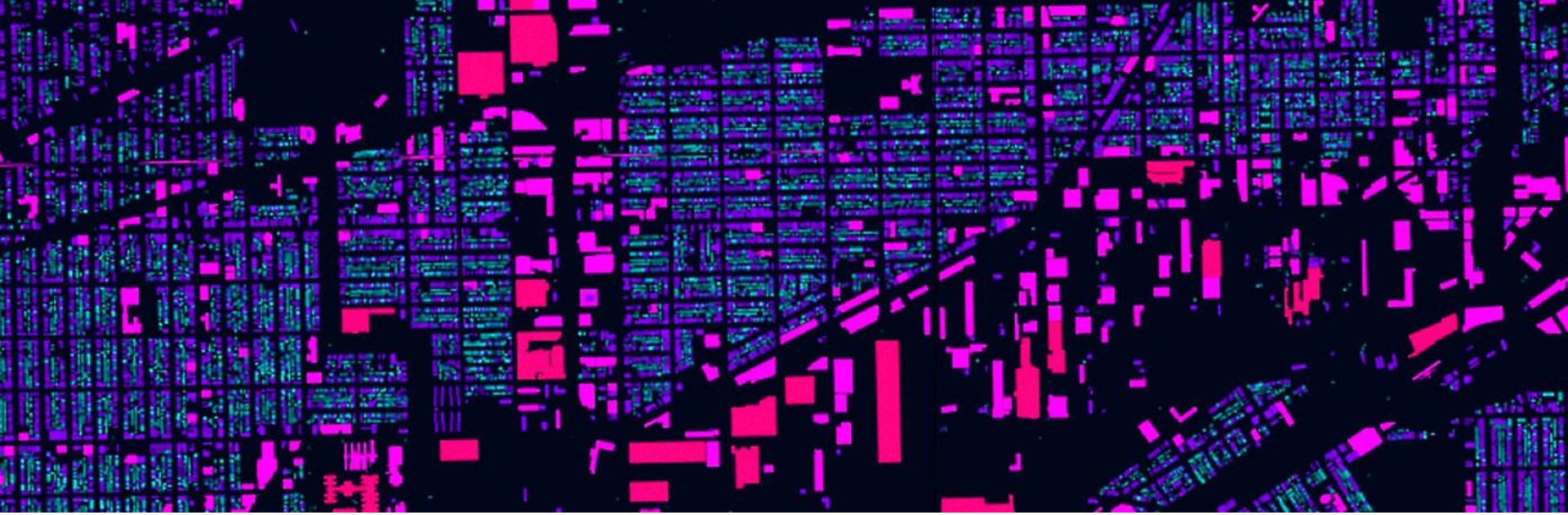
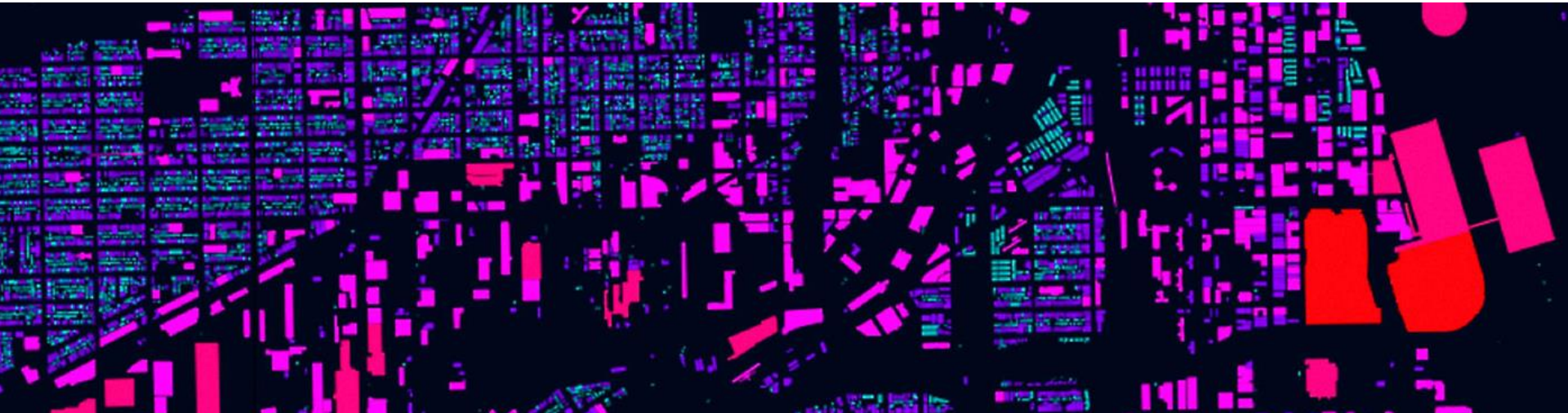


Smart Sustainable Cities

Trends and Real-World Opportunities



Role Of The GSMA

WE ARE THE GLOBAL INDUSTRY VOICE SHAPING THE FUTURE OF MOBILE

INDUSTRY FORUM

Enabling industry collaboration and consensus

POLICY ADVOCATE

Promoting policies that foster growth and investment

MARKET THINK TANK

Delivering insight and analysis from global industry data

BUSINESS CATALYST

Serving the global mobile ecosystem through events such as Mobile World Congress and Mobile Asia Expo

GSMA and Smart Sustainable Cities

global and regional technology trends

- Mobile connections and M2M

defining a ‘smart sustainable city’

- Challenges of urban living
- Solutions and definitions
- Importance in today’s context

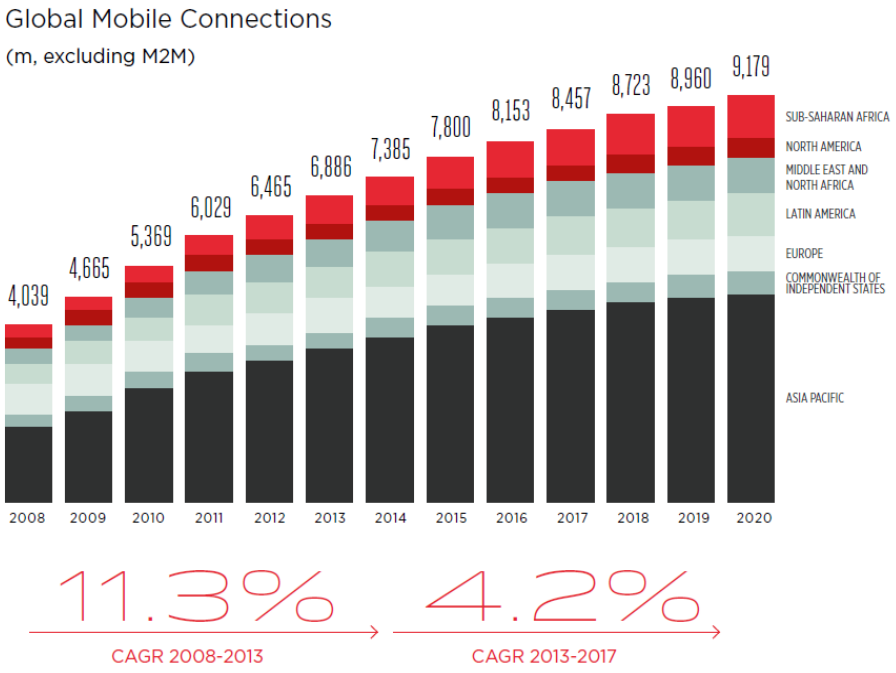
partnerships and possibilities

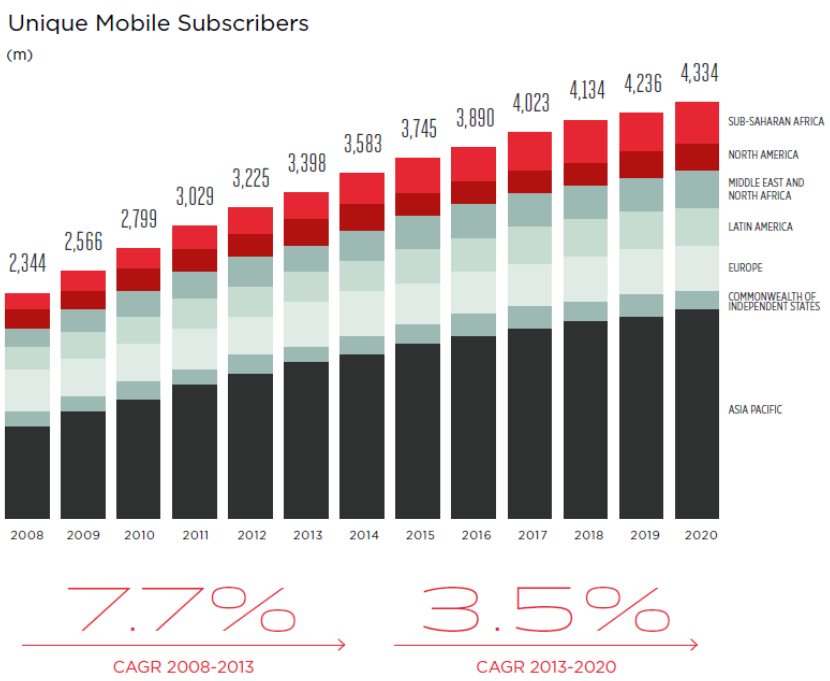
- Case studies across borders and verticals

Macro Trends

Continued Growth In Mobile

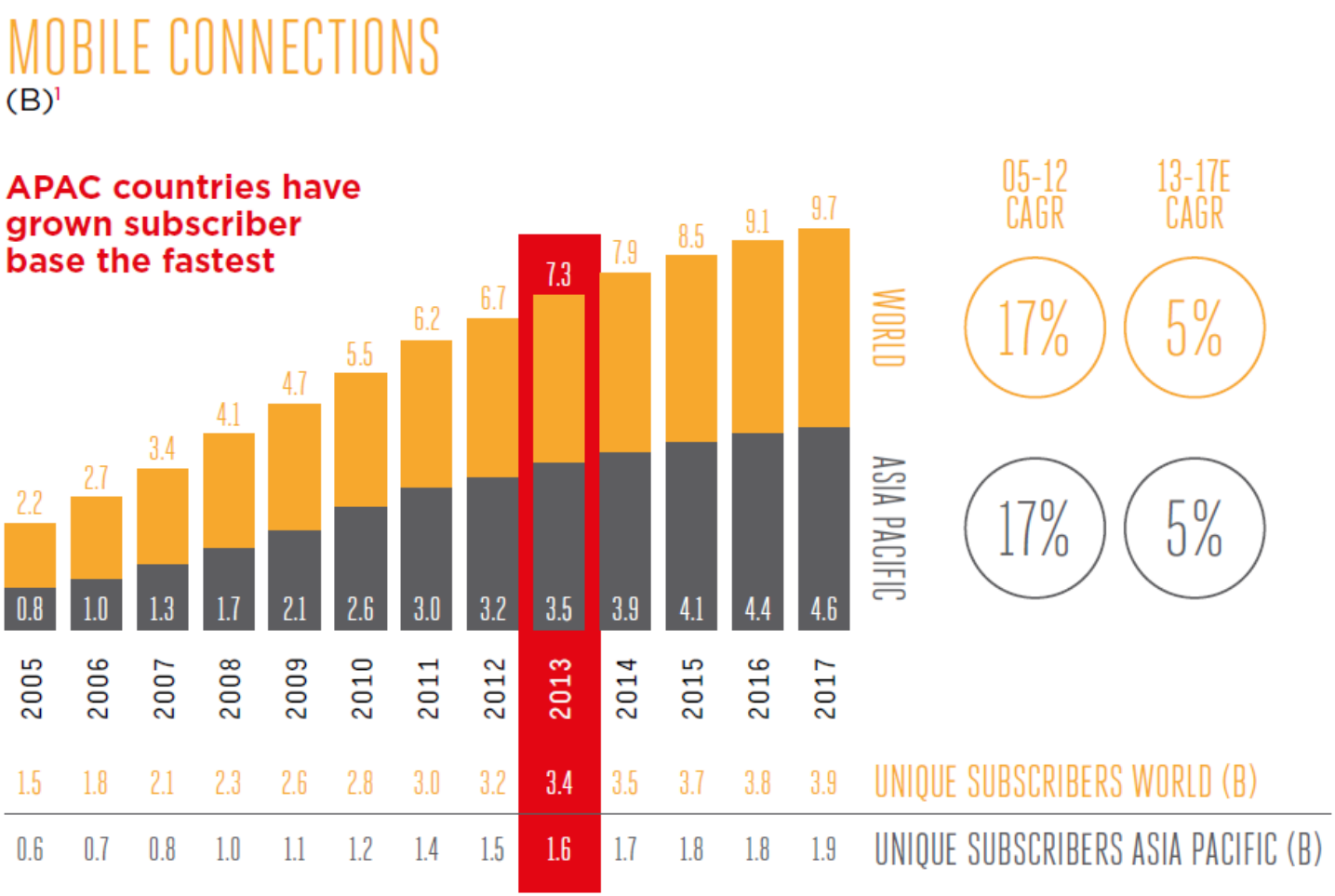
- Global SIM-enabled connections reached 6.9 billion in 2013 and are expected to reach 9.2 billion by 2020 (excluding M2M)
- Global subscribers reached 3.4 billion in 2013 and are expected to reach 4.3 billion by 2020





Source: The Mobile Economy Report 2014, GSMA, February 2014

Asia Pacific – 3.5 billion Mobile Connections in 2013



Source: GSMA Intelligence, Q2 2013

… And The Growth Trajectory Continues For 2014

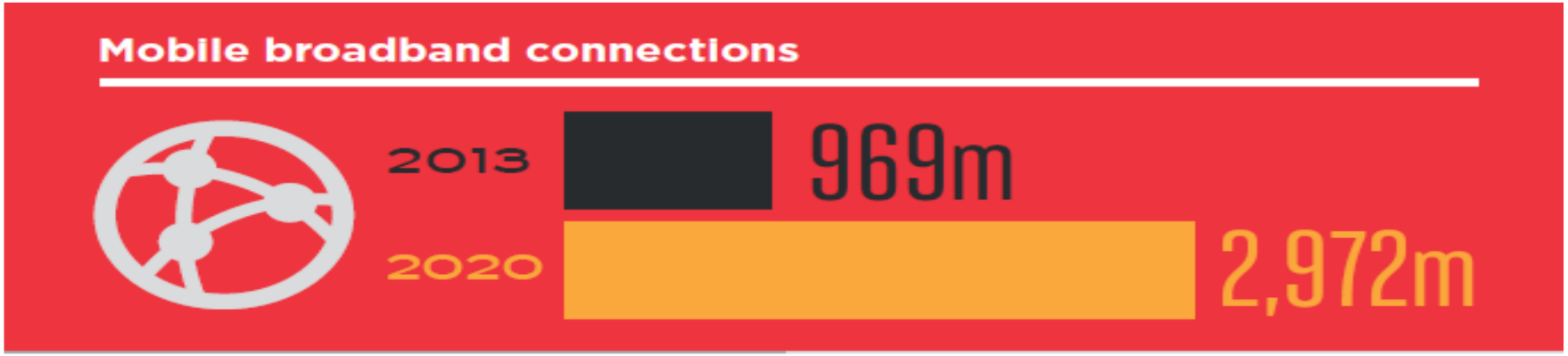
ASIA PACIFIC MARKET

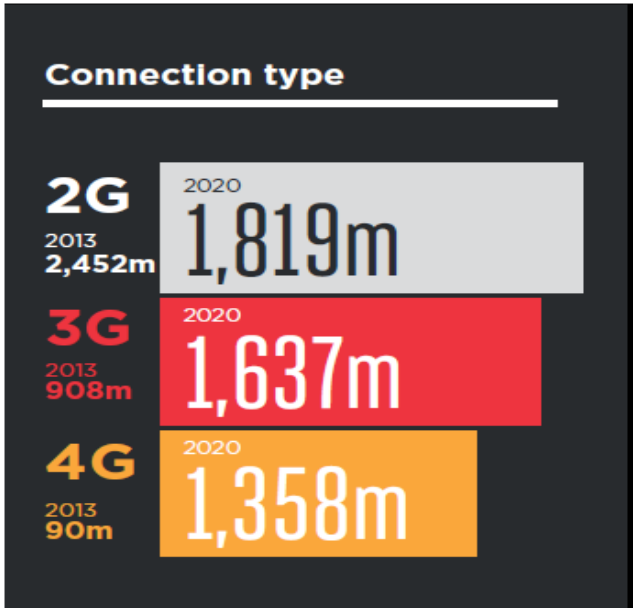
Unique subscribers

5.5%
CAGR
2013 - 2020

Source: GSMA Mobile Economy 2014, Asia Pacific, June 2014

Increased Mobile Broadband Connections



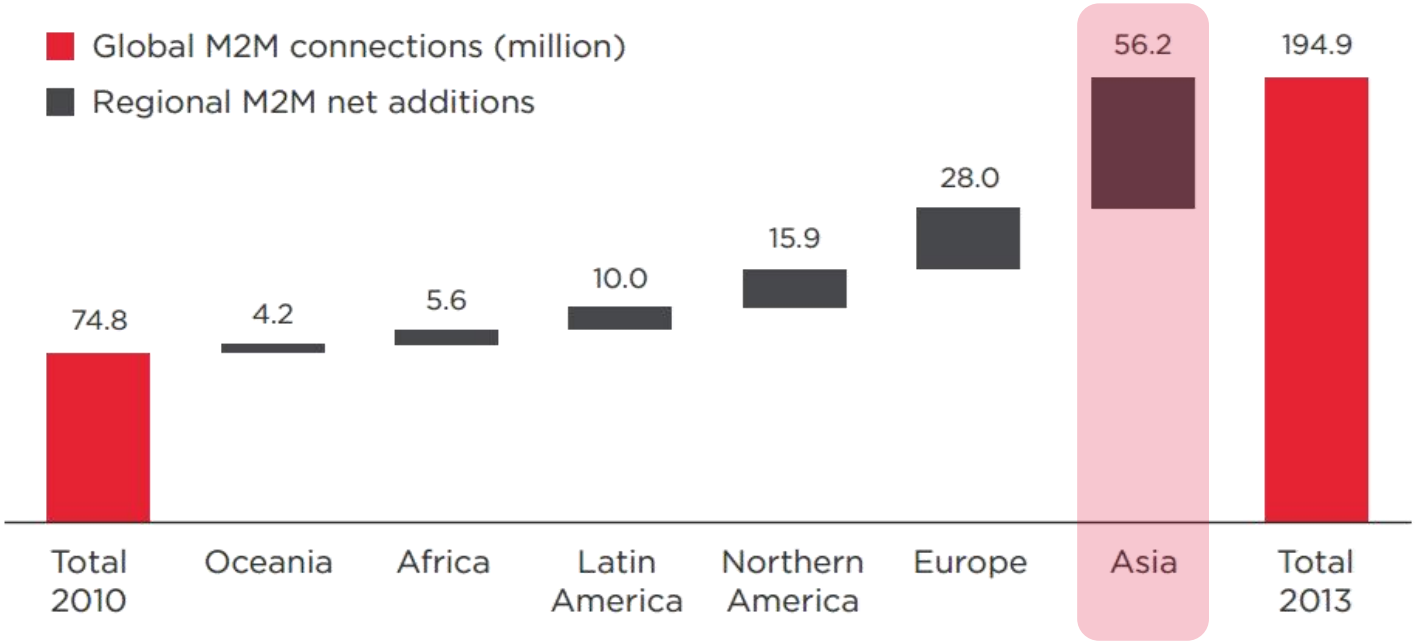


Mobile operators across the Asia Pacific region have invested US$ 430 billion over the past six years, equivalent to 20% of revenues over the period. This has helped to improve network coverage (especially in remote areas), increase network capacity to accommodate growth in the subscriber base as well as accelerating levels of data growth.

Capex levels are forecast to grow at just over 5% per annum out to 2020.

Source: GSMA Mobile Economy 2014, Asia Pacific, June 2014

Asia Towards 2020 | M2M Playing A Key Role

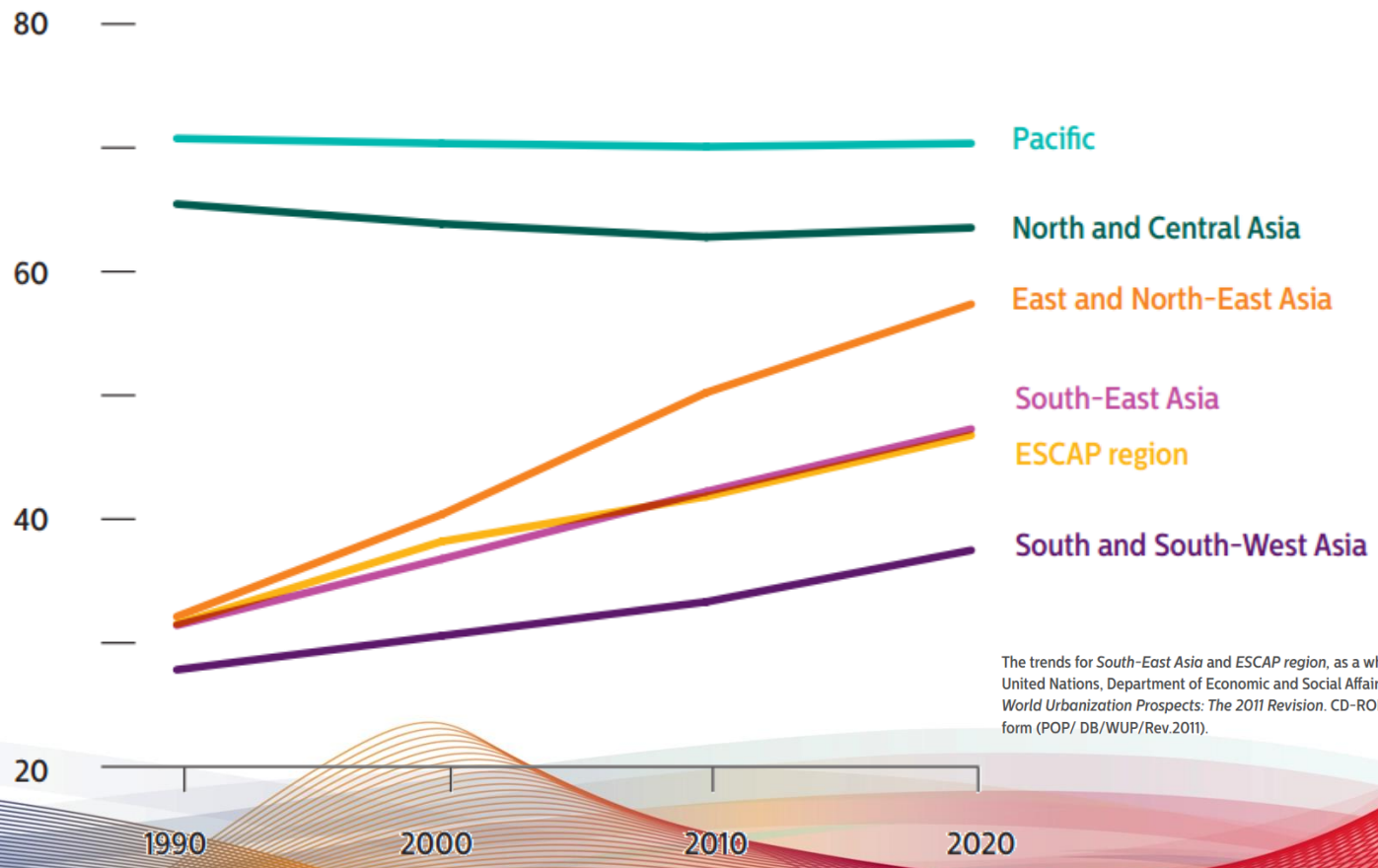


- China is already the world's leader in M2M (GSMAi).
- Asia will be the most connected region by 2020 (PwC).

Defining Smart Sustainable Cities

Urbanization Still on the Rise in APAC

Urbanization in Asia and the Pacific across subregions, 1990–2020



The trends for *South-East Asia* and *ESCAP region*, as a whole, are very similar.
United Nations, Department of Economic and Social Affairs, Population Division (2012). *World Urbanization Prospects: The 2011 Revision*. CD-ROM Edition - Data in digital form (POP/ DB/WUP/Rev.2011).

Modern Mega-Cities Face Great Challenges

More than half of the world's mega-cities (13 out of 22) are now found in Asia and the Pacific

- Population growth
- Waste disposal
- Traffic congestion
- Energy usage
- Pollution
- Economic growth
- Food supply
- Aging infrastructure
- Education
- Employment
- Clean water
- Health

Challenges Beget Opportunities

Challenges	Associated opportunities
Population growth	Creates possible economies of scale for smart cities solutions Tax revenues
Carbon emissions	Safety from switch to public transport/cycling Savings from low emission buildings low energy consumption Health improvement
Energy consumption	Associated carbon emissions reduction Smart grid Re-use of waste products (heat) from energy production
Economic growth	Hubs of culture Innovation Start-up ecology Benefits of business activity (tax, employment)
Well-being of citizens	Make cities work for citizens Smart health

Cities are increasingly looking to become "smarter"

In response to these trends, cities across the globe are increasing looking toward ICT and mobile technologies with regard to improving service provision and quality of life for citizens.

- Increasing **urbanisation** means that cities need to cater for larger populations
- Increasing **environmental challenges** and governments to take leadership in this area
  - Incentivising different energy options to optimise usage and environmental outcomes
- **Governments** are being challenged to deliver their **services more effectively**, for example:
  - Providing **transport** to larger, denser and more widespread populations
  - Efficiency in delivering **public services**
  - Increasing **citizen engagement** and participation

What is a Smart City?

A Smart City makes extensive use of ICT, **including mobile networks**, to improve the quality of life of its citizens in a sustainable way.

A Smart City combines and shares disparate data sets captured **by intelligently-connected** infrastructure, citizens and vehicles

- to generate new insights and provide **ubiquitous services**
- enable people to **access information** about city services and move around easily,
- improve the efficiency of city operations
- enhance security
- fuel economic activity
- and increase resilience to natural disasters

“Smart Cities” covers a broad range of application

Smart Cities Application Areas

Smart Energy
Smart grids
Smart metering
Water management
Smart buildings

Public Services
Smart street lighting
Waste management
Smart stadiums
Smart retail

mGovernment
Electronic registrations
Taxation and payments
Electronic voting
Citizen participation

Health
e- and m- Health
Electronic health records
Citizen self management
Efficient administration

Education
e- and m- Education
Lifelong learning
Education for employment
Efficient administration

Transport & Logistics
Traffic management
eCall
Fleet management
Freight management

Smart Cities Enablers

mIdentity
Secure identification / authentication

mCommerce
e- and m- Payments
Mobile ticketing

Big Data
Analysis of multiple, large data sets

Mobile As A Key Enabler

Smart sustainable cities are built on certain key success factors:

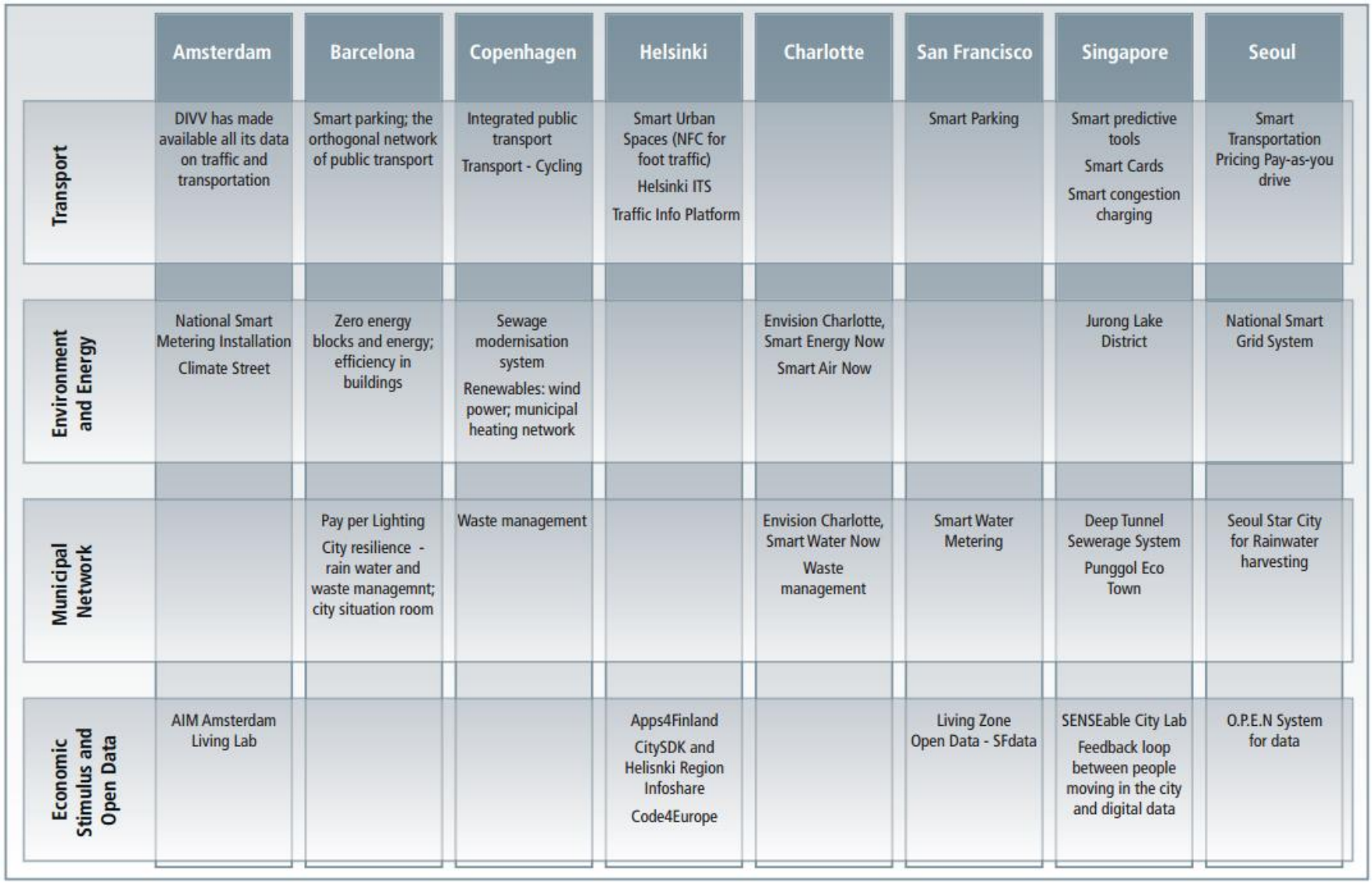
- Building productive partnerships
- Smart interoperable ICT
- Capture and distribute actionable data
- Focus on solving specific problems
- Role of mobile network operators

Services and Geographical Breakdown

Core Smart City Services

Source: GSMA Connected Living Tracker http://www.gsma.com/connectedliving/tracker

Examples of Smart City Deployments



	Amsterdam	Barcelona	Copenhagen	Helsinki	Charlotte	San Francisco	Singapore	Seoul
Transport	DIVV has made available all its data on traffic and transportation	Smart parking; the orthogonal network of public transport	Integrated public transport Transport - Cycling	Smart Urban Spaces (NFC for foot traffic) Helsinki ITS Traffic Info Platform		Smart Parking	Smart predictive tools Smart Cards Smart congestion charging	Smart Transportation Pricing Pay-as-you drive
Environment and Energy	National Smart Metering Installation Climate Street	Zero energy blocks and energy; efficiency in buildings	Sewage modernisation system Renewables: wind power; municipal heating network		Envision Charlotte, Smart Energy Now Smart Air Now		Jurong Lake District	National Smart Grid System
Municipal Network		Pay per Lighting City resilience - rain water and waste managemnt; city situation room	Waste management		Envision Charlotte, Smart Water Now Waste management	Smart Water Metering	Deep Tunnel Sewerage System Punggol Eco Town	Seoul Star City for Rainwater harvesting
Economic Stimulus and Open Data	AIM Amsterdam Living Lab			Apps4Finland CitySDK and Helisnki Region Infoshare Code4Europe		Living Zone Open Data - SFdata	SENSEable City Lab Feedback loop between people moving in the city and digital data	O.P.E.N System for data

Productive Partnerships Will Drive Adoption

- In several smart city programmes tracked by the GSMA, the public sector helped finance early projects and city administration helped reconcile commercial & public policy objectives

Santander, Spain: Using research funds from the EU, a consortium of 25 partners led by Telefonica turned the coastal town into a smart city laboratory.

Busan, South Korea: A collaboration between Busan Metropolitan City, Cisco and KT shared the costs and risks associated with building a cloud-based Green u-City project.

- However, sometimes innovative companies need to take the lead

Friedrichshafen, Germany: Deutsche Telekom built its own smart city ecosystem that can be replicated in projects across multiple different cities. This was demonstrated through its advanced smart metering project in Friedrichshafen, which has yielded substantial insights into mobile network operator roles.

Case Studies from Across Asia

new mobile connections in Asia over the next five years will drive

India

10 Million

extra homes in India that could be powered by electricity
as a result of cutting power theft through the use of mobile-enabled smart meters

Japan

$10 Billion

saved in healthcare costs in Japan
through the adoption of mobile technologies for remote monitoring, disease management, and preventive medicine for the elderly

China

$22 Billion

in additional economic productivity
in China as a result of mobile vehicle telematics that reduce traffic congestion and help Chinese commuters reclaim nearly two hours of time each week

South Korea

$12,000

reduction in education costs
for students in South Korea through the use of technology and mobile-enhanced learning in place of private after-school education

Research conducted by PwC for the GSMA

China | Automotive | Mobile Telematics

China is the largest automotive market in the world

13 mn *cars on the road*

13.6 mn *cars sold in one year*

120 mn *cars on the road today*

165 mn *cars expected*

718 mn

people live in urban centres today

87 mn

rural people are expected to migrate to urban centers

805 mn

urban residents by 2017

mAutomotive will help each commuter save...

through reduced commute time

2 hours weekly

x 76 mn commuters

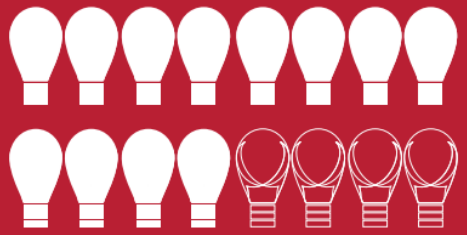
=

22 bn $ *addition to annual economic productivity*

India | Energy | Smart Metering

24%

of electricity is lost every year



17 bn USD

is the economic cost of these losses

$$$$$
$$$$$

1/2

of these losses are due to power theft

10 mn

Indian households can be powered from mobile enabled smart meter energy savings in 2017

South Korea | Education | Mobile Learning

70% students go to private after-school classes

17.5 bn USD around 1.5% of GDP is spent on private, after-school education

---

90% of South Koreans between 12 to 29 years own smartphones → **7.5%** 7.5% of them own tablets → **60%** users spend more than two hours a day on these devices

Technology-enhanced learning can help students save...

8000 to 12000 USD over their school lives = **1 to 2 years** of university or higher education costs

Japan | Healthcare | Remote Monitoring

1 in every 3

Japanese will be over the age of 65 by 2025

$ $ x 4.6

On average, senior citizens spend almost 5 times as much money on healthcare as compared to their younger counterparts

51%

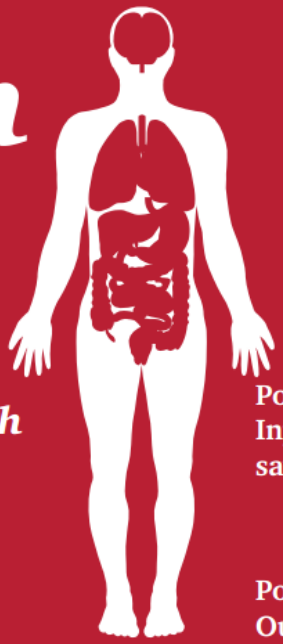
of Japanese healthcare is spent on senior citizens

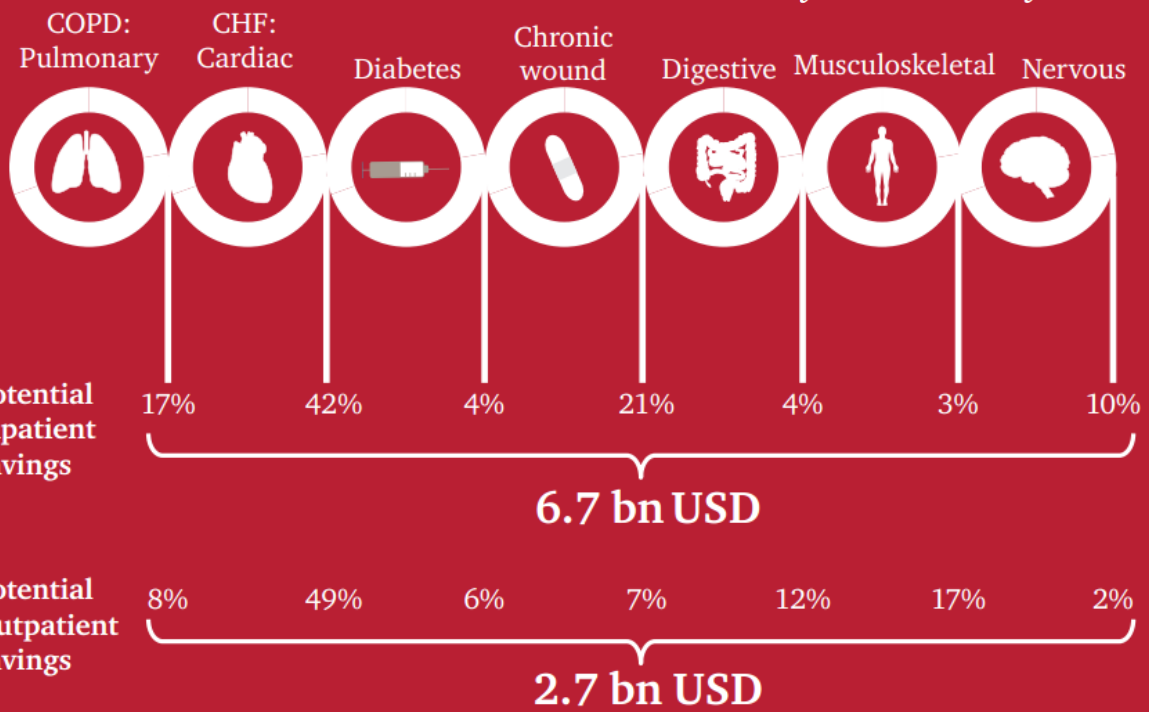
Average life expectancy

84.2 years *79 years*

10 bn USD

can be saved through mHealth for elderly care in 2017



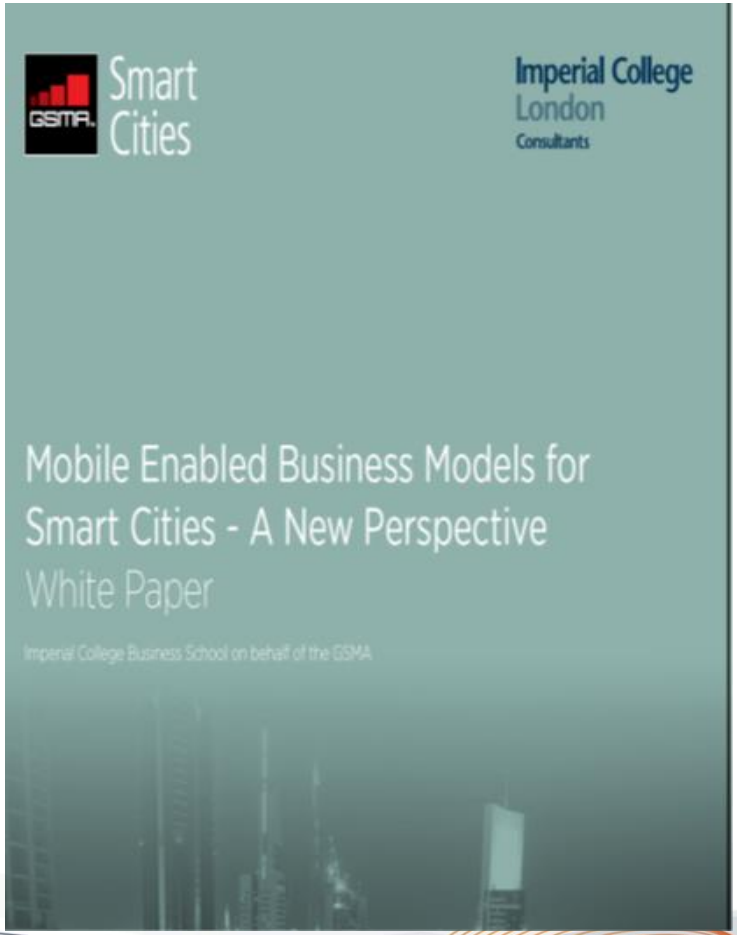


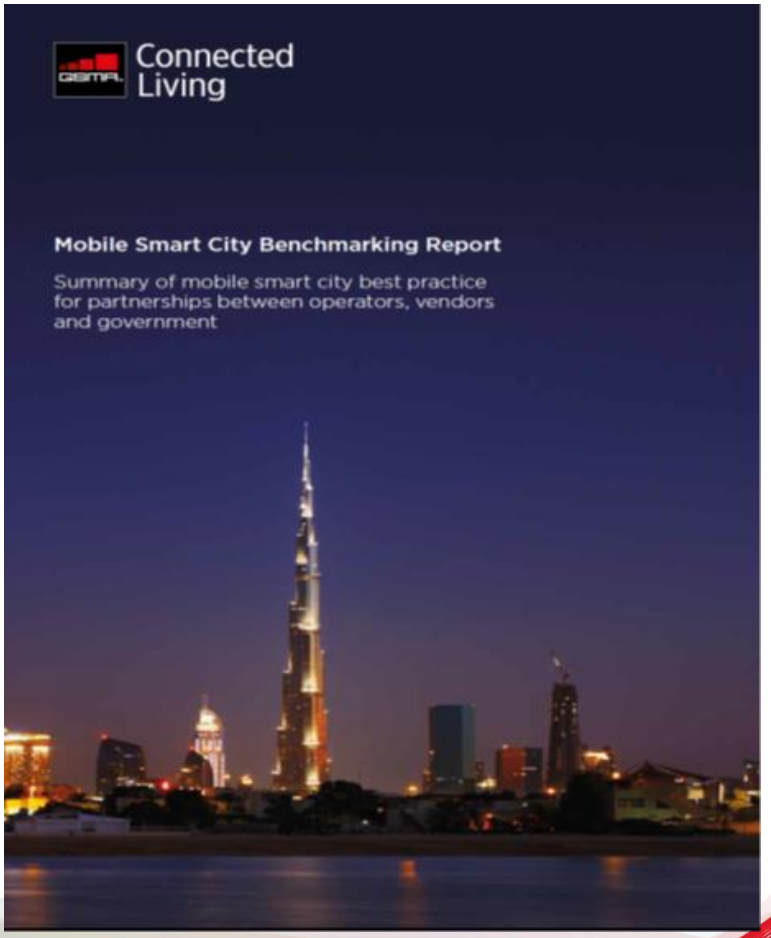
Mobile is facilitating an exciting future for us

- The mobile network is at the 'heart' of building a more 'connected' future for all of us.
- As the mobile ecosystem continues to evolve both globally and in Asia, we will see a number of new things - new services, new technologies, new business models – that can help improve the lives of our citizens.
- Key to all this is ensuring that there is a clear, stable, transparent, consultative and predictable telecoms policy and regulatory environment – one that supports continuous investment into infrastructure and innovation.

- **Spectrum harmonisation for mobile broadband can unlock US$1 trillion in GDP for Asia Pacific**
- **Cross-sector collaboration and smart partnerships will be a key enabler**
- **Supporting innovation with a common position on intellectual property rights is important to encourage the continued momentum of the sector**

GSMA Resources





THANK YOU