COUNTRIES

CUMULATIVE INFRASTRUCTURE INVESTMENTS

(US$ B)[1]



1. GSMA Intelligence estimates of 2008-12 capex for selected opcos extrapolated to Asia Pacific by cluster capex/revenue shares
2. Countries with less than 0.1B investment not displayed individually: Samoa, Vanuatu, Bhutan, Brunei Darussalam, Tonga and Solomon Islands
Source: GSMA Intelligence

Figure 13

Classification of countries to estimate socio-economic impact

This report divides Asia Pacific into three clusters, based on mobile penetration and the United Nations' Human Development Index (HDI), which uses life expectancy, education and income to rank countries' stages of development, level of urbanisation.

Within these three clusters, representative countries are modeled to aggregate the socio-economic impact of mobile technology. The relative value of mobile varies according to levels of mobile penetration. In areas of high penetration, the incremental value of mobile is relatively low. However, in rural areas, its incremental value is high, offering the potential to make a substantial contribution, for example to the availability and quality of education and healthcare and to increase rural employment and raise incomes.

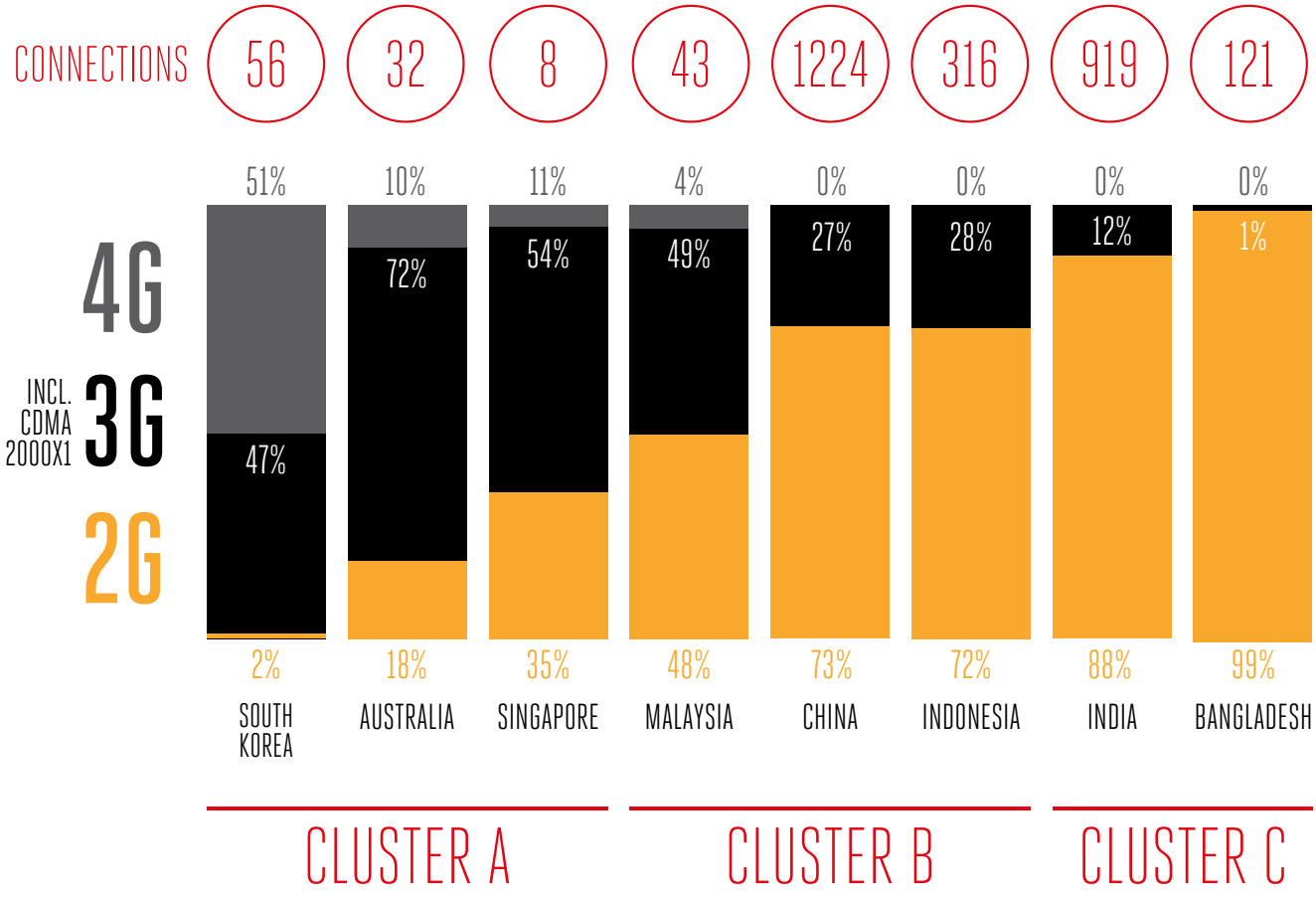
Levels of mobile evolution vary across clusters of countries. While penetration has crossed 100% levels in developed countries, there is significant headroom for growth in emerging markets (Cluster C countries).

Therefore, while reach of mobile infrastructure and services is the focus in emerging markets, focus is on driving service richness in industrialised ones. New business models are emerging both in emerging and industrialised countries to achieve these goals.

While cluster A countries have transitioned to 3G and 4G, most emerging markets are yet to make that journey.

MOBILE CONNECTIONS BY TECHNOLOGY ACROSS APAC

(M)[1]



1. GSMA Intelligence 2013 estimates
Source: GSMA Intelligence

Figure 14

3G and 4G adoption in emerging markets will drive future growth in the region across clusters.

There are significant differences in productivity-linked impact across countries driven by the extent of informal sector presence. Emerging markets in Cluster C are expected to benefit the most from application mobile technology due to greater extent of informal sector presence.

SOCIAL IMPACT OF MOBILE

Raising The Standards Of Living

Mobile is raising the standards of living and productivity through improving

CONVENIENCE & EFFICIENCY

Greater affordability of mobile connectivity and innovative mobile solutions are increasing access to basic services like banking, healthcare and education.

An educated population is the foundation of a healthy and prosperous society.

mEducation

mEducation solutions can significantly improve affordability of education by up to 65% , which can help millions of households in countries like India, where cost of school education can be as high as one-third of household income

Proficiency

Mobile-enabled solutions can also help improve student proficiency. Experiences with the Hole in the Wall & Khan Academy initiatives indicate that for low proficiency students, **improvements of up to 50-75% in performance could be achieved.**

Employability

Another area mobile solutions can have an impact is employability. In India, for instance, nearly 64% to 80% of graduates have been found to be unemployable in various fields. In one study, nearly 30% engineers were found to be unable to solve basic mathematics problems. A conservative 20% point improvement in employability – indicated by successful e-learning programs in India – could help ~300,000 engineering graduates become suitable for employment.

While mobile solutions have the potential to transform the delivery and quality of education, with further support, **these technologies could achieve even more.** Government support will be critical to ensure that new solutions in education can achieve their full potential.

Social Impact in key sectors

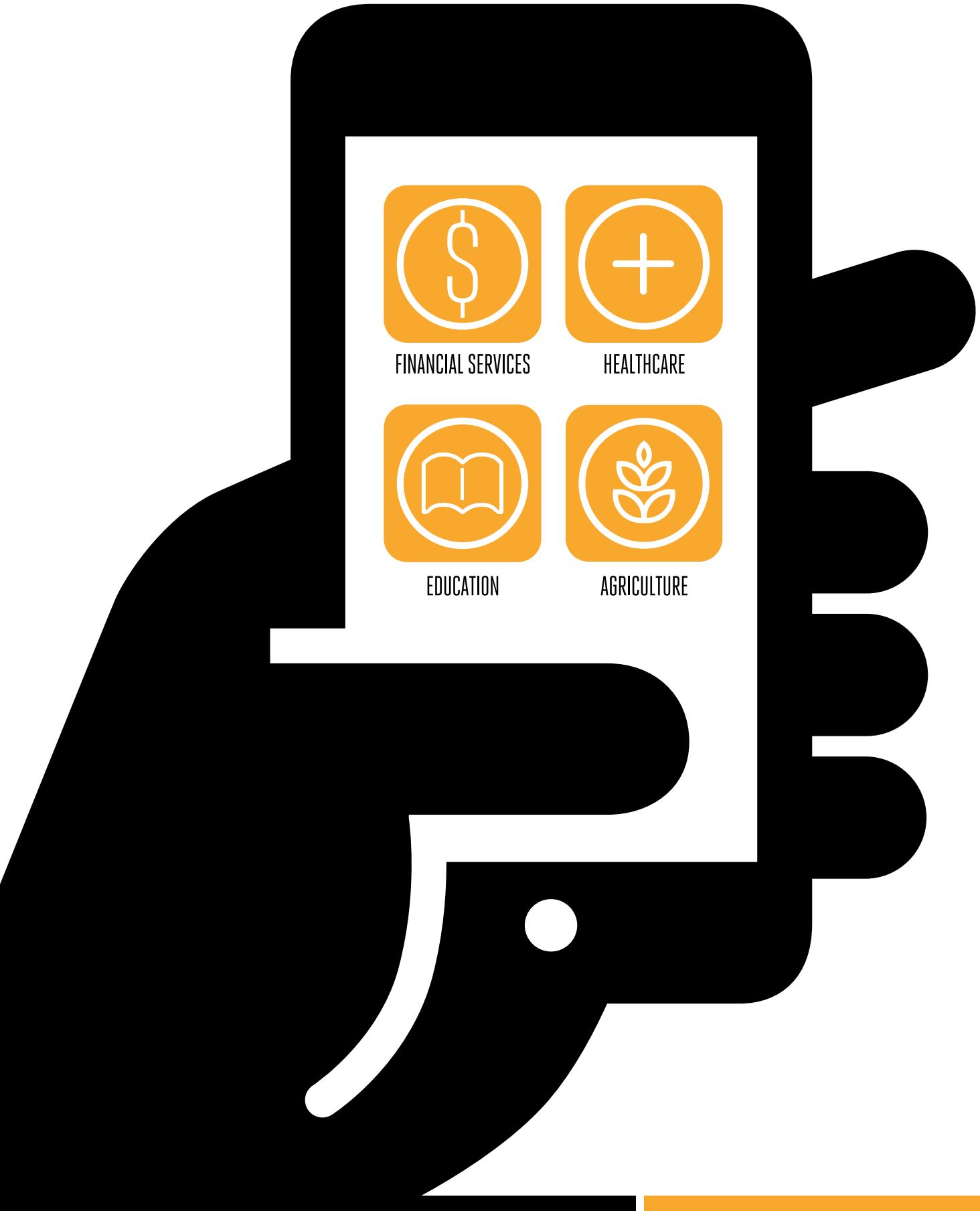
Many emerging markets face multiple challenges today. Those that have large rural populations in particular face difficulties providing access to basic infrastructure and services such as electricity, education, healthcare and banking.

Child mortality rates are high and governments struggle to contain the spread of life-threatening communicable diseases. Farmers frequently suffer from poor access to pricing updates as well as weather forecasts and crop-specific agricultural information. This affects their productivity and ability to generate a consistent income, ultimately increasing their vulnerability and keeping many trapped in a cycle of poverty.

Mobile offers the ability to overcome these socio-economic barriers through innovative solutions that bring essential services to the masses that would otherwise be devoid of them. Mobile payments provide opportunities for millions of unbanked to gain access to financial services. Mobile-led educational services and content help overcome constraints of poor education infrastructure and assist farmers in improving their productivity.

Mobile solutions are also beneficial for the advanced economies, where they help improve convenience and efficiency of services. Smartphone-based tools such as self-help health utilities, online collaborative learning, advanced technologies such as Near Field Communication (NFC) and smart farming with assistance from GPS systems provide populations in the developed world with greater comfort and cost effectiveness.

The social impact of mobile and how it is addressing key global challenges is assessed across key sectors in four steps.



30%

Compared to the global average—where skilled workers attend 60 percent of births—the rate in Bangladesh is just 30 percent.

MHEALTH SOLUTIONS CAN PLAY AN IMPORTANT ROLE. IN BANGLADESH, PREGNANT MOTHERS CAN RECEIVE SMS OR VOICE MESSAGES WITH PRENATAL ADVICE.

A.

Healthcare

Introduction

As governments around the world struggle to meet the dual challenges of rising demand for health services and increasingly tight budgets, they have an urgent need to find solutions that are both affordable and that can also extend quality care to all citizens.

Growing demand for healthcare services calls for more doctors and trained health workers, while the rapid ageing of populations in many countries only increases this pressure. Meanwhile, many emerging markets continue to battle infectious diseases and maternal and infant mortality. In meeting these different challenges, existing resources will not suffice.

Mobile technology offers promising solutions to global health problems. First, the technology is readily available and, as penetration of the technology reaches high levels in a growing number of countries; mobile devices provide the ideal tool through which to deliver healthcare services. Whether that is real-time advice or remote diagnosis, promoting medical adherence or extending affordable health services to remote rural areas, mHealth holds the potential to help solve a wide range of healthcare challenges.

MOBILE APPLICATIONS FOR HEALTH CHALLENGES

KEY CHALLENGES	mHEALTH APPLICATIONS
MATERNAL AND CHILD HEALTH • Infant/child malnutrition and mortality • Maternal health	• Public and healthcare worker information/education
COMMUNICABLE DISEASES Infectious diseases, e.g. tuberculosis, malaria, HIV/AIDS	• Public health surveillance • Patient monitoring/compliance
NON-COMMUNICABLE DISEASES Diseases such as cardiovascular disease, obesity, cancers, diabetes	• Remote diagnostic /treatment support • Public wellness apps
HEALTHCARE FOR THE ELDERLY Aging population changing healthcare system requirements	• Public wellness apps • Patient monitoring/compliance
COVERAGE / ACCESS • Sufficient physicians, nurses • Accessible by geography, SES	• Healthcare worker education • Remote diagnostic /treatment support
QUALITY Maintain consistent, convenient, high quality of healthcare, drugs, and equipment	• Patient monitoring/compliance • Remote diagnostic /treatment support
OVERALL COST Overall cost of healthcare system limiting factor for all countries	• Patient monitoring/compliance • Public information/education

Figure 15

The health challenges faced vary from country to country, depending on demographic shifts and levels of development.

In the more advanced economies of Asia Pacific, the key challenges are lifestyle diseases and the quality, and sustainability of healthcare.[5] In rapidly-emerging countries such as Malaysia and Indonesia, challenges center on universal access and the control and prevention of diseases. By contrast, in countries such as India and Bangladesh, the challenges revolve around increasing access to basic healthcare and disseminating information for all citizens.

1.

Improving maternal and child healthcare

One of the main reasons for maternal and infant deaths is lack of information and access to maternal healthcare. This means educating and informing the community workers who attend births and advise pregnant mothers—something to which mHealth is particularly well suited.

For Bangladesh, while the rate of maternal deaths still remains worryingly high, the country is severely limited by a shortage of individuals equipped with midwifery skills. Compared to the global average—where skilled workers attend 60 percent of births—the rate in Bangladesh is just 30 percent. This, combined with lack of access to health information for mothers, means Bangladesh has 240 deaths per 100,000 births compared to the global average of 210.[6]

Here, mHealth solutions can play an important role. In Bangladesh, the Aponjon program—operated by the Mobile Alliance for Maternal Action, founded by the United States Agency for International Development (USAID) and Johnson and Johnson—delivers information to health workers via mobile devices, while pregnant mothers can receive SMS or voice messages with prenatal advice appropriate to their gestation stage.

5. Source: Australian department of health and ageing, South Korean ministry of health and welfare, Singapore ministry of health
6. Based on latest WHO 2010 data

APONJON MOBILE-BASED EDUCATIONAL PROGRAM

2 MILLION
TARGET USERS OF APONJON BY 2015

50 000
MOTHERS REACHED BY APONJON

Informational mobile campaigns
- Pregnant mothers receive SMS or voice messages with prenatal advice appropriate to their gestation stage
- eg: Aponjon program by MAMA in Bangladesh

Education and referral can reduce perinatal and maternal mortality 30%
- Mobile-assisted education of traditional birth attendants reduced perinatal mortality 30%
- Maternal mortality found to be reduced by 26% in regional trials in Pakistan and 50% in Uganda

Maternal mortality in Bangladesh can be reduced to 168 per 100,000 live births from current 240

Figure 16

For India, too, disseminating information to mothers and healthcare workers is an important part of reducing maternal mortality and infant deaths.

The Commcare mobile app—powered by Dimagi, a US-based social enterprise—is being used by ASHA2, which works with India's National Rural Health Mission to train social workers to educate mothers and facilitate safe pregnancies.

The app can also deliver registration forms and prioritised checklists, monitor danger signs and offer educational prompts. Simple visual materials are easy to understand for audiences with low literacy rates and improve the effectiveness of monitoring and knowledge sharing. And studies have shown that Commcare engages more decision makers in the household in the mother's pregnancy and the child's health, while promoting a better understanding of critical topics among mothers.

2.

Combating communicable diseases

For Thailand, with a high burden of tuberculosis compared to other parts of the world, mHealth has helped drive patients' adherence to their drug regimen. A number of mHealth techniques have been deployed. Patients have received SMS-based and phone reminders to ensure they take their pills on time, helping achieve 90 percent compliance. With a full-scale roll out in Thailand, some 30,000 people could be cured of TB.

In India, communicable diseases place a heavy burden on healthcare services, particularly tuberculosis, with an estimated 40 percent of citizens suffering from TB[7] (either latent or active).[8] With low drug compliance, about 300,000 people needed re-treatment in 2010 because of default and a resulting relapse in their condition. With mHealth, a tremendous opportunity exists to reduce the number of relapses and cure more people. Through a program run by Operation ASHA, a non-governmental organisation, fingerprint scanning during administration of patients' medicine at mini TB centers means their drug adherence can be tracked with additional adherence prompted through SMS reminders.

opASHA TB COMPLIANCE INITIATIVE

FINGERPRINT SCANNING / TRACKING DURING ADMINISTRATION OF MEDICINE AT MINI TB CENTERS FOLLOWED BY SMS REMINDERS

- opASHA centers located in existing community locales eg: shops, homes
- GSM modem uploads compliance data via SMS, sends SMS reminders to supervisors on missed doses
- Government provides free medication, diagnostics and grants for each patient cured to make centers sustainable

60 000 SUPERVISED DOSES TO 3,000 PATIENTS

89% OF PATIENTS SUCCESSFULLY COMPLETE TREATMENT

opASHA OPERATES IN 17 CITIES IN 8 STATES ACROSS INDIA

205 TREATMENT CENTERS IN INDIA • 7,930 PATIENTS ENROLLED IN 2012 • TOTAL COST FOR ENTIRE THERAPY IS US $50/PATIENT

1. Apollo Telemedicine Networking Foundation. Source: AFNF; Ericsson; WHO; BCG analysis

Figure 17

7. 5-10% of people without HIV and 30% of those co-infected with HIV develop active disease
8. Combination of latent and active TB,TB India 2011 Revised National TB Control Programme Annual Status Report

3.

Managing healthcare for the elderly

For countries with ageing populations, the challenge for governments is to deliver quality care to older individuals who may live for many years with one or more conditions—while also controlling costs.

Non-communicable diseases present a significant challenge. Respiratory conditions are a particular problem. In Japan, approximately 5 percent of the population suffers from chronic obstructive pulmonary disease (COPD).[9]

For such conditions, mHealth applications offer a way forward, allowing for patient monitoring and compliance as well as remote diagnostics and support during treatment. Mobile-assisted remote monitoring through equipment such as a "COPD briefcase" with built-in video capabilities and monitoring sensors could also be conducted through 3G-enabled mobile phones.

This is the case in Japan, where the Life Watcher platform in the Japan Enable program enables patients suffering from chronic diseases to be discharged and rehabilitated at home, rather than in hospital.

Another of the promises mHealth holds is the potential for individuals to use apps to take greater responsibility for their own wellness, disease management and prevention. Smartphone apps are becoming part of preventive care and public wellness, including apps that conduct diagnostics and drive medication compliance, as well as those offering tips on sports and wellness, diet and nutrition and relaxation and inspiration.

In delivering healthcare to ageing populations, mHealth represents a powerful tool. With sensors connected to them, home alert systems can provide remote monitoring of a patient's condition. Sensors serve a variety of functions, including trip and fall detectors, moisture sensors, location detectors and epileptic alarms.

In addition, care quality can also be improved when empowering patients to manage their own wellness and preventive care. Apps include those offering interactive reminders and health tips, as well as apps that promote self-monitoring and appropriate diets.

The potential cost reductions from these kinds of technologies are immense. When it comes to hospitalisation, for example, savings will accrue from a 50-60 percent reduction in hospitalisations. Across the advanced economies of Japan, South Korea, Singapore and Australia, estimates put the combined cost savings of avoided hospital nights at US $1.7 billion annually, with 630,000 annual hospital nights avoided in Japan, 250,000 in South Korea, 30,000 in Singapore and 120,000 in Australia.[10]

Remote monitoring and home alert systems also offer the potential to reduce expenditure. Pilots of such systems in Scotland have demonstrated the potential for up to 25 percent healthcare cost savings while reducing the burden on the system.

The potential for 25 percent in savings in these countries from using remote monitoring for elderly care translates into annual savings of US $21 billion for Japan, US $130 million for South Korea, US $80 million for Singapore and US $2.3 billion for Australia.

And reducing the burden on health systems of looking after the elderly has a further advantage—the ability to focus resources on urgent cases.

9. WHO estimates
10. Source: WHO; United Nations; Businessweek, BCG analysis, Ministry of Health Budgets (Singapore 2013 initaitives), Australia 2012 budget, South Korean ministry of health and welfare, Japan Ministry of Health, Labor and Welfare 2012 estimate

40

4.

Broadening access to healthcare

In delivering healthcare to remote rural areas, emerging markets are often hampered by an overall lack of healthcare workers.

In India, for example, there are only six doctors and 13 midwives for every 10,000 people.[11] Here, mHealth and telemedicine offer the ability to significantly extend coverage by allowing health workers to conduct consultations, diagnostics and treatment remotely.

For doctors, this saves travel time to remote areas and improves their retention rates. Meanwhile, patients save time, costs and the physical burden of traveling long distances to obtain treatment.

For example the Apollo Telemedicine Networking Foundation, a not-profit organisation that is part of the Apollo Hospitals Group, is providing primary, secondary and tertiary healthcare to remote rural areas by using telemedicine solutions to link them to key hospitals in India. Fast emerging countries also need to find affordable ways to extend access to healthcare to all their citizens. For Indonesia, one barrier to universal access is a cultural one: most Indonesians only visit doctors as a last resort and 42 percent see family or friends as their primary source of health information. Poor transportation and low health literacy levels present additional barriers.[12]

In Indonesia, mHealth solutions such as remote diagnostics and support during treatment have helped overcome these barriers. Since 2006, Indonesians have had the option of conducting live consultations with a doctor via a mobile device or online, through initiatives like TanyaDok and LiveConsult.

REMOTE DIAGNOSTIC TREATMENT AND SUPPORT

20-50
CONSULTATIONS PER DOCTOR/DAY

5000
ARTICLES WRITTEN BY SPECIALISTS AVAILABLE

LIVE CONSULTATIONS WITH A DOCTOR VIA MOBILE OR WEB SINCE 2006

- Social media type interactive format
- Mobile app and online portal
- Public forums and private chats provide comfortable forms of communication
- LiveConsult or TanyaDok has several subscription options
- From 5$/day up to 15$/year

<1 HOUR
TYPICAL RESPONSE TIME

HUNDREDS
OF CONTRIBUTING DOCTORS

Figure 18

11. According to World Health Statistics 2011
12. Source: The Adoption of SMS Technology in Disseminating Health Information in Indonesia:Mercy Corps Indonesia

The impact of these services has been extensive. In Indonesia, mobile medicine subscriptions have broadened access to accurate drug and price information, addressing a wide range of health-related problems, including low health literacy rates, a high incidence (80 percent)[13] of malpractice resulting from poor doctor-patient communication and the reluctance of Indonesians to seek health information from doctors.

To address this challenge, Indonesia has worked with operators and other stakeholders to develop a text-message (SMS) based pharmaceutical information subscription service costing just 50 US cents per SMS and giving users the power of choice when it comes to the medicines they take. Partners in the project include content provider Jatis an independent institution Lembaga Anti-Fraud Asuransi Indonesia (LAFAI), with implementation by Telkomsel.

The service—Info Obat Murah—reaches approximately 14 percent of mobile subscribers in Indonesia, and has 29 million hits to date. It has consistently shown high satisfaction with data accuracy, pricing and decision-making assistance.[14]

HEALTHCARE SERVICES

29Mn

HITS TO DATE

13. 2011 figure reported to the Medical Disciplinary Honor Assembly
14. Source: The Adoption of SMS Technology in Disseminating Health Information in Indonesia:Mercy Corps Indonesia, Center for market health innovations; BCG analysis

42

5.

Increasing the quality and reducing the cost of care

In meeting the task of improving healthcare quality and access while retaining control of expenditure, mobile technology offers a significant advantage. Mobile devices give patients healthcare services at their fingertips, addressing a key challenge for health systems—that of providing face-to-face consultations, which drive up costs and puts pressure on health workers.

Several countries are demonstrating the benefits in both the cost and quality—of replacing some face-to-face consultations with remote versions. Systems such as Singapore's Healthline and Australia's HealthDirect offer advice, information and diagnostic services and are accessible online and via mobile apps—services that are increasingly popular in countries such as Australia, where demand for remote medical information is substantial, with 84 percent of Australians consulting a website when seeking health information.[15]

Some countries have deployed 24-hour help-lines. Australia's HealthDirect helpline has had strong adoption and feedback from users, attracting 150,000 calls in the first year of operation and 3 million calls to date. With a call taken every minute, the service has gained 80 percent patient satisfaction.

The service avoids the cost and time associated with face-to-face consultations with doctors and reduces the pressure on healthcare workers. This also frees up the capacity of physicians to make face-to-face appointments in urgent cases.

15. Source: HealthDirect.org.au

The potential impact of mHealth

mHealth can be a powerful assisting tool for countries to improve health conditions for their populations. This includes lower default rates for treatment of diseases, improve knowledge of danger signs and reduce mortality.

IMPACT POTENTIAL OF mHEALTH (2/2) - WHO OBSERVATORY

- Improve quality of life for those in need of care
- Empower patients to take care of their own health
- Reduce costs in elderly care 25%

- Save mothers and children by reducing maternal and perinatal mortality 30%
- Improve quality and efficiency of public health surveillance

- Reach twice as many rural patients per doctor
- Improve TB treatment compliance by 30-70%

Figure 19

Barriers to implementation and requirements for support

While the potential of mHealth to transform the delivery of healthcare services is recognised, many obstacles remain to the full-scale implementation of mHealth solutions in most countries. The World Health Organisation has identified nine key barriers to implementation.

For example, uncertainty about how regulation will govern mHealth applications inhibits deployment. Lack of clarity and legal policies also creates concerns about information security and patient confidentiality and privacy.

For some countries, mHealth is not yet a substantial part of health policy and strategy and policy-making struggles to keep up with technological and other developments in mHealth. Moreover, overburdened health systems and competing priorities mean health policymakers face difficult decisions.

Private sector involvement is also needed, yet with many different players, the landscape is complex. Companies have yet to demonstrate the potential value of mHealth to the bottom line and financially sustainable business models have yet to emerge.

Finally, while mHealth is rooted in technological advances, its implementation is dependent on human factors.

Yet demand for mHealth solutions from health workers and general public remains low and health professionals and decision makers lack the knowledge and technical expertise to assess mHealth's benefits and cost effectiveness.

Breaking down these multiple barriers will require changes in regulatory regimes as well as the evolution of industry ecosystems. If regulators remove barriers to mHealth and accelerate its adoption, benefits will be felt more quickly.

OPPORTUNITIES FOR REGULATORS TO ACCELERATE mHEALTH

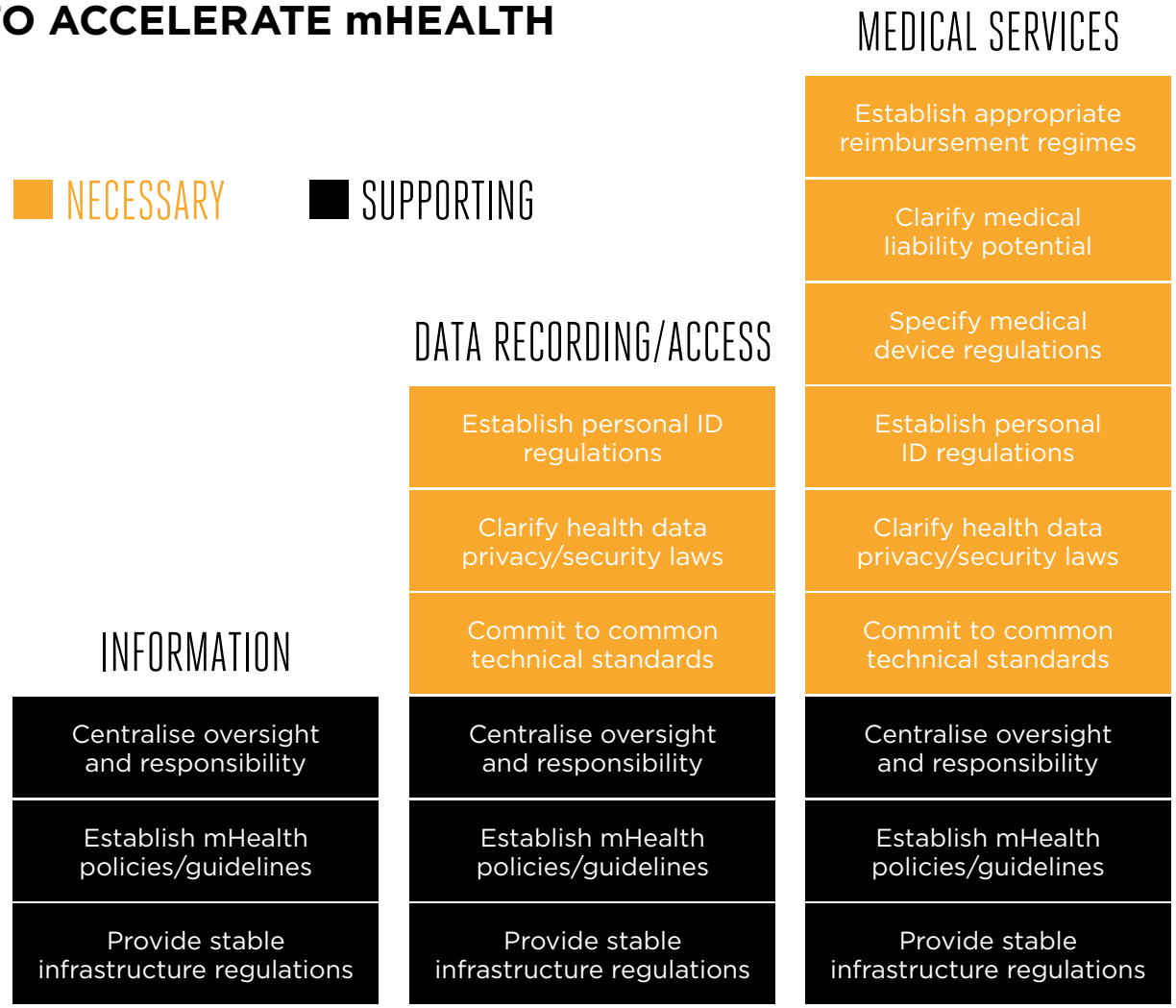
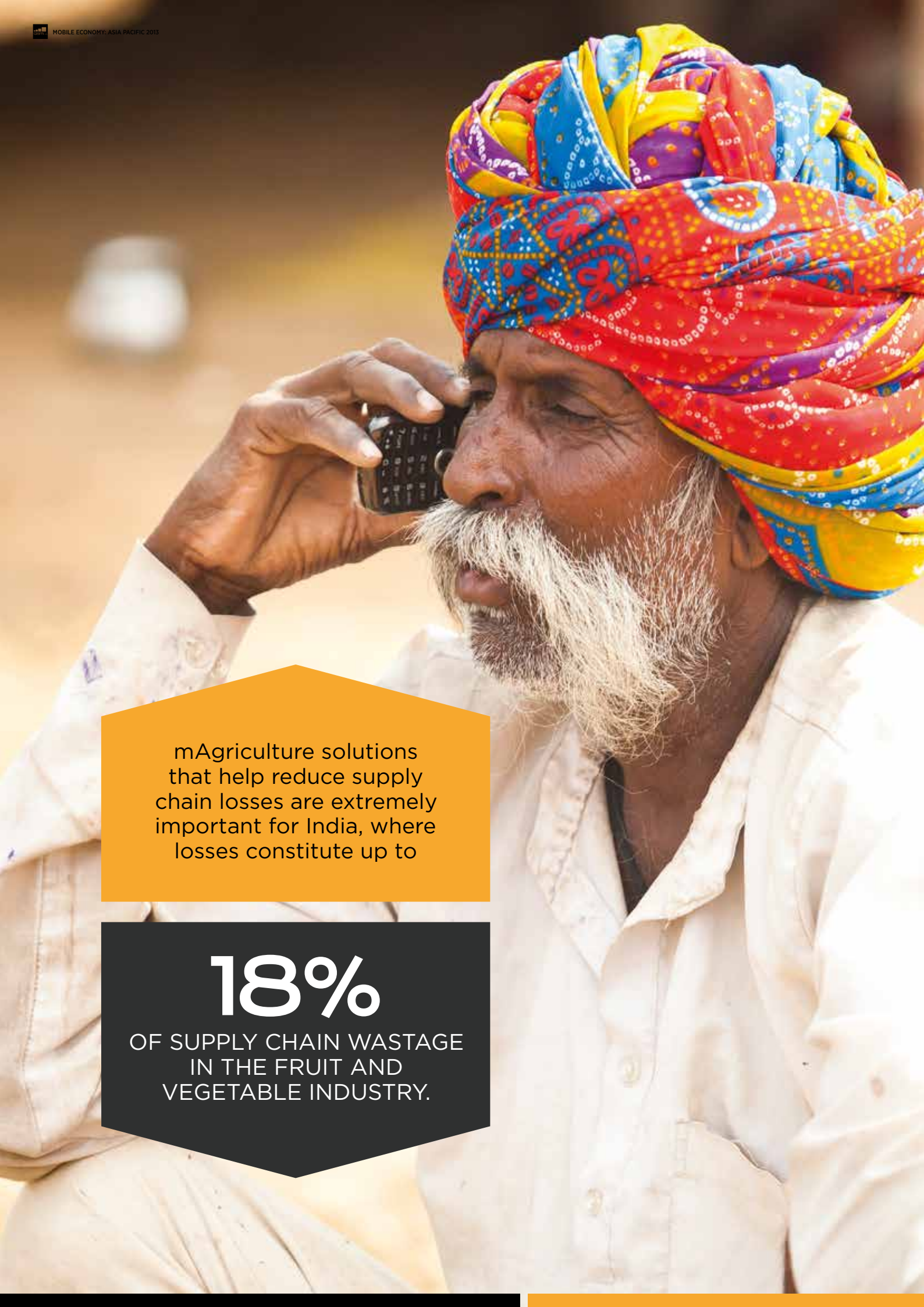


Figure 20



mAgriculture solutions that help reduce supply chain losses are extremely important for India, where losses constitute up to

18%

OF SUPPLY CHAIN WASTAGE IN THE FRUIT AND VEGETABLE INDUSTRY.

B.

Agriculture

Introduction

Across the world, agriculture faces four key challenges today. These range from inefficiencies in supply chain to weak market mechanisms and lack of access to relevant financial services.

Such deficiencies not only have an impact on farmers but also affect other participants in the agricultural value chain, including input providers, intermediaries such as co-operatives and commodities traders, food product manufacturers or processors, wholesalers, retailers and transport providers.

In emerging markets, the challenges are often more severe when compared to regions who have reached full economic maturity. For countries such as India and Bangladesh, all four issues are pressing, whereas in other fast growing economies like Malaysia and Indonesia, there is still significant room for improvement in supply chain optimisation, farmer education and access to financial services.

mAgriculture solutions can play a significant role in addressing all the four challenges highlighted above. Mobile devices can be used to improve logistics by matching supply with demand, to supply farmers with relevant information on agricultural techniques and local weather information, to provide access to market prices and to deliver financial services.

mAGRICULTURE APPLICATIONS

KEY CHALLENGES	mAGRI APPLICATIONS
SUPPLY CHAIN INEFFICIENCIES • Gap in supply-demand match • Intermediaries act in silos • Poor logistics – causing wastage protection against crop failure	• Raw material sourcing enhancement • Real time visibility of supplier networks • Track and trace facility of products in supply chain
PRODUCTIVITY LOSS • Poor knowledge of agri-inputs, seeds usage • Lack of accurate weather info • Poor irrigation systems	• Agriculture extension services • Weather forecast service • Remote irrigation system
POOR MARKET AND PRICE DISCOVERY • Non-availability of prices for crops across markets • Poor access to alternative markets	• Current price information • Commodity trading platforms for farmers
CREDIT, SAVINGS AND INSURANCE • Non availability of loans facility • Non availability of insurance for protection against crop failure	• Micro-insurance for crops • Credit availability for farmers - Payments enabled by m-payment facility

Figure 21

1.

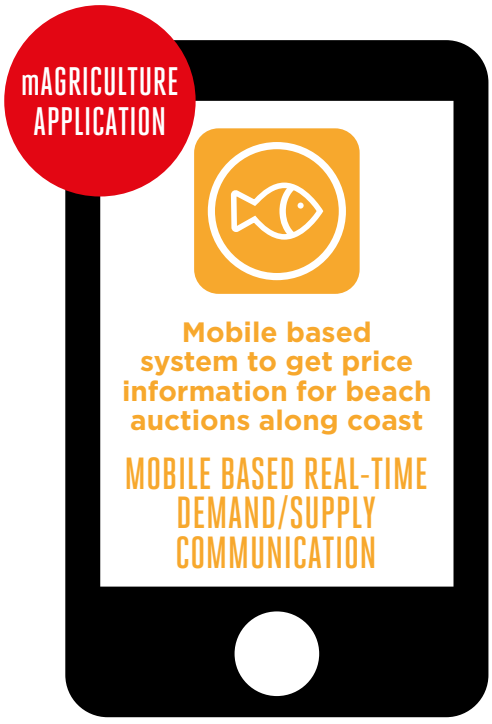
Addressing supply chain inefficiencies

In emerging economies such as India and Bangladesh, the efficiency of the agricultural supply chain is compromised by a number of obstacles. Challenges include a mismatch between supply and demand, the fact that agricultural intermediaries act in silos and the weakness of transport and logistics, leading to substantial agricultural wastage.

In the southern Indian state of Kerala, for example, the mismatches between supply and demand in the fishing industry caused price volatility and wastage.

Access to mobile-based real-time price information has helped make a substantial difference to the efficiency of beach auctions along the state's coast, as a larger proportion (approximately 60 percent by 2001) of fishermen now possess mobile phones. By using their mobiles to gain real-time information on prices in a wide range of markets, fishermen can make better decisions on where to sell their catch.

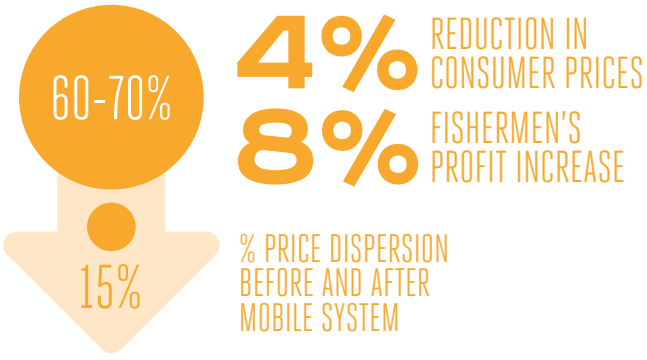
EFFICIENCY IMPROVEMENT THROUGH MOBILE COMMUNICATION IN KERALA (INDIA)



- 60% fishermen have phones (2001)
- Fishermen gain information on prices in other markets, decide where to sell in real-time

WASTAGE, PRICE VOLATILITY DRAMATICALLY REDUCED

- Wastage almost eliminated (from 5-8%)
- Improved margins for fishermen, benefits consumers too



Source: Overview of ICT in Agriculture – InfoDev World Bank Group | Note: Price dispersion calculated as (Highest price– Lowest price) Highest price %

Figure 22

Another challenge faced by farmers in many emerging markets is the need to meet the high standards of international buyers, many of whom now demand traceability and transparency throughout their supply chains. A program targeting pineapple farmers in Ghana—initiated by the United States Agency for International Development (USAID)—provides a promising model for farmers in emerging economies such as India. Using a GPS-based product tracking system, Ghanaian pineapples were tracked from when they leave the farms and collection sites to the ports from which they are exported, ensuring compliance with GlobalGap certifications.[16]

mAgriculture solutions that help reduce supply chain losses are extremely important for India, where losses constitute up to 18 percent of supply chain wastage in the fruit and vegetable industry.

Reducing productivity loss

Lack of access to information about agricultural best practices and up-to-date weather information prevents many farmers in emerging markets from maximising productivity and ultimately, profit. This is something mobile technology can address. For instance, the Community Knowledge Worker (CKW) initiative from Africa has used farmer communities as a channel for agricultural training and development.

Success of such initiatives offers hope to those in rural India, where by 2011; unemployment had reached almost 14 percent, compared to 7.6 percent in urban areas. If widely rolled out in countries such as India and Bangladesh, the CKW service could generate vital rural employment and push up agricultural productivity and rural incomes.[17]

Technical guidance on farming methods and weather warnings can help farmers maximise yields and increase production. In the Philippines, for example, a mobile-based application—the Farmer's Text Centre—is providing important technical guidance and weather warnings to rice farmers. As a result, farmers are increasingly opting to plant crops that have higher yields and reporting production increases of up to 20 percent.

The solution has important implications for Indonesia, which is a large rice importer, and could benefit by improving rice farming productivity.

16. Source: USAID; ictinagriculture.org
17. DNA India – citing Labor Ministry data (Sept, 2012)

Improving market access and pricing information

For many farmers in emerging markets—particularly those in remote rural areas—poor information on market prices for crops means they are unable to maximise their returns, preventing farmers from being able to increase their incomes and creating substantial post-harvest waste.

Information services like Reuters Market Light (RML) in India provide vital market information via SMS channel to benefit farmers. By providing timely and relevant market prices, RML has enabled farmers to plan their harvest and strengthened their negotiating power in markets.

REUTERS MARKET LIGHT (RML)

- Information on updated and localized market prices (for crops of choice), weather, agri expert advice, agri news
- Enables farmers to decide when to harvest, at what prices to negotiate with intermediaries

2013 **1M** UNIQUE SUBSCRIBERS IN 13 STATES IN INDIA

90% FARMERS BELIEVE THAT RML WAS USEFUL FOR THEM

Source: "Mobile Applications in Agriculture" (2011) – Syngenta Foundations; Reuters Market Light web portal

Figure 23

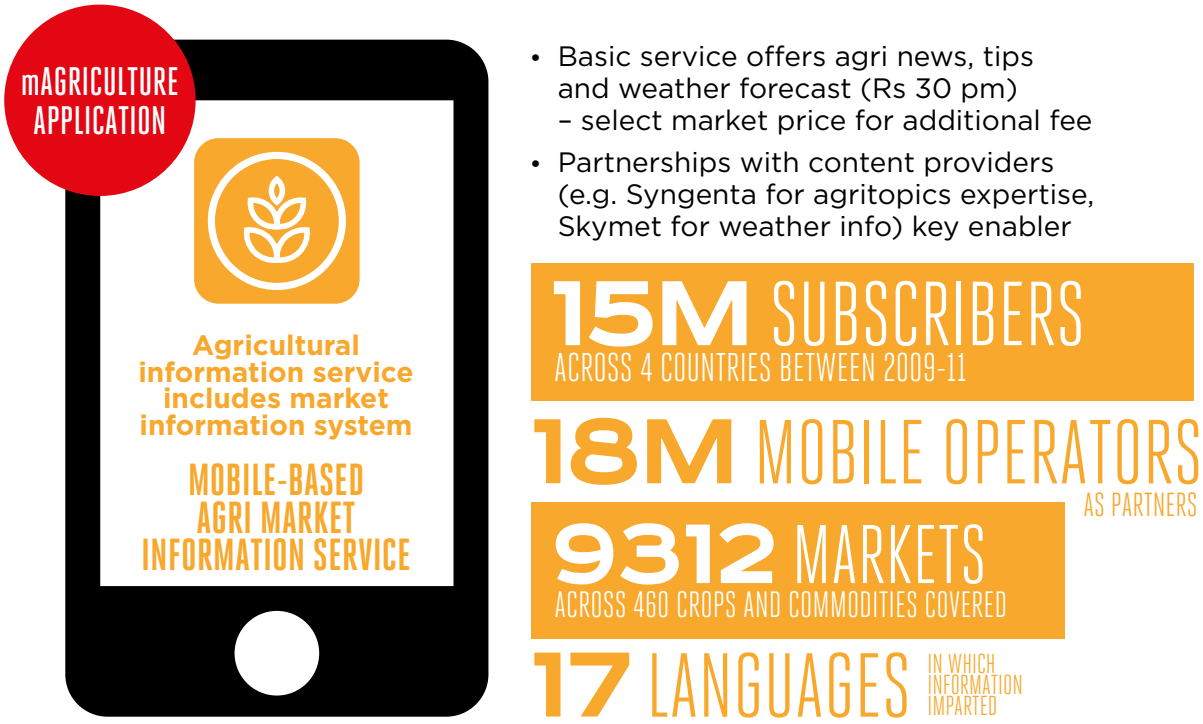
In addition to gaining access to agricultural and market information, farmers need to be connected to potential buyers. In areas where land-holdings are fragmented, lack of such information and market access can lead to post-harvest losses as high as 40 percent.[18]

In Sri Lanka, Dialog Tradenet—a mobile solution that is addressing asymmetries in markets, particularly in the world's poorest countries—is providing farmers with a virtual market place. Tradenet uses SMS alerts in English, Sinhala and Tamil to provide updated pricing information and help farmers find buyers for their products. [19]

Another mAgriculture project that has shown great promise in increasing the flow of market information in countries like India and Indonesia is the Nokia Life Agriculture Service, a mobile-based agricultural information service. This is critical as in many rural communities, poor knowledge of agricultural markets leads to loss of income with up to 70 percent of the price paid by consumers going to middlemen.

The impact has already been substantial. Between 2009 and 2011, the service—which has 18 mobile operators as partners—attracted 15 million subscribers across four countries. And incomes for subscribing farmers are estimated to be rising by up to 10-15 percent.[20]

NOKIA LIFE AGRI SERVICE



Source: "Mobile Applications in Agriculture" (2011) – Syngenta Foundations; GSMA mAgri Nokia Case Study

Figure 24

18. Source: ISAS Working Paper on Economic Inefficiencies (India)
19. Source: WSA Mobile; Dialog Tradenet web portal
20. Source: USAID – Nokia Life Agriculture ICT and AG profile (2012)

Providing access to financial services

Without access to credit, savings and insurance products, many agricultural workers in emerging markets find it difficult to generate a consistant income.

Lack of insurance, in particular, creates uncertainties for these smallholders and means they are badly hit by severe weather events such as droughts or floods.

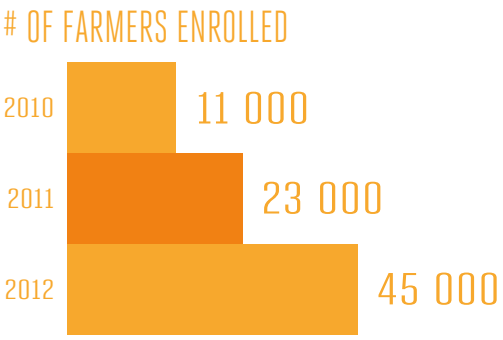
Mobile-payment based micro-insurance programs can help farmers safeguard their crops from the vagaries of nature. Kilimo Salama—a micro-insurance program from Kenya, is a successful example from Africa that provides mPayment linked crop insurance to farmers

KILIMO SALAMA CROP INSURANCE

- Purchase of insurance via mobile
- If weather station shows loss, all farmers paid irrespective of actual loss on field
- Payout disbursement via mobile channel

IMPACT OBSERVED

- 40% agri-hinterland covered by scheme
- 30 operational weather stations



Source: Syngenta Foundations (Mobile Applications in Agriculture), 2011; UAP Report on Kilimo Salama (2012)

Figure 25

The Kenyan crop insurance model has the potential to be replicated elsewhere. In India, for example, crop insurance penetration is substantial but concentrated among large farmers. Using mobile-delivered micro-insurance, protection could be extended to millions of smallholder farmers, reducing uncertainty and preventing floods and drought from destroying their businesses.

Impact potential and requirements for support

A wide range of mAgriculture solutions is available to empower farmers and improve efficiency in the agricultural value chain. The impact potential across key assessment metrics is significant. Mobile solutions can help lower price volatility, increase farmer income and help reduce consumer prices.

For the full impact of mAgriculture solutions to be realised, governmental support will be critical.

Governments can promote m-solutions through favorable policies that help establish mobile payment systems that are accessible to farmers. They can also build infrastructure support through partnerships, subsidies and content distribution to ensure farmers receive high quality information related to agriculture techniques.

The telecom regulator's role is equally critical, in providing a policy environment to support rapid deployment of mobile networks in rural and remote areas.

NEED FOR SUPPORT FROM GOVERNMENT AND TELECOM REGULATORS

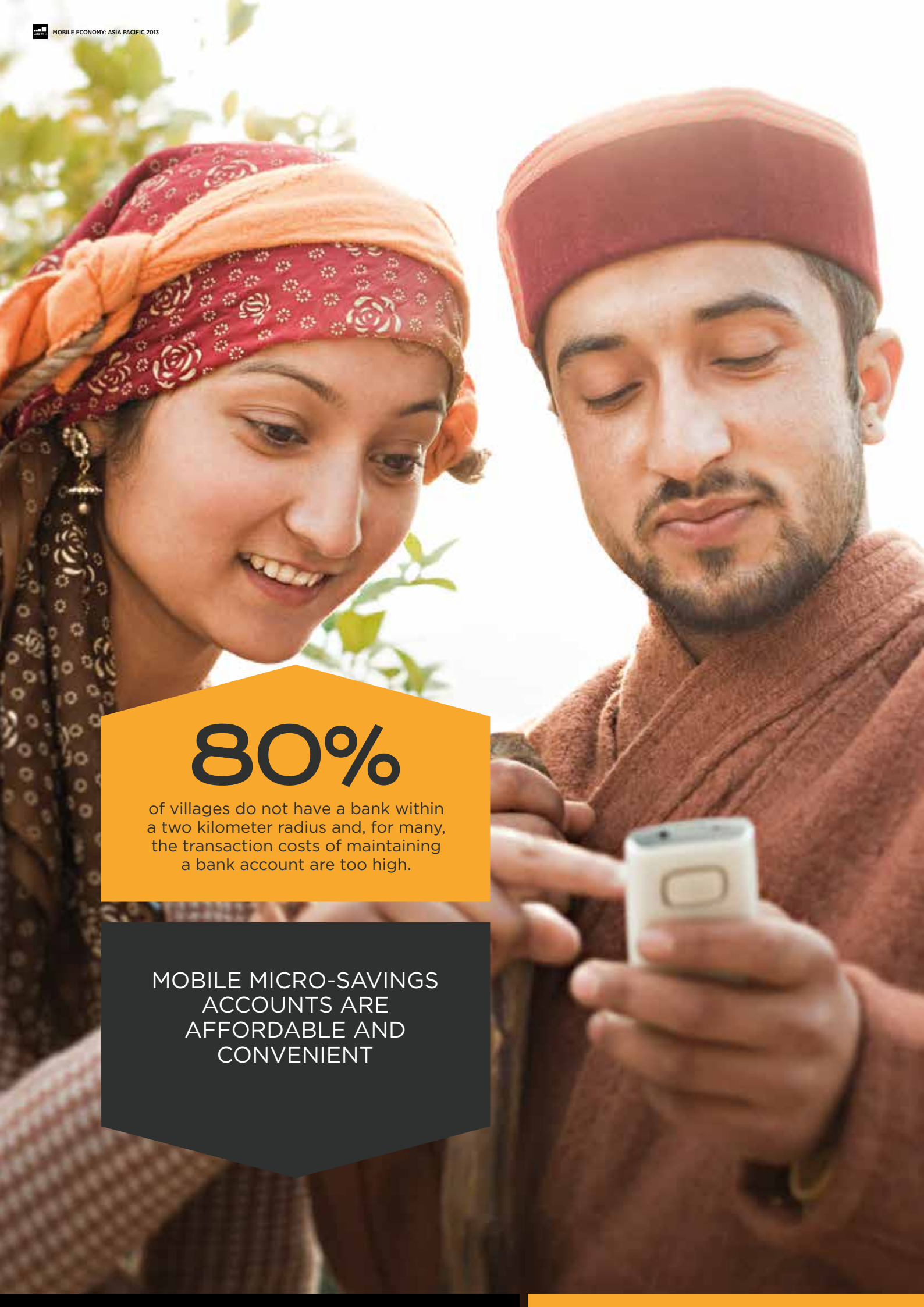
	GOVERNMENT ROLE	TELECOM REGULATOR ROLE
POLICY SUPPORT	Suitable policy environment to help creation of mobile-systems for commodity markets, mobile-enabled banking	• Support rapid deployment of voice and data networks in rural areas • Define infrastructure and spectrum specifications, investments for mobile networks • Recommend device subsidies for universal rural access
INFRASTRUCTURE SUPPORT	• Public-private partnerships towards infra development for m-solutions (incl. telecom infrastructure) • Subsidies in hardware / software investments	
CONTENT SUPPORT	• Provide access to free edu-content for farmers • Validate/ensure quality of agri-info content-collaborate with agri-universities • Up-to-date localized weather information	Provide recommendations for further applications of m-solutions for agriculture

Figure 26

Mobile operators have a pivotal role in developing an ecosystem that supports mAgriculture solutions. When it comes to farmer services, companies can develop mobile-based agricultural information service for farmers that include agronomy services, weather information and advice from with experts. These services can also offer access to commodity markets, with information relating to prices as well as mechanisms connecting buyers and sellers.

These companies can also build critical infrastructure by expanding 2G and 3G network coverage to rural areas. In addition, they can develop and operate mobile payment systems, hosting in-house mobile applications and create incentives for developers to come up with apps that have rural applications.

With a vast consumer base, the telecom industry has the knowledge and experience to customise mobile, voice and data packages to the needs of farmers. And by tapping into their sales and retail networks, companies can also promote the use of mobile technology in agricultural settings.



80%

of villages do not have a bank within a two kilometer radius and, for many, the transaction costs of maintaining a bank account are too high.

MOBILE MICRO-SAVINGS ACCOUNTS ARE AFFORDABLE AND CONVENIENT

C.

Financial Services

Introduction

Mobile has played a key role in supporting / enabling many financial services across the Asia Pacific countries. These include services like Near Field Communication (NFC) that drive convenience for many to offerings like mobile money and mobile remittances that are crucial to the financially excluded in emerging countries. Given the magnitude of the challenges, we have chosen to focus first on financial services for the unbanked.

For millions of unbanked people in the world today, lack of access to financial services exacerbates the problems they face, from volatility of cash flows to sudden demands for funds to cope with crop failures or medical emergencies. Access to financial services has the potential to improve their lives and reduce the risks and high costs they face when forced to turn to informal channels for sources of finance.

However, many barriers exist when it comes to accessing formal financial services. These include high administration costs, lack of proximity to bank branches, the difficulties of understanding complex financial products and lack of financial literacy. Meanwhile, banks have little incentive to provide services to individuals with low incomes who they perceive as high-risk borrowers.

BARRIERS FOR ACCESS TO FINANCIAL SERVICES

AFFORDABILITY

- High entry/service costs or fees
- High minimum transaction value

ACCESSIBILITY

Lack of proximity/ convenience
- Geography
- Time, schedule

PRODUCT COMPLEXITY

- Cumbersome process or requirements
- Unsuitable and complex features

FINANCIAL LITERACY

Lack of awareness or knowledge on financial products and concepts

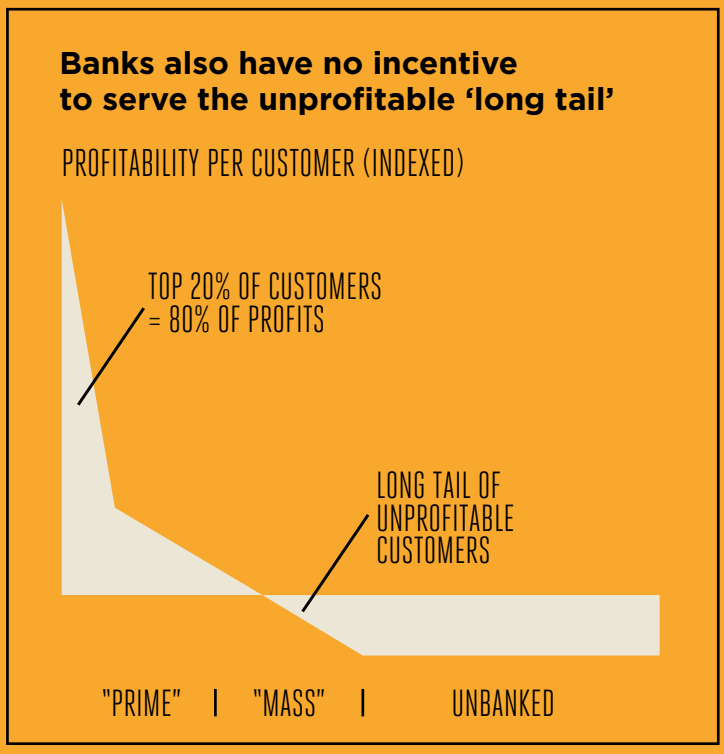


Figure 27

The challenges differ from country to country, with emerging countries struggling to extend financial services to all of their citizens, while mature markets want to improve efficiency and provide users with a better experience.

Mobile technology plays a critical role in broadening access to financial services, offering simple and affordable services that can be accessed almost anywhere and do not require financial literacy. Such services break down traditional barriers to financial services.

Moreover, an increasingly wide range of services can be offered via mobile money, from micro-savings and micro-loans to micro-insurance packages. MFS (Mobile Financial Services) also enables small cash transactions, bill payments and remittances to be made from anywhere. In mature markets, services such as payment through contactless cards and mobile banking is increasing convenience for consumers and enhancing the richness of interactions with their financial providers.

SUMMARY OF MFS SOLUTIONS

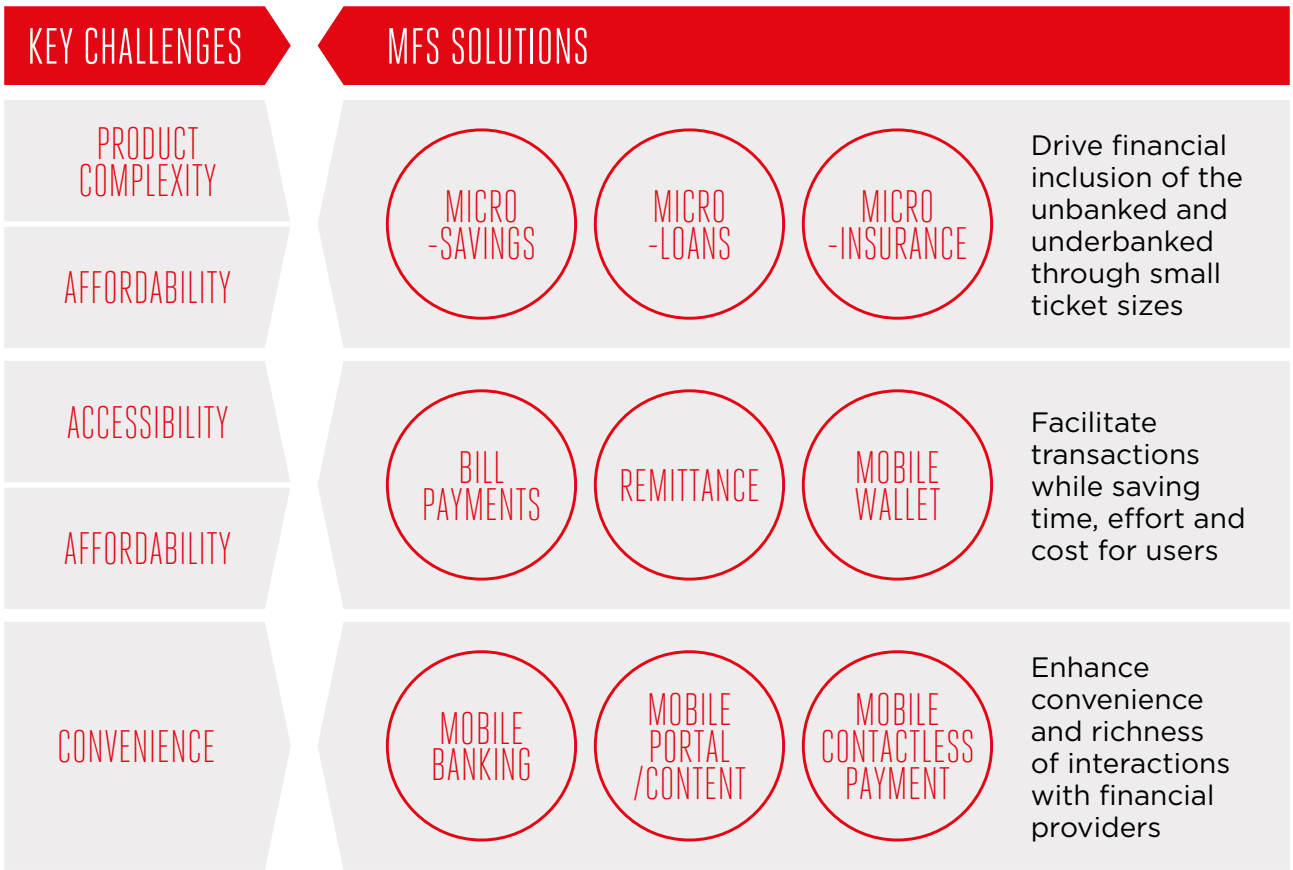


Figure 28

Spreading financial access to the poor

In emerging countries such as India and Bangladesh, low banking penetration leaves large numbers of citizens with no access to financial services.

In Bangladesh, for example, almost half of the population is financially excluded with 40 percent of citizens under-banked (with no access to products such as savings accounts). Helping redress this situation is an MFS solution, giving 3 million Bangladeshis an affordable and accessible alternative to a regular bank account.

Corporate partners have played a critical part in rolling out the services, with key bank initiatives—including the bKash venture of BRAC Bank and Dutch Bangla Bank's mobile bank account— coming together in 2011 to develop an mBanking offering.

MOBILE LEAD BRANCHLESS BANKING IN BANGLADESH

3 MILLION
MOBILE BANKING USERS

US $4.5M
DAILY TRANSACTION VALUE

70 000
CUSTOMER POINTS

ACOUNT FEATURES AND SERVICES INCLUDE

- Micro-savings: $0-1 to register (deposit, withdrawal, balance enquiry)
- Remittance
- Mobile money (P2P transfers)
- Salary disbursement
- Bill payment

Source: Asia Development Bank; Axco Insurance Market Information; CGAP; GSMA; IFC; MixMarket.org; World Bank; BCG Analysis

Figure 29

Because of the high rates of mobile phone ownership, one of the benefits of mobile-led branchless banking is the speed at which it can be adopted.

This has been demonstrated in India, which now has 20 million registered users. MFS services developed by banks are delivered through strategic partnerships with technology providers such as FINO and Eko and operators such as Bharti Airtel and Vodafone.

Mobile enabled branchless banking features and services include micro-savings accounts, person-to-person transfers, remittances and salary disbursements. Account holders can obtain cash at customer service points, ATMs and bank branches, and there are no requirements for opening deposits. Moreover, average transaction costs for mobile financial services are about 20 US cents, compared to US $1.45 at branches.[21]

Penetration has grown rapidly, with 53 out of India's 75 banks now offering MFS. In just one year (2011 to 2012), the volume of transactions has doubled with the value of those transactions tripling.

Many of the users of these services are individuals who had been previously unbanked, with 81 per cent using informal means of savings and 31 percent working as day laborers or factory workers and domestic workers.[22]

Multiple benefits for low-income users

From creating a safety net protecting against financial shocks to providing remittance channels for migrant workers, MFS is a powerful tool for the governments, helping them improve the lives of low-income communities.

First, mobile micro-savings creates a vital and convenient buffer for the poor against the shocks of severe and unexpected costs, such as job loss, the death of a spouse or a family illness.

Yet in India, 80 percent of villages do not have a bank within a two kilometer radius and, for many, the transaction costs of maintaining a bank account are too high, at an average of US $1.45 per transaction—unaffordable for those in rural areas whose average daily expenditure can be as little as 65 US cents.[23]

For individuals living in these circumstances, a bank account is therefore both physically and financially out of reach. However, mobile micro-savings accounts are affordable and convenient, with many customer service points and agents in villages, making it easy to deposit and withdraw funds. Registration and transaction fees are a matter of a few cents and no minimum balance is required to start an account. Users can then deposit and withdraw money when they need it, helping cope with events such as an illness in the family.

21. SBI vs Eko costs ;Malhotra 2010
22. Source: IMFI 2012
23. Source: World Bank, National Sample Survey (2009-10), SBI vs Eko costs; Malhotra 2010

MOBILE MICRO-SAVINGS EXAMPLE

MAYA LEARNED ABOUT A MOBILE MICRO-SAVINGS ACCOUNT AND QUICKLY SIGNED UP SINCE IT WAS NEARBY..

Multiple customer service points and agents in her village made it easy to deposit and withdraw

.. AND CHEAP

- US $0.40 registration fee
- No minimum balance
- Average transaction fee US $0.21

THE MOBILE BANKING SERVICES INCLUDE: DEPOSIT, WITHDRAWAL 24/7 BALANCE INQUIRY VIA SMS • PERSON-TO-PERSON TRANSFER

IMPACT

Maya is able to make small deposits 1-2x a week at her neighborhood store using her PIN. She feels secure in that she receives an SMS confirmation each time

One day, she was hospitalized where the doctor asked for $100 to continue the treatment
Her family had spent all their cash and were thinking to borrow from a loan shark at 5-10% monthly interest

But then Maya remembered her savings. Relieved, she quickly went to the nearby service point to withdraw money for her treatment.

Source:The Banker, The Economist, CGAP, World Bank,; BCG analysis

Figure 30

MFS also plays a critical role for migrant workers, offering them a secure and affordable alternative to expensive and unreliable remittance providers, particularly in places where villages rarely have bank branches and few people possess the proper documents needed to open a bank account.

For individuals in these circumstances who, for example, send money to relatives every month, this means using an informal hawala courier, which can cost up to 7.5 per cent of the funds to remit the money.

With mobile remittances, individuals can register at a local store using an easy registration process. In order to use the service, all that is needed to deposit and remit funds simply is a mobile phone and identity card and this costs only 1 to 2 percent of the remittance value.[24] The funds are easily accessible to relatives as customer service points are available in many shops in local villages, removing worries about relatives being tricked by a fake courier and eliminating the need to travel farther than the corner shop to receive a remittance.

24. EKO fees

Enhancing citizen services through MFS

For cash-strapped governments in emerging countries, MFS provides an efficient means of operating a secure, cost and time efficient welfare disbursement system, enabling egovernment and supporting disaster relief efforts.

In many countries, welfare disbursements are currently inefficient, taking up unnecessary time and resources. This places a heavy financial and administrative burden on administrations.

In India, for example, the cost of administering the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is substantial and efficiency is hampered by frequent funding leakages, procedural delays and corruption.[25]

Such disbursement challenges also prevent wider adoption of programs such as Janani Suraksha Yojana (JSY), a maternity program providing rural women with financial incentives to have institutional childbirths. With delays leading to payments that can take up to a year and payment only available as cash or checks, women are reluctant to sign up for the program.

For such welfare payments, MFS provides an efficient and secure disbursement tool. Using mobile accounts, the solution reduces the risk of fraud and payments can be monitored consistently and immediately at reduced cost, greater efficiency than physical and offline processes and with lower levels of reduced leakage.

As well as enhancing regular welfare payment efficiency, MFS can also provide a powerful tool at times of crisis, supporting disaster relief initiatives by directing help and information to those in need.

In Bangladesh, for example, floods occur on average every five years and last up to 35 days, affecting up to 75 percent of the population and causing US$365 per household in losses—mainly to crops and property—for each affected family (about 30 percent of the annual household income).[26]

At such times, mobile finance services can offer a channel through which to solicit and distribute donations and to collect and disseminate information and resources to those in need.

In response to the floods in Pakistan, EasyPaisa—a Pakistan-based branchless banking service—used its platform to solicit donations from people who lacked internet access and then to distribute those donations to affected households (a model that had proved highly successful for relief efforts in the wake of the Haiti earthquake). Mobile money or coupons can be used to direct people to specific stores or relief centers.

25. Mahatma Gandhi National Rural Employment Guarantee Act, 47% of people believe that corruption exists in the distribution of NREGA receipts; estimated Rs 71.5M (about US $1.5M) were paid in bribes to NREGA officials in 2007
26. Akter(2007): "Introducing a Micro-Flood Insurance Market in Bangladesh"

Enhancing service levels at affordable prices

In other Asia Pacific economies such as those of Indonesia and Thailand, MFS solutions are helping meet the demand for greater convenience and affordability from their citizens. In Indonesia, for example, mobile solutions are being applied to remittance services, replacing the cheaper but less reliable informal channels.

Mobile remittance services are already offered by four of the top network operators—Telkomsel, XL, Indosat and Axis—and with transaction fees of 40 US cents.

NEAR FIELD COMMUNICATION (NFC) SYSTEMS IN ASIA PACIFIC

NTT DOCOMO, China Mobile, and KT agreement will make it possible for customers to use their NFC phone across borders to make payments, purchase tickets and both collect and redeem coupons.

SOUTH KOREA

>10M NFC smartphones sold by the end of 2012

>200,000 terminals support NFC payments[1]

> 2M people have used their phones to pay transit fares

CHINA

China Mobile has set a goal for 2013 of distributing 10M NFC enabled phones with 3M registered customers

>1M payment terminals to have been deployed by UnionPay

SINGAPORE

Government-driven launch in 2012 to expand this year with transit fare-collection

Currently, only retail payments are available with MasterCard PayPass apps issued by EZ-Link and DBS bank

AUSTRALIA

Vodafone-Hutchison and Optus announced NFC launch in 2012

>100,000 payment terminals already deployed

1. Visa payWave and MasterCard PayPass Source: SK Telecom, NFC times, NFC world

Figure 31

In advanced economies, MFS offers speed and convenience. In Japan, for example, near field communication (NFC)—allowing smartphones and similar devices to communicate with each other by touching them together or bringing them into close proximity—has deep penetration, making mobile payment popular as a convenient means of making financial transactions.

NFC technology on mobile has a wide variety of applications in Japan, ranging from payments for train or cinema tickets to restaurant reservations, employee ID passes and electronic money. Armed with a mobile device, many users find NFC a convenient way of making small transactions.

NFC penetration in South Korea has rapidly grown, thanks to regulatory support and cooperation across the ecosystem. NFC has a wide variety of applications in the country, which vary from public transport to security systems and retail purchases.

APPLICATIONS OF NFC (NEAR FIELD COMMUNICATION) IN SOUTH KOREA

Source: GSMA- Korea blazes global trail for NFC

Figure 32

Technical and cross-border interoperability seen as the way forward.

Grand NFC Korea Alliance has been formed with mobile operators, regulators, handset makers, payment card providers and point of sale suppliers to promote NFC development and ensure interoperability in the region.

KT (Korea Telecom) customers in Japan can now use NFC handsets to redeem coupons at more than 200 outlets in Japanese airports and downtown Tokyo thanks to cooperation with NTT DOCOMO.

Penetration has been growing rapidly, as users find use of mobile phones for small ticket transactions convenient. KT, SK Telecom and LGU+ have sold more than 10 million NFC handsets. 6 million of KT's subscribers have NFC handsets compatible with the global standard, and 500,000 of its subscribers have been registered for Cashbee prepaid service which uses NFC.

Both Visa and Mastercard have supported the deployment of NFC readers at merchants. SK estimates that there are now more than 200,000 contactless terminals across the country.[27]

27. Source: GSMA- Korea blazes global trail for NFC as of Nov,2012

Impact potential and requirements for support

MFS has the potential to serve 300 million consumers in India and Bangladesh by 2020, raising the adult financial inclusion rate to nearly 70 percent in these countries.

For MFS to realise its full potential, support from financial services regulator and government is key. One key ask for support is in allowing a greater role for MNOs vs. banks. While select countries Sri Lanka, Indonesia, Philippines etc. have taken a lead in providing greater leeway, many others like India can do more to allow MNOs a greater role. This would help extend MFS to many millions currently excluded.

A CLEAR YET FLEXIBLE REGULATORY ENVIRONMENT IS NECESSARY FOR MFS TO TAKE OFF

ASKS OF SUPPORT FROM FINANCIAL SERVICES REGULATOR

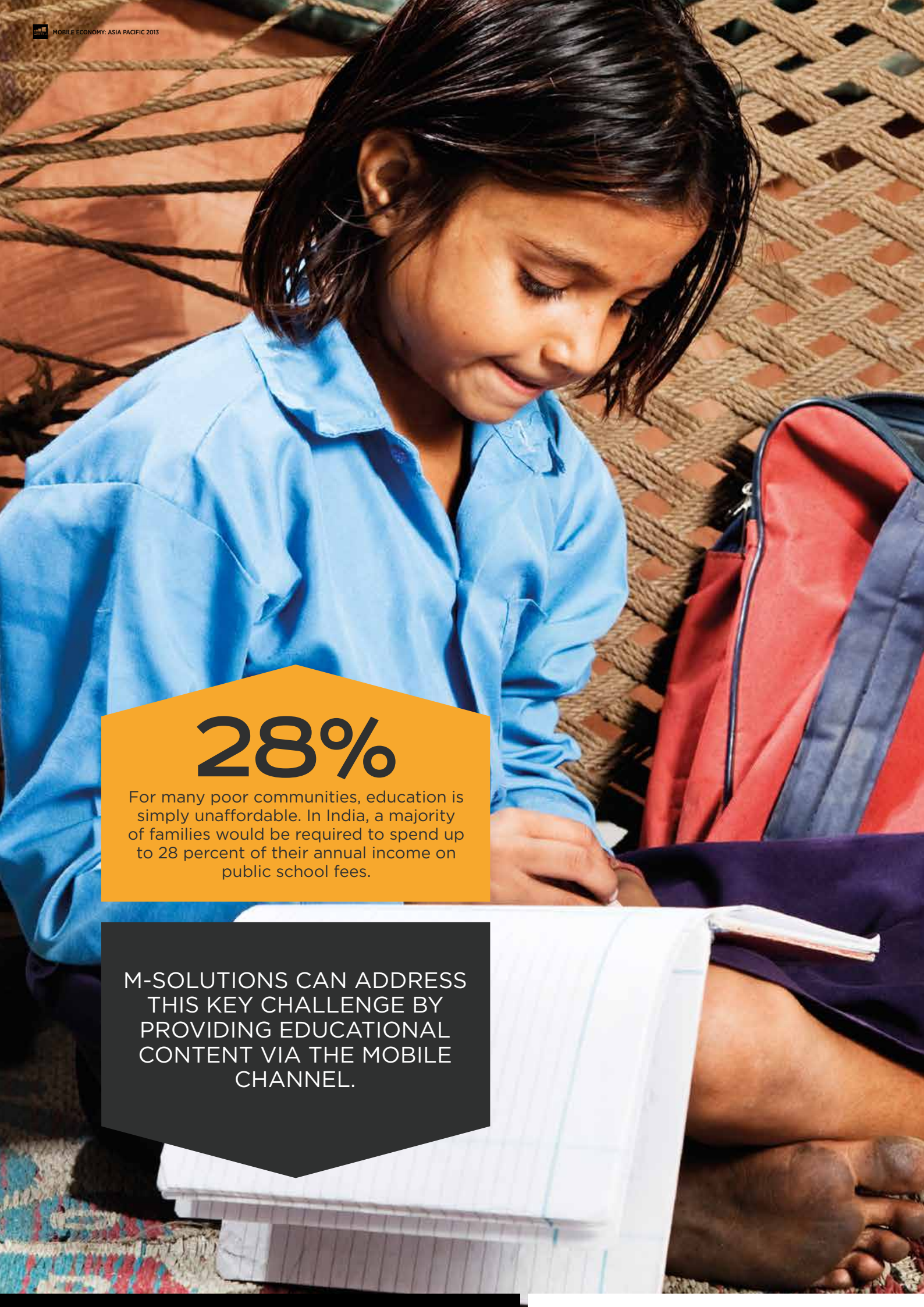
- Establish inclusive regulations on the role of banks vs. MNOs and other business correspondents
- Give non-banks more leeway in MFS space to establish the most effective business model and ecosystem e.g. ability to appoint agents
- Ensure flexibility in existing regulation or establish new MFS specific regulations to allow for innovation
- Loosen prudential measures to a level appropriate to the low value, high frequency nature of transactions

ASKS OF SUPPORT FROM GOVERNMENT

- Establish a dedicated fund for promoting use of MFS among low income clients
- Incentivise agents to enroll and maintain clients
- Incentivise private partners to develop tailored platforms and intuitive interfaces to reach low-income urban and rural populations

Source: CGAP Branchless Banking Self Assessment, BCG analysis

Figure 33: Regulatory requirements for MFS



28%

For many poor communities, education is simply unaffordable. In India, a majority of families would be required to spend up to 28 percent of their annual income on public school fees.

M-SOLUTIONS CAN ADDRESS THIS KEY CHALLENGE BY PROVIDING EDUCATIONAL CONTENT VIA THE MOBILE CHANNEL.

D.

Education

Introduction

In increasing the quality of education and broadening access to schooling and skills-based learning to greater numbers of people, governments face three challenges—extending access to underprivileged communities, making education affordable for these communities and increasing the quality of the education delivered.

Yet since traditional methods of delivering education are labour intensive, it is hard to capitalise on economies of scale. However, new forms of education—delivered through mobile technology—make these economies of scale possible, helping make education something for everybody.

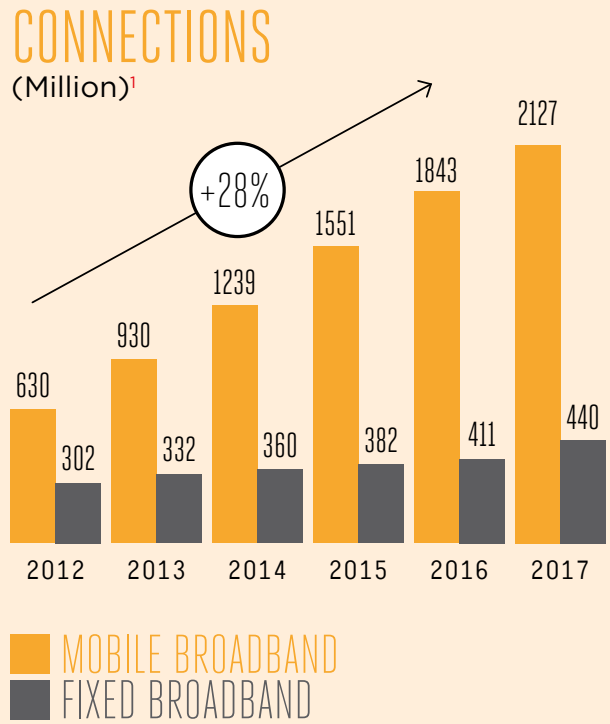
The concerns of education authorities vary according to the level of development their country has reached. While for emerging countries still struggle with the task of delivering quality education to their citizens, for mature economies the challenge is one of cost.

When it comes to education, the advantage of mobile technology is that it can address issues of quality as well as access (through cost reduction). Not only can mobile devices give both teachers and students access to academic content remotely, wherever they are, the quality of that content can be consistently high with richly interactive features that are both entertaining and effective learning tools.

Mobile broadband is increasingly the dominant mode of internet access in Asia Pacific. It is estimated that, by 2017, there would be over 2.1 billion mobile broadband connections in Asia-Pacific. Any internet-based application would be highly relevant for these users.

PROLIFERATION OF MOBILE BROADBAND IN APAC AND RELEVANCE TO M-SOLUTIONS

MOBILE BROADBAND IS MORE PREVALENT THAN FIXED BROADBAND - EXPECTED TO GROW SIGNIFICANTLY FASTER BY 2017 TO 2.18B CONNECTIONS



M-SOLUTIONS VIA MOBILE NETWORKS WILL BENEFIT THESE CONNECTIONS

REACH

Mobile networks access rural areas where formal education sub-standard

COST

Content disseminated over internet economical compared to brick and mortar courses

QUALITY

Flexible learning through mobile devices

Collaborative online courses enhance quality

Figure 34

Therefore, a broad range of solutions – not limited only to mobile devices – have been considered when addressing challenges in education. Initiatives that are enabled by the internet can be proliferated using mobile internet accessed through various devices.

SUMMARY OF mEDUCATION SOLUTIONS

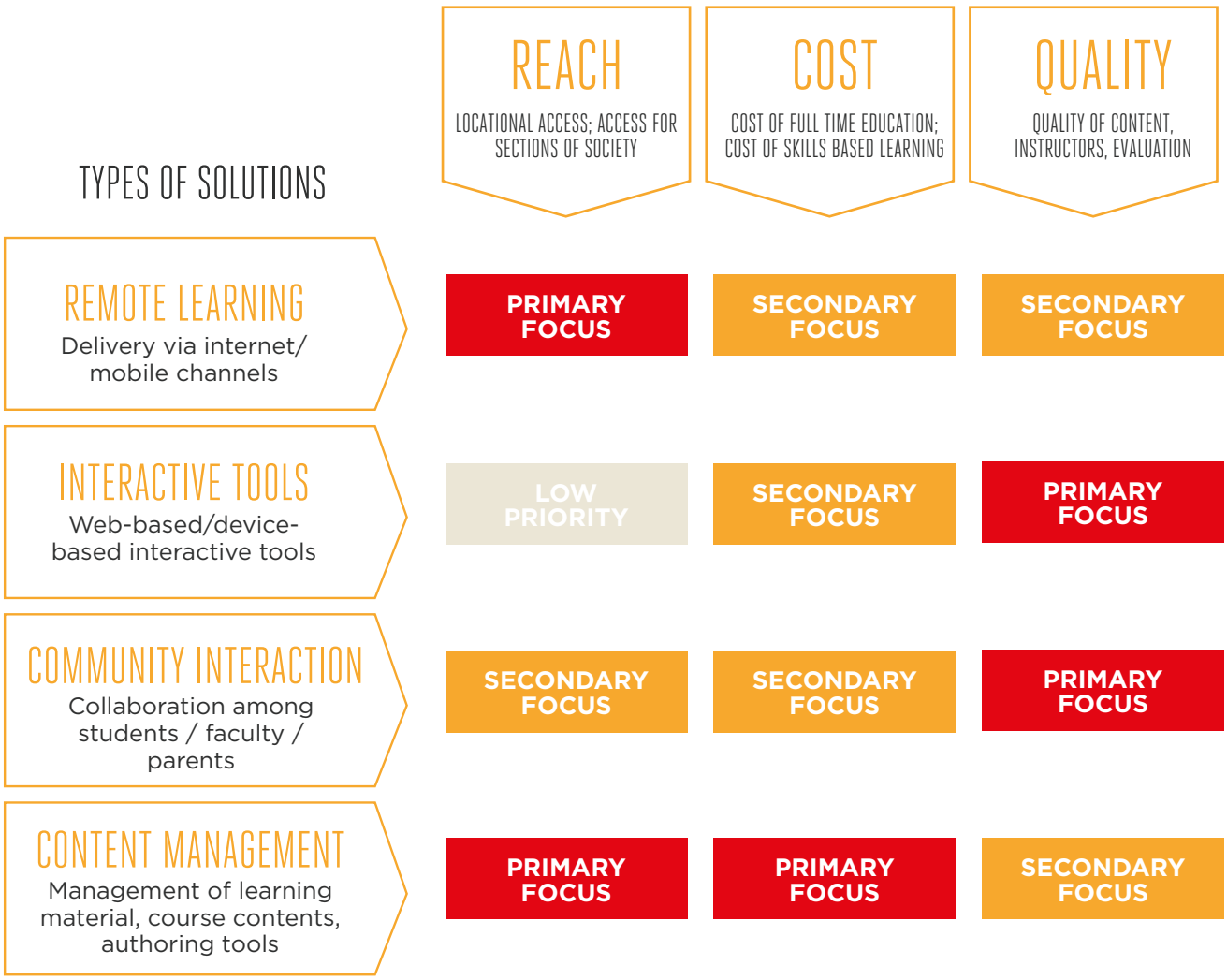
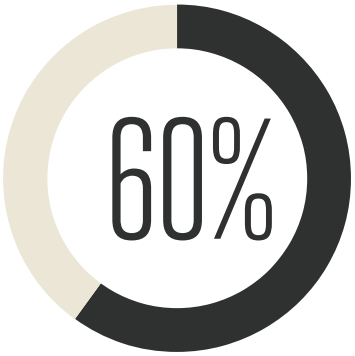


Figure 35

INCREASING EDUCATION'S REACH

For many emerging countries, the biggest educational challenge is difficulty of access, especially among rural and less-privileged communities. And with less than 60% of secondary school teachers[28] trained to teach, the goal of expanding access to education is extremely difficult.

However, mobile solutions provide learning tools with which children can either teach themselves or access tutor services that would otherwise be unaffordable.

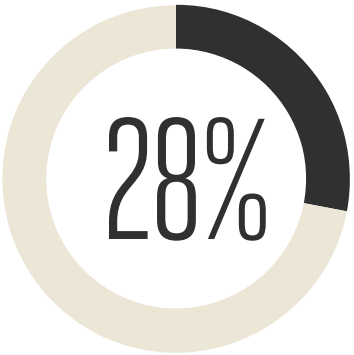


LESS THAN 60% OF SECONDARY SCHOOL TEACHERS[28] TRAINED TO TEACH

LOWERING THE COST OF EDUCATION

For many poor communities, education is simply unaffordable. In India, a majority of families would be required to spend up to 28 percent of their annual income on public school fees, and 40 to 167 percent for international schools[29].

M-solutions can address this key challenge by providing educational content via the mobile channel.



IN INDIA, A MAJORITY OF FAMILIES WOULD BE REQUIRED TO SPEND UP TO 28 PERCENT OF THEIR ANNUAL INCOME ON PUBLIC SCHOOL FEES

28. Source: World Bank Education Statistics for low income countries (Percentage of trained teachers in Secondary schools, 2010)
29. For households with Annual income of ~Rs 1.8 Lakh to Rs 4 Lakh (US $1 = Rs 54); Source: EW Schools Survey 2009; Tamil Nadu Government Chennai Fee Structure report; Press search; Census of India, BCG analysis

Tata DOCOMO's Tutor on Mobile service in India provides a knowledge marketplace for affordable access to education. Through the services, subscribers can obtain access to learning content on a wide range subjects, including school curricula, job interview preparation guides and content on hobbies.

TATA DOCOMO TUTOR ON MOBILE

1 MILLION
USERS EXPECTED TO BENEFIT FROM SERVICE IN 1 YEAR

200 000
ACTIVE USERS IN EARLY PHASE OF LAUNCH

1.5M
PIECES OF CONTENT ACCESSED IN FIRST YEAR

~75
CONTENT PROVIDES CONTRIBUTE TO CONTENT

Learning content on multiple subjects provided for subscribers
- Incl. school topics, interview prep, hobbies
- Multiple channels employed (including WAP, SMS, IVRS, videos)

Content sourced from providers, including other subscribers

Affordable prices for content
Educational videos on math, chemistry for Rs 5 to Rs 15

Source: Tata Docomo Tutor on Mobile portal; Press search

Figure 36

Boosting the quality of education

When it comes to the quality of education available, a lack of qualified teachers is a challenge, particularly in secondary and higher education. This leaves a clear opportunity for mEducation to fill the gap.

One initiative that has helped alleviate quality concerns in education has been the 'Bridgeit' program by the International Youth Foundation. The initiative leverages the power of mobile phone technology to improve the quality of teacher instruction and increase student proficiency in subjects like math, science and life sciences. In the program, teachers downloaded educational video content using mobile phones, which were connected to TVs in their classrooms, allowing students in remote areas to access a larger range of educational content. In the Philippines, Bridgeit has benefitted over 976,000 students by training nearly 1500 primary school teachers over the course of seven years.[30]

Another illustration of the potential of this solution is the Khan Academy, an online open education content provider that offers free access to more than 3,400 instructional videos presented by experts on a wide range of subjects, along with interactive quizzes and tools teachers can use to chart students' progress.

KHAN ACADEMY ONLINE EDUCATION INITIATIVE

Source: Khan Academy Web portal

Figure 37

30. Source: http://www.iyfnet.org/bridgeit

In addition to increasing access to educational content, m-solutions can also offer certification opportunities, helping improve the employment prospects in places where college education leaves graduates with only low quality skills.

Here, the corporate sector can play a role. For example, to enhance employability, Microsoft offers professional IT certifications for Microsoft products. In addition to in-class courses, Microsoft provides preparation materials online with exams costing approximately US $125. The certifications come in four tiers: Associate, Expert, Developer and Master.[31]

Microsoft has found that the program has increased employability, with 60 percent of IT professionals reporting that certification was what secured them a new job and 91 percent of recruitment managers including the certification as part of their hiring criteria.

Another aspect of quality in education is the level of language training offered, something that is becoming increasingly important as globalisation of the workforce demands proficiency in languages such as English. Yet language-training services remain poor quality, particularly in emerging countries.

Using an mEducation application, online language learning communities can address this deficit. One example is Live Mocha, which provides a social platform through which it connects language learners directly with native speakers in more than 38 languages so that they can practice via voice chat.

31. Source: Microsoft Learning

Impact potential and requirements for support

An educated population is the foundation of a healthy and prosperous society. Once, only the wealthier nations were able to deliver high quality education to their citizens. Today, with m-solutions, the goal to turn every young person into a well-educated student is eminently achievable.

Estimates suggest that mEducation solutions can significantly improve affordability of education by up to 65%[32], which can help millions of households in countries like India, where cost of school education can be as high as one-third of household income[33]

Mobile-enabled solutions can also help improve student proficiency. Experiences with the Hole in the Wall and Khan Academy initiatives indicate that for low proficiency students, improvements of up to 50-75% in performance could be achieved.

Another area mobile solutions can have an impact is employability. In India, for instance, nearly 64% to 80% of graduates have been found to be unemployable in various fields. In one study, nearly 30% engineers were found to be unable to solve basic mathematics problems.[34] A conservative 20% point improvement in employability – indicated by successful e-learning programs in India – could help ~300,000 engineering graduates become suitable for employment.

32. Based on Megastudy example | Source: Literature research, analyst Report, cram school for undergrads who plan to enter Medical (MEET) or Dental (DEET) graduate program
33. Source: Census of India, Credit Suisse survey on Indian consumerism (2011), BCG Analysis
34. Based on NASSCOM studies, FICCI and World Bank surveys

While mobile solutions have the potential to transform the delivery and quality of education, with further support, these technologies could achieve even more. Government support will be critical to ensure that new solutions in education can achieve their full potential.

NEED FOR SUPPORT FROM GOVERNMENT AND TELECOM REGULATOR

	GOVERNMENT ROLE	TELECOM REGULATOR ROLE
POLICY SUPPORT	• Support adoption digital tech. in education • Develop and support donor initiatives for supplying mobile devices to program recipients (esp. the under-privileged)	• Devise policies to enable development of mobile networks in remote / rural regions eg: Joint PPP programmes, tax incentives • Define acceptable use of mobile phones for education purposes
INFRASTRUCTURE SUPPORT	• Invest in mobile networks and devices infrastructure (Government led or public / private partnerships) • Provide subsidies for ICT infrastructure for m-solutions	
PARTNERSHIPS AND PROMOTIONS	• Partnerships with m-solutions in government controlled school systems, universities • Co-create for curricula for m-based learning • Engage in teacher training for m-education	Provide support to promotion of safe-use of mobile devices among school children

Figure 38

Future impact

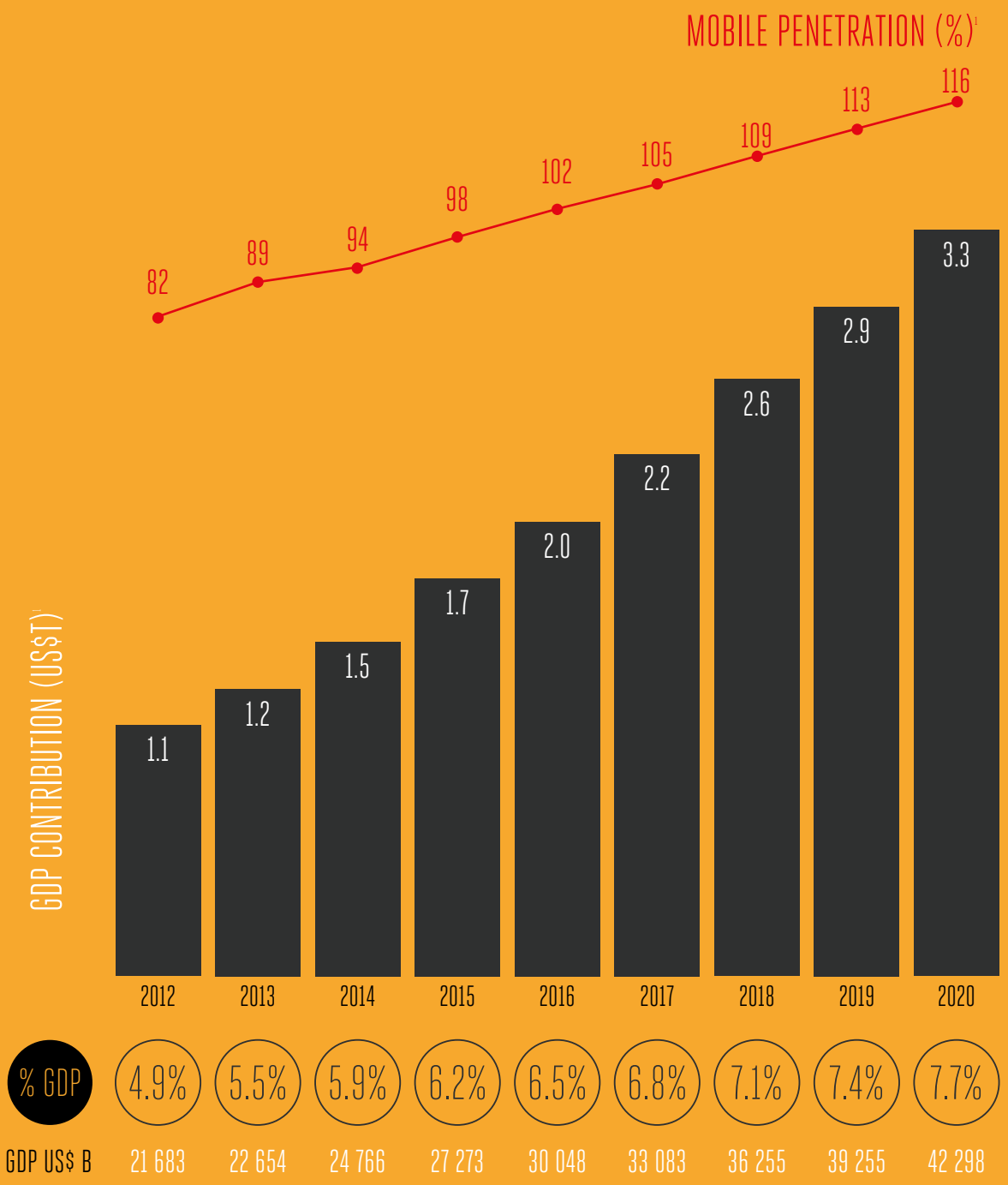
There is potential to unleash much greater socio-economic impact via mobile technology in the coming years. This would entail a significant step up in GDP contribution from the mobile ecosystem as mobile penetration grows across the region.

By 2020, mobile could contribute to almost 8% of the Asia Pacific GDP, with 22 million additional jobs, an incremental 12% financial inclusion and significant contribution through infrastructure investments (US $240billion) and public funding (US $300billion).

Private sector investment is important for the growth of mobile, yet operators' ability and willingness to invest depends on the presence of a conducive regulatory environment. MNO investments have flattened of late after many years of sustained increase. Governments therefore need to consider how to shape this environment and facilitate investments. Spectrum availability and sustainable pricing would be key to enable the next wave of investments in 4G and data.

To be able to invest, companies need clarity on the overall cost of doing business—including both their anticipated returns and profitability from doing business. Moreover, their willingness to invest will depend on how they view the security of these investments—including the anticipated stability of the regulatory environment, as well as how the rule of law will be enforced.

GDP CONTRIBUTION FROM MOBILE



1. GSMA Intelligence forecasts for number of connections until 2017, then linear growth based on Ovum estimates until 2020 Source: GSMA Intelligence; GSMA; Ovum; EIU; BCG analysis

Figure 39

FUTURE IMPACT

GDP

2012 **1 Tn**
1 trillion USD GDP impact

2020 **3.3Tn**
3.3 trillion USD GDP impact

Employment

2012 **16M**
16 million jobs created by mobile industry and points of sale

2020 **22M**
22 million jobs created in mobile industry and points of sale

Public Funding

2012 **100B**
100 billion USD contribution to public funding, in addition to spectrum licenses

2020 **300B**
300 billion USD contribution to public funding, in addition to spectrum licenses

Education

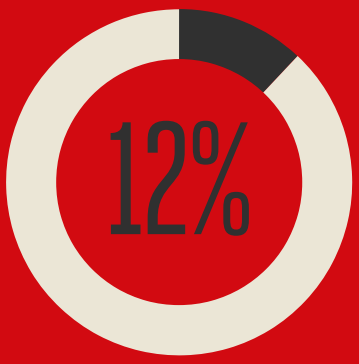
2012 **50%** proficiency improvement in key subjects[1]

2020 **+20%** employable students from improved grades[2]

Personal Finance

2012 **1%** financial inclusion in developing countries

2020 **12%** financial inclusion for 2020



Civil Society

2012 **1.5B**
1.5 billion connected people by mobile

2020 **2.1B**
2.1 billion connected people with mobile

Environment

2012 **600M**
CO2 reduction from **600M** high-mobility workers and farmers

2020 **1 Billion**
CO2 reduction from **1 Billion** high-mobility workers and farmers

Infrastructure

2012 **80B**
80 billion USD investments in infrastructure

2020 **240Billion**
240 billion USD investments in infrastructure

Figure 40

1. Based on previously unbanked baseline 2020 estimates: India 12%, Bangladesh 10% 2. NASSCOM; UNESCO report on graduate employability; Min. of Higher Education Malaysia; Press search . Note: GDP impact estimated based on GDP correlation with mobile penetration. Investments, public funding and jobs are based on GDP impact ratios, with jobs adjusted for scale effect. Source: GSMA Intelligence; EIU; Ovum; GSMA; World Bank; World Health Organisation; UNESCO; BCG analysis

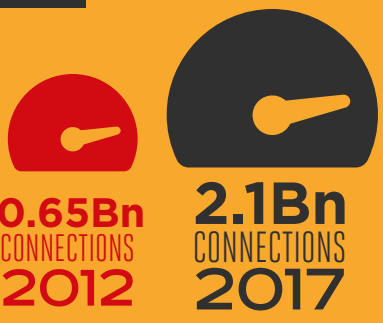
Connection Base Growing Fastest

7.3 Billion
CONNECTIONS WORLDWIDE 2013

3.5 Billion
CONNECTIONS IN ASIA PACIFIC

Migration To Mobile Broadband

2.1 Bn



Mobile broadband is increasingly the dominant mode of internet access in Asia Pacific. It is estimated that by 2017, there would be over 2.1 billion mobile broadband connections in Asia Pacific.

Spectrum Availability

Spectrum availability and sustainable pricing would be key to enable next wave of investments in 4G and data.

A key point for Asia Pacific policymakers to consider is that failure to allocate spectrum according to international standards (failure to harmonise) leads to increased costs and inefficiencies for all stakeholders.

700MHz

US $1 trillion
across Asia Pacific by 2020

2.1M additional jobs
created by 2020.

By allocating the

700 MHz band

to mobile, countries have the potential to push GDP impact by tenfold

A total increase of more than

US $1 trillion

across Asia Pacific
by 2020

Regulations

There are five regulatory themes, each of the themes is assessed across two parameters:

- An as-is assessment of current regulations
- Suggestions on regulations based on international benchmarks

A.

Spectrum Management - the Digital Dividend and Harmonisation

The ongoing digitalisation of television broadcasting has created a unique opportunity to reallocate bandwidth to new uses. Because digital television at current levels will take 25 per cent or less of the current spectrum used by analogue broadcasting, spectrum can be freed up – a once-in-a-lifetime 'Digital Dividend'.

The Digital Dividend refers to seizing the opportunity created when terrestrial broadcasting moves from analogue to digital, which reduces the amount of spectrum required to transmitting the same number of TV channels by 50-75 percent. It creates a historic opportunity for society to consider how to deploy the very valuable frequency resources in the UHF band and to seek to maximise the benefits to society.

In North America, Latin America and the Asia Pacific, the Digital Dividend refers to the 700 MHz band – specifically, the 698-806 MHz band. This band offers a sweet spot for mobile services, with an ideal combination of range and data capacity, enabling roll-out in less populated rural areas and lower service costs.

However, in order to reap the fruits of the Digital Dividend and band harmonisation, policymakers need to take action. Most of Asia Pacific countries have now committed or stated intention to follow the APT proposed band plan, and are thus well underway with a harmonised allocation that would greatly benefit the entire region. By allocating the 700 MHz band to mobile, countries have the potential to push GDP impact by tenfold as compared to digital broadcasting, a total increase of more than US $1 trillion across Asia Pacific by 2020. It can also create 2.1 million additional jobs and seven times more government revenues.

Delays in expediting the Digital Dividend could reduce the GDP impact by an estimated US $320 billion until 2020 at Net Present Value, with a loss in extra tax revenues of an estimated US $50 billion. Further, failing to commit to the APT proposed harmonised band plan could reduce benefits between 5 and 30 percent[35] for a non-harmonised country. Due to risk of interference in a radius up to 200 kilometer, also benefits of neighboring countries could be significantly reduced.

35. Source: Datamonitor; EIU; OECD; World Bank; National statistics units; BCG analysis

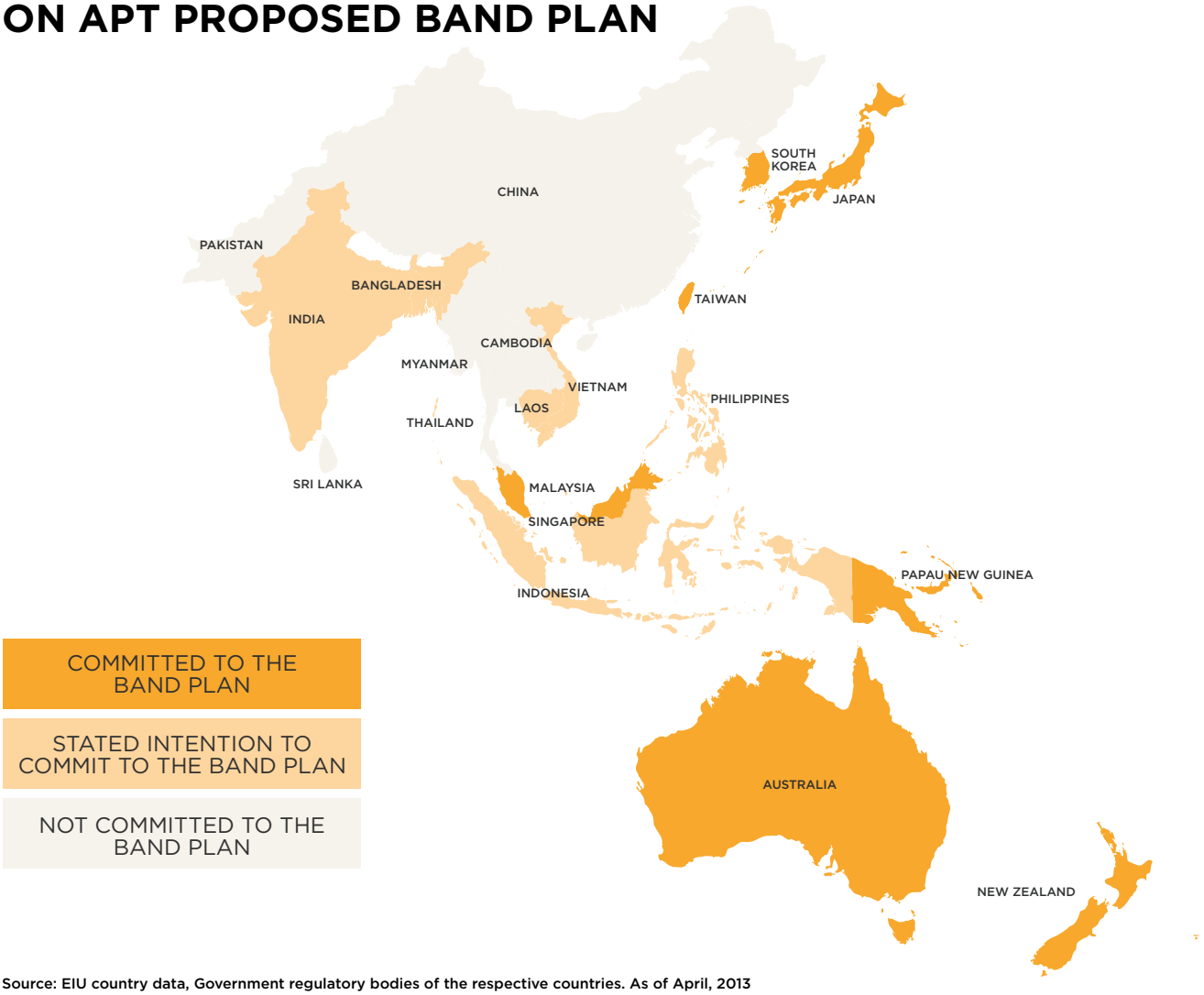
In examining the impact of the regulatory environment in Asia Pacific on the Digital Dividend, three areas are considered:

- Recent developments in Digital Dividend spectrum allocation in Asia Pacific,
- The economic benefits of allocating the Digital Dividend spectrum to mobile (as compared to digital broadcasting), and
- The economic impact of a delayed or non-harmonised roll-out of mobile broadband.

Recent developments in Digital Dividend spectrum allocation

Commitment to the APT proposed 2x45 MHz band plan in the 698-806 MHz range is strong and growing in the region, with the majority of countries either committed to implementing harmonised technical specifications or stating their intention to do so. Collectively, the populations of these countries number more than 2 billion.

COMMITMENT STATUS OF APAC COUNTRIES ON APT PROPOSED BAND PLAN



Source: EIU country data, Government regulatory bodies of the respective countries. As of April, 2013

Figure 41

Further, at a recent meeting (May, 2013), representatives of South Asian Telecom Regulatory Council have endorsed the joint adoption of the APT 700 MHz frequency band plan.

Economic benefits of allocating the Digital Dividend spectrum to mobile

In modeling benefits of early harmonisation on the 700 band, we examine two different scenarios: harmonisation of mobile services and harmonisation of broadcasting services. In each of these two scenarios, the benefits are assessed along four economic dimensions:

- The impact on GDP growth
- The impact on government revenues
- The impact on job creation
- The impact on business creation

Given a roll-out timeline of 2015 (the start of roll-out) to 2016 (when the full effects will be evident), we predict a number of impacts. Service costs will decrease by 6 percent in countries with high mobile penetration and 10 percent in countries where penetration is low.

Mobile broadband can greatly simplify access to information and business services such as online payments, price information and access to commodities exchanges.

When it comes to business productivity gains, we predict a 5 percent gain in the first year of roll-out and a 10 percent gain in 2016. Agricultural productivity will also rise as a result of harmonisation, with a 5 percent improvement in the first year of roll-out and a 10 percent improvement in 2016.

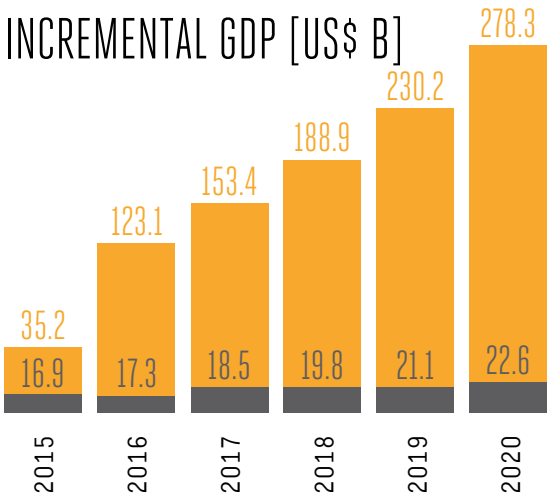
Allocation of the 700 MHz band to mobile will have significant incremental economic benefits over broadcasting in Asia Pacific. It translates to nearly US $1 trillion in incremental GDP between 2015 and 2020, 1 million new business activities by 2020, incremental government revenues of over US $100 billion and 2.1 million additional jobs created by 2020.

New business creation is expected from entrepreneurship and the internet service provider (ISP) value chain. New jobs would be created as a result of the launch of new businesses. Increases in productivity and new business creation would lead to incremental GDP growth and government revenues would be generated by income tax from additional employees, corporate levies and value added tax on goods and services.

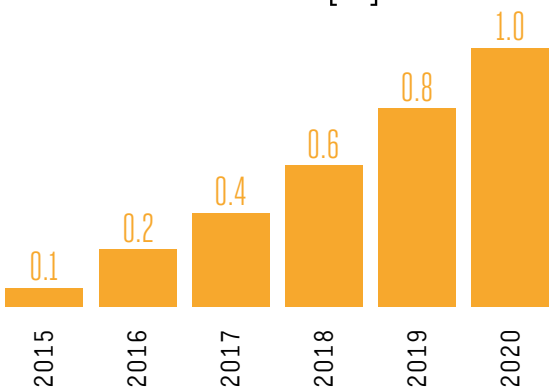
INCREMENTAL ECONOMIC IMPACT OF MOBILE BROADBAND OVER BROADCASTING

GDP INCREASED US$ 1,009B 2015-2020

(NPV US$ 876B – 3.7% of GDP[2])

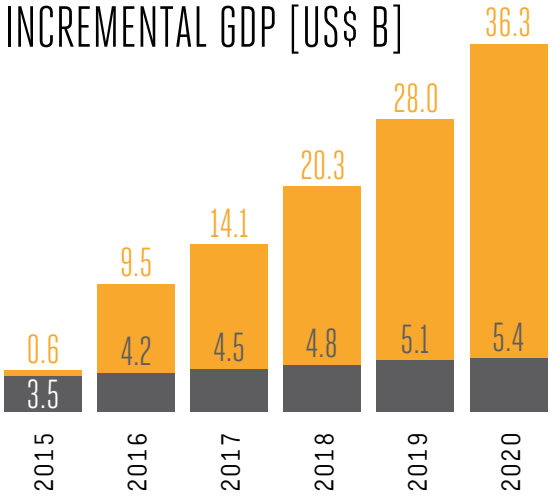


1.0M NEW BUSINESS ACTIVITIES BY 2020[1]

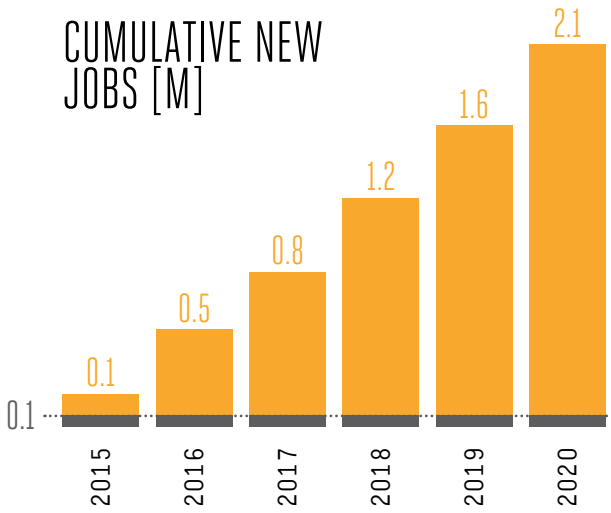


GOVERNMENT REVENUES UP US$ 109B

(NPV US$ 92B – 0.4 of GDP[2])



2.1M ADDITIONAL JOBS CREATED BY 2020



1. Incl. new independent businesses, new departments/units/business areas within existing firms 2. Total Asia Pacific 2013 GDP | Note: NPV discounted by study country government security rates for each cluster; 1.5% for Korea, 2.8% for Malaysia, 4.0% for Indonesia and 5.0% for India

Source: Datamonitor; EIU; OECD; World Bank; National statistics units; BCG analysis

Figure 42

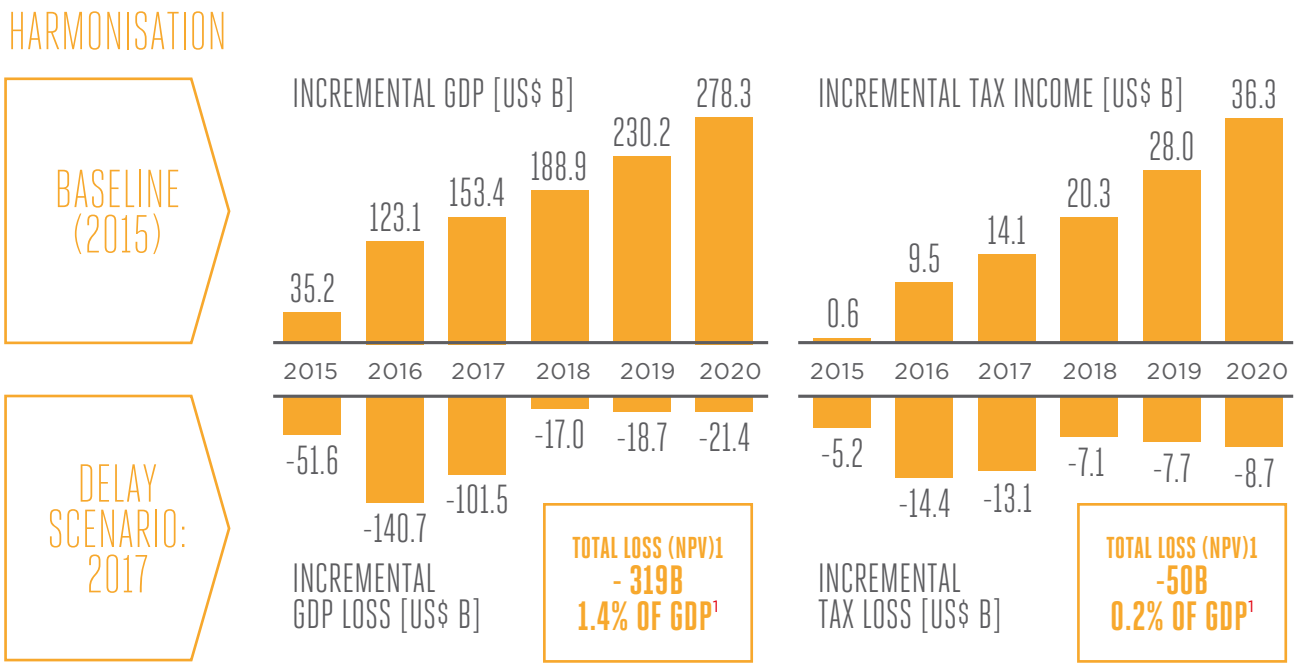
Impact of delayed / non-harmonised roll-out

The benefits of the Digital Dividend are highly dependent on roll-out timing. Delaying a decision on the 700 MHz band would affect roll-out, which would diminish the overall benefits of harmonisation.

We estimate the opportunity cost—in terms of the socio-economic impacts—of delaying harmonisation until 2017 compared to the benefits of the early harmonisation baseline of 2015.

Delays will have major implications on all of the expected benefits. It is estimated that delaying harmonisation till 2017 would result in a loss of nearly US $319 billion of impact on the GDP. This will also translate into a loss in the order of US $50 billion of tax income. Further, this would result in 359,000 fewer new business activities and 708,000 fewer jobs created across Asia Pacific.

GDP AND TAX REVENUE IMPACT OF DELAY IN HARMONISATION (VS BASE SCENARIO) (APAC)

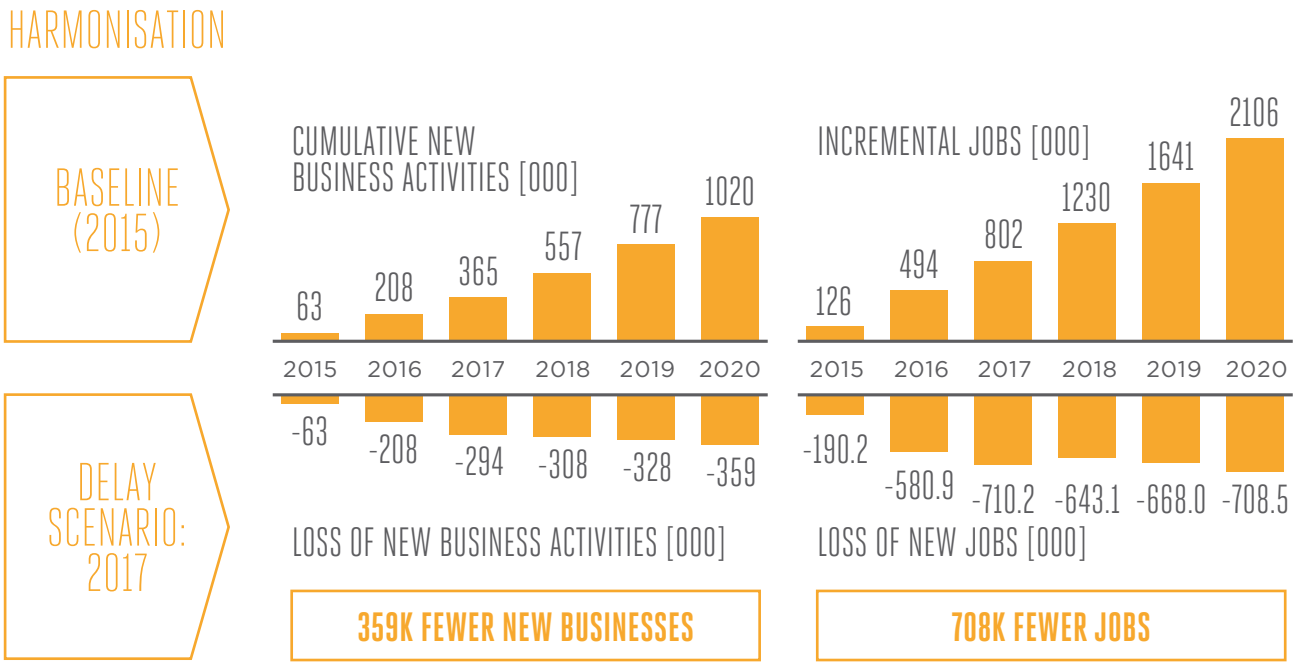


US $319B GDP IMPACT LOST IF DELAYING UNTIL 2017 AS WELL AS **US $50B** TAX INCOME

Source: Datamonitor; EIU; OECD; World Bank; National statistics units; BCG analysis

Figure 43

IMPACT OF DELAY IN HARMONISATION ON NEW BUSINESS ACTIVITIES AND JOBS CREATION (APAC)



359K FEWER NEW BUSINESSES CREATED IF DELAYING UNTIL 2017 AS WELL AS 708K FEWER JOBS CREATED

Source: Datamonitor; EIU; OECD; World Bank; National statistics units; BCG analysis

Figure 44

The impact of a delay in the decision on band allocation and of non-harmonisation goes beyond the individual country—lack of harmonisation also has an effect on other nations because of the resulting interference between neighboring countries.

When signals interfere with each other on the same frequency, they may cancel each other out or one signal may overpower the other. Signal overload occurs when interference from one source becomes swamped, preventing the signal from being transmitted. Alternatively, the receiver may not able to distinguish the desired signal from the unwanted one.

This interference leads to a reduction in the quality of service, as a result of which, neighboring countries can be directly affected within a range of approximately 200 kilometers. For this reason, decisions on band allocation may undermine the effects of harmonisation across the region.[36]

In looking at the potential implications of non-harmonisation, we modeled the effects on a representative country (Country X) and on its neighboring countries. The representative country has a medium developed economy and share borders with one developed country (A-cluster), one medium-developed country (B-cluster) and one less developed country (C-cluster).

36. Source: Ægis "UHF Technical Compatibility Issues"; Expert calls

MODEL OF REPRESENTATIVE COUNTRY TO ASSESS IMPLICATIONS OF NON-HARMONISATION

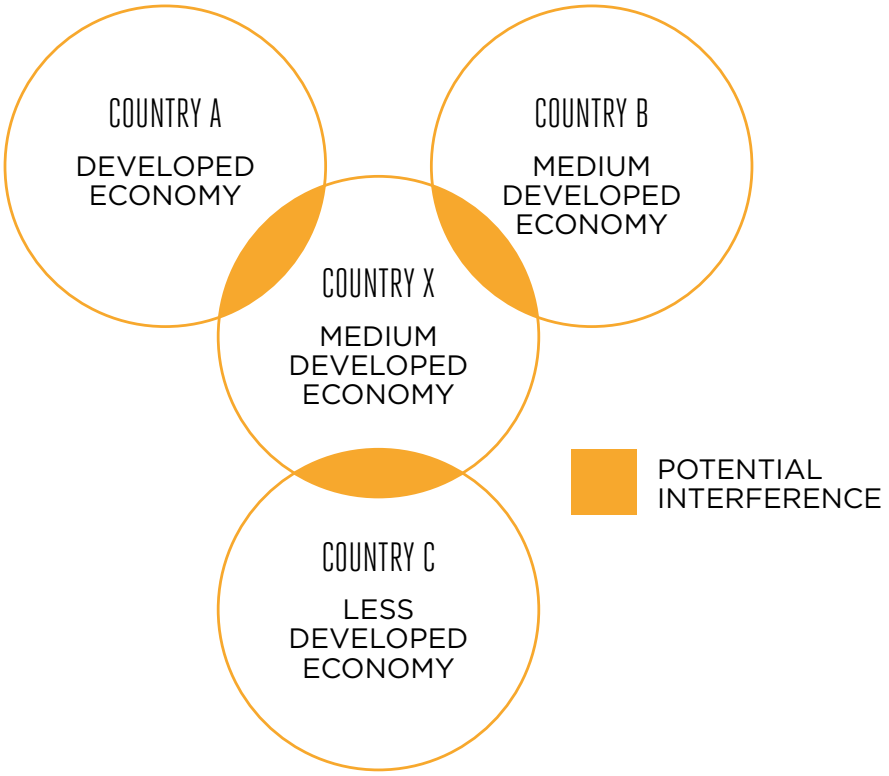


Figure 45

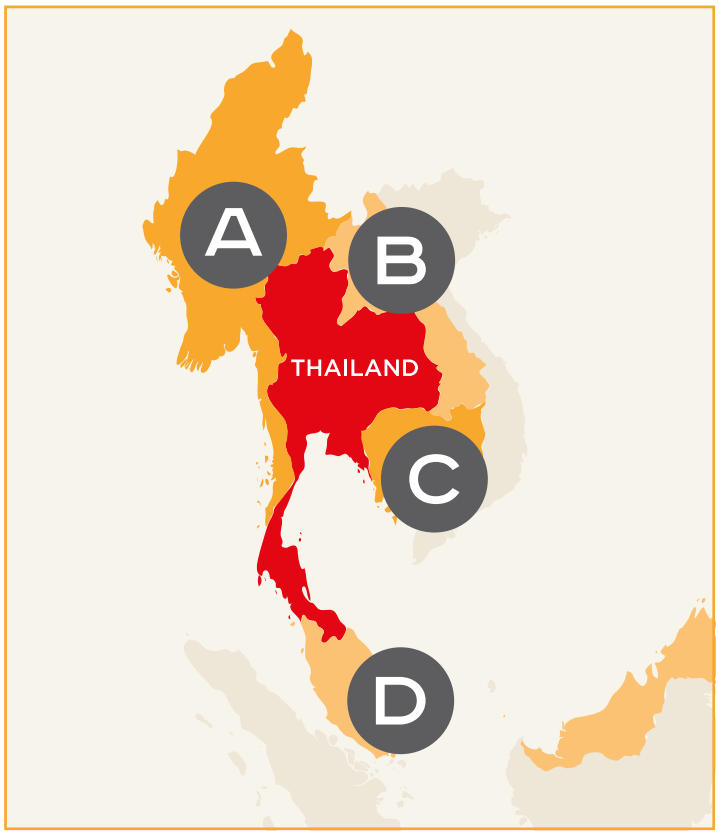
Country X adopts a non-harmonised 700 MHz band solution, as a result of either a spectrum split between digital broadcasting (DTT) and mobile services (IMT) or the use of Time Division Duplexing (TDD) technology, as opposed to frequency division duplexing (FDD).

This non-harmonisation affects both Country X and its neighboring countries. For Country X, the impact is the cost of mitigating signal interference, the loss of 700 MHz band mobile coverage and an increase in the cost of handsets. Meanwhile, neighboring countries will experience cross-border interference.

Non-harmonisation results in direct reduction of benefits due to interference across borders. This is mainly expected to affect the population living on both sides of the border. This would result in reduced benefits for both the non-harmonised country as well as its neighbors.

In Asia Pacific, non-harmonisation in a country like Thailand will have severe impact on its neighbors. Fragmentation would reduce benefits for Thailand resulting in a GDP loss (Net Present Value) of over US $322 million between 2014-20.

IMPACT OF NON-HARMONISATION IN THAILAND (OVERVIEW)



NON-HARMONIZATION IN THAILAND WILL HAVE SEVERE IMPACT ON NEIGHBORS

A. MYANMAR

- Myanmar will potentially have interference from Thailand
- Large parts of country directly affected, hence is likely to inhibit efficient roll-out nationwide

B. CAMBODIA

- Cambodia will not be able to use the 700MHz band for LTE due to interference

C. LAOS

- Laos will not be able to use the 700MHz band for LTE due to interference

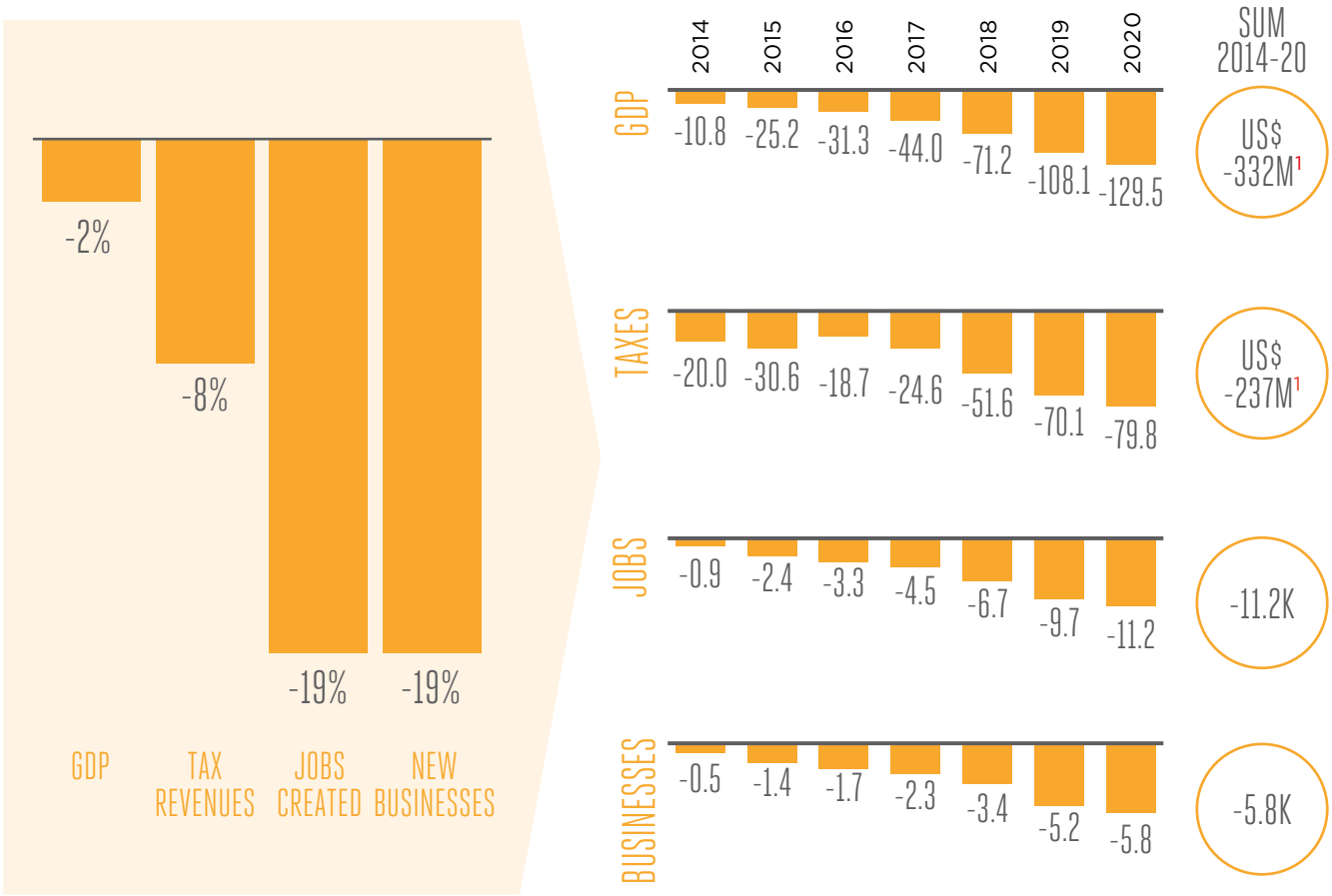
D. MALAYSIA

- Malaysia will have interference in the northern part of the country, along border with Thailand
- An estimated 10% of the rural population will be affected by the interference

Note: An 200 km interference zone assumed from Thai territories. Source: Expert interviews, BCG analysis

Figure 46

ECONOMIC IMPACT OF NON-HARMONISATION IN THAILAND (2014-2020)



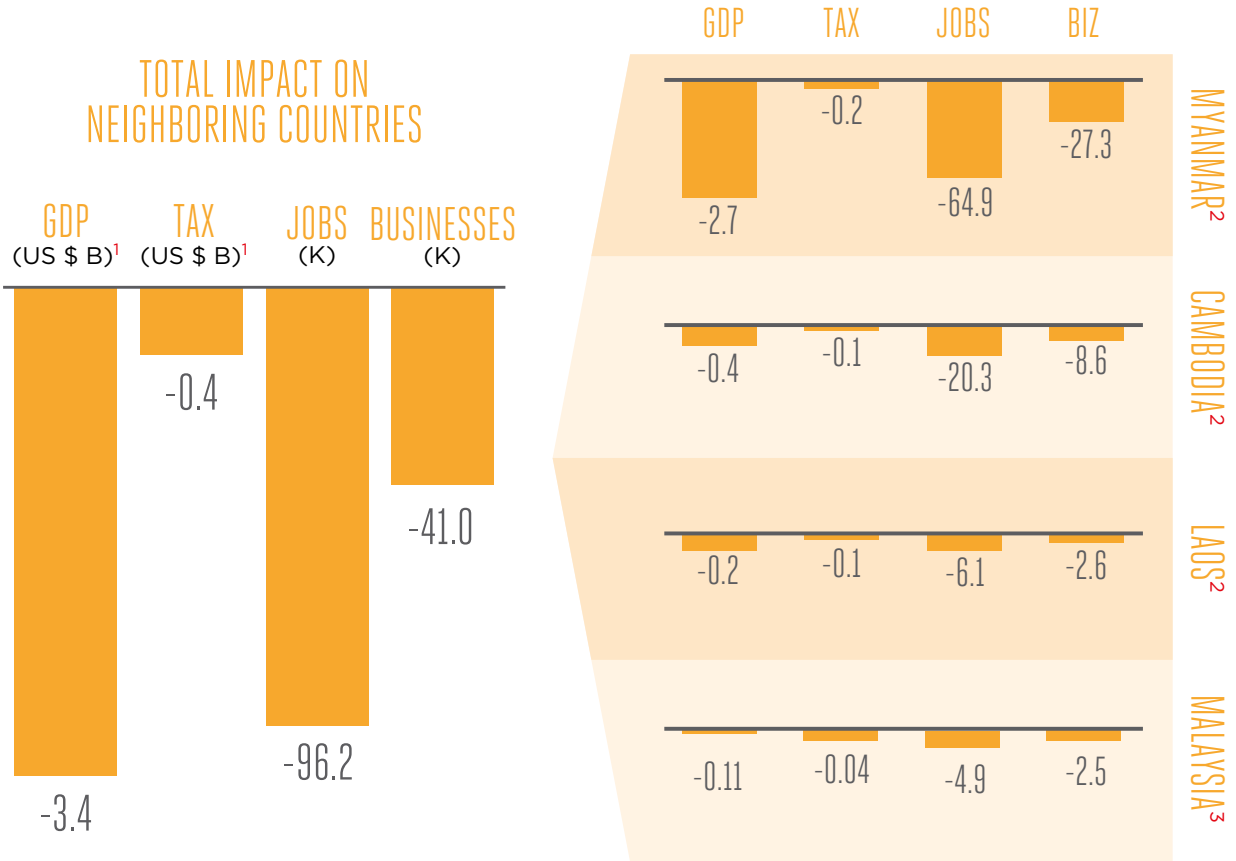
BENEFITS OF THE 700 BAND REDUCED BY 2-19% FOR THAILAND COMPRISING US$ 332M IN GDP, US$ 237M IN TAXES, 11K JOBS AND 6K BUSINESSES

1. 2013 Net Present Value. Source: BCG analysis

Figure 47

In the case of non-harmonisation in Thailand, neighboring countries stand to lose as much as US $3.4billion in GDP, US $0.4billion in taxes,96K jobs and 41K businesses by 2020.

ECONOMIC IMPACT ON NEIGHBORING COUNTRIES DUE TO NON-HARMONISATION IN THAILAND (2014-2020)



NON-HARMONIZATION WILL HAVE A PERPETUAL EFFECT ON NEIGHBOURS

1. NPV 2014-2020 2. Assumes entire country is affected 3. Assumes 10% of rural population affected by the interference. Source: BCG analysis

Figure 48

B.

Spectrum Management - Policy Choices

In addition to allocation of 700 MHz band (Digital Dividend) to mobile, there are many other spectrum related policy choices that are key to enabling investment.

These include making spectrum available in line with ITU recommendations, allocating relevant spectrum bands (over and above 700 MHz) and ensuring that spectrum earmarked for mobile is released. Further, that the spectrum is released in such a manner that lot sizes offered are adequate to allow usage of all technologies.

Also critical is aligning pricing with international benchmarks, after adjusting for local market conditions (prevalent ARPUs, PPP etc.), and facilitating a market approach to spectrum sharing and trading.

A telecommunications regulator faces eight key questions on spectrum management. Regulators may need to make certain trade-offs in the scope of the actions taken on these questions. The chart below showcases the different options, as exercised by regulators across the world, on each of the dimensions.

REGULATORS' EIGHT KEY QUESTIONS ON SPECTRUM MANAGEMENT

		REGULATORS' KEY QUESTION	REGULATORS' SCOPE OF ACTION		
1	SPECTRUM	What is the pricing imperative?	Max auction revenues	Opt. allocation with high reserve price[1]	Optimal allocation
2		Which spectrum to be made available to telecommunication as per ITU suggestion?	Reduced bands, reduced amount	All bands, reduced amount	Full extent of ITU suggestions
3		Which technology is allowed to be used?	Technology determination	Partial tech neutrality	Full tech neutrality
4		What is the timing and quantity of spectrum release?	Progressively (Limited quantity)	Single band, wide spectrum	Multi-band, wide spectrum
5		What is the process for renewal of spectrum?	Extension[2]	Re-auction	Re-auction and subseq. liberalization
6		What is the approach to spectrum sharing?	Sharing prohibited	Sharing within specific barriers	Open sharing
7		What is the approach to spectrum trading?	Trading prohibited	Reselling after clearance	Multilateral trade
8		What will happen to spectrum in case of sector consolidation?	New entity to give up spectrum w/o compensation	New entity charged to keep spectrum	New entity to retain spectrum w/o payment

Figure 49

Across the different dimensions considered for crafting suggestions on best practices for Asia Pacific countries, we have articulated suggestions in the order of sequence mentioned above started with suggestions on pricing.

1.

Spectrum pricing

First of all, the price for new spectrum is a key consideration for operators as spectrum constitutes one of their most important assets and is the basis for their operations.

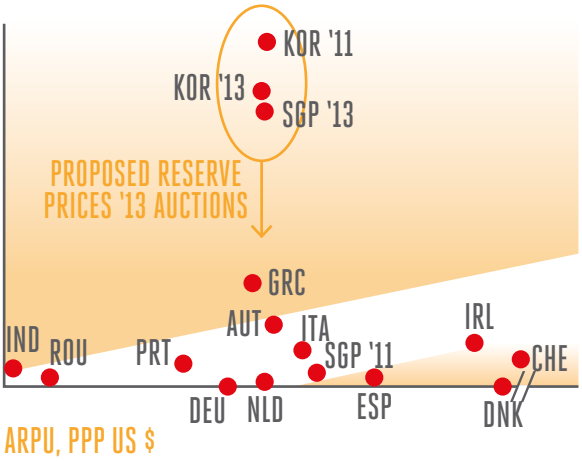
To provide certainty for industry and investors, regulators need to ensure that spectrum prices are sustainable in the long-term for operators.

Benchmarking spectrum reserve prices and putting them into relation with local market conditions is a good indicator of sustainability. Figure 50 shows that relative spectrum reserve prices per MHz adjusted for country population, license duration, and national purchasing power parity typically increase with national ARPUs. While some outliers can be observed, reserve prices are found within a certain corridor.

BENCHMARKING OF SPECTRUM RESERVE PRICES AT INTERNATIONAL AUCTIONS

1800 MHz RESERVE PRICE PER MHZ*POP/YEAR, PPP VS. ARPU

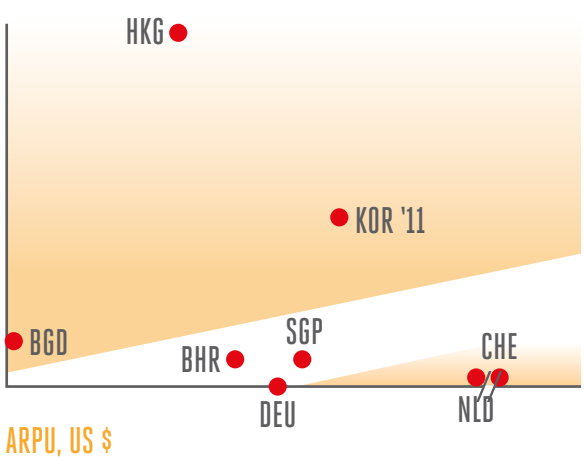
US $/MHz/Pop/year (PPP adjusted)



1800MHz RESERVE PRICE

2100 MHz RESERVE PRICE PER MHZ*POP/YEAR, PPP VS. ARPU

US $/MHz/Pop/year (PPP adjusted)



2100MHz RESERVE PRICE

AS A RESULT OF HIGH RESERVE PRICES IN SPECTRUM AUCTIONS MNOS' COST TO OPERATE WILL BE SIGNIFICANTLY INCREASED

Source: Regulator information, GSMA Intelligence, BCG analysis

Figure 50

These outliers include South Korea, where the high reserve prices—far higher than international benchmarks—and specific auction rules for spectrum auctions in 2011 resulted in a high price for the 1800 MHz band. Competition was fierce as only one network operator was allowed to acquire spectrum per band. Further, the block considered for auction was the only block feasible for a 4G roll-out in 1.8GHz band. A similarly high reserve price is proposed for the 2013 and 2014 spectrum auctions of 1.8GHz and 2.5GHz bands.

In Hong Kong, too, companies face a high reserve price in upcoming 2.1GHz auctions, with the Office of the Communications Authority (OFCA) proposing a combination of spectrum reassignment and an auction in 2016 for the renewal of 2.1GHz spectrum licences. The proposed reserve price (via spectrum utilisation fees, or SUF) of HK $77 million per MHz (approx. US $9.9M per MHz[37]) for a 15-year duration is significantly higher than international benchmarks. [38]

37. As of May 1st, 2013
38. Source: OFCA, BCG analysis

The effects of aggressive spectrum pricing can be very pronounced. In the Netherlands, for example the high spectrum pricing policy brought Dutch incumbent KPN to the verge of bankruptcy.

CASE STUDY

DUTCH OPERATOR KPN ON THE VERGE OF BANKRUPTCY AFTER 2012 SPECTRUM AUCTIONS

The 2012 Dutch spectrum auction for 800MHz, 900MHz, 1.8GHz, 2.1GHz, and 2.6GHz bands was designed to favor new entrants. This created an artificial scarcity of spectrum for incumbents, forcing the auction dynamics into chaos.

To stay in business, KPN was forced to spend €1,35 billion in the spectrum auction—some 40 to 50 percent above analysts' expectations.

This led to a fall in the company's share price, forcing KPN to sell its subsidiary in Spain and some of its German mobile towers in order to generate cash. Its attempt to sell its Belgian mobile business failed and the company is now trying to dispose of more of its non-core assets. In addition, KPN plans to cut 5,000 jobs in 2013 and has cancelled payment of dividend until 2015.

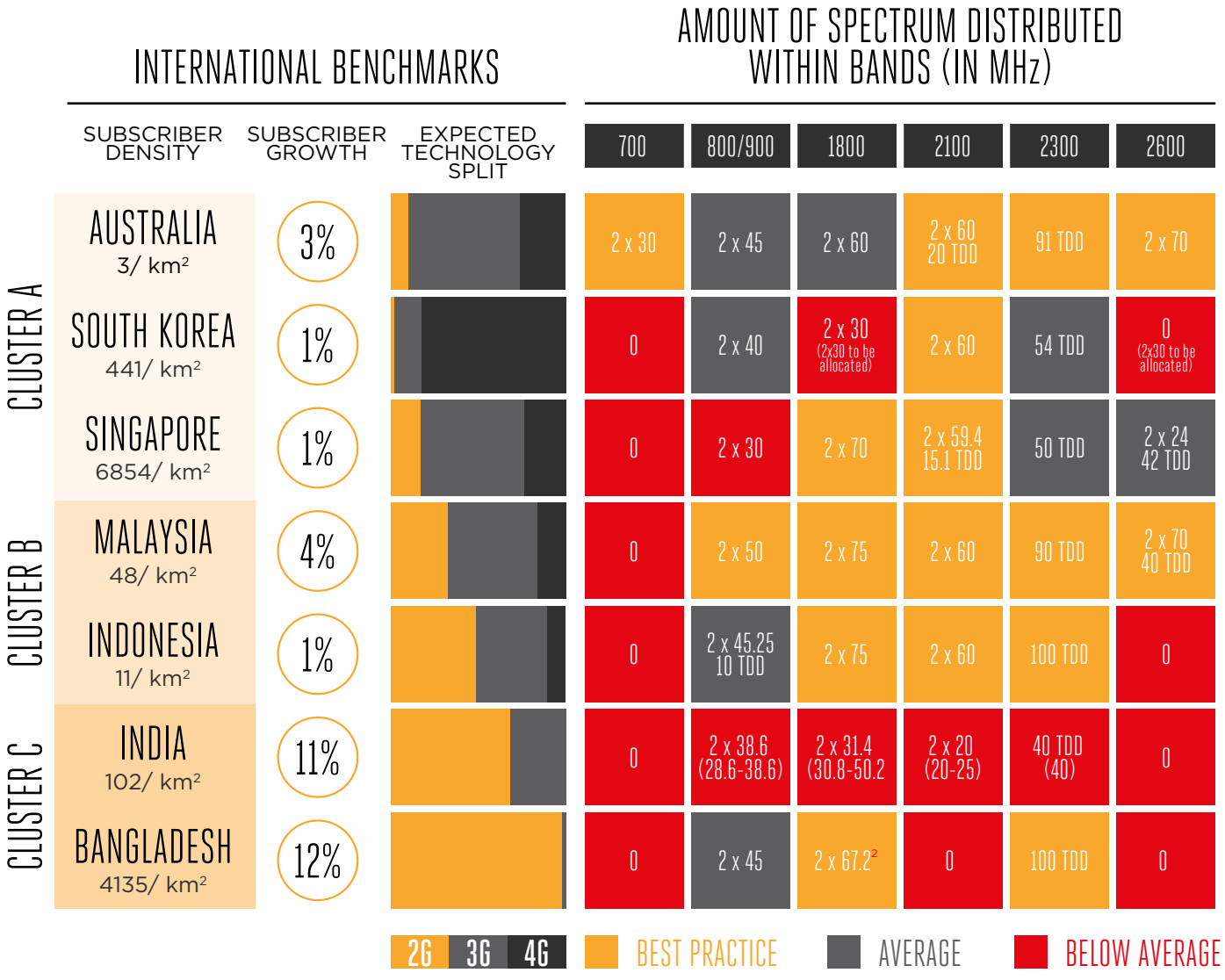
2.

Spectrum availability

Besides the price of spectrum, the amount available to operators is crucial to allow efficient operations. This is important both for providing fast broadband services as well as to enable adequate mobile coverage.

Significant differences in the amount of spectrum available to mobile operators can be observed across various countries in Asia Pacific and also within clusters. While by and large, developed countries lead the pack in terms of spectrum availability, some cluster B countries also exhibit best practise in this dimension [See Figure 51].

SPECTRUM AVAILABLE FOR MOBILE OPERATORS IN VARIOUS ASIA PACIFIC COUNTRIES



Source: GSMA Intelligence; country regulators: Australian Communications and Media Authority (ACMA), Korea Communications Commission (KCC), Infocomm Development Authority of Singapore (IDA), Malaysian Communications And Multimedia Commission (SKMM), Badan Regulasi Telekomunikasi Indonesia (BRTI), Telecom Regulatory Authority of India (TRAI), Bangladesh Telecommunication Regulatory Commission (BTRC); BCG analysis

Figure 51

On the other hand, poor spectrum availability limits overall development of the sector. Operators now require more spectrum than ever before to satisfy the hunger for exponentially increasing data traffic. Rollout of 3G and 4G is only accelerating this trend.

A key point for Asia Pacific policymakers to consider is that failure to allocate spectrum according to international standards (failure to harmonise) leads to increased costs and inefficiencies for all stakeholders. In the absence of harmonisation benefits are reduced not only for the country concerned but also for the rest of the region. A lack of harmonisation also leads to decreased economies of scale and reduces the affordability of mobile devices (see chapter on Digital Dividend).

3.

Technology neutrality

Another important policy consideration is fostering technology neutrality so that industry players have greater opportunities to develop products and services.

Technology neutrality—allows players to deploy any technology in the spectrum. This creates competition to develop technologies and eventually leads to the adoption of most efficient technology.

Most Asia Pacific countries already support technology neutrality and those that do not yet support it need to make it a priority. Enabling technology neutrality goes beyond just allowing use of any technology for the concerned band. This also involves provision for adequate lot sizes as required to run different technologies. While countries like India have articulated a clear intent to enable tech neutrality, some of the lot sizes are not large enough for seamless roll out of 3G and 4G. This theme is further explored in the subsequent section.

4.

Timing and quantity of spectrum release

Additionally, for making large amounts and many bands of technology neutral spectrum available, the timely release of spectrum is a must.

By offering small block sizes, making available only a limited amount of the band and doing so through a series of consecutive auctions, regulators increase spectrum scarcity and create significant uncertainty for operators. This is particularly the case since new-generation technologies require a minimum amount of contiguous spectrum. The requirements range from 5MHz blocks for 3G to 10MHz blocks for 4G, with even larger continuous blocks further improving efficiency.

While Australia released large blocks of 2x2.5 – 2x10MHz in total lot sizes of up to 2x60MHz FDD + 20MHz TDD, India granted each new entrant 4.4MHz of spectrum and then released lot sizes of 2x1.25MHz – 2x5MHz in total lot sizes of as little as 2x5MHz via spectrum auctions. Furthermore, Australia held far fewer rounds of spectrum assignment compared to India.

In addition to ensuring that lot sizes are adequate and spectrum is released in a timely manner, the regulator needs to provide a clear roadmap that lays out future availability and timing of spectrum release to minimise uncertainty for operators.

5.

Licence renewal

Governments need to create a license renewal process that creates transparency and certainty regarding future licence holdings. This allows operators to plan their investments —something companies value highly when considering capital expenditures.

The New Zealand regulator, for example, has established the concept of license continuity via its Management Rights Regime.

When spectrum licences were due to expire in 2011 and 2012 for 800 MHz and 900 MHz bands respectively, incumbents—Telecom New Zealand and Vodafone New Zealand - were able to renew the majority of their licences, preventing the need for an auction of spectrum and the reshuffling of spectrum holdings, thus promoting infrastructure investments and service continuity.[39]

39. Source: Govt of New Zealand Radio Spectrum portal, ICT, BCG analysis

6.

Spectrum sharing

As cases from outside Asia Pacific indicate, spectrum sharing is a means of expanding coverage and increasing efficiencies.

In Germany, for example, operators were allowed to share spectrum in order to fulfill their rural coverage obligations, with terms and conditions decided upon among the players and no fees to the regulator required. In fact, German operators had to meet strict coverage obligations for LTE in rural areas without high-speed internet connections before less rural areas could be connected.

CASE STUDY

SPECTRUM TRADING AND SPECTRUM SWAPS IN SINGAPORE AND NEW ZEALAND

In Singapore, where Malaysian mobile internet company Green Packet has been able to enter the market by purchasing 30MHz in 2300MHz and 2600MHz spectrum from Singapore's Pacnet for US $2.04 million.

The deal gives Green Packet access to Singaporean WiMAX customers and network services to mobile network operators.

Meanwhile, in New Zealand, a spectrum swap took place between Vodafone New Zealand and CallPlus to transform a total of 65MHz of existing TDD spectrum in the 2600MHz into 2x30MHz of FDD spectrum. The new FDD spectrum holdings are located in LTE Band 7, which is characterized by small cell sizes, high capacity and high potential for re-use, allowing LTE services to be provided in crowded locations such as train stations and sports stadiums.

(Source: IDA, RSM, company websites, BCG analysis)

7.

Spectrum trading

Another way to unleash the potential of mobile and facilitate technology upgrades is through spectrum trading.

For a start, spectrum trading can be a way of bringing new industry players into the market – thus making market entry independent of scheduled auctions.

For operators, spectrum trading increases flexibility and allows them to refine the alignment of their spectrum holdings with their business needs.

As new generation technologies require large contiguous bands of spectrum, trading also allows operators to purchase required blocks or to swap spectrum in order to reach the critical spectrum block size. This allows them to install new technology infrastructure using the previously unsuited spectrum.

8.

Consolidation

Another very important question a regulator has to address is the handling of spectrum in M&A activities. Examples from Asia Pacific suggest that spectrum should be bound to companies during the consolidation process, with no requirement for fee payments to the regulator if pre-allocated spectrum is being used by the new entity. In case the new entities were to become too dominant in the market it might be required to decrease spectrum holdings. However, under such circumstances operators were allowed to sell excess spectrum at market value.

In Australia, for example, when Vodafone acquired Hutchison along with the company's spectrum rights, the regulator acknowledged the spectrum rights and did not require the parties to give up spectrum as part of the consolidation. This held true even though a new entity held approximately 40 percent of total spectrum in metro areas and approximately 26 percent of total spectrum in non-urban regions.

C.

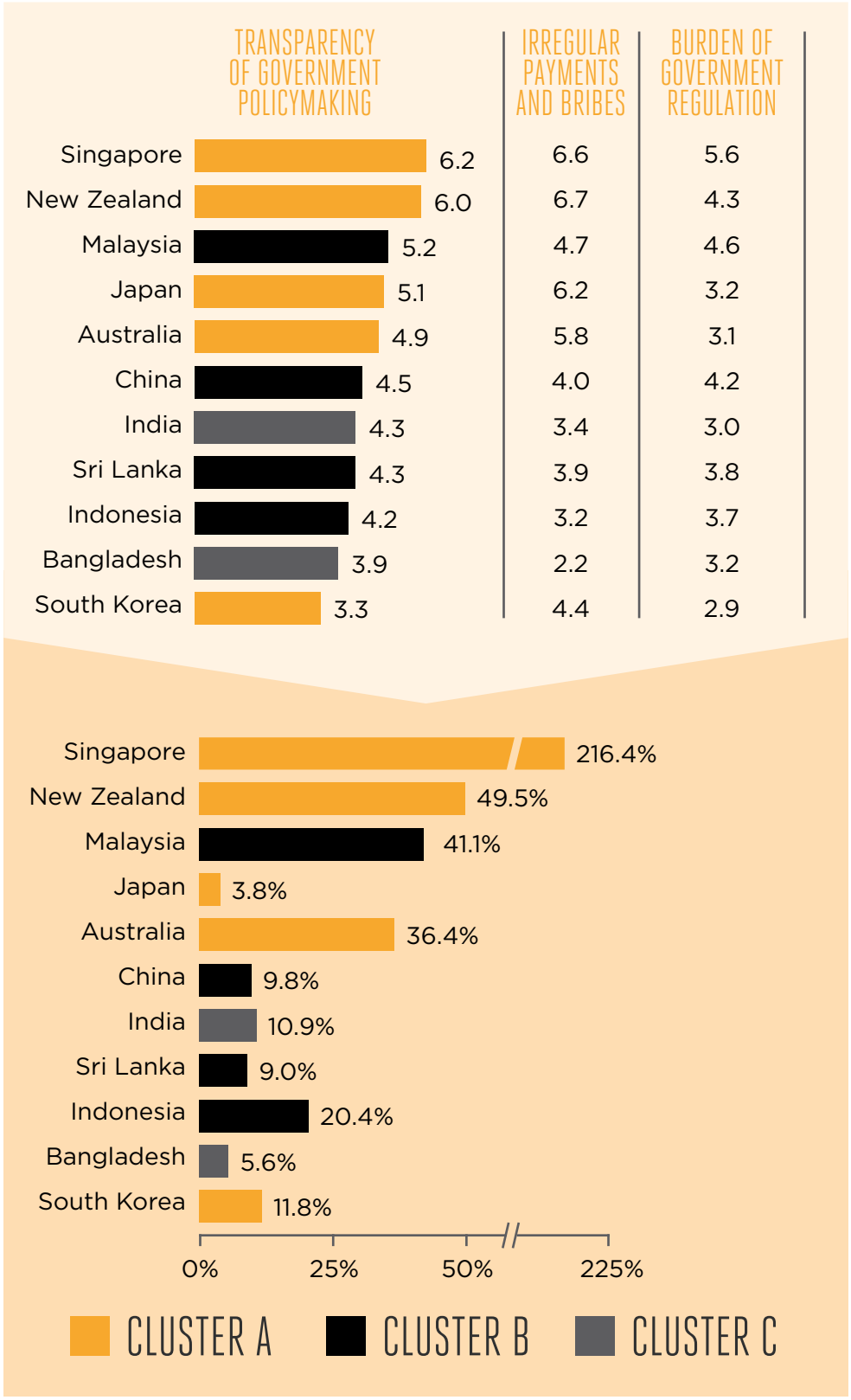
Spectrum Management— Transparency and Stability

Along with conducive choices on different aspects of spectrum management, regulators need to provide transparency and stability in overall policy making.

Transparency and stability in policymaking are key to inspiring investments across all sectors. They support trust in the regulatory process and reduce uncertainty around future cash flows, thus increasing investors' willingness to invest. This in turn requires an appropriate regulatory environment which is inclusive and consistent.

Figure 52 illustrates that across Asia Pacific countries (from all clusters) high ratings for transparency indicators correspond to higher incoming foreign direct investments (FDI) as share of their GDPs.

TRANSPARENCY IN POLICY LEADS TO INCREASE FDI



CLUSTER A COUNTRIES HAVE BEST SCORES, FOLLOWED BY COUNTRIES IN CLUSTER B AND C...

...TRANSLATING TO HIGHER INCOMING FDI

Source: World Economic Forum, OECD, BCG analysis. Ref: OECD and WEF: all scores are marked out of 10

Figure 52

The example given below relating to India shows that a lack of transparency and stability in the regulatory process can lead to unwanted outcomes. In this case, a planned spectrum auction failed due to a relatively unstable and non-transparent process, leading to a very high reserve price and subsequent rejection by network operators.[40]

CASE STUDY

INDIAN REGULATORY PROCESS LED TO FAILURES

The topic of re-farming has been discussed by the Telecom Regulation Authority of India (TRAI) since 2009.

The period from then until the actual spectrum auction was characterized by constant change in scope of actual spectrum in focus and regulations around it. Ultimately, the EGoM was involved in to the process and the entire matter went to court.

In late 2010, TRAI came up with the recommendations to re-farm 900MHz spectrum and have current operators swap to 1800MHz.

The Hon'ble Supreme Court of India entered the scene in February 2012 when it squashed the 1800MHz spectrum rights in 22 circles obtained in 2007 auctions. Later consultations have revealed TRAI's intentions to also use the 1800MHz spectrum to support re-farming of 900MHz spectrum after license expirations in 2014. Further plans included to offer operators to pay for liberalization of 1800MHz spectrum. Spectrum re-farming in India would boil down to re-auction and liberalize 900MHz spectrum and to offer current operators to purchase 1800MHz spectrum in order to continue their 2G operations on this inferior band in case they would not be successful in the 900MHz auction.

The Department of Telecommunications (DoT) ultimately accepted most of TRAI's recommendations and decided that all of the 900MHz spectrum would be auctioned with specific rules on auction participation and spectrum swap. The first spectrum auctions were set up in November 2012.

During this process, stakeholders, including network operators, repeatedly called for a consultation process which ultimately was never initiated.

The first time operators were actually included in the process was at the first auction itself where they could decide whether to participate.

The lack of stakeholder involvement had led to very high reserve prices and ultimately only 1/4 of available spectrum could be sold.

A second auction for 900MHz and 1800MHz spectrum was set up in a rush in March 2013 without having learned from previous mistakes. It failed completely as no bids were placed.

A third auction is expected to take place towards the end of 2013. The success remains to be seen as it depends on the regulator to factor in past learning and feedback from stakeholders.

40. Source: TRAI; BCG Analysis

On the other hand, the example of New Zealand illustrates how a clear spectrum roadmap and the involvement of all stakeholders along the process inspires trust through transparency and stability.[41]

CASE STUDY

NEW ZEALAND REGULATOR INSPIRES TRUST THROUGH STAKEHOLDER INVOLVEMENT

New Zealand's 5 year spectrum outlook incorporates characteristics of transparency and stability

SPECTRUM OUTLOOK CREATED AS:

- Proposed work program for ministry
- Request for stakeholders to comment on future trends and spectrum management
- Intention to include stakeholders' opinions into regulation

TRANSPARENCY

States explicit goals for regulation

- Is reviewed regularly to incorporate updates and changes
- Invites stakeholders to participate in discussion and incorporates suggestions

STABILITY

- Clearly defines scope and upcoming projects within spectrum regulation
- Supports strong track record of NZ regulation
- Complements NZ Radio communication Regulation Acts from 1989 and 2001

41. Source: RSM; BCG Analysis

D.

The Regulatory Cost of Doing Business—Universal Service funds

Universal access to telecommunication services for all geographies and socio-economic groups has been a matter of concern for governments around the world. This involves expanding the reach of communciations to underserved rural and remote locations, make this access affordable for lower income groups, and enable socio-economic groups to benefit from these services.

There are multiple ways to help address the needs of universal service. Business model options include public-private partnerships, mandatory service obligations, corporate social responsibility (CSR) activities, bottom-up initiatives and universal service funds (USFs).

In the context of Univseral Service goals, USFs may comprise of dedicated funding targeted at providing access to telecommunication services to socio-economic groups underserved by the market.

SCOPE OF USF UTILISATION

USFs target socio-economic groups under-served by the market

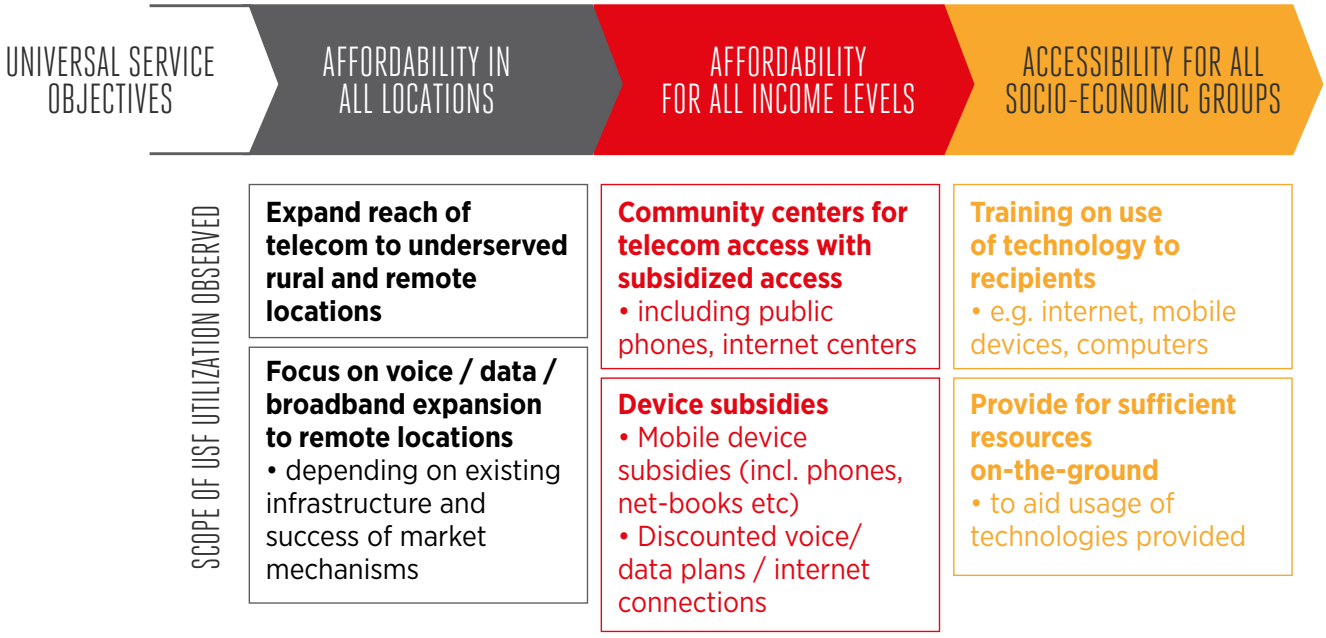
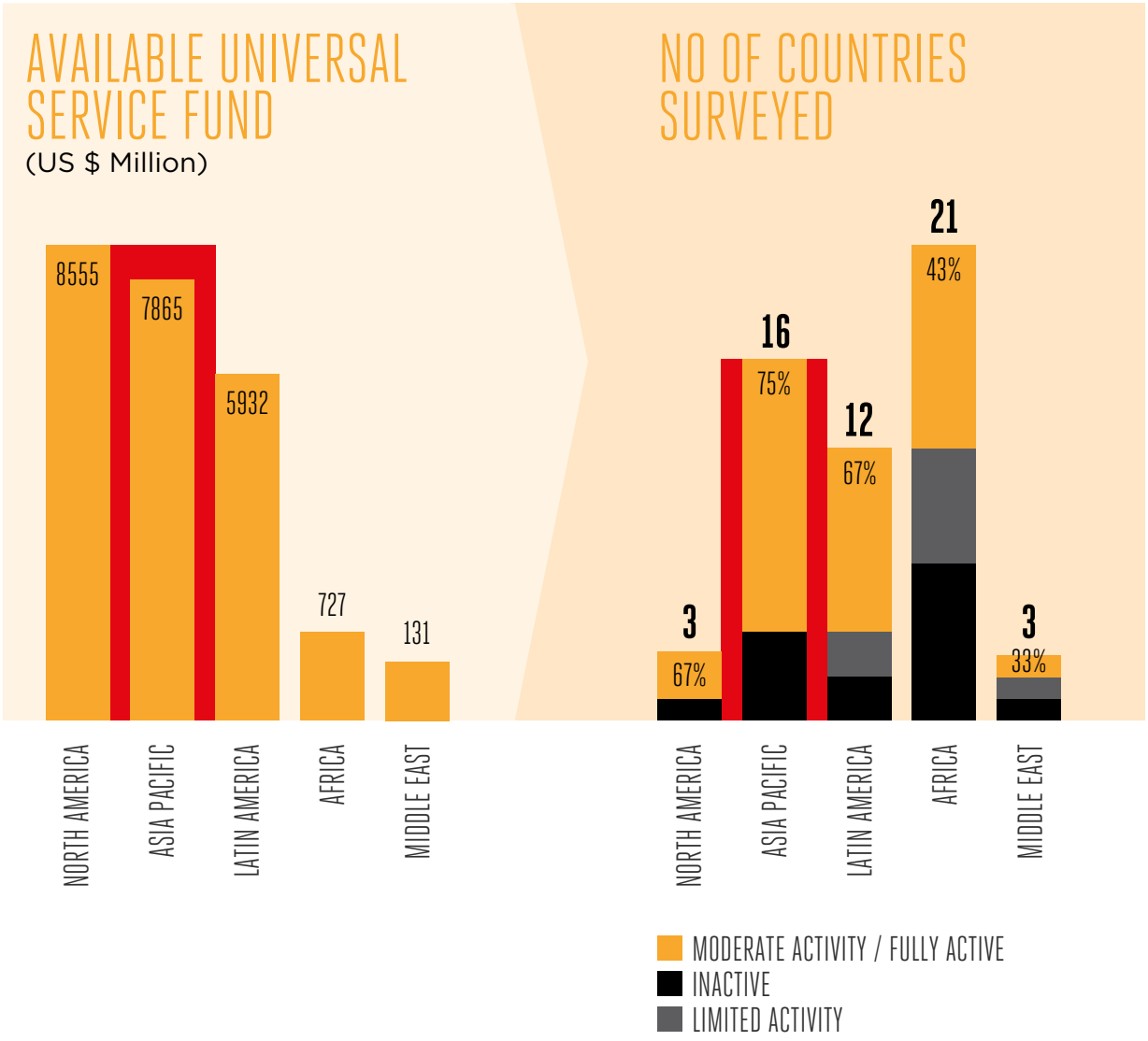


Figure 53

A major source of this funding has been a levy charged to mobile operators – commonly a percentage of their revenues. Other sources of funding include direct government grants, private investments and aid from non-governmental organisations (NGOs).

Globally, USFs have been prominent in regions like Asia Pacific. Asia Pacific has amongst the largest corpuses of Universal Service Funds, and nearly 75% of Asia Pacific funds observed are found to have moderate or high level of activity.

AVAILABLE UNIVERSAL SERVICE FUNDS (2009-2011) AND LEVEL OF ACTIVITY OF USFs ACROSS COUNTRIES



Note: Years of corpus amount vary from 2009-2011 for various countries. Source: GSMA; BCG Analysis

Figure 54

Today, universal service funds face four key challenges.

1. Need for greater clarity in objectives: There is a need for greater clarity in the objectives for these funds, with a need for specific goals to be set for USFs in emerging economies. For example in large, complex territories such as Indonesia—funds require targeted objectives to ensure that goals are successfully achieved.

   However, some objectives are not currently well aligned with needs. For example India's National Optical Fiber Network (NOFN) initiative for villages is included within USF objectives, while in fact market-led solutions would be feasible.

2. Failure to achieve objectives: Implementation of USF projects often fail to meet their objectives. This may be because of delays in implementation of projects. For example, the critical Palapa Ring fiber network infrastructure project in Indonesia has experienced numerous delays.

   Further, attention can be diverted away from fund objectives due to shifting political priorities, as has been the case in Pakistan – where attention was diverted from the fund to an extent, due to anticipated elections.

3. Under-utilisation of funds: Funds collect contributions that are much higher than actual need resulting in under-utilisation (in Asia Pacific, only 28 percent of funds have been disbursed)[42]

4. Financial burden for industry and larger economy: Financial burden among industry players and within the broader economy due to the USF levy can have an impact on the availability of funding, as well as the ability of operators to continue investments in the mobile ecosystem.

42. Source: GSMA

Promoting best practices

The challenges facing USFs can be surmounted in a variety of ways, including aligning objectives more closely with needs, coming up with innovative business models and allowing for flexible fundraising.

Need for greater clarity in objectives: To achieve greater clarity in USF goals, policymakers need to define tangible milestones for their objectives. For example, as Malaysia has done, different goals can be for communities of different sizes, from towns and villages to remote areas.

Failure to achieve objectives: To avoid failing to accomplish objectives, policymakers can promote alternative business models, such as the public-private partnership model developed in Finland or the service obligations used in Brazil. Improved governance also reduces the risk of failure such as the time-bound projects seen in Colombia, where costs are well defined and a four-year detailed plan has been drawn up.

Under-utilisation of funds and financial stress: Reducing the financial pressure on industry can be brought about by re-aligning levy amounts and using alternative sources of funds. Another way of addressing under-use of USFs is to encourage private sector participation in key projects.

International examples demonstrate the viability of this approach, with Colombia reducing its USF levy from up to 5 percent to 2.2 percent—while also raising funds through spectrum allotment and value added services.[43]

SUMMARY OF BEST PRACTICES FOR USFs

Best-practices to address challenges involve aligned objectives, innovative business models and flexible fund-raising

NEED FOR GREATER CLARITY IN OBJECTIVES

Define tangible milestones for objectives
e.g. different goals for tiers of towns / villages / remote areas (Malaysia)

Clear articulation of role of USF
USF focus on areas underserved by market forces– e.g. targeted interventions in Morocco

Evolution of goals in-sync with tech. evolution
e.g. 3G proliferation for rural communities included under USF in Chile
e.g. voice to data evolution in Malaysia

FAILURE TO ACHIEVE OBJECTIVES

Alternative business models
e.g. public private partnership model (Finland), service obligations (Brazil),

Superior governance
Sustainability through education for recipients, incentives for efficient implementation (e.g. Colombia/Chile)
Time-bound projects with well-defined costs, e.g. 4 year detailed plans (Colombia)

UNDERUTILIZATION OF FUNDS AND FINANCIAL BURDEN

Encourage private participation to enable greater utilization of funds
e.g. proportionate participation of private players in key projects

Re-align levy amounts to reduce pressure
e.g. reduction of levy from upto 5% to 2.2% (Colombia)
e.g. step-wise reduction of levy from 4.5% to 0.8% in Canada

Utilize alternative sources of funds
e.g. fund collection on spectrum allotment, value added services (Colombia)

Source: GSMA; BCG analysis

Figure 55

43. Source: GSMA

These policies have been successfully implemented in a number of countries.

In Malaysia, a layered approach to universal access was adopted as objectives evolved from voice to data. Once basic telephony was installed in all areas of the country, Malaysia expanded its USF objectives to include bringing access to broadband or internet to remote and rural areas.

The objectives behind this included promoting ICT use to enable a knowledge society and the socio-economic development of local communities and bridging the digital divide.

Malaysia's practical, layered approach to ICT goals allowed policymakers to accommodate three segments of the country: suburban and sub-rural areas, rural areas and remote areas, with broadband targeted for suburban and rural and telephony targeted for remote areas.

Malaysia's strategy has helped the country achieve its universal service goals for voice and data.

ACHIEVEMENT OF UNIVERSAL SERVICE GOALS IN MALAYSIA

Malaysia adopted a layered approach for enabling universal access as objectives evolved from voice to data

.. to help achieve universal service goals for voice and data

TELECOM: 96.8% pop. covered by 2012

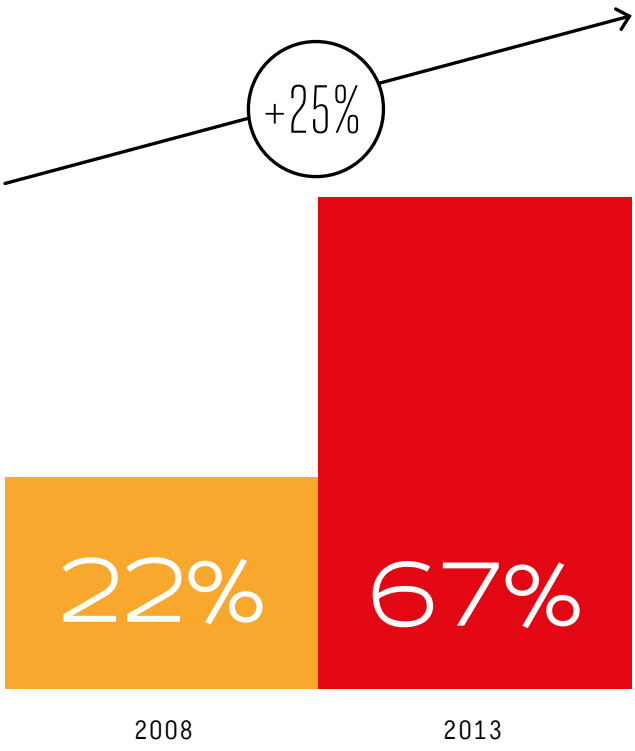
RURAL TELECENTRES: benefit to 2.5 million rural households

NETBOOKS: Benefit to ~1.5 million low-income and students

WI-FI VILLAGES: Benefit to 0.8 million rural community

Significant jump in broad-band penetration

Household broadband penetration (%)



Source: GSMA; ITU Malaysia country presentation; Press Search; BCG Analysis

Figure 56

Countries concerned to avoid lack of clarity in their goals can look to the example of Morocco, which used funding from its USF to execute initiatives that could not be achieved by market forces and then partnered with mobile opertors on select projects.

In its three priority areas—rural public telephony, installation of community centers and expansion of broadband capacity–it used a transparent process of project selection, prioritising opportunity areas for development in telecom and inviting providers to suggest universal service projects during the selection process.

In a "play or pay" approach, operators can either participate in projects under their universal service obligations or pay out 2 percent of their revenues as levy.

So far, several projects in Morocco have been implemented through the "play or pay" approach. In addition to improving telecom infrastructure, promotion of use of ICT in education has been a key focus area for the country. This is achieved through internet connections in schools, subsidisation of internet connectivity as well as devices (including laptops, mobile devices).

In many places, alternative models—such as public-private partnerships, service obligations and bottom-up initiatives — have enjoyed better success in achieving objectives for Universal Service than USFs, as international examples demonstrate.

In Finland, for example public-private partnerships have delivered broadband for all citizens. While 95 percent of the population is covered via commercial investments, approximately 4 percent of the population—those living in remote locations—are served via the public-private partnership.

In Brazil, mandatory service obligations expansive coverage were established in 2007, when new licences for 3G mobile services were issued, resulting in almost all of the population being covered by 3G by 2012.

Bottom-up initiatives have also proved successful, as is the case in Bangladesh, where the Village Phone (VP) program was funded using profits from Grameenphone's nationwide service while loans were provided via Grameen Bank, the microfinance institution, for purchase of mobile phones. As a result, by 2011, Grameenphone's network covered about 99 percent of the Bangladeshi population.[44]

In Colombia, success has been achieved by establishing an independent USF organisation with measurable goals and time-bound implementation plans. With full financial and legal autonomy, the USF organisation has a four-year plan with detailed project descriptions and clearly defined targets and costs.

The levy amount was reduced from up to 5 percent to 2.2 percent to align it with universal service needs and ICT training programs have been made available for all recipients, including instruction on use of devices, internet navigation and spreadsheet tools.

As a result of this approach, 86 percent of the available funds were disbursed in 2011, paying for the installation of 12,797 rural community telephony lines covering all municipalities and providing internet services in many locations.

As highlighted by the examples above, best-practices suggest that alternative sources of funds, accompanied by ramp-down of levy can be instrumental in reducing financial stress on the mobile ecosystem, while ensuring high utilisation of existing funds. Alignment of levy amounts to Universal Service needs has been successful in countries like Colombia and Canada, which have enjoyed utilisation rates in excess of 85%.

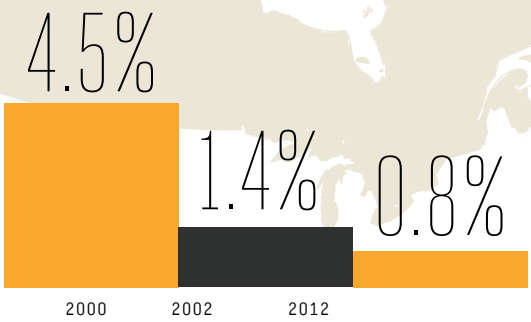
44. Source: GSMA

BEST-PRACTICES SUGGEST ALTERNATIVE SOURCES OF FUNDS, RAMP DOWN OF LEVY MAY HAVE POSITIVE IMPACT

However, successful USFs starting to reduce levy amount..

CANADA

Levy as % of net revenues



Basic level of service (voice + internet) envisaged for all Canadians

Contributions from telecom providers **fully disbursed** each year

.. and are also exploring alternate means of fund-raising

COLOMBIA

2.2%

of operating revenues used for fund

(down from upto 5% previously)

+

Additional funds collected from use of spectrum

+

Contributions from successful bids for services such as VAS

86% fund utilization in 2011

Source: GSMA

Figure 57

E.

The Regulatory Cost of Doing Business—Sector Specific Taxes

A vibrant mobile telecom sector brings vast social and economic benefits to a country. High taxation, however, is a key barrier to reaping the benefits of mobile. The adverse impact spans across the ability of companies to invest in infrastructure, which in turn affects mobile penetration and level of mobile services usage. Having covered spectrum fees and Universal Access linked payouts earlier in the report, we have focused on other corporate and consumer facing taxes.

ADVERSE IMPACT OF TAXATION ON ICT

TYPE OF TAXATION/FEE	INFRASTRUCTURE INVESTMENTS	MOBILE PENETRATION	MOBILE SERVICES USAGE
CONNECTION/ SIM TAXES	INDIRECT IMPACT	STRONG / DIRECT IMPACT	STRONG / DIRECT IMPACT
USAGE TAXES	INDIRECT IMPACT	STRONG / DIRECT IMPACT	STRONG / DIRECT IMPACT
HANDSET TAXES	INDIRECT IMPACT	STRONG / DIRECT IMPACT	STRONG / DIRECT IMPACT
HIGH CORPORATE TAX RATES	STRONG / DIRECT IMPACT	INDIRECT IMPACT	INDIRECT IMPACT
ADDITIONAL REGULATORY FEES	STRONG / DIRECT IMPACT	INDIRECT IMPACT	INDIRECT IMPACT

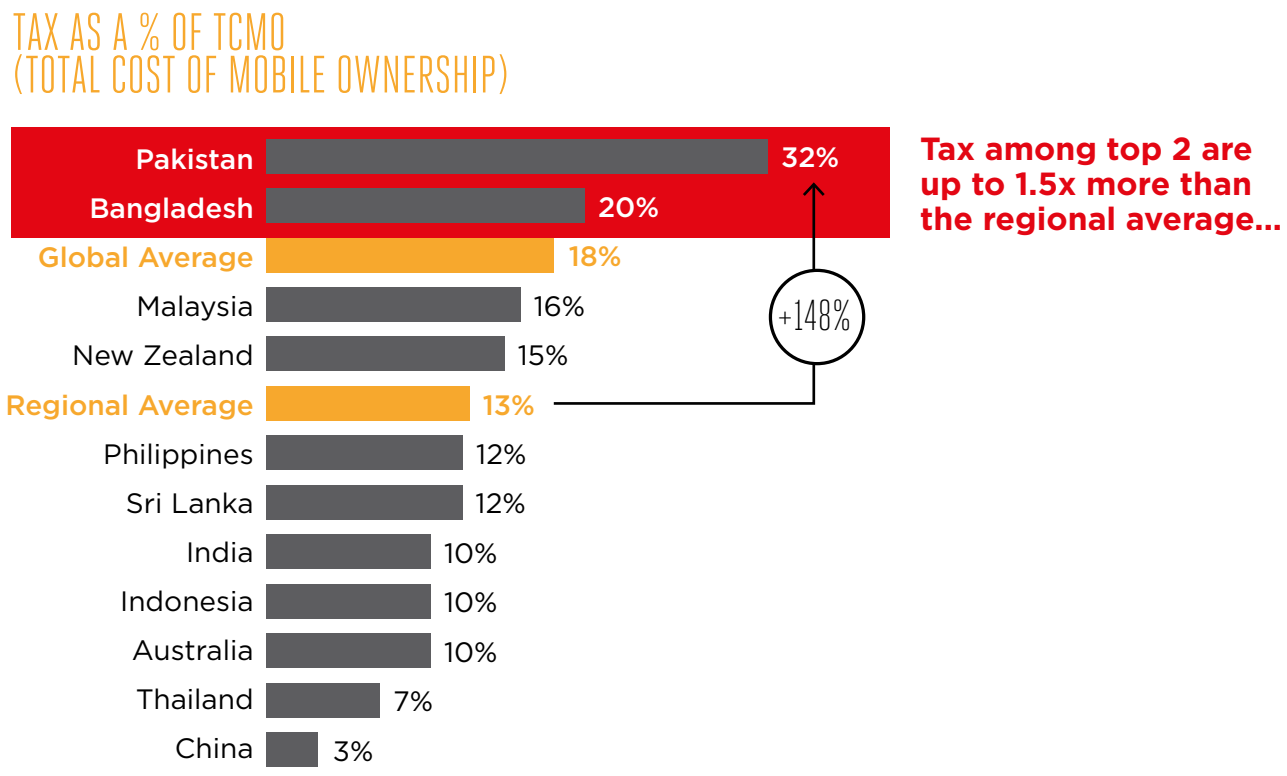
Source: GSMA, Press Search, BCG Analysis

Figure 58

Policymakers, therefore, need to drive growth in this sector via tax reforms. This means evaluating current tax policy and realigning it with the key levers of national development objectives. Specifically, lowering or removing mobile-specific taxes (such as SIM card taxes) can help increase mobile adoption. Given the many direct and indirect benefits of the telecom sector to socio-economic growth retaining/ applying sector specific taxes on mobile operators is bound to impact adversely.

Pakistan and Bangladesh, for instance, have significantly higher mobile sector taxes compared to global benchmarks. As compared to a regional average of 30%, the corporate tax rate in Bangladesh is as high as 35-45% and 35% in Pakistan. VAT rates on mobile services are also higher – at 15% in Bangladesh and 19.5% in Pakistan, compared to a 10% regional average. In Pakistan, VAT rates on mobile services are also higher than in other sectors (19.5% vs 16%).

TAX AS % OF TOTAL COST OF MOBILE OWNERSHIP ACROSS ASIA PACIFIC

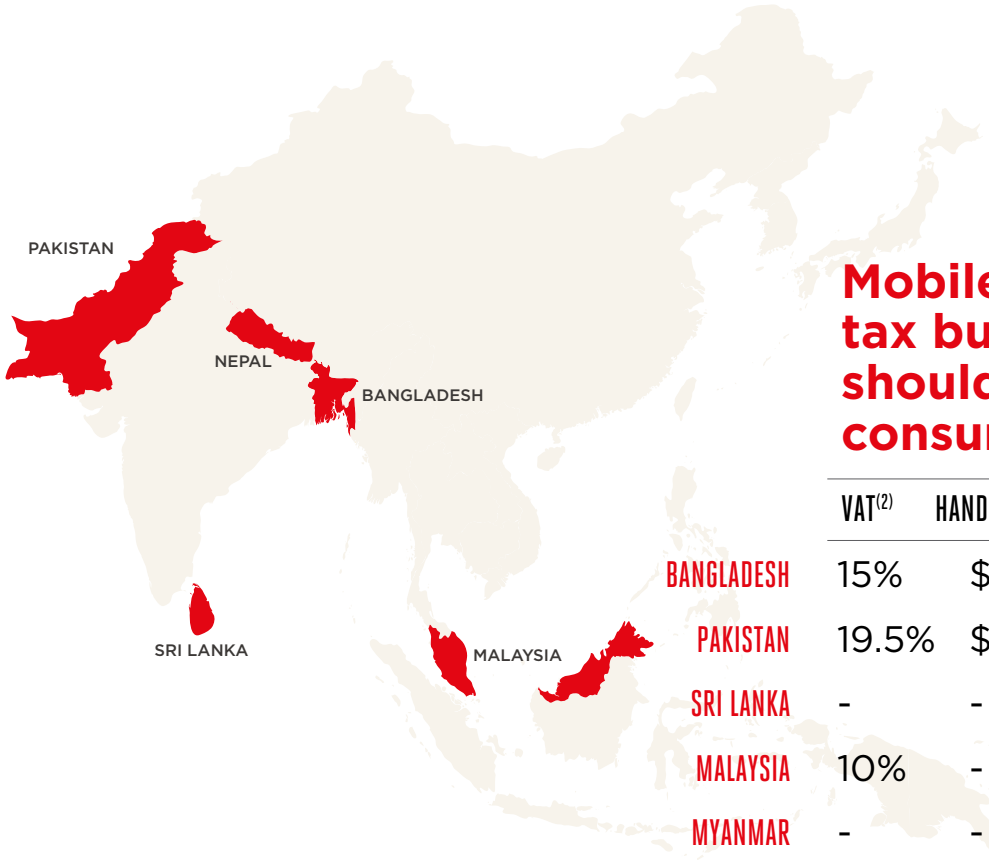


Note: TCMO measures the total cost to an average consumer of owning and using a mobile phone; mobile specific tax within Asia Pacific also include Malaysia with 6% usage tax, Sri Lanka with 20% handset and usage tax but no VAT. Source: GSMA global tax review 2011, Press search

Figure 59

Mobile sector specific taxation is uncommon but can be found in a few countries in the region.

COUNTRIES IN APAC WITH MOBILE-SPECIFIC TAXES



Mobile specific tax burden often shouldered by consumers

	VAT[2]	HANDSET[1]	SIM[1]	USAGE	
BANGLADESH	15%	$1.38		$7.50	-
PAKISTAN	19.5%	$2.92		$2.92	11.5%
SRI LANKA	-	-		20%	20%
MALAYSIA	10%	-		-	6%
MYANMAR	-	-		$200	
NEPAL	13%	-		-	5%

1. Taxes per unit. Source: GSMA global tax review 2011, press search

Figure 60

Such high taxation can inhibit mobile penetration growth in emerging countries like Pakistan and Bangladesh.

Bangladesh is not on track to reach their goal of 70% mobile penetration by 2015, and Pakistan's low penetration is on a low growth trajectory of 4-5%.

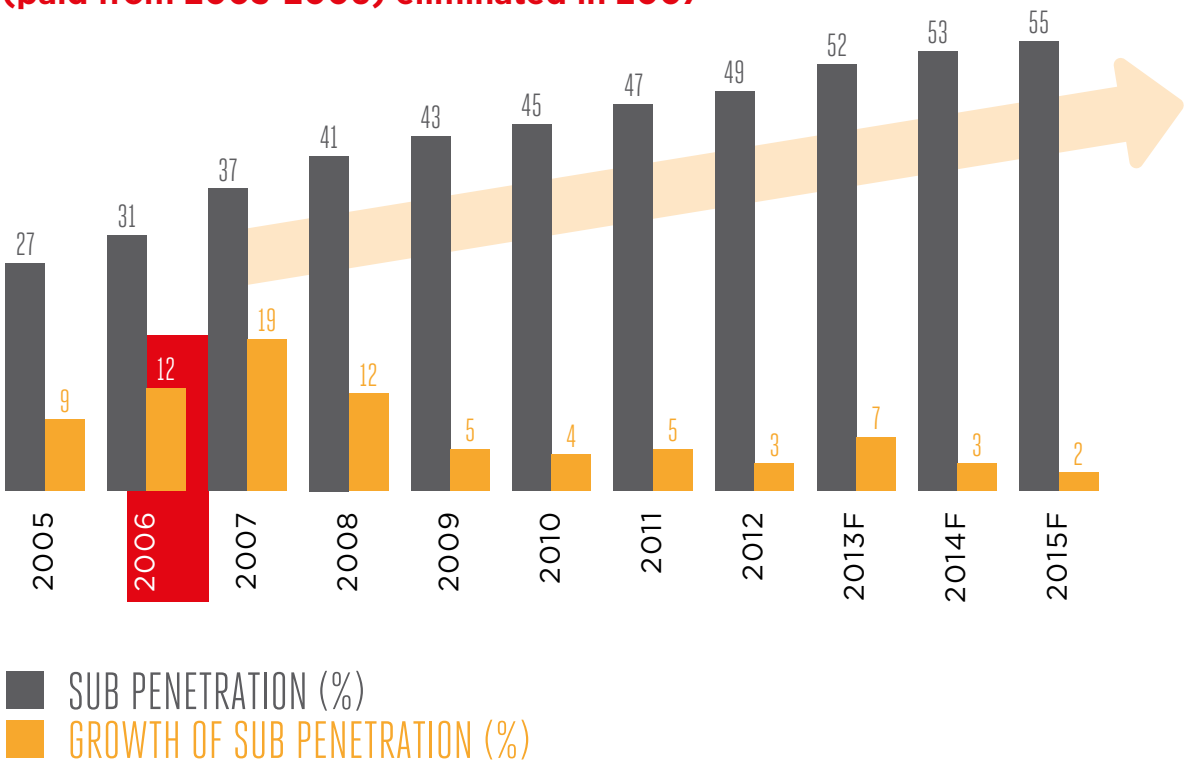
Profitability of operators in these markets has declined amidst tax and market pressure, and levels of infrastructure investments have dropped by nearly 15 to 18%.

Lowering taxes pays off

Lowering or removal of mobile-specific taxes is important for growth in emerging economies. Taxes should not represent an obstruction to recognised key social and economic development levers e.g. mobile and broadband penetration.

REACTIONS TO MOBILE SECTOR TAXES IN BANGLADESH

10% Excise tax on the telecom services (paid from 2003-2006) eliminated in 2007



Source: Press search, GSMA Mobile policy handbook

Figure 61

There is an imminent need to align taxation approaches with national development objectives through a review and reform of telecom sector tax policies. This could entail the following:

- Establish a taskforce to review the tax structure and conduct an independent and comprehensive study to understand impact of various tax schemes
- Scrutinise sector specific taxes, specifically the impact of consumer end taxes on discouraging adoption and growth at the grassroots level
- Calibrate corporate tax and VAT in line with benchmarks to remove discriminatory rates against the telecom sector, and explore removal or temporary waiver of certain taxes
- Stability in tax regulations: Important to create a long-term roadmap and drive towards adherence to the roadmap. Similarly, important to avoid changes with retrospective effect as well as other abrupt changes.

Tax levels greatly affect price-sensitive consumers, particularly in emerging countries, influencing their uptake and usage of mobile services. International case studies demonstrate the positive impact on the growth of mobile of lowering taxes.

In June 2009, for example, the Kenyan government decided to make mobile handsets exempt from VAT, leading to a sharp increase in penetration rates from 50 percent to 70 percent, and a rise in handset purchases by more than 200 percent. Even so, the total cost of telephony—which includes a 10 percent usage tax—remains significant, representing 7.5 percent of per capita income.

Similarly, in Pakistan, a reduction in SIM card taxes from US $35 to US $8 between 2002 and 2007 led to higher penetration and investments, with mobile phone ownership increasing from less than 1 per cent in 2000 to more than 20 percent by 2006.

Meanwhile, with a cut in regulatory fees charged to operators from 4 percent to 1.5 percent, mobile network coverage increased from 40 percent to 80 percent in just three years. Even so, Pakistan still remains a country with the world's third highest tax levels as a proportion of the cost of mobile ownership.[45]

45. Source: GSMA; WHO; BCG analysis

F.

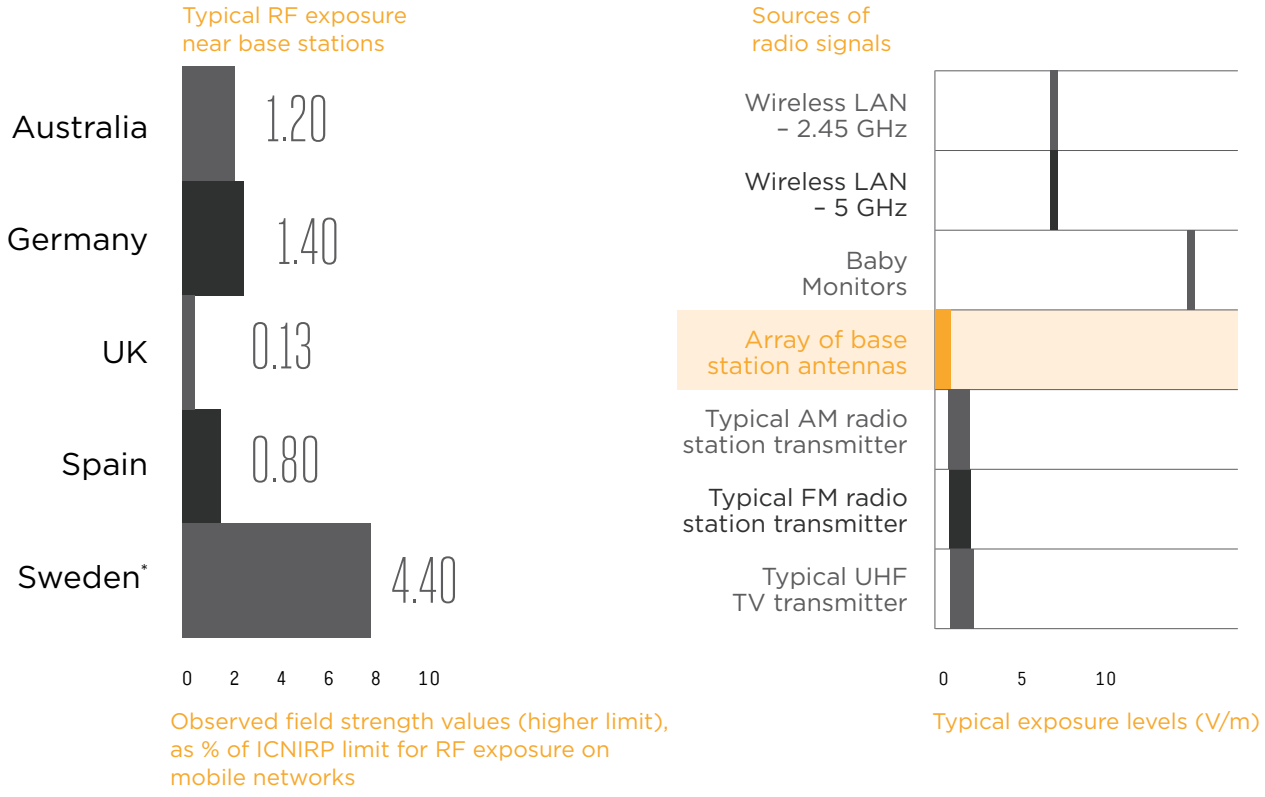
The Regulatory Cost of Doing Business—RF exposure

In order to support growth in the mobile sector policymakers need to address the issue of public concern about radio frequency (RF) exposure by establishing norms that are science based, protective of health and allow for mobile network expansion to provide coverage and service quality.

Best practices suggest that norms should be aligned with global guidelines. In addition, pro-active communication with consumers and stakeholders is key to addressing authority and mobile network operator objectives of providing services.

Global norms for RF exposure, as developed by the ICNIRP (International Commission on Non-Ionising Radiation Protection) and endorsed by the World Health Organisation (WHO), have been found to be protective for all persons against established health hazards. Typical RF exposure in public areas observed across many countries has been found to be a small fraction of the permissible limit in the ICNIRP guidelines. Further, RF exposure from mobile network antennas sites is often less than or comparable to other common sources of radio signals, like broadcast transmitters and Wireless LAN.

TYPICAL RF EXPOSURE NEAR BASE STATIONS, COMPARISON OF RF EXPOSURE ACROSS SOURCES OF RADIO SIGNALS

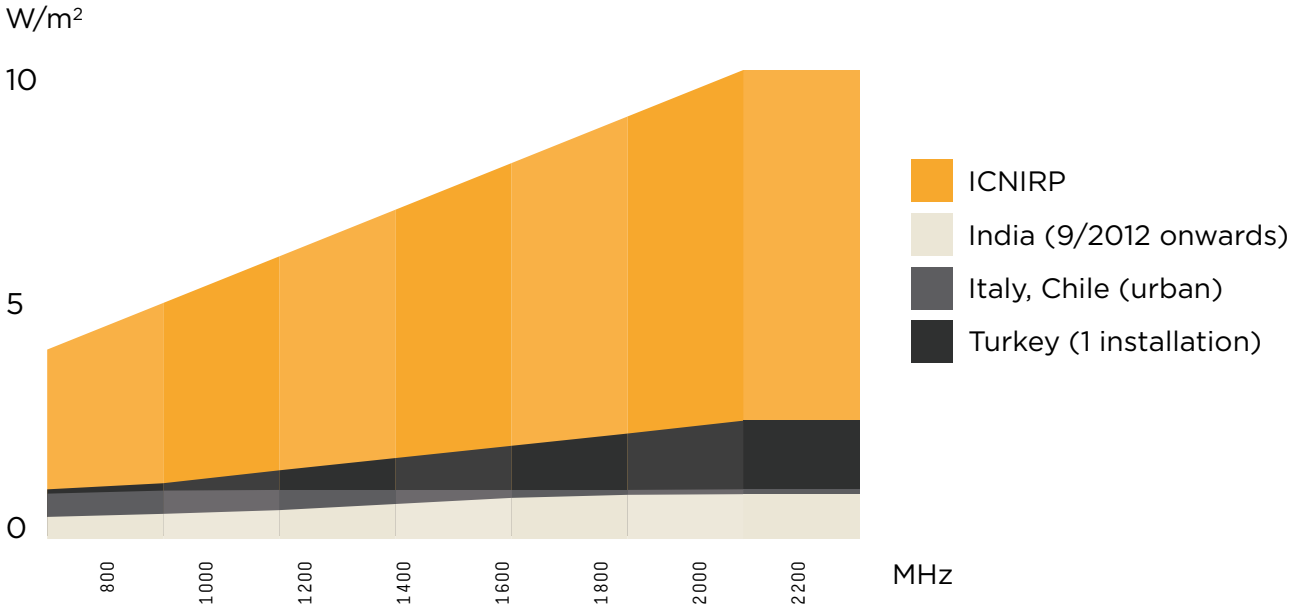


*For Sweden, RF exposure is total exposure, of which mobile services is only a small part. Note: exposure levels for Wireless LAN and baby monitors at 20 cm; exposure levels for radio transmitters average urban levels. Source: GSMA and MMF – Implications for Mobile Communications Infrastructure of Arbitrary Radio Frequency Exposure Limits (2010); GSMA – "Impact of exclusion zone policies on sitting base stations" (2012);

Figure 62

Internationally, **most countries have followed the global RF exposure recommendations**. A survey of 20 countries conducted by GSMA revealed that as many as 16 of them follow the ICNIRP guidelines on mobile network antenna RF exposure limits. However, a few countries do follow more restrictive norms, often due to public concerns about effect of mobile towers on public health. It should be noted that no scientific basis for such concerns has been found. UK's Health Protection Agency has pointed out that "although a substantial amount of research has been conducted in this area, there is no convincing evidence that RF field exposure below guideline levels causes health effects".

COUNTRIES WITH STRICTER RF EXPOSURE NORMS (FOR MOBILE TOWERS) THAN ICNIRP GUIDELINES



Source: GSMA, ICNIRP

Figure 63

Deviation from global radio frequency exposure norms could lead to **reduced quality of service**. With restrictive exposure norms, mobile operators would need to adhere to larger compliance distances from mobile network antennas. This is the distance near to the mobile network antenna where RF exposure can be higher than the prescribed limit. Access to such areas is controlled to ensure compliance. With substantially reduced allowable RF exposure limits, this distance would increase substantially at current power levels. An example of this concern is in regions of Belgium, where compliance distances may increase more than 10 times with restrictive limits.

A large compliance distance forces companies to **reduce the power of their antennas** so that access to the compliance zone can be controlled, resulting in a reduction in the coverage level of the mobile network and a fall in the quality of indoor signals.

Moreover, operators usually co-locate 2G and 3G cells in the same sites. Stricter norms would necessitate keeping 2G and 3G cells on separate sites, **slowing down roll-out of technologies** such as 3G and 4G.

This has been demonstrated in Brussels, Belgium, where roll-out of 4G services has been delayed as a result of the restrictive exposure limit of 1.5 volts per meter per operator.

Best practices suggest that norms aligned with global guidelines, combined with pro-active communication are important for addressing all objectives.

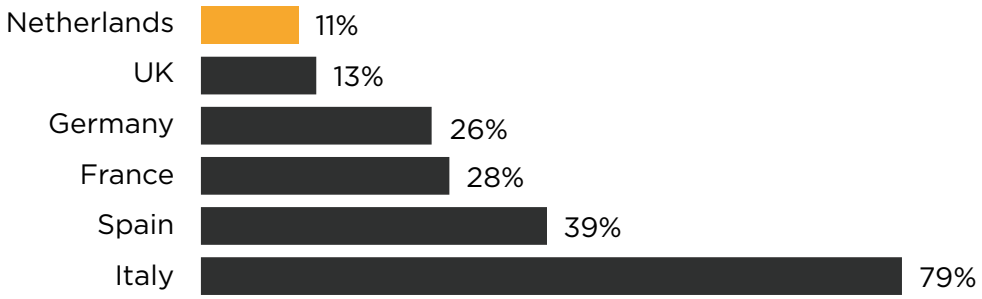
Several examples exist of countries that have aligned their limits to global standards, simplified their procedures and communicated pro-actively with the community to allay public concerns about RF exposure.

The Netherlands follows global RF exposure norms defined by the World Health Organisation (WHO). It has simplified procedures with requirements determined by size of masts: full building permit (more than 40 m), light building permit (5 to 40m), installations shorter than 5 m do not need a building permit but requirements are adjusted with a pre-planning meeting with municipalities, and demanding no additional approvals for configuration changes. Instead, the National Antenna Bureau conducts random measurements to ensure safety norms are being met.[46] A government mandated platform—the Knowledge Platform on Electromagnetic Fields and Health—**provides clarifications on questions about radio frequency exposure** and the government organises stakeholders' round-table sessions.

The policy has proved successful, with the Netherlands enjoying among the world's fastest 3G speeds and standard radio frequency approval timeframes of less than two months.

Moreover, the percentage of individuals who believe mobile phone towers have a negative effect on people's health is lower than in many other countries.

% RESPONDENTS WHO FEEL MOBILE PHONE MASTS HAVE ADVERSE HEALTH IMPACT (EUROBAROMETER STUDY)



Source: GSMA; Eurobarometer study (2010); Press searches

Figure 64

46. Source: GSMA; Euobarometer study; Press search

Malaysia is another country that follows global radio frequency exposure norms defined by the WHO. While explicit approvals are required for each tower there are exemptions for low-power antenna sites, **time-bound process for approval** and simplified procedures for site changes.

To address public concerns, information on radio frequency exposure is disseminated via publications and on the Communications Commission's web portal. Seminars are organised to discuss the topic.

This has contributed to strong industry growth with 96.8 percent of population covered by 2012. The Malaysian authorities are considered highly active in their execution of the National Communications strategy.[47]

In 2003 **Australia** changed from more restrictive norms (for both masts and devices) to the WHO recommendations. This was accompanied by development of an industry code of practice that sets out when consultation is required and in what format.

Procedures are simplified, with no explicit approval for each tower, although operators must demonstrate compliance. Australia has also simplified procedures for the erection of small antennas and changes to existing sites. Both the government and industry are active in providing public access to reliable science-based information.

As a result, 95 percent operators comply with Australia's regulation and codes and standard radio frequency approval timeframes are three-to-five months.[48]

47. Source: GSMA; WHO; BCG analysis
48. Source: GSMA;WHO; BCG analysis

G.

The Regulatory Cost of Doing Business—Privacy

With the convergence of mobile services and the internet, smartphones and mobile applications are generating substantial benefits for consumers and society. This evolution is also creating new privacy challenges. Traditional approaches to online privacy are often based on compliance with national and local laws, where they exist. However, new mobile applications, services and data flows are increasingly global, and geographically bound data privacy laws seem unable to keep pace.

Mobile users want application and service providers to treat their personal data consistently and responsibly, regardless of the device, technology or operating platform they use. They also want tools and guidance to help them manage their privacy. The mobile industry should rise to the challenge of creating contextual, mobile-friendly ways to help users make informed decisions about their information and privacy. Likewise, companies that design and build mobile applications must ensure users' privacy is respected and protected.

KEY AREAS OF CONCERN FOR PRIVACY OF MOBILE DATA

"WHAT IS MY DATA USED FOR?"
Is it used for commercial gain?.. for advertisements? Do I have a say in that?

83% RESPONDENTS FEEL 3RD PARTIES SHOULD SEEK PERMISSION BEFORE USING PERSONAL DATA

"WHAT HAPPENS TO MY PERSONAL DATA WHEN I USE MY MOBILE"
What data is collected? Who uses the data? For how long is it retained?

72% RESPONDENTS CONCERNED ABOUT SHARING EXACT LOCATION OF MOBILE

"IS MY DATA SAFE?"
How is it being protected? What do I do if it gets compromised?

88% RESPONDENTS FEEL SAFE-GUARDING PERSONAL INFORMATION VERY IMPORTANT

Source: Futuresight, GSMA – "User perspectives on mobile privacy" (2012)

Figure 65

Managing the issue

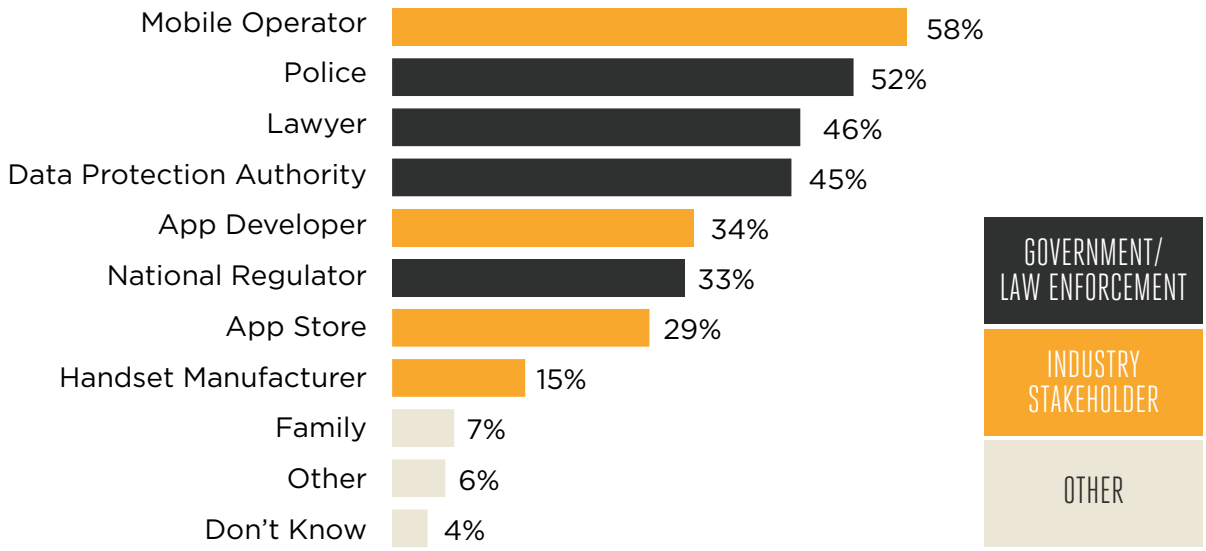
Research shows that mobile customers want transparency, choice and control over their information. They are especially concerned about apps that 'secretly' access and use their personal information.

Unfortunately, a single, practical approach to privacy protection does not exist. Mobile and online content and service providers are subject to a patchwork of different national and local laws. Furthermore, local, national and regional laws are often inconsistent and seem unable to provide effective privacy safeguards for mobile users in a globally connected world.

Users hold industry and government stakeholders responsible for protecting the privacy of their information. A GSMA study in Brazil (Privacy Attitudes Survey, 2012) revealed that the mobile operator is the first entity respondents would turn to if they experienced an invasion of privacy.

% OF RESPONDENTS WHO WOULD TURN TO MOBILE OPERATORS IN CASE OF DATA PRIVACY INVASION

Who would people turn to if they suffered a serious invasion of privacy whilst using a mobile app"



Source: Futuresight, GSMA – "User perspectives on mobile privacy" (2012)

Figure 66

Mobile app developers lack a clear set of laws or global standards to follow in relation to consumers' data protection. Therefore governments, through appropriate intervention, and industry, through self-regulation, need to work in tandem to address privacy concerns.

Laws that are too prescriptive are likely to have a detrimental effect on consumers by affecting the way they experience mobile services, while increasing the service providers' cost of doing business and limiting their investment options. Nonprescriptive, light-touch regulation alongside industry self-regulation would create a level playing field protecting both consumers and service providers.

Regulation by governments should be technology- and service-neutral. For example, laws that govern the handling of a user's location data should be applied consistently, regardless of the underlying technology used, such as cell ID, GPS or Wi-Fi. Self-regulation within the mobile sector can complement laws and formal regulation, particularly when, for example, rapid technological advances have outgrown the policy. To this end, the GSMA has produced a set of universal Mobile Privacy Principles describing how consumers' privacy should be respected and protected when they use mobile applications and services. The GSMA also published a set of Privacy Design Guidelines for Mobile Application Development. These act as tools to help app developers design privacy controls into their apps from the outset.

Policymakers should ensure that data protection and privacy rules are clear and flexible enough to address potential future risks, while encouraging continued innovation in technology and information use. Regulation that is not tied to a particular technology or service, but focuses on the desired outcome for consumers, will prove more effective and durable than rules that are too specific and prescriptive.

For the full report on Mobile Economy:
Asia Pacific 2013 please visit the GSMA website at
www.gsma.com/mobileeconomyasia