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conversation that matters

## ITU Telecom World 2013

*Embracing change in a digital world*



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# ■ ITU Telecom World 2013

**One conversation  
not to be missed**

**Dr Hamadoun I. Touré,  
ITU Secretary-General**



On behalf of ITU, its 193 Member States and more than 700 Sector Members and Associates from industry, international and regional organizations, and Academia, it gives me great pleasure to welcome participants to ITU Telecom World 2013, which is hosted this year by Thailand, in Bangkok, one of Asia's most dynamic and cosmopolitan cities.

Conversation is at the heart of ITU Telecom World 2013. It gives me great hope for the future of the information and communication technology industry to see international experts exchanging ideas and opinions with the audience both in the room and online. The formats and topics are diverse, but the debate is always passionate, informed and engaged.

Here as elsewhere in the world, we are seeing a continuing revolution in the information and communication technology sector. The shift to Internet protocol (IP)-based services is shaking the foundations of communication systems as we know them. We need to understand these changes, work out how to grow with them, and benefit from them.

ITU Telecom World 2013 explores the theme of "Embracing change in a digital world". The interactive panel sessions, workshops and showfloor sessions focus on five major areas of change:

- Changing user behaviour as people increasingly interact and communicate via social media and data apps rather than voice or face-to-face.
- Shifting industry dynamics as new web-based companies compete with telecommunication operators and flourish, playing by different rules.

- Changing business models and spaces thrown up by the exceptional opportunities in machine-to-machine communications and the Internet of Things, enabling socio-economic development on an unprecedented scale.
- Emerging new technologies such as halo nets, embedded Wi-Fi chips and unlimited low-cost processing and storage, creating a singularity where human life will be irreversibly transformed.
- The pressing need for new standardization and regulatory approaches to allow for the evolving realities of new players, markets and technologies.

The event brings together a wide audience from the public and private sectors. Heads of State and Government, ministers, policy-makers and regulators meet industry CEOs from operators, vendors, service providers and content developers. Innovators, big thinkers and influential advisors are all here. And so are the media.

The world-class Forum covers an extensive range of topics (see pages 10–28) and offers interactive discussion among high-quality speakers. Panellists are selected as experts in their fields to offer informed opinions from the contrasting perspectives of government, business and technology. Innovative solutions, business models and partnerships emerge from the debate, as participants share knowledge, experience and best practice.

The showfloor at ITU Telecom World 2013 enables national and thematic pavilions and industry stands to showcase the best of products, technologies, investment opportunities and partnerships from around the world. In the InnovationSpace, the finalists of the Young Innovators Competition 2013 pitch their winning



conversation that matters



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ideas on creating real-life, ICT-based solutions to development challenges. Here also The Lab demonstrates fascinating new ideas and cutting-edge solutions at the nexus of art, technology and society — the future in action.

But all talk of the future envisages an enabling environment for our industry to flourish. Policy and regulatory environments established a solid foundation for the development of mobile services around the world. We now need to repeat the feat in broadband, despite the increased complexity that technology convergence and rapid innovation bring. It is time for all countries to rise to the challenge.

The Broadband Commission for Digital Development, co-founded by ITU and the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2010, provides valuable guidance for the development of ICT, and especially broadband. Its most recent report “The State of Broadband 2013” sets out a number of policy recommendations for developing broadband and maximizing its impact. The Commission has demonstrated the importance of broadband in accelerating progress towards meeting the Millennium Development Goals as well as being an essential driver of progress in the post-2015 development agenda.

We still have far to go. As we move into 2014, two-thirds of the people in developing countries will still be offline, with no access to the Internet at all. The picture is even worse in least-developed countries — home to some 890 million people, of whom 818 million will still be without any form of Internet access. But in this huge challenge lies a huge opportunity — to do business and to see real and lasting progress delivered, not just in the capital cities, but in the world’s most rural and remote areas as well.

We are already seeing technological progress on a scale never before imagined — particularly with the astonishing arrival of mobile broadband, the fastest-growing technology in human history. ITU predicts that by the end of 2013, there will be close to 2.1 billion mobile broadband subscriptions.

It took 125 years to reach the first billion fixed-line subscriptions globally — and we are very unlikely ever to reach the second billion. But it took just nine years to reach the first billion mobile broadband subscriptions — and it took only two more years to reach the second billion.

Having seen the tremendous progress over the recent years, I am confident that our industry will seize the opportunity and employ the transformative power of ICT to accelerate development. So as our world continues to go digital, let us continue doing this great work — and let us embrace the change.



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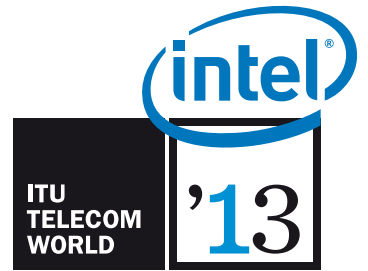
# Bangkok welcomes ITU Telecom World 2013

*ITU Telecom World is the platform for high-level debate, knowledge-sharing and networking that is essential to drive the success of the global information and communication technology sector.*

*The event fosters constructive debate on policies, strategies, models and markets. It facilitates connections between individuals, ideas and industry players, opening up partnership and investment opportunities. It also highlights the importance of collaboration and cooperation across the sector.*



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■ ■ ■ *ITU Telecom World 2013 is hosted by the government of Thailand in the state-of-the-art IMPACT Exhibition and Convention Center in Bangkok, one of Asia's most cosmopolitan cities. A regional hub for commerce, tourism and transport, Bangkok offers first-class conference and business facilities with world-renowned charm and hospitality. With its mix of traditional and modern culture, historical highlights and dynamic urban environments, Bangkok is an ideal place for networking and for making conversations happen.*

*Thailand is a leading member of the Association of Southeast Asian Nations (ASEAN), a group of ten emerging countries with a total population of some 600 million, offering an attractive destination for trade and investment. Regional competitiveness will be further driven by the formation in 2015 of a free trade market – the ASEAN Economic Community – which will capitalize on the region's huge consumer market, expanding middle class and increasing availability of disposable income. ASEAN free trade agreements with China, the Republic of Korea, India, Australia and New Zealand, plus a comprehensive economic partnership with Japan, open up the entire Asian continent, which now accounts for more than 50 per cent of global trade.*



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## ■ *Embracing change in a digital world*

### *Forum programme themes*

#### ■ *Day 1: 19 November 2013*

##### **Forum opening conversation**

The information and communication technology sector is undergoing a period of major transition. Even the way we

communicate with each other is changing. Messaging and "rich voice" using presence and social media capabilities are increasingly replacing voice calls. Users of data and information are now producers as well

as consumers, leading to an explosive demand for bandwidth. New technologies and markets are introducing new players to the industry, challenging traditional business models and regulatory frameworks.

These changes resulting from the shift from a voice-centric to a data-centric era are also bringing opportunities that have the potential to enable social and economic development on an unprecedented scale. Changes in technology promising unlimited and low-cost processing, storage and communication capabilities, together with developments in software-defined networks and data analysis, are transforming the fundamental structure and character of the ICT sector. How can the ICT sector adapt to distribute the benefits of the new digital world on a fair and equitable basis, while ensuring that such important matters as privacy, data protection and cyber-security are addressed effectively?

### Riding the data wave

The plethora of new wireless devices reaching international markets is facilitating innovative business models but straining the ability of fixed and mobile networks to keep pace. Wireless has for some time provided basic connectivity in Asia, but the data storm that has hit European and North American markets will present new challenges to operators because of the shortage of high capacity back haul. "Front-hauling" is one of the techniques that have been promoted as a solution but its use of scarce spectrum presents other difficulties.

### Telecommunication companies and over-the-top players

The telecommunication industry is in a quandary over so-called over-the-top (OTT) services, especially for voice and messaging. It now seems inevitable that telephony and short message service (SMS) revenues will decline. Some operators are partnering with the likes of WhatsApp and Facebook to differentiate their offering from the services they generally provide. Others are taking an entirely different path, lobbying regulators to allow them to block or charge fees to their new rivals. A handful still believes GSMA's Rich Communications Suite (RCS) is a saviour. RCS is said to be changing the way people communicate. It delivers an experience beyond voice and SMS by providing users with instant messaging or chat, live video and file sharing across any device, on any network, with all the enabled contacts in their address book. RCS taps into how consumers are already sharing their daily experiences with each other.

### Regional leaders' round table

At ITU Telecom World in 2012 a group of regional CEOs acknowledged that telecommunication companies were experiencing a time of great change, with increasing costs and falling revenues. The industry must reinvent itself by finding different ways to collect revenues in order

to become sustainable in the long run. Different business models are needed to meet the challenges of customer choice brought about by licensed and unlicensed players and the changing world of telecommunication companies and OTT services.

The bottom line is also affected by the way customers communicate with each other and the movement away from voice and data-centric communications to machine-to-machine (M2M) communication and the Internet of Things. This is a time of immense technological change involving mind-blowing challenges for regulation.

Many of these topics were covered during the World Conference on International Telecommunications (WCIT-12), held in Dubai in December 2012. Some would say that the conference widened the divide between those in favour of an open and free Internet, and those seeking to control it. Perhaps views have changed since then. How does the industry and other main stakeholders now understand the challenges and what are they doing to meet them?

### TD-LTE technology and spectrum workshop

The TD-LTE Technology and Spectrum Workshops held in Geneva and Dubai successfully and efficiently promoted the development of time-division long-term evolution (TD-LTE). The third TD-LTE Technology and Spectrum Workshop, jointly hosted by ITU, the Global TD-LTE Initiative (GTI),

China Mobile and the Telecommunication Development Industry Alliance (TDIA), is scheduled for 19 November in Bangkok during ITU Telecom World 2013.

This workshop seeks to promote efficient use of spectrum by drawing up a global unified spectrum allocation strategy, and to further accelerate TD-LTE commercial deployment in the world. It is an opportunity for government leaders, regulators, CEOs of operators and chairmen of international associations to share their views on mobile broadband development.

## The social and mobile app world: friend or foe?

One of the most vociferous debates in today's telecommunication industry centres on how operators should deal with OTT players and third-party web companies. From Internet-based alternatives to telephony and texting, such as Skype, Viber or WhatsApp, to the social content economy spurred by companies like Facebook, Twitter or YouTube, carriers feel a threat to some of their traditional revenues. Social media and mobile apps are changing the world. What are the most significant changes that are currently taking place, and what further disruption is on the horizon?

## Network virtualization

Existing services are delivered via dedicated infrastructure, resulting in the underuse of network resources except during busy hours. Network virtualization promises to end this and significantly reduce operational expenditure. This opens up the possibility of shared network resources, reduced capital investment and reduced operating expenses for network operators. Network operators expect a software purchase business model, while original equipment manufacturers need to protect their interests. For manufacturers, this may mean ceding exclusivity over some network functions, with the possibility that more and more functions will come under the network operator domain. What business models will emerge? How will original equipment manufacturers and network operators coexist in this new environment?

## Convergence and regulation

Telecommunications, media and other regulators now inhabit a changing world dominated by end-to-end Internet protocol (IP) devices and networks, a world of OTT operators providing applications where voice is as much an application as a weather outlook, a world where every user is a content generator. Content, whether live

or streamed, can be viewed on numerous different smart devices and over multiple delivery technologies. Delivery platforms vary from digital broadcasting and satellite to broadband, IP, and fixed and wireless networks. It is the consumer who largely decides how they access content and applications, but there can be lock-in.

Today applications and services are largely provided by different players from those providing the alternative and competitive local infrastructure. The dominant players are no longer the national incumbent ruled by the national regulator but largely free rein international companies. Many new companies are increasing their value, whereas infrastructure players are struggling to maintain their current worth. There has been a quantum change in the value chain — software and application service providers now dictate to infrastructure players.

Is it time to think radically about the scope of telecommunications and media or broadcasting regulators? Should these bodies be merged? Will such changes assist or hinder the investment and rapid roll-out of new services? Who needs protecting? What is the appropriate level of regulation or can the industry work together to produce guidelines and self-regulate? ■

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# Next Value Partner



## ■ Day 2: 20 November 2013

### The Internet of Everything

The Internet of Everything is quickly becoming one of the hottest topics for the global communications community. It is at the centre of convergence of ICT and traditional communications in otherwise unconnected commercial structures. The consumer market is the darling of today, but the business-to-business (B2B), business-to-consumer (B2C), government-to-business (G2B) and government-to-citizen (G2C) connections of tomorrow in the form of the Internet of Everything will be the future. Less than 1 per cent of the potential trillions of devices and sensors are connected today. The challenge for the industry will be to deliver the connection of the future — with sound business goals that benefit society — on a secure and reliable platform.

### Education transformation: importance of ICT in 21st century education

Today's students live in a world of global competition, technology-fuelled innovation and rapid change that requires new skill-sets for problem solving, collaborative learning and critical thinking. The integration of information and communication technologies in the teaching and learning

process helps in acquiring these new skills, both inside and outside of the classroom. Given the importance of accelerating ICT to transform education, what barriers need to be overcome? How can we best take advantage of technologies that have successfully promoted learning and led to thriving communities around the world?

### New opportunities in voice and messaging

The traditional telephony format for voice is at the end of its life (or is it?). What is certain from analysts is that a new post-telephony era is beginning. Understanding this opportunity is vital, especially as premium margins rapidly erode as a result of competition and arbitrage from OTT service providers. It is time to explore the main drivers of user value for voice.

### Education transformation: from vision to action

No matter what the vision for a good educational system, no one single action can make it a reality. Transforming education to meet current global competition is a complex challenge requiring strong leadership from government as well as public-private partnerships with a variety of ecosystem partners. It also requires a

technology infusion coupled with the right training for teachers. National and regional educational transformation projects can provide useful experience in this area.

### Mobile technology and productivity in the enterprise

Mobile apps have the potential to transform the way people do business, making workforces more mobile, responses instantaneous and giving large volumes of people access to back office data through "bring your own device". A mobile first approach to business processes and design can take user experience to another level inside the enterprise and solve real business problems. Mobile interfaces provide detailed insights and analytics never before seen on any device or interface. Consumer-centric user experience can provide insights into how to engage employees.

### How can world citizens ensure their privacy in a digital world?

Interconnected electronic devices and applications are collecting a multitude of data on individual citizens — everything from where you are and have been, who you have communicated with, when you



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are active, how you spend your time, and what your interests and personal preferences are. This information is now being collected and analysed by business and governments. What should citizens do and what are their rights? What should be the role of government and business? And how can this role be translated into laws and international standards?

## The Internet of Everything based on IPv6

Networking people, processes, data and things into an all-embracing Internet will, in the next 10 years, generate a value of more than USD 14 trillion, touching all sectors of the economy. An Internet of Everything world will be more relevant and valuable than ever before, turning raw information into knowledge and creativity into practical innovations. An unprecedented opportunity lies ahead for businesses, individuals and society.

The size of the digital data universe is increasing exponentially. Between "big data" and "open data" lies an immense data mine, waiting to be exploited. The

technology that will enable this larger-scale communication among all of these objects and data is the new Internet Protocol version 6 (IPv6).

Examples of the use of the Internet of Everything include smart grid, smart buildings, connected health care and patient monitoring, smart factories, connected education, smart transport, connected marketing and advertising, smart environment and agriculture, and connected gaming and entertainment. IPv6 pioneers from the Asia region have already built up a store of experience on the transformational and life-changing economic and societal impacts of the Internet of Everything.

## Big data, big brother?

Big brother is watching us. Recent revelations about the practices of security agencies tell us so. But how concerned should we be? Should we accept reassurances that no one has the time or inclination to wade through vast oceans of data just to monitor our activities? Or should we recognize that we have entered the era of big data analytics in which computers tirelessly sift through huge data sets searching for trends and patterns?

Analysing those patterns can increase efficiency and competitive advantage — allowing machine parts to be replaced just before they fail. But it also challenges privacy protection and raises the spectre of penalties based on propensities. Big data predictions could result in punishments being imposed even before a crime has been committed. Judging people on what we predict they might do challenges the notions of justice and free will underpinning many societies. How can we take advantage of big data analytics without destroying the fabric of society?

## Education transformation: financing e-learning programmes

Using technology to improve access to high-quality education is a must for the 21st century but the crucial question is how to fund such critical and multidisciplinary projects. Transforming and adapting education to the new challenges should be approached as a strategic investment for a country and its citizens. It is the government's responsibility to catalyse internal resources and collaborate with private industry to make it happen.

## Digital Africa — the economic impact of the Internet

It is estimated that the Internet contributed around USD 15 billion to gross domestic product (GDP) in 2012 across 14 African countries — South Africa, Egypt, Nigeria, Kenya, Algeria, Morocco, Angola, Ghana, Senegal, Tanzania, Cameroon, Côte d'Ivoire, Mozambique and Ethiopia. Private consumption is the main driver, while public and company investment lag behind investment in more developed countries. There are opportunities for growth, depending on the maturity of the Internet ecosystem. Different stakeholders (governments, policy-makers and business leaders) can play a role in increasing the economic impact of the Internet in Africa.

## Protecting the individual in an increasingly connected world of big data

The maturing of social networking, combined with the power of computing devices and reduced cost of communication, has made it possible for others to collect and use our personal information. This is now being done, with or without our awareness or consent. This complex matter requires careful consideration by all stakeholders, including regulators and legislators. There is a growing body of evidence indicating that some societal benefits have been achieved by harnessing big data. But there must be a balance between privacy and social benefit. In a global digital community, we need to be clear about whose rules apply — and to whom.

## Building telecommunication applications within telecommunication companies

As the profitability of voice services continues to decrease, telecommunication companies have invested massively in value-added services such as Internet-Protocol television (IPTV), video-on-demand (VoD), OTT apps, mobile services or web portals — but with often disappointing results. How can telecommunication companies change focus and funnel investment in value-added services as a winning strategy?



Telecommunication companies are being challenged by OTT messaging services and social networking apps — in many areas the new digital landscape is now dominated by OTT players. How are telecommunication companies responding? What can be learned from the reactions of operators and the experience of media companies? And what are the most important new technological developments underpinning future value-added services?

### **Transforming education: content that matters**

Recent studies indicate that broadband-enabled technologies can improve the effectiveness of instruction and enhance learning outcomes. To achieve that

outcome requires 21st century students to be sophisticated consumers, interpreters and users of content. Schools need to equip students with a set of new skills that enable them to better compete in the digital era. Content plays a key role in the new teaching and learning environment. According to these studies, broadband is an essential vehicle for delivering content and tools that can be used to spur student engagement, enhance learning outcomes, facilitate collaboration and innovation among educators, and enable cost savings in the administration of education. How must traditional educational content evolve to meet the new requirements of the digital era and help students acquire 21st century skills?

### **Potential transformative impact on Africa of the Internet and digital technology**

Affordable technologies can help to accelerate the way Africa addresses a number of socio-economic challenges. Digitization can yield leapfrogging effects that can disrupt current value chains, transforming the way Africans access or use services. What benefits do such leapfrogging effects bring? There is a potential to transform financial services, retail and health care. Many interesting experiments are being conducted in these areas, and there are several success stories. What actions need to be taken for some of these experiments to reach full scale and truly transform lives?

## From voice to data to cloud: transitioning the telecommunication company business model

The world of texts and telephony brought about a huge global telecommunication boom. Today with the arrival of OTT services, returns from many telecommunication operators barely cover their cost of capital. Is this situation sustainable for fixed and mobile operators? Are we delivering fit-for-purpose services to users? What are the best tactical and strategic responses to OTT services? Can the coming world of cloud services restore the previous vibrancy we saw with voice and messaging?

## Mobile security challenges and policy in the Association of Southeast Asian Nations consumer protection perspectives

As the world becomes more interconnected, integrated and intelligent, mobile broadband is playing an ever-increasing role in changing the way people live, work and communicate. This emerging trend brings benefits but also risks and vulnerabilities. The volume and sophistication of mobile attacks is increasing. There is evidence that mobile device malware — viruses, worms, Trojans and spyware — has

been on the rise over the past few years because most mobile platforms do not yet have native mechanisms to detect malware. Malware threats result in personal losses, corporate costs and economic damage, including damage to national reputation and credibility. The security of mobile devices and networks has therefore become a top concern at corporate, industrial, national and international levels. Governments and regulators have an important role in coping with the mobile security challenges that have been arising. However, close international cooperation is required in order to effectively combat cybersecurity threats.

The Association of Southeast Asian Nations (ASEAN) is looking into consumer protection, and will incorporate and share common policies on mobile security by 2015.

## Resilient ICT for disaster relief

Information and communication systems were damaged extensively during the east Japan earthquake on 11 March 2011, with some of them ceasing to function. This failure highlighted the importance of such systems within social infrastructure. The National Institute of Information and Communications Technology (NICT) of Japan has a wealth of experience that can throw light on the challenges for national

disaster relief projects in Japan as well as in Thailand.

## Visionary keynote with Telenor: leapfrogging into a digital future for all

Mobile connectivity and digital communication has become part of our everyday life. Being connected is what enables us to work, play and take part in society. Mobile phones not only mean freedom, they also mean opportunity and growth. Mobile connectivity is not a luxury good for the few — it is a necessity for everyone.

In preparing its market entry into Myanmar, Telenor Group puts 15 years of experience in Asia to the test. Eager for growth and change, this frontier market aims to leapfrog the mobile development chain and enter the digital age faster than any country has ever done before. This presents a range of opportunities, but also a set of challenges.

Jon Fredrik Baksaas, President and CEO of Telenor Group, one of the top ten mobile operators in the world and a leading operator in the Asia region, shares his perspectives on reaching the mass market and enabling emerging nations to leapfrog to an inclusive digital future — a digital future for all. ■

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## ■ Day 3: 21 November 2013

### Satellite broadband services: opportunities and challenges

Broadband and ultra-broadband satellite services are experiencing high growth worldwide. Important milestones in North America and Europe are paralleled by interesting initiatives in developing regions such as Asia and Latin America. The Asia region in particular is seeing broadband services via satellite playing an increasingly important role in bridging its large digital divide. But growth in demand remains low, although service offerings are increasing. The stakeholders involved see high market potential, because a large volume of the population is not reached by terrestrial networks. But they also face the challenge of reaching these underserved market niches.

### From smart solutions to smart city societies

The on-going development of smart cities can be seen as a continuous process, in which new techniques are constantly being implemented. For example, carbon-heavy options are being replaced by more environmentally friendly techniques, and waste and pollution are being recycled as energy. But municipal utilities have different priorities and challenges from those of

their investor-owned counterparts. Today, all over the world, rapid urbanization is putting enormous stress on city resources and infrastructure. Many major cities are nearing the point at which they could easily become overwhelmed by crime, congestion, and the responsibility of ensuring public health and safety.

Thousands of smart city projects are under way worldwide, but hurdles such as technology, financing, policy and consumer engagement remain. The question that needs a quick answer is how to lower these barriers through education and outreach. A road map is needed to show the most effective way of moving forward.

Creating a smart city society requires a coordinated ecosystem to be put in place. As cities become smarter, the amount of data the city produces grows exponentially. Information is constantly being generated from traffic lights, sensors, meters, computers and more. Currently, this information is sent to different locations and organizations. Using advanced analytics programs, utilities have successfully added a level of intelligence and predictive value to this information. What are the lessons learned? What kinds of policies need to be imposed on smart buildings as part of a larger sustainability initiative? How would you build a future city?

### Grids need to get smarter than smart

Smart grids and super grids are prerequisites to the integration of large-scale renewable energy in the future energy system. The success of the transition towards a sustainable energy system depends, to a large extent, on how existing and new energy systems fit together. Smart grid processes, integration and business models depend on advanced ICT infrastructure and technologies, in which smart meters will play a large part. Can today's grids cope with the increasing demands placed upon them? How can next-generation intelligent grids fully support renewable energy, big data and small-scale power generation?

The world is a patchwork of different implementations. There is an urgent need for standards. Municipal utilities expect grid stability and security from next-generation smart grids. What is the future of energy storage and new technologies such as power-to-gas? What is needed in terms of innovation? What business models and regulation are needed?



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**The future of the Internet: big data, big brother, big technology, big telecommunication companies and big governments — or not?**

Technology is progressing exponentially, and what sounded like science fiction only three years ago is now becoming a reality — Google Glass, self-driving cars, predictive search and anticipatory services, ultra-smart electronic agents and voice or gesture controlled devices, digital classrooms and affordable telepresence. The new currency of the global economy is data, and everyone seems to be scrambling to become the next Exxon-Mobil. Whoever controls the digital oil-fields, the pumps,

the pipelines, the refineries and the filling stations is bound to become even more powerful than the oil companies.

The rapidly dawning Internet of Things and the rise of machine-to-machine (M2M) networks will magnify even further every challenge we have encountered up to now — and with increasing power comes increasing responsibility. Add the rapid developments in neuroscience, human-machine interfaces, artificial intelligence, robots and nanotechnology, and we are looking at the most amazing commercial opportunities as well as some quite vexing ethical challenges in the near future. What will happen to the Internet, telecommunications and telemedia, data, privacy and technology, and what scenarios are

we likely to see globally? What strategies do we need to adopt to make sure that the new digital ecosystem puts human benefits first?

**Connections, art, technology and society**

Technology increasingly affects every aspect of human life, leading to a convergence of disciplines with a massive potential impact upon society. Art, science and technology are no longer discrete fields. Having always been an explorer, the artist is now also an engineer, experimenting with new technology, inspiring new realities, liaising between the digital world and the people.

As human interface devices become ever more prevalent, from the touchscreens and body monitors of today to tomorrow's screenless devices and new forms of M2M communications, what moral and ethical questions are raised? How does the loss of boundaries between disciplines, between the expert and the end user, and between the public and the private sphere affect society? How important are cultural, societal and political differences with regard to the role of machines, robots and the digital world in general? Art has the power to hint at what the future of the human to digital relationship will be.

### Smart mobility — connecting, integrating and commercializing transport in a smarter world

Personal mobility is key to the success and prosperity of every country's economy. But growing populations in the world's largest conurbations and increasing volumes of traffic are leading to paralysis. By intelligently and dynamically connecting modes of transport, such as cars or public transport, people can quickly and easily use different mobility models as needed to get where they are going. Integrated offers and new business models will be key to an emerging ecosystem that includes telecommunication companies and automobile vendors and manufacturers, as well as the transport sector and Internet

companies. What are the trends, challenges and success patterns of introducing connected mobility offerings?

### Impact of spectrum options on device availability

Finding spectrum to satisfy the growing demand for mobile data is getting ever more difficult. Timely release of spectrum in the right combination of low- and high-frequency bands is required to achieve national coverage of both urban and rural areas. Policy-makers in many countries are adopting a technology-neutral approach to free up spectrum such as the 900 MHz and 1800 MHz bands for long-term evolution (LTE) deployments, and many regulators are also looking at allocating digital dividend spectrum for mobile broadband.

Although a wide variety of spectrum bands has been approved for LTE, the availability of commercially viable devices depends on the choice of primary bands in different regions of the world. Which are the key LTE bands for Asia and what is the likely availability of spectrum in the region? Adoption of the APT700 MHz band plan represents a major new opportunity for regional and global spectrum harmonization that could deliver the benefits of economies of scale for end-user devices. How does spectrum fragmentation affect device design, availability and the prospects for international roaming? What is the likely time-scale for the 700 MHz band

to be brought widely into use for LTE mobile broadband services?

### Future of broadband

Broadband access is a global success story. Citizens and governments view the digital economy as a driver of growth and development. This means that broadband is now part of the critical national infrastructure. Yet (according to PricewaterhouseCoopers) the telecommunication industry has failed to cover its cost of capital in the past decade. Too many resources are required, for too little value created. There is an infrastructure sustainability crisis.

The race to be first to market with each technology generation has resulted in a fixation on peak bandwidth. However, what is of value is not a supply of bandwidth, but rather fit-for-purpose services that meet user expectations. How can a demand-led industry put broadband back onto a sustainable growth path? What changes to network design, marketing and operations will lead to future success?

### Big data and cities — towards data- driven governance

According to political scientist James C. Scott, one of the central problems of statecraft is to make a society legible — in order to govern, one has to know where things and people are. Since mobile-phone



Getty Images

services, credit cards, and other socio-technical systems are so closely connected to our daily lives, their “digital exhaust” becomes an increasingly valuable resource for observing the processes and interactions of society. In many ways, the repositories associated with big data are like an unlined landfill — filled with the residues and byproducts of unrelated processes.

But there is also a need for citizens to make sense of what is going on around them. The classic democratic obligation to rigorously inform oneself in order to participate in public affairs has become almost impossible to fulfil. Visualization has a role in urban governance, for example in the controversies around waste infrastructure. Accountability technologies encompass citizen-driven practices of distributed data collection, the collective analysis through

visualization of these data, and ultimately their strategic use in the public discourse, in the legal system or in political processes.

### Balancing competition and subsidies in broadband promotion

The positive impacts of broadband for national economies are well known. Governments around the world are focusing on broadband promotion. What is the role of competition, the primary driver of the mobile voice success story? Are the subsidies that are being deployed as elements of the strategies efficient? What is the appropriate balance between infrastructure deployment and stimulation of demand? Lessons can be learned from a range of country experiences, in particular

the possibility of leapfrogging to broadband deployment in countries with low overall connectivity.

### Mobile cloud networks

Innovative services and products over the next decade will be strongly driven by cloud computing technologies. Research on cloud technologies will need to address challenges such as radio access in the cloud, new opportunities for sharing of infrastructure, open source, software-defined networks (SDN), new content delivery networks (CDN), and information-centric networks (ICN). Globally, green requirements, performance and scalability, and their related impacts on policy, regulation and standardization, will also need to be addressed.

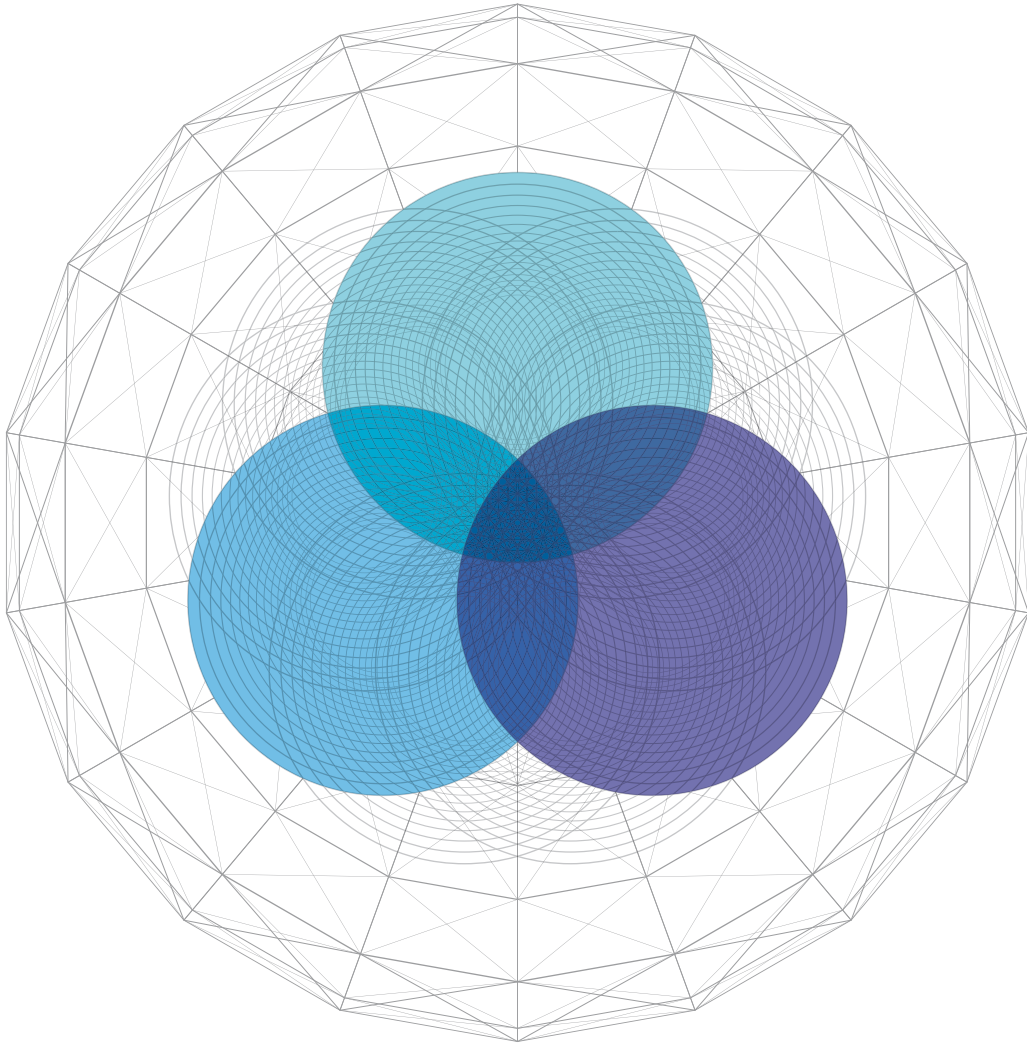
Telecommunication networks need to be prepared for the requirements coming from cloud services, in order to be able to transport information in an effective and efficient way. The cloud concept is being brought into network architectures by introducing virtualization into all signal processing and information storage in the networks, and by replacing current network node functionalities by the service provision concept. Game developers, network operators, OTT content providers and community operators will have a big role to play in these new paradigms. What are we likely to see in terms of innovation, standardization, business models and implementation?

### The spectrum struggle in Asia: technological convergence challenges to the satellite industry

The Asia region offers the biggest market opportunities for most telecommunication stakeholders worldwide, with room for all types of networks and services — fixed, mobile, satellite, and broadcasting. The search is on for new spectrum to provide such services. The satellite sector is fully involved in these discussions, as part of the agenda of the World Radiocommunication Conference in 2015 (WRC-15). How can satellite operators handle the search for new spectrum for their services? At WRC-15, how will they be able to manage the competition from other services for spectrum, in particular in the C, X, Ku and Ka bands?

### 3D printing: boon for global innovation or Napster moment for the manufacturing industry?

The development of 3D printing has already brought us to the cusp of a manufacturing revolution with a profound but as yet uncertain impact on daily life. The prototyping era beginning now is empowering the end user, enabling us to personalize, to tweak design parameters, and potentially to copy any object — from a mobile phone cover to a tennis shoe. How does the process actually work and what materials are currently being used? What are the wider implications for the manufacturing industry, and for ownership and intellectual property versus open source shared knowledge? To what extent can we draw parallels to the music industry and content community, struggling to control distribution and move to access models? 3D printing is here to stay: the critical question is how we embrace this revolution. ■



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### Telecommunication innovation: time to pivot?

The language we use defines the horizons of our imagination. The telecommunication industry places a myopic focus on "coms" in its business model. Now it is time to shift mindsets from the delivery of "coms" to one of enabling "tele". From an innovation perspective, the industry is defining its offering too narrowly as digital engagement over a distance. It must pivot to serve the broader needs of teleconsumers and tele-enterprises alike, engaging in relationships, learning, services and commerce across physical and virtual boundaries.

### Digital dividend

The transition from analogue to digital television (with its higher spectrum efficiency) permits a significant reduction in the amount of spectrum required for terrestrial broadcasting. In response to the exponential traffic growth associated with the use of smartphones, this digital dividend is generally allocated to mobile services.

This major change in spectrum use poses questions for regulators and governments. How can the transition from analogue to digital television be best achieved? How can the reallocation of

spectrum to mobile services be ensured in a timely manner in order to promote broadband access for all? What should be done to benefit from economies of scale in worldwide roaming through the adoption of international spectrum harmonization? How should television white spaces be dealt with during and after the transition to digital television? What are the best ways of using television white spaces to promote broadband for all? International regulations (in particular those that arise from WRC-15 decisions) might be able to assist in addressing these challenges.

### Back to the future: what the digital back-office must deliver

The digital landscape will evolve over the coming years with significant implications for service providers of information technology (IT). What strategies are major service providers pursuing in terms of centralization, virtualized services and cloud? What are the key business models and digital services to watch, and what will these services demand from IT? Where must the industry collaborate if it is to be part of an open, vibrant digital world?

### Spectrum for the future

The pressure on spectrum resulting from the exponential growth of mobile services raises a number of challenges for governments and regulators, who are in charge of managing spectrum. How can the spectrum requirements of government and commercial services be balanced in order to achieve a sustainable use of spectrum? How can the spectrum requirements of licence-exempt services (for example Wi-Fi) and licensed services (such as mobile networks) be balanced to promote the widest development of broadband services at an affordable price? How can the spectrum requirements of terrestrial and space services be balanced? How can the use of more spectrally efficient technologies be promoted without disrupting existing investments? Again, international regulations (in particular those that arise from WRC-15 decisions) are expected to provide some answers to these questions.

### Funding and pricing of next-generation broadband networks

National fibre and LTE networks are being rolled out in a number of areas. In other places, the debate rages as to how such networks should be funded, and how much consumers are prepared to pay for faster broadband services.



### Squeezing spectrum

Continuing penetration of smart mobile devices and applications has squeezed spectrum, and the industry has developed various solutions to alleviate the growing spectrum needs. For example, equipment players are developing new products such as small cells, some operators are pushing for network or spectrum sharing and Wi-Fi offloading, and regulatory bodies are reviewing the use of new spectrum bands. These solutions have regulatory and commercial implications for future network architecture.

### Delivering broadband to rural areas

There are many technologies available to provide rural areas with broadband access to the global ICT network and its services. What are the most appropriate ones to enable rural areas around the world to use the advantages of broadband access in a cost-efficient and reliable way? What are the regulatory and commercial implications of different technology options? How can the potential barriers of spectrum, funding and project management best be addressed?

### Cooperative creation of global standards

The time has come to establish the conditions for true cooperative creation of global standards in telecommunications in order to cope in a timely and efficient manner with the challenges raised by ever faster developments in information and communication technologies and innovative services. What is the most appropriate platform for cooperation to guarantee sustainable functioning of global as well as local telecommunication networks and services?

## Many faces of mobile financial services

Being connected at all times and in all places with practically everybody and everything has many implications in our lives. It makes digitization of our lives possible, practical and profound. It shakes established value chains and moves power from existing players to potential new ones. Financial services are no exception to that trend. To what extent has the ubiquity of communications already changed financial services and the way they are consumed? And what is to be expected in the future?

## Multimedia over multiple media: convergence in broadband access

Operators have been, until now, largely engaged in the incremental improvement of their existing facilities, with systems such as DSL and DOCSIS. Some operators have taken the plunge to deploy an entirely new network (fibre) to achieve greater

access speeds. Several efforts are currently under way to design a new kind of access network that uses fibre and copper or wireless together. It is hoped that this synergistic combination will make true broadband more affordable and accessible.

## Discovering new relevance for ITU in a multistakeholder world — the lessons of WCIT-12

The World Conference on International Telecommunications in 2012 (WCIT-12) reassessed the need for formal international regulation in the midst of the free market forces which had grown up over the preceding 24 years. The outcomes provided some valuable pointers to future opportunities for ITU in moving to the next phase of its evolution in serving its membership and building on its strengths. An important watershed event will be the Plenipotentiary Conference in 2014 where the debate on ITU's new relevance will continue.

## Forum closing conversation

What has been learned about opportunities arising from the transformation of the ICT sector — from the perspectives of technology, business and policy? What are the challenges and potential of new business models in areas such as voice, network virtualization, and data? What new frameworks are there for regulation and standardization, and what new approaches should be taken to spectrum requirements and data privacy? What are the implications of new technologies and smart solutions? ■

The summaries in this section (pages 10–28) are based on the ITU Telecom World 2013 Forum programme available at [http://www.itu.int/online/tlc/WORLD2013/forum/fp?event=wt2013&\\_sort=D](http://www.itu.int/online/tlc/WORLD2013/forum/fp?event=wt2013&_sort=D)

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# Measuring the information society

ITU Deputy Secretary-General, Houlin Zhao, pictured here launching ITU's flagship report Measuring the Information Society 2013 in the presence of high-level representatives from government, industry and the United Nations family, including ambassadors to the United Nations Office and other international organizations in Geneva. Mr Zhao was accompanied by Brahim Sanou, Director of ITU's Telecommunication Development Bureau (BDT) and François Rancy, Director of ITU's Radiocommunication Bureau



# ■ Measuring the information society

## Key findings

### Facts and figures

- ▶ Some 250 million additional people came online in 2012.
- ▶ The Republic of Korea tops ICT ranking for the third year in a row.
- ▶ An estimated 40 per cent of the world will be online by the end of 2013, but 1.1 billion households — 4.4 billion people — remain unconnected.
- ▶ Mobile broadband is now more affordable than fixed broadband.
- ▶ Almost the whole world is now within reach of mobile cellular service.
- ▶ Some 30 per cent of the world's youth are "digital natives".
- ▶ Broadband is getting faster, with 2 Mbit/s now the most popular basic package.
- ▶ Despite economic upturn, capital investment levels of telecommunication operators have not returned to the 2008 peak.



Mobile broadband over smartphones and tablets has become the fastest growing segment of the global ICT market, according to ITU's flagship annual report *Measuring the Information Society*, released on 7 October 2013. New figures from the report show buoyant global demand for information and communication technology products and services, steadily declining prices for both cellular and broadband services, and unprecedented growth in the uptake of third-generation (3G) mobile connections.

ITU Deputy Secretary-General, Houlin Zhao, launched the report during a special event featuring interactive panel discussions with representatives from government, industry and the United Nations family (see photos on page 30).

The report confirms ITU's earlier estimates that by the end of 2013 there will be 6.8 billion mobile-cellular connections worldwide — almost as many as there are people on the planet. The report points out that while ubiquitous availability of mobile-telephone services is undeniable, with close to 100 per cent of the population covered by a mobile signal, not everyone has a mobile phone. From a measurement point of view, the ongoing challenge thus remains to identify those who are still left without access to ICT. An estimated 2.7 billion people will also be using the Internet by the end of this year — though speeds and prices vary widely, both across and within regions.

Mobile broadband connections over 3G and 3G+ networks are growing at an average annual rate of 40 per cent, equating to 2.1 billion mobile-broadband subscriptions and a global penetration rate of almost 30 per cent (see chart). Almost 50 per cent of all people worldwide are now covered by a 3G network.

## ICT Development Index country rankings

ITU's ICT Development Index (IDI), as published in the 2013 edition of *Measuring the Information Society*, ranks 157 countries according to their level of ICT access, use and skills, and compares 2011 and 2012 scores.

The index shows that the Republic of Korea leads the world in terms of overall ICT development for the third year in a row, followed closely by Sweden, Iceland, Denmark, Finland and Norway. The Netherlands, the United Kingdom, Luxembourg and Hong Kong (China) also rank in the top 10, with the United Kingdom moving up from 11th position last year (see table on page 35).

All countries in the IDI top 30 are high-income countries, underlining the strong link between income and ICT progress. Differences between developed and developing countries are large, with IDI values on average twice as high in the developed world compared with developing countries.

The report identifies a group of "most dynamic countries", which have recorded above-average improvements in their IDI rank or value over the past 12 months. These include (in order of most improved): United Arab Emirates, Lebanon, Barbados, Seychelles, Belarus, Costa Rica, Mongolia, Zambia, Australia, Bangladesh, Oman and Zimbabwe. "The 2012 IDI figures show much reason for optimism, with governments clearly prioritizing ICT as a major lever of socio-economic growth, resulting in better access and lower prices," says ITU Secretary-General, Dr Hamadoun I. Touré.

The report also identifies the countries with the lowest IDI levels — the "least connected countries". Home to 2.4 billion people, the least connected countries could derive great benefits from better access to, and use of, ICT areas such as health, education and employment. "Our most pressing challenge is to identify ways to enable those countries which are still struggling to connect their populations to deploy the networks and services that will help lift them out of poverty," comments Dr Touré.

The IDI combines 11 indicators in a single measure that can be used as a benchmarking tool and can help track progress in ICT development over time. It includes such indicators as mobile cellular subscriptions, households with a computer, Internet users, fixed and mobile broadband Internet subscriptions, and basic literacy rates.

## Broadband pricing and affordability

Analysis of trends in broadband pricing in more than 160 countries shows that in the four years between 2008 and 2012 fixed-broadband prices fell by 82 per cent overall, from 115.1 per cent of gross national income per capita in 2008 to 22.1 per cent in 2012.

The average price per unit of speed (Mbit/s) also decreased significantly between 2008 and 2012, with a global median price of USD 19.50 per Mbit/s in 2012, less than a quarter of the price that was being charged in 2008.

The results of comprehensive data collection on prices of four different types of mobile-broadband service show that in developing countries mobile broadband is now more affordable than fixed broadband, but still much less affordable than in developed countries.

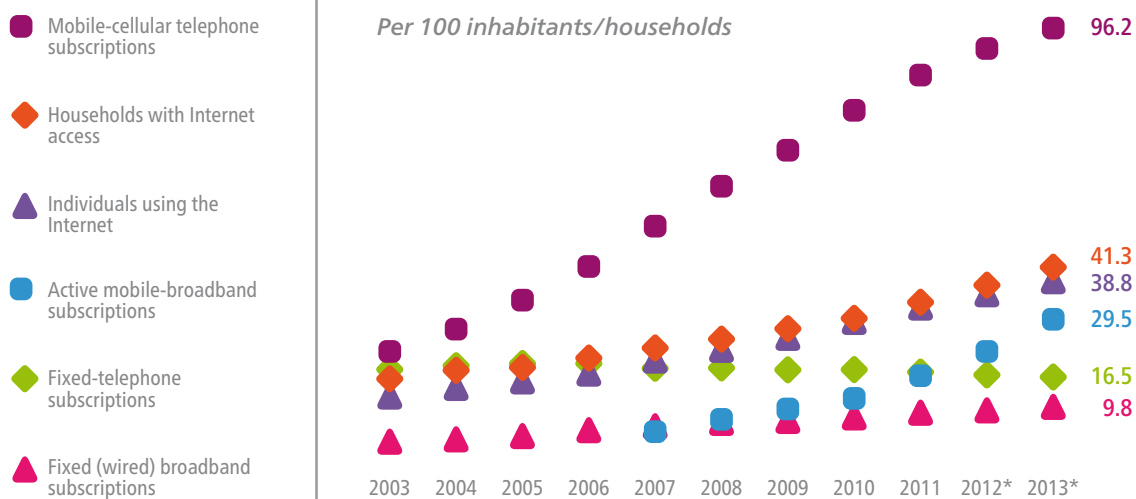
Austria has the world's most affordable mobile broadband, while Sao Tome and Principe, Zimbabwe and the Democratic Republic of the Congo have the least affordable, with service cost equal to or higher than average monthly gross national income per capita. Other countries that rank well for mobile broadband

affordability include Qatar, the United Kingdom, Germany, Kuwait and France.

## Digital natives

A new model developed by ITU for this year's report estimates the size of the digital native population worldwide. The model defines digital natives as networked youth aged 15–24 years with five or more years of online experience, and shows that in 2012 there were around 363 million digital natives. This equates to 5.2 per cent of the total global population, and 30 per cent of the global youth population.

### Global ICT developments, 2003–2013\*



Note: \*Estimates.

Source: ITU World Telecommunication/ICT Indicators database.

Out of a total of 145 million young Internet users in the developed countries, 86.3 per cent are estimated to be digital natives, compared with less than half of the 503 million young Internet users in the developing world. Within the next five years, the digital native population in the developing countries is forecast to more than double. This first-ever global measurement of the number of digital natives is very timely, coming hot on the heels of ITU's Beyond 2015 Global Youth Summit, held in San José, Costa Rica, and which concluded with a declaration presented to the United Nations General Assembly in New York by that country's President Laura Chinchilla.

"Young people are the most enthusiastic adopters and users of ICT. They are the ones who will shape the direction of our industry in the coming decades, and their voices need to be heard," says Mr Sanou.

The report shows that, globally, young people are almost twice as networked as the global population as a whole, with the age gap more pronounced in the developing world.

## Digital divide

At the beginning of 2013 almost 80 per cent of households globally had a television, compared with 41 per cent of households with a computer and 37 per cent with Internet access.

The number of households with Internet access is increasing in all regions, but large differences persist, with penetration rates at the end of this year set to reach almost 80 per cent in the developed world, compared with 28 per cent in the developing world.

An estimated 1.1 billion households worldwide are not yet connected to the Internet, 90 per cent of which are in the developing world. The trend is strongly positive, however, with the proportion of households with Internet access in developing countries increasing from 12 per cent in 2008 to 28 per cent in 2013 — a remarkable 18 per cent compound annual growth rate.

The number of Internet users as a percentage of the population has been growing on average at double-digit rates over the past ten years. The percentage of the population online in the developed world will reach almost 77 per cent by the end of 2013, compared with 31 per cent in the developing world.

## Investment in telecommunications

Telecommunication operators' capital expenditure peaked in 2008, with global investment totalling USD 290 billion, followed by two consecutive years of decline. Despite the upturn in 2011, 2008 investment levels have not yet been restored.

Sluggish investment levels after 2008 are consistent with an overall economic environment of restricted access to capital markets. With the expansion of global operators into new markets, many operators are active in both developing and developed countries. The adverse financial environment in the developed world is likely to jeopardize investments in the developing world.

**Global rankings**  
**ICT Development Index (IDI), 2011 and 2012**

Economy	2012		2011		Economy	2012		2011		Economy	2012		2011		
	Rank	IDI	Rank	IDI		Rank	IDI	Rank	IDI		Rank	IDI	Rank	IDI	
Republic of Korea	1	8.57	1	8.51	Oman	54	5.36	58	4.80	Algeria	106	3.07	105	2.98	
Sweden	2	8.45	2	8.41	Romania	55	5.35	54	5.05	Sri Lanka	107	3.06	107	2.92	
Iceland	3	8.36	4	8.12	Serbia	56	5.34	51	5.38	Botswana	108	3.00	108	2.83	
Denmark	4	8.35	3	8.18	The Former Yugoslav Republic of Macedonia	57	5.19	55	4.93	Namibia	109	2.85	111	2.60	
Finland	5	8.24	5	7.99	Brunei Darussalam	58	5.06	56	4.93	Honduras	110	2.74	109	2.70	
Norway	6	8.13	6	7.97	Malaysia	59	5.04	57	4.81	Cuba	111	2.72	110	2.66	
Netherlands	7	8.00	7	7.85	Costa Rica	60	5.03	65	4.47	Gabon	112	2.61	112	2.46	
United Kingdom	8	7.98	11	7.63	Azerbaijan	61	5.01	60	4.62	Ghana	113	2.60	114	2.30	
Luxembourg	9	7.93	9	7.76	Brazil	62	5.00	62	4.59	Nicaragua	114	2.54	113	2.39	
Hong Kong, China	10	7.92	10	7.66	St. Vincent and the Grenadines	63	4.81	59	4.71	Zimbabwe	115	2.52	119	2.16	
Australia	11	7.90	15	7.54	Seychelles	64	4.75	70	4.36	Kenya	116	2.46	116	2.23	
Japan	12	7.82	8	7.77	Moldova	65	4.74	67	4.46	Swaziland	117	2.44	115	2.27	
Switzerland	13	7.78	12	7.62	Trinidad and Tobago	66	4.73	63	4.54	Bhutan	118	2.40	117	2.19	
Macao, China	14	7.65	13	7.57	Bosnia and Herzegovina	67	4.71	64	4.49	Sudan	119	2.33	118	2.19	
Singapore	15	7.65	14	7.55	Ukraine	68	4.64	69	4.38	Cambodia	120	2.30	121	2.05	
New Zealand	16	7.64	18	7.31	Turkey	69	4.64	66	4.47	India	121	2.21	120	2.13	
United States	17	7.53	16	7.35	Panama	70	4.61	68	4.38	Nigeria	122	2.18	123	1.96	
France	18	7.53	19	7.26	Georgia	71	4.59	73	4.24	Lao P.D.R.	123	2.10	122	1.99	
Germany	19	7.46	17	7.33	Mauritius	72	4.55	74	4.23	Senegal	124	2.02	125	1.88	
Canada	20	7.38	20	7.14	Maldives	73	4.53	71	4.31	Solomon Islands	125	1.97	124	1.91	
Austria	21	7.36	21	7.10	Armenia	74	4.45	75	4.18	Lesotho	126	1.95	126	1.84	
Estonia	22	7.28	25	6.74	Saint Lucia	75	4.43	72	4.28	Yemen	127	1.89	129	1.76	
Ireland	23	7.25	22	7.10	Jordan	76	4.22	77	3.90	Gambia	128	1.88	127	1.79	
Malta	24	7.25	24	6.85	Colombia	77	4.20	78	3.89	Pakistan	129	1.83	128	1.78	
Belgium	25	7.16	23	6.85	China	78	4.18	79	3.86	Uganda	130	1.81	130	1.72	
Israel	26	7.11	26	6.70	Venezuela	79	4.17	76	4.00	Djibouti	131	1.77	131	1.71	
Spain	27	6.89	27	6.65	Albania	80	4.11	80	3.80	Zambia	132	1.77	137	1.64	
Slovenia	28	6.76	28	6.60	Ecuador	81	4.08	83	3.73	Mauritania	133	1.76	133	1.70	
Barbados	29	6.65	36	6.01	Fiji	82	3.99	81	3.79	Myanmar	134	1.74	132	1.70	
Italy	30	6.57	29	6.43	Mexico	83	3.95	82	3.78	Bangladesh	135	1.73	139	1.62	
Qatar	31	6.54	30	6.41	South Africa	84	3.95	85	3.67	Cameroon	136	1.72	136	1.66	
Greece	32	6.45	33	6.21	Mongolia	85	3.92	90	3.59	Côte d'Ivoire	137	1.70	135	1.66	
United Arab Emirates	33	6.41	45	5.68	Egypt	86	3.85	87	3.65	Comoros	138	1.70	134	1.68	
Czech Republic	34	6.40	31	6.30	Suriname	87	3.84	84	3.73	Angola	139	1.68	138	1.63	
Latvia	35	6.36	37	6.00	Viet Nam	88	3.80	86	3.65	Republic of the Congo	140	1.66	140	1.58	
Portugal	36	6.32	35	6.07	Morocco	89	3.79	89	3.59	Rwanda	141	1.66	143	1.54	
Poland	37	6.31	32	6.22	Islamic Republic of Iran	90	3.79	88	3.61	Tanzania	142	1.65	141	1.57	
Croatia	38	6.31	34	6.14	Tunisia	91	3.70	92	3.58	Benin	143	1.60	142	1.57	
Bahrain	39	6.30	42	5.79	Peru	92	3.68	91	3.58	Mali	144	1.54	144	1.43	
Russian Federation	40	6.19	38	5.94	Jamaica	93	3.68	93	3.54	Malawi	145	1.43	145	1.41	
Belarus	41	6.11	46	5.57	Dominican Republic	94	3.58	95	3.36	Liberia	146	1.39	148	1.27	
Hungary	42	6.10	39	5.91	Thailand	95	3.54	94	3.42	Democratic Rep. of the Congo	147	1.31	146	1.30	
Slovakia	43	6.05	40	5.85	Cape Verde	96	3.53	96	3.18	Mozambique	148	1.31	149	1.26	
Lithuania	44	5.88	41	5.79	Indonesia	97	3.43	97	3.14	Madagascar	149	1.28	147	1.28	
Cyprus	45	5.86	43	5.71	Philippines	98	3.34	98	3.14	Guinea-Bissau	150	1.26	152	1.19	
Bulgaria	46	5.83	47	5.50	Plurinational State of Bolivia	99	3.28	102	3.08	Ethiopia	151	1.24	150	1.22	
Uruguay	47	5.76	50	5.38	El Salvador	100	3.25	103	3.06	Guinea	152	1.23	151	1.20	
Kazakhstan	48	5.74	49	5.41	Tonga	101	3.23	101	3.09	Eritrea	153	1.20	153	1.15	
Antigua and Barbuda	49	5.74	44	5.70	Syrian Arab Republic	102	3.22	99	3.13	Burkina Faso	154	1.18	154	1.11	
Saudi Arabia	50	5.69	48	5.46	Paraguay	103	3.21	100	3.10	Chad	155	1.01	156	0.94	
Chile	51	5.46	52	5.08	Uzbekistan	104	3.12	104	3.02	Central African Republic	156	1.00	155	1.00	
Lebanon	52	5.37	61	4.62	Guyana	105	3.08	106	2.96	Niger	157	0.99	157	0.93	
Argentina	53	5.36	53	5.06											



AFP/Image Source

## **■ Online content delivery**

### ***Business models in a converged market***

In today's converged market, a single device can be used to access different types of content (voice, text or video) from multiple sources. Conversely, any particular item of content can be obtained through a variety of devices. At the heart of this convergence is the Internet. What does all this mean in business terms? This article takes the obvious commercial approach of following the money. It is adapted from "Digital broadcasting and online content delivery", a discussion paper written by Gordon Moir and John McInnes, Partner and Senior Associate, respectively, at Webb Henderson LLP, London, for the 13th ITU Global Symposium for Regulators, held in Warsaw, Poland, in July 2013.

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#### **Internet value chain**

The Internet value chain (see chart) includes: content rights, which cover both commercial and user-generated content; over-the-top (OTT) services such as e-mail, voice-over-the-Internet Protocol (VoIP), video-on-demand, gaming and e-commerce; enabling technology services which include web hosting, billing and advertising; connectivity covering both fixed and wireless network providers, Internet service providers, and content delivery network services; and user interfaces

(for example, computers, smartphones and smart televisions).

The different parts of the value chain are now beginning to merge because of increasing consolidation, with players extending their scope. New means of delivering content are being used and new business models are appearing.

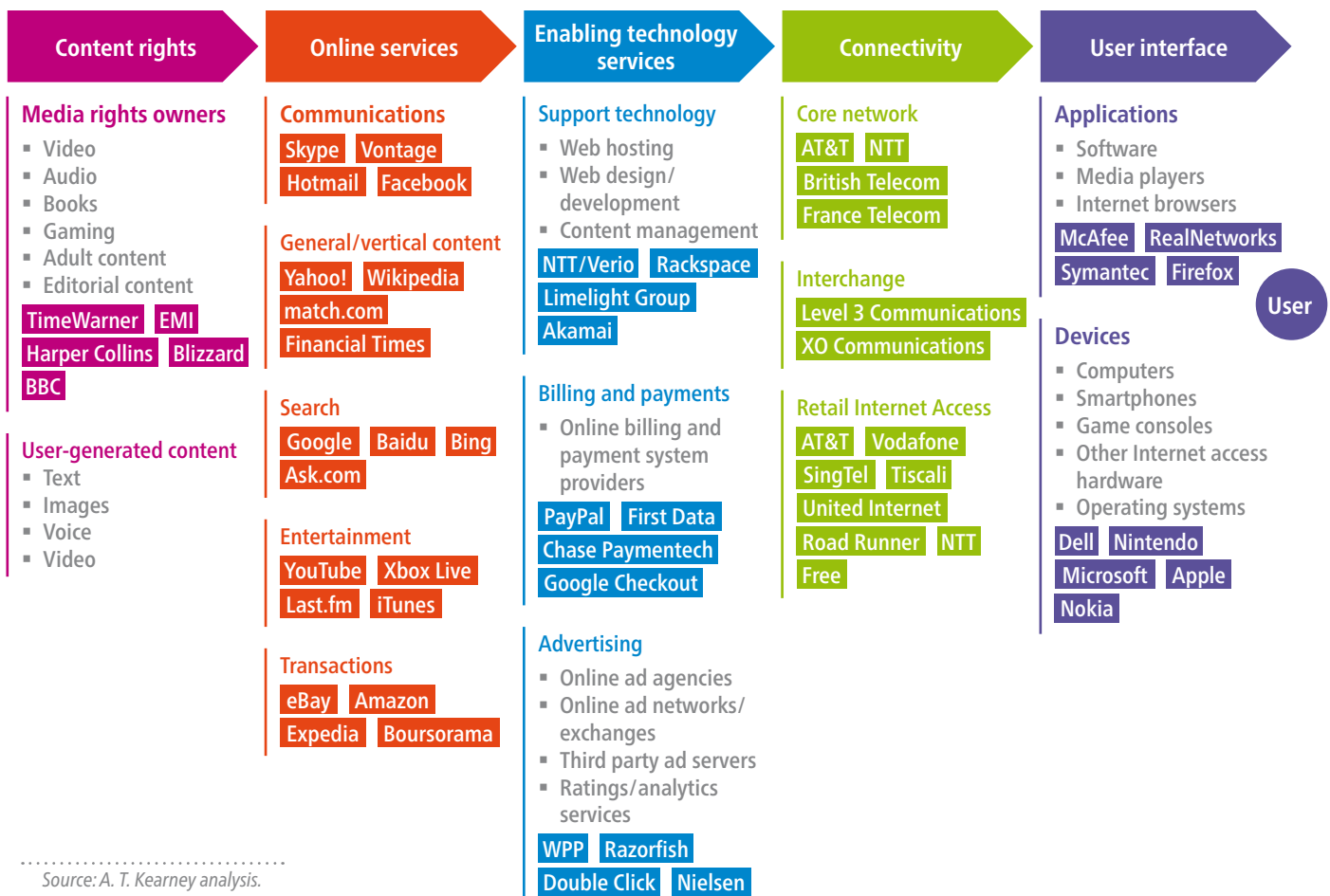
## Main players

Convergence has seen a number of global brands, such as Microsoft, Apple, Amazon and Google, becoming active across various parts of the Internet value chain. Google, in particular, has been at the forefront of this development. From being a search engine, Google's activities

now range from device manufacture, operating systems and cloud storage to e-mail, maps, content distribution and online advertising.

Telecommunication providers are also attempting to diversify into other areas. Examples include the development of Telefónica Digital, BT's ventures into sport

## Overview of the Internet value chain



Source: A. T. Kearney analysis.

content and online television content via YouView, and AT&T and Verizon's multiple play offerings.

Subscription television services offer premium programmes, such as new release movies and live cultural or sporting events. But they face competition from content producers that now offer their products direct to customers over the Internet. For example, several sporting leagues, such as Major League Baseball and the National Basketball Association, offer subscribers the ability to stream live games.

Similarly, content aggregators have started moving up the video supply chain to produce their own content for direct release to their subscribers. A recent example of this was the Netflix production of the hit series *House of Cards*.

Online music streaming services have become increasingly popular, with companies such as Spotify experiencing huge growth. Google has entered this space with GooglePlay. There has also been an increase in user-generated content viewed online as a result of the popularity of services such as YouTube.

Producers of smart television are increasingly bundling sales of their products with access to on-demand programming, such as YouTube and BBC iplayer, as well as Internet access.

## Business models

The key to a business model is its revenue stream. In the converged market of content communication the main sources of revenue are subscriptions and advertising, while strategic partnerships can help to cut costs.

## Subscription-based models

The delivery of digital content via the Internet has changed the nature of subscription-based models, although they retain their customary format of payment of a regular subscription fee in exchange for access to particular content.

Content providers now commonly offer both a free (basic) and a paid (premium) service. The free product is offered in an attempt to attract subscribers. For example, the *Wall Street Journal* provides free access to the video section of its website and non-subscribers are given a quota of free articles each month. Traditional news articles remain subject to a paywall.

Video-on-demand (VoD) providers generally charge users a subscription fee for "all you can eat" access to a content library. For example, Netflix subscribers pay a small monthly fee for unlimited access to its entire video library. Netflix's VoD service can be accessed at any time from multiple

devices. YouTube, the popular online video sharing site, originated as a free service but recently announced the introduction of additional subscription channels where users can pay for access to niche or premium programming. In the United Kingdom, BSkyB has launched a new "pay as you go" model on its Internet television service. End users pay a fee for 24-hour online access to BSkyB's premium sports content.

Netflix provides a successful example of the subscription-based model. The company started by offering a basic DVD-by-mail service and built up a substantial video library that its subscribers could access for a small monthly fee. Netflix now has over 33 million global subscribers and a total revenue of approximately USD 3.6 billion for the 2012 financial year.

In contrast to traditional broadcast and cable television providers, Netflix offers its subscribers unlimited access to premium content that is free from advertisements. Netflix operates with a reduced cost base — online streaming tends to be cheaper than other delivery models and Netflix generally offers delayed access to new content — which has allowed it to rely on subscription fees without the need for advertising revenues. Netflix now acquires original content for its subscription streaming service, the first title being the *House of Cards*.

*Netflix now acquires original content for its subscription streaming service, the first title being the House of Cards*

## Online advertising models

In online advertising models, content is given away to users at no cost, or at only a minimal cost, in an effort to generate web traffic. This traffic is then on-sold to advertisers for a profit. An estimated USD 99 billion was spent in 2012 on Internet advertising.

The most common online advertising models are based on "cost per click" and "pay per view". In the cost per click model, the advertiser pays each time a user clicks on a listing and is redirected to the relevant website. The pay per view model is similar, except that the advertiser pays for each click regardless of whether the user makes it to the target site or not. Another variant, the "cost per action" model, is performance based, with the advertiser paying only when a purchase is made. Google and Facebook are successful examples of the online advertising model.

AdWords is Google's primary online advertising product, netting the company an estimated USD 43.7 billion in 2012. As the leading online search engine, Google offers advertisers advanced user information and the opportunity to provide their target audience with a tailored message. This level of access to consumers allows Google to charge a premium for use of its AdWords product.

Facebook, originally established as a small social networking site in 2004, now has some of the highest traffic volumes on the Internet. The company claimed to surpass one billion users in September 2012 and reported a profit of USD 5.1 billion for the 2012 financial year. Besides its huge user base, what makes Facebook particularly attractive to advertisers is the sheer amount of personal data that the company has access to about its users. Facebook requires all new users to set up an account which entails providing detailed personal data about the user. Following registration, Facebook members are then free to roam the site and to interact with other Facebook users. All of these interactions can be tracked and detailed personal profiles pieced together to give advertisers the ability to directly tailor and pitch their messages to a targeted audience.



## Hybrid models

The hybrid model combines subscription with online advertising. A good example of this can be found in the online music streaming industry where several large players, such as Pandora and Spotify, have emerged to rival the broadcast radio industry. Rather than apply the traditional radio business model, which relied almost exclusively on advertising revenues, online music streaming providers have tended to offer a basic service that is funded by advertisements along with the ability to subscribe to a premium service.

Related business models are also being used in other online content delivery industries. For example, the New York Times has announced that its paywall has been removed for the video section of its website. Users will still be required to pay a subscription to access unlimited new articles (a quota of free viewing has always been available), but access to its video library will now be funded by online advertisements — meaning that it will be free for users.

## Other revenue streams

Other revenue streams include product placement, expanding activities along the Internet value chain, and benefiting from business synergies.

Product placement is the purposeful incorporation of commercial content into non-commercial settings in order to promote a particular product or brand. It is estimated that two-thirds of television viewers attempt to avoid watching advertisements. Because product placements are directly integrated into the programme, they are more difficult to avoid, making them an attractive option for advertisers. Netflix decided to use product placements to subsidize the cost of producing *House of Cards*.

The production, aggregation and distribution of content online can present opportunities for growth in markets along the value chain. For example, network operators and content aggregators are often able to generate new business-to-business revenue streams by providing wholesale content delivery network services to content providers.

Exclusive content deals, where premium content is made available only over certain platforms in exchange for beneficial delivery terms, is a good example of a business synergy. Most set-top-boxes, such as AppleTV and Roku, offer their subscribers access to certain programmes based on the content deals that are in place with content producers. These producers have direct access to viewers at discounted rates and set-top operators are able to increase their offering to attract subscribers. The ability to partner with other businesses can lead to potential cost savings and new sources of revenue.

## Concerns over customer data

Meanwhile, the increasing amount of personal data available to online businesses and the opportunities for using such information, for example through targeted advertising, is raising complex regulatory issues, in particular around privacy and data protection. How to deal with such concerns is likely to be a key focus for regulators in the future.



## ■ Near-field communication mobile payments

Mobile money refers to financial transactions and services that can be carried out using a mobile device such as a mobile phone or tablet. These services may or may not be linked directly to a bank account. Now you can add money to

your mobile, keep all your credit cards and loyalty coupons on it, access your bank account and use it like your ordinary wallet for payments. Mobile money may soon change the way we pay for goods and services.

*Demonstrating how near-field communication (NFC) works with a smartphone. Users of smartphones will soon be able to pay for their bus fare, track their children through school badges, register for medical services, or deposit money on automated teller machines*

This article surveys innovations in the mobile payments landscape and their likely impact on future standardization activities. It is based on “The Mobile Money Revolution: Part 1: NFC Mobile Payments”, a Technology Watch Report published by ITU’s Telecommunication Standardization Sector (ITU-T).

*“The Mobile Money Revolution. Part 1: NFC Mobile Payments” is a Technology Watch report published by ITU-T in May 2013. Technology Watch reports assess new technologies with regard to existing standards inside and outside ITU-T and their likely impact on future standardization. This report, along with other Technology Watch reports, can be found at <http://www.itu.int/techwatch>.*

## Mobile wallet

An electronic account held on a mobile device is known as a “mobile wallet” and may feature deposit accounts, credit accounts, loyalty accounts, merchant accounts, gift cards and coupons.

The mobile wallet is actually a menu on the smartphone. Built-in near-field communication (NFC) wireless technology is one of the ways of enabling payment for goods and services using a mobile device. Google Wallet, for example, works with an NFC-enabled device and is available on major mobile networks in the United States such as T-Mobile, Sprint, AT&T and Virgin Mobile.

Google Wallet has partnered with outlets where consumers can shop and just use their phones to tap payments on point-of-sale devices that are PayPass-enabled. The mobile wallet can also be used to make online payments to partner merchants by accessing the Google Wallet account through a wireless application protocol (WAP) browser. When a user makes a payment using Google Wallet, Google actually pays the merchant and then processes the transaction with the customer’s selected credit or debit card (Visa, MasterCard, American Express, Discover), so neither the merchant nor the phone operating system ever obtains the customer’s payment card information. Google Wallet is PIN protected against fraud, and if the phone is stolen, the customer can remotely manage the Google Wallet to disable the account by logging online.

Credit card companies MasterCard and Visa are also active in this field. MasterCard in August 2012 signed a five-year deal with Everything Everywhere in the European market to develop a co-branded, contactless NFC payments service. MasterCard is partnering with Deutsche Telekom in Germany and elsewhere in Europe, and with Turkcell in Turkey, and has been working with Orange on QuickTap, the first commercial NFC payment service in the United Kingdom.

The ISIS mobile wallet is being promoted by AT&T, T-Mobile and Verizon Wireless. It holds virtual versions of credit and debit cards on the mobile device and can be accessed only via a PIN code. All sensitive data are stored on a chip on the mobile phone. The ISIS mobile wallet was launched in October 2012 in the United States.

Apple’s Passbook is another type of digital wallet designed for storing tickets, coupons, cards or boarding passes on the user’s iPhone. Unlike Google Wallet, it is not used for making payments. Passbook also sends alerts and pop-ups to be readily accessed at the user’s location. For example, in the case of a boarding pass for a flight, if the boarding gate has changed, the system will push the new information to the user’s lock screen. In the United States, Passbook is already being used for digital ticketing. The ticket bought using the iPhone is kept in the Passbook wallet and the user scans the phone to get access.

China UnionPay, owned by banks, is the dominant player in China for NFC mobile payments. Its agreements with 157 banks provide a good basis for its mobile payment services. China UnionPay and China Mobile signed a partnership agreement on mobile payments, promising to collaborate in this field. China’s leading mobile carriers — China Mobile, China Telecom and ChinaUnicom — have each established their own mobile payment subsidiaries. All three have strong mobile subscriber populations, control access to millions of mobile devices, and see mobile payments as an additional revenue stream. E-commerce service providers Alipay, Tenpay and YeePay all have large active user bases and are looking to use the power of smartphones and applications as a way to break into mobile payments.

In the Republic of Korea, SK Telecom and Korea Telecom (KT) are the main players in NFC mobile payments. SK Telecom has partnered with Visa while KT joined with MasterCard to launch NFC mobile payment services. Grand Korea Alliance, which includes mobile network operators, handset manufacturers, card issuers and government agencies, opened an NFC shopping mall in the Myeondong area in Seoul where shoppers can make NFC-based payments at 200 outlets, order drinks, and download coupons.



AFP

In Japan, NTT DOCOMO dominates the mobile contactless payments landscape. NTT DOCOMO and Sony jointly developed the contactless FeliCa (felicity card) chip which is being used to create the iD mobile wallet inside the phone. NTT DOCOMO has also subsidized the installation of readers at the national level and developed strategic partnerships with banks, retailers and merchants. NTT DOCOMO's partnership with MasterCard aims to integrate the iD mobile wallet with MasterCard's Paypass to enable NTT DOCOMO subscribers to make purchases overseas. NTT DOCOMO, KDDI and Softbank have formed the Japan Mobile NFC Consortium to align the country's standards for NFC with international ones.

### Mobile phone as a point of sale

Limited availability of NFC-enabled handsets is hampering widespread consumer adoption of mobile payment. Credit card and technology companies have therefore developed a contactless payment system as a transitional solution until NFC-embedded smartphones are widely introduced.

Square, a mobile payment service introduced by Twitter founder Jack Dorsey, has no elaborate hardware installations. Square offers a free credit card reader and application that connects to your iPhone, iPad or Android device. The Square card reader can simply be plugged into a mobile device's standard 3.5 mm headphone

mini-jack and can be used for swiping credit cards. Square has two main applications, "Pay with Square" and "Square Register". Pay with Square allows customers to view merchant menus, make mobile payments and receive virtual receipts. Square Register is a point of sale software aimed at replacing traditional credit card terminals and cash registers. To buy items, customers just need to provide their name at the check-out. Merchants will know the customer's name because they will see the name and a picture of the customer on their registers, and can accept payments with a simple tap of a button.

In Hungary, a cloud-based service is operated by mobile payments company Cellum in partnership with MasterCard and is handling 1 million transactions per month. Users scan Quick Response (mobile phone readable bar codes) to make payments authenticated with a PIN.

In the Czech Republic, the three mobile network operators partnered with the top four banks to launch a mobile-wallet service called Mobito. Retailers key in the user's mobile number on their point of sale device and users receive a notification which they authenticate with a PIN.

## Security of mobile payments

Mobile payments and mobile money transfers all require secure transactions to protect against eavesdropping or modification of the communication between the device and the server.

M-money transactions (payments via a mobile phone) raise the concern of how to keep information secure if a mobile phone is lost or stolen. Currently, a two-factor authentication is used. Before making any m-payment, the user will typically register the phone — which acts as the

token — with the bank or mobile service provider offering the m-money service (the first factor) and then confirm the payment with a PIN or password (the second factor). Securing the transaction requires a trusted user interface plus either a trusted execution environment or a secure element.

Cloud computing holds the potential to overcome some of the security challenges of m-money, provided that network infrastructure is secure.

## Standardization

Although the way of accepting payments on point of sale terminals from NFC cards or devices has been standardized, the same cannot be said for loyalty points and vouchers. Each NFC point of sale deployment requires adaptation of the software on each payment terminal, and integrating each terminal with the retailer's back-end loyalty scheme and the offers and customer relationship management systems. This is not only time-consuming but costly.

Mobile telecommunication operators have focused on driving the standardized deployment of mobile NFC, using the subscriber identification module (SIM) as the secure element to provide authentication,

security and portability. The Smart Card Alliance is a not-for-profit, multi-industry association working to stimulate the understanding, adoption, use and widespread application of smart card technology.

Work within ITU has already resulted in Recommendation ITU-T Y.2740 on approaches to developing system security for mobile commerce and mobile banking in next-generation networks, Recommendation ITU-T Y.2741 on the general architecture of a security solution for mobile commerce and mobile banking in the context of next-generation networks, and Recommendation ITU-R SM.1896 on frequency ranges for global or regional harmonization of short-range devices.

## Looking ahead

With the rapid adoption and growth in mobile technologies worldwide, mobile money services are being adopted all over the world, albeit in different ways in the developed and developing worlds. Mobile payment processing must be global, and the only way to ensure that processing is uniform is to develop and adopt global standards.



## ■ *Serving the unbanked*

Globally, more than 2.5 billion adults — most of them in developing economies — do not have a formal bank account. Low levels of financial inclusion are a barrier to socio-economic development, so mobile money can be a game changer for the poor.

This article considers innovations driving mobile money transfer applications in developing countries, and how the spread of mobile money is contributing to financial inclusion. The article is based on “The Mobile Money Revolution. Part 2: Financial Inclusion Enabler,” a Technology Watch Report published by ITU’s Telecommunication Standardization Sector (ITU-T).

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*“The Mobile Money Revolution. Part 2: Financial Inclusion Enabler,” is a Technology Watch report published by ITU-T in May 2013. Technology Watch reports assess new technologies with regard to existing standards inside and outside ITU-T and their likely impact on future standardization. This report, along with other Technology Watch reports, can be found at <http://www.itu.int/techwatch>.*

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### **Bank or mobile phone?**

Only 41 per cent of adults in developing countries have a formal bank account. In Africa, just 20 per cent of families have bank accounts. Why? The obvious reason is lack of money. Bank accounts are too expensive, banks are too far away (especially in rural areas), and people lack the right documents to open an account or simply do not trust banks. A growing number of people in remote areas are using innovative alternatives to traditional banking, made possible by the rapid spread of mobile phones

As the World Bank notes, in a large unbanked population, many people operate on a cash only basis. When faced with loss of income as a result of unemployment, or having to pay healthcare costs, people rely on networks of friends and family to provide money. Using informal methods to transfer money is risky and expensive. This, added to poorly developed transport systems, makes mobile money more appealing.

The recent growth of mobile money has allowed millions of people who are otherwise excluded from the formal financial system to transfer money cheaply securely and reliably.

## Success in sub-Saharan Africa

Mobile money has achieved the broadest success in sub-Saharan Africa, where 16 per cent of adults report having used a mobile phone in the past 12 months to pay bills or send or receive money.

The most visible success is in Kenya, where transactions through the mobile banking service “M-PESA” exceed USD 375 million each month and users save up to USD 3 in service charges on each transaction. Users not only send and receive money through M-PESA, but also use the service for savings.

According to GSMA’s annual report, *Mobile Money for the Unbanked 2012*, there were 140 live mobile money transfer

systems in place in low- and middle-income countries, targeting the unbanked.

Remittances and remote payments are the most common uses of mobile money in developing countries. For example, M-PESA, which markets its service as “Send money home”, is used primarily for domestic remittances. In the Philippines, international remittances are more popular, with the service “Smart Padala” enabling overseas workers to send money to their relatives.

Consumers use mobile money where the service adds value, so differences in the rate of adopting mobile money services across markets are driven by what users regard as being of value. For instance, in Bangladesh, people may spend three to four hours travelling to banks and queuing to pay utility bills. Mobile payment is popular because it avoids work time loss.

Along with the technology, a well-developed agent network is essential for mobile money services to achieve scale. As well as providing cash-in and cash-out services, agents build trust for first-time users of formal financial services. The agents receive a commission for the work they do — converting cash into e-money and vice versa.

Governments have started using mobile money transfer services to make salary and pension payments to citizens, and to collect revenues such as taxes. In Afghanistan policemen and other officials are paid their wages via “M-PAISA”, a mobile money service. Tanzania accepts tax

payments through mobile-money services. In countries such as India, mobile money is being used to deliver welfare or social aid payments.

Mobile money has also facilitated emergency responses. In Haiti, for example, following the 2010 earthquake, Voilà partnered with international aid agency Mercy Corps to provide virtual vouchers to victims through a cheap mobile phone loaded with an e-wallet from Indonesia’s PT Telkomsel. Institutions such as the World Bank, GSMA and the Bill and Melinda Gates Foundation have initiated and are funding mobile money programmes for the unbanked.

Mobile money services involve both the telecommunication and financial services sectors. In order to protect consumers, regulators need to establish a level playing field for operators in both of these sectors.

## Mobile money transfers

Mobile money transfers using mobile phones require senders to give the money to a remittance centre and pay a fee. The remittance centre then transfers the money electronically through the phone service provider to the recipient’s phone. In the case of international remittances, the person receiving the money gets a text message advising of the transfer. The recipient can go to any licensed outlet, including a retail store or restaurant, to get the money. The recipient may have to pay a fee to collect the money. In the case of domestic

*Some examples of mobile money applications in emerging economies*

M-money application	Countries implemented	Main features	Technology
<b>M-PESA</b>	Kenya, Tanzania, South Africa and Afghanistan	<ul style="list-style-type: none"> <li>▪ P2P transfers</li> <li>▪ Pay school fees</li> <li>▪ Pay electricity bills</li> <li>▪ Pay for goods and services</li> </ul>	SIM Application Toolkit (STK) Unstructured supplementary service data (USSD)
<b>Easypaisa</b>	Pakistan	<ul style="list-style-type: none"> <li>▪ Pay utility bills</li> <li>▪ Make P2P transfers</li> <li>▪ Increase air time credits</li> <li>▪ Save money</li> <li>▪ Pay for goods and services</li> </ul>	USSD and Internet
<b>T-Cash</b>	Haiti	<ul style="list-style-type: none"> <li>▪ Receive salary</li> <li>▪ Make P2P transfers</li> <li>▪ Pay bills</li> </ul>	USSD
<b>Globe GCash</b>	Philippines	<ul style="list-style-type: none"> <li>▪ Pay utility bills</li> <li>▪ Make P2P transfers</li> <li>▪ Use as a mobile wallet</li> <li>▪ Increase air time credits</li> <li>▪ Pay for goods and services</li> </ul>	Short message service (SMS), STK
<b>Airtel Money</b>	India and 14 African countries including Uganda, Tanzania and Kenya	<ul style="list-style-type: none"> <li>▪ Make P2P transfers</li> <li>▪ Pay for goods and services</li> <li>▪ Bill payments</li> </ul>	USSD
<b>MTN Mobile Money</b>	Africa, including Uganda, Ghana, Cameroon, Côte d'Ivoire, Rwanda and Benin	<ul style="list-style-type: none"> <li>▪ P2P transfers</li> <li>▪ Buy air time</li> <li>▪ Check balances</li> <li>▪ Pay utility bills</li> </ul>	USSD and STK
<b>EKO</b>	India	<ul style="list-style-type: none"> <li>▪ Make P2P transfers</li> <li>▪ Bill payments</li> <li>▪ Loan payments</li> </ul>	USSD
<b>WIZZIT</b>	South Africa	<ul style="list-style-type: none"> <li>▪ P2P transfers</li> <li>▪ Buy air time</li> <li>▪ Check balances</li> <li>▪ View statements</li> <li>▪ Pay electricity</li> </ul>	USSD

remittances, the transfer is handled automatically on the mobile money platform.

The mobile remittance industry is expanding thanks to the increased penetration of mobile phones in remote

regions and the mushrooming of remittance service providers. According to the World Bank's Migration Development Brief, remittance flows to developing countries were estimated to have reached

USD 372 billion in 2011, and are expected to reach USD 467 billion by 2014. India and China rank highest as recipients of migrant remittances, to the tune of USD 64 billion and USD 62 billion respectively.

EKO in India provides financial services to non-banking customers. By connecting the telecommunication infrastructure to the bank's core banking system, it provides a platform for low-cost micro-transactions. EKO hopes to tap a huge potential market in India, where three quarters of the country's 1.25 billion people live on less than USD 2 a day. The Reserve Bank of India recently removed restrictions on agent exclusivity, so customers can now transact at customer service points of one bank even if their accounts are held at another bank. Such interoperability should mean greater efficiency and lower costs across the system.

## Interoperability

Interoperability protects the customer and could be a factor in promoting financial inclusion. But these benefits are hard to achieve because the way interoperability works is complex.

At the technical level, decisions have to be taken on how to handle payment clearing and settlement between the different operators. In a country with just a few mobile payment operators, it might be possible to do this bilaterally or multilaterally. But as the number of operators increases, the relationships between them grow exponentially.

Governments have an important role in facilitating mobile money payments in order to promote financial inclusion. In emerging markets, interbank settlement systems, and often payment switches, are operated by a consortium of local banks which may not have the greatest incentive to see mobile payments take off.

Some countries allow interoperability without making it compulsory, an example being Pakistan's many-to-many model, while others make no provision for it at all. And without being obliged to do so, operators have little incentive to make their services interoperable. Governments wishing to ensure interoperability may have to amend existing regulations.

GSMA's global "Mobile Money for the Unbanked" initiative looks at interoperability of transfers at the level of an international multilateral hub, rather than at local level. Currently, there are bilateral agreements between mobile network operators and other members of the mobile money ecosystem. GSMA's approach aims to replace these with a multilateral agreement. A multilateral model would enable operators to save on costs and resources. Each operator connected to a multilateral hub would then be able to send a remittance to any mobile phone user in the world on any other participating network without any additional negotiation or agreement.

## Security matters

Mobile money transfer applications use various communication channels, some of which are not secure.

Short message service (SMS) is the most commonly used application in mobile money transfers in developing countries for low-value payments because it is simple to use and is compatible with a variety of phones including low-end devices. But SMS is not the ideal platform for making payments because messages travel and are stored on the mobile device in plain text without end-to-end encryption.

Unstructured supplementary service data (USSD) has the advantage of informing the user whether a message has reached the recipient or not. But the message is sent in plain text, as with SMS. South Africa's WIZZIT mobile money transfer service uses USSD.

The SIM Application Toolkit (commonly referred to as STK) is a standard from GSM which has been used since 1998 to secure mobile phone applications, especially for mobile banking and privacy. A passcode or PIN is needed to access the application, and information is encrypted for wireless transfer. M-PESA makes use of STK to secure the application.

Wireless Application Protocol (WAP)-based implementations, commonly used by banks, provide better security, because data are encrypted between the customer and the merchant or bank.



AFP

## Standardization

There are no common technology standards for mobile money transfer. Many different mobile phone devices and client- and server-based technologies are being used. Banks face a challenge in offering mobile banking on any type of device. The end user must be able to transfer money to anyone, even if the recipient is unbanked. But interoperability is becoming tougher with ever more complex banking transactions and the proliferation of smartphone apps for mobile money.

ITU-T Study Group 17 is the lead study group on telecommunication security. Its terms of reference include developing and maintaining security outreach material, coordination of security-related work, and identification of needs and assignment and prioritization of work to encourage timely development of telecommunication security recommendations. ITU-T Study Group 17 could investigate both security and interoperability under a new Question on mobile money security architectures.

## A way forward

ITU could work towards developing a code of practice for regulators (especially in the developing world) with a view to creating a level playing field that will enable stakeholders to engage in mobile money services. As a first step, ITU could establish a Task Force on Mobile Money for Emerging Economies, including stakeholders such as GSMA, the World Bank, and the Bill and Melinda Gates Foundation, to discuss standards, technology for mobile payments, and regulations for mobile money.

ITU could also play an important role in facilitating the standardization of innovations in the area of mobile money in emerging economies, possibly by setting up an ITU-T Focus Group on Mobile Money.



Getty Images

Using the world's first bitcoin automated teller machine (ATM) on 29 October 2013 at Waves Coffee House in Vancouver, British Columbia, Canada. The machine resembles an ordinary ATM and allows users to buy or sell bitcoins, the digital currency of the Internet

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*"The Mobile Money Revolution. Part 2: Financial Inclusion Enabler," is a Technology Watch report published by ITU-T in May 2013. Technology Watch reports assess new technologies with regard to existing standards inside and outside ITU-T and their likely impact on future standardization. This report, along with other Technology Watch reports, can be found at <http://www.itu.int/techwatch>.*

## ■ Bitcoin

### *Mirage or future gold standard?*

Bitcoin is a digital virtual currency that lets you send money to anyone online, anywhere in the world at very low transaction fees. It is created and transacted by cryptography, rather than by financial institutions. And it is not controlled by any bank or government.

Bitcoin was devised by Satoshi Nakamoto (a pseudonym for one or more people) and became operational in 2009. It is based on sophisticated mathematical schemes for encryption and digital signatures to protect against counterfeiting.

All over the world people are now trading hundreds of thousands of dollars' worth of bitcoins every day with no middle man and no credit card companies. A satoshi (0.00000001 bitcoin) is the smallest amount that can be handled in a transaction.

This article looks into the future of bitcoins and is based on "The Mobile Money Revolution. Part 2: Financial Inclusion Enabler," a Technology Watch report published by ITU's Telecommunication Standardization Sector (ITU-T).

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## What is it?

Like gold, bitcoins are “mined” and can be bought on Bitcoin Exchanges. The bitcoin network is made up of users with computers that can generate the currency — the process known as “mining” — by undertaking what The Economist characterizes as “difficult number-crunching tasks”. Bitcoin is created from open-source software.

There were about 11 million bitcoins in circulation in April 2013, and the maximum that can be generated is 21 million. Currently, 25 bitcoins are generated every 10 minutes but the rate of creating them is slowing — roughly halving every four years. Although 99 per cent of all bitcoins will have been created by 2032, it will take until 2140 to reach 100 per cent. The supply of bitcoins closely resembles the supply of gold over time. But as Bloomberg Businessweek points out, “A bitcoin’s not so much a thing as an understanding”.

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## What is it worth?

The value of an individual bitcoin, which was just USD 20 at the beginning of February 2013, hit record highs above USD 250, before falling abruptly to below USD 150 in April.

The enormous rise in value of the currency since its inception is linked to what some economists say is its biggest problem: that the supply increases only at the rate that is coded into the system. This is in contrast to regular paper currency, where supply is managed by a central bank and controlled so that it increases slightly faster than the growth of the economy. This means that the value of the currency falls slightly every year, in the phenomenon known as inflation. A bitcoin economy — like an economy that uses gold as its currency — is deflationary. According to Bloomberg Businessweek, “Bitcoin is a hedge against the entire global currency system”.

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## Secure and safe?

Bitcoin transactions are authenticated cryptographically and cannot be reversed, so there is no need to restrict access to the network. There is no risk in accepting payments from complete strangers, so people do not need anyone’s permission or trust to go into business as a bitcoin-based merchant or financial intermediary. But, as The Economist points out, “The complexity and opacity of the system means that it also appeals to those with more nefarious purposes in mind, such as money laundering or paying for illegal drugs”.

A user must have a bitcoin address, which is a randomly generated string of 27–34 letters and numbers, and which is initially associated with zero bitcoins. People can use the bitcoin address to protect their anonymity when making a transaction, because there is no registry of these addresses. The addresses are kept in bitcoin wallets, which operate like bank accounts. But if the data are lost, the bitcoins are gone too.

A transaction shows both the source and destination address as well as the amount, and is signed by the source address’s private key. All active clients on the network are informed of the transaction.

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## What now?

Security, fraud prevention and regulatory concerns arise in the bitcoin context, and it remains unclear how these will influence people’s views about using a currency that is not backed by a government.

Using bitcoin on a mobile phone is an exciting prospect, and perhaps the standardization of the bitcoin wallet and protocol, as well as bitcoin transactions and mining, would reassure people that bitcoin is as good as gold. ITU–T Study Group 17 could investigate bitcoin security in the future.



## ■ **Location matters**

### *Spatial standards for the Internet of Things*

#### **Getting location anywhere**

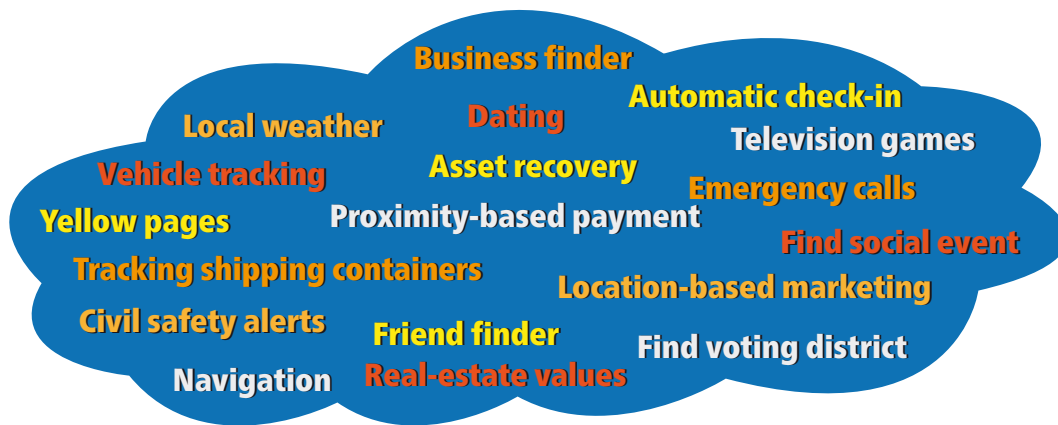
Spatial information — knowing our precise and accurate location — can be useful wherever we are and whatever we are doing. Increasingly, we get our spatial information via the Internet (see chart), and the Internet's connection to the real world depends on open spatial standards.

This article is drawn from *Location matters: Spatial standards for the Internet of Things*, a Technology Watch report published by ITU's Telecommunication

Standardization Sector (ITU-T) in September 2013. The report looks at global efforts to weave different sources and formats of spatial information together so that they can enhance our experience of the natural and built environment. It was written by the Open Geospatial Consortium, in collaboration with ITU. The Open Geospatial Consortium brings together more than 475 companies, government agencies, research organizations and universities to develop open standards for the communication of spatial information.

Today all new smartphones are location-enabled through onboard Global Positioning System (GPS) chips. Mobile devices that can report their location to applications play leading roles in fields as diverse as transport, emergency response, disaster management, environmental sampling, meteorological and oceanographic research, municipal and utility maintenance operations, and location marketing.

*Some of the many location-based service applications delivered via the Internet*



## The need for common standards

Like text, imagery and video, spatial data require their own collections of standards — with different standards for geospatial data referenced to the Earth's surface and engineering data referenced to, for example, a building's engineering coordinate system.

Standards enable communication of spatial data between software systems. When your smartphone responds to your request for a street address, or when a disaster-response centre sends a warning to phones and television sets in the path of a tornado, a stack of standards defined by a variety of standards organizations comes into play.

The spatial standards community is concerned with the consistent encoding of location data and the use of well-defined,

consistent service interfaces for finding, accessing and invoking location-based services and associated data. These standards come into play, for example, when a web browser accepts your waypoints to create a map showing the route you have taken, or when it overlays that map on an Earth image or a three-dimensional contour map.

## Spatial processing complexity

Communicating simple latitude-longitude coordinates is not complex, but computers expect consistency. To ensure interoperability in the service stack, a standard is required. Geography Markup Language (GML) and Open GeoSMS define rules, such as coordinate order (latitude then longitude); whether these numbers are to be expressed as floating-point numbers

or degrees, minutes or seconds; whether coordinates are separated by a comma or a space; and accuracy considerations (see map).

There are many Earth coordinate reference systems in use today. It is therefore critical to specify the coordinate reference systems, for example, the World Geodetic System (WGS) in its latest revision, WGS 84 2d. Improper expression and use of a coordinate reference system can introduce a serious positional error in the coordinate.

GML is part of the interoperability platform that enables a single software program to control and access data from multiple Earth-imaging devices, for example, on satellites. GML is embedded in international encoding standards for domains such as weather, aviation, hydrology, geology, augmented reality, and emergency response.

Open GeoSMS facilitates the communication of location content in short message service (SMS) transmissions. SMS is a feature in every mobile phone — all mobile phones therefore have the potential to communicate location information in a standard way.

Geospatial standards must meet many interoperability requirements beyond defining a way to express a latitude-longitude coordinate. Standards define and provide consistent ways to exchange and process Earth-referenced data that may be encoded using grid cells, vectors, polygons or other methods of representing Earth features and phenomena.

Information products, such as maps provided by map browsers or turn-by-turn directions provided by navigation devices, are the result of complex operations involving diverse spatial databases, analytical engines and display functions. Interoperability is essential because in today's web-services environment these operations are more commonly performed on distributed systems than on a single computer. These distributed systems must interoperate to support complex geospatial value chains.

### Standardization gaps

While GML and related standards give smartphone app developers access to extraordinary geospatial resources, critical gaps remain. One glaring gap is between indoor and outdoor location systems. Users

accustomed to easy and accurate outdoor navigation expect a seamless transition when moving indoors, but as yet there are only limited environments in which this is possible.

Things in the Internet of Things all have location, and usually their locations matter. Where a sensing device is located in a building is highly relevant to applications that use data from that sensor. Access to accurate building information — not just floor plans — is becoming increasingly important. Standards are needed to provide building information, such as the location of devices, throughout a building's lifecycle. Perhaps a majority of the devices in the emerging smart grid will be user-owned devices inside and on top of buildings, rather than utility-owned devices in outdoor electric power transmission and distribution networks.

### Location-based service technologies

Location-based services require three basic kinds of technology and standards: network communication; position determination; and spatial analysis and portrayal. For most location-based service applications, network communication is provided by the wireless communication infrastructure that supports cell phones.

Internet connectivity enables location-based services to take advantage of everything available through the World Wide Web: search, video and videoconferencing,

music, social networking, file sharing, shopping, advertising and more. Phones designed for Internet protocol (smartphones) have opened the door to apps that leverage both Internet-resident resources (the cloud) and the phones' extraordinary processing power, sensors and graphical user interfaces to provide unprecedented capabilities, many of them location-based.

### Disaster management and response

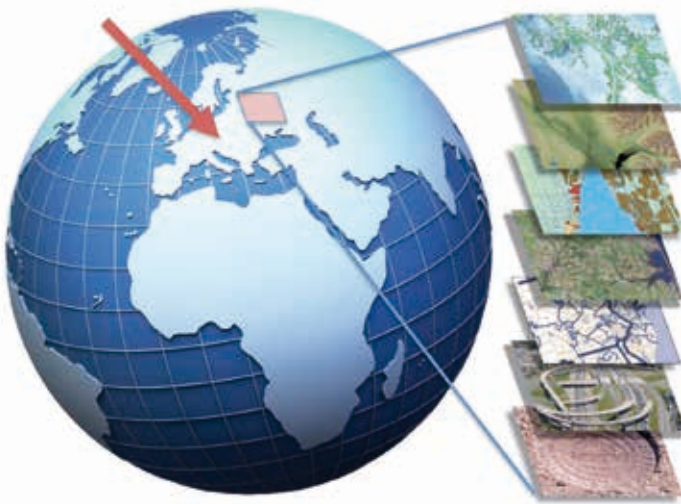
Wireless networks are invaluable in emergencies and disasters, not only because cellular networks are more disaster-resistant than wired networks, but also because timing data collected at the transmitter sites can be used to calculate and report cell phone location, even if people's phones do not have GPS. In recent years, crowdsourcing and volunteered geographic information have emerged as major factors in disaster management.

In the interests of providing more widely accessible disaster-relief location information, a number of volunteer organizations have developed open-source social media, crowdsourcing and user-generated content applications. For example, the Sahana platform for disaster management was created in response to the December 2004 Indian Ocean tsunami that hit several countries including Sri Lanka. The Ushahidi map visualization application for crowdsourcing the collection of crisis information was developed

*Spatial standards are necessarily complex because digital geographic data and processing are complex*

**Simple point location query/response must specify:**

- coordinate order (latitude then longitude)
- floating-point numbers or degrees/minutes/seconds?
- coordinates separated by a comma or a space?
- accuracy considerations
- coordinate reference system (such as WGS 84 2d)



**Other spatial standards are required to:**

- match place name to location
- measure distance and altitude
- image the Earth
- overlay maps
- express spatial relationships
- query spatial databases
- invoke spatial operations
- discover spatial information
- describe curves
- calculate area
- adjust errors
- name geographic features
- search for geospatial features
- protect data rights

to map reports of post-election violence in Kenya in 2007/2008. Sinsai.info, a crisis-mapping site that used the Ushahidi platform in response to the Great East Japan Earthquake, was launched four hours after the earthquake occurred. GeoSMS-enabled software is available for Android and used by Sahana and Ushahidi. It provides for communication between victims and rescue teams and sends location updates to Sahana for relief and rescue coordination.

### Smart infrastructure

Efforts towards smart grid standards have been led primarily by electrical engineers thinking in terms of network topologies — which device is connected to which device — rather than where the devices are located in a city or a building. But the location of these devices often matters. Transport is undoubtedly the domain where industry and consumers make the most use of location-based services. GPS has revolutionized way-finding for drivers worldwide and created a new market niche for transport data and service providers. Corporations and governments

use location-based services to realize significant improvements in logistical efficiencies, maintenance and the tracking of their fleets of vehicles. The field of intelligent transport systems goes beyond the reach of today's GPS services to encompass a range of new capabilities related to traffic safety, reductions in congestion and greenhouse gas emissions, and auto-pilot capabilities for vehicles. In transport, as in other domains, the seamless exchange of geospatial information between platforms and applications requires a coherent framework of geospatial standards.

## Trends to watch in location-based services

The market value of location-based services comes not only from the number of devices that are connected, but also from the number of spatial datasets that can be quickly discovered, accessed and used. The global implementation and use of existing geospatial standards makes a huge amount of spatial data available to applications. The value of an Earth browser such as Google Earth, Bing Maps or WebGL Earth is enhanced significantly if the browser is capable of processing KML (formerly Keyhole Markup Language) data. KML is an encoding standard that enables a user's unique spatial data to be displayed on top of the map provided by an Earth browser.

**Pervasiveness:** The number of people using mobile phones continues to rise, as does the percentage of mobile devices with Internet access and location awareness. The cost of Internet access is decreasing and the percentage of the electromagnetic spectrum allotted to wireless Internet is increasing. Improvements in electronics are expanding the options for efficient use of spectrum through such means as dynamic spectrum access technologies. The relatively new WiMAX-Advanced and LTE-Advanced standards have led to new opportunities in broadband wireless access, building on different widely adopted technologies. The Russian Global Navigation Satellite System (GLONASS) is in operation, and the European Galileo satellite navigation system on the horizon. All of these

## Workshop on Internet of Things Trends and Challenges

*An ITU Workshop on the Internet of Things Trends and Challenges is scheduled to take place at ITU headquarters in Geneva, Switzerland, on 18 February 2014. The workshop is organized in conjunction with several related meetings of the ITU standards groups, such as the Internet of Things Global Standards Initiative on 19–25 February 2014, and the Internet of Things Joint Coordination Activity on 25 February 2014.*

*The workshop will bring together experts from both industry and academia. It will explore the status of various standards initiatives in the area of the Internet of Things and M2M communications both in ITU and in other standards-developing organizations.*

*A particular focus will be on the progress made in the Internet of Things-related standards and protocols development in academia and the open source community.*

*The workshop aims to facilitate the expansion of the Internet of Things worldwide through a better understanding of current trends, including a wide range of standardization work, and the challenges that must be overcome in order to adopt globally accepted standards in this area.*

trends will support continuing growth of location-based services for the foreseeable future.

**Interactivity:** In popular terms, broadband refers to bits per second, and the average number of bits per second available to mobile applications continues its upward trend. Broadband also refers to the number of channels that a connection can support simultaneously, and possibilities for interactivity thus increase in line with the number of channels. Interactivity in a complex location-based service application might involve frequent updates of location data and direction-of-view data, while also providing two remote users with live two-way video and audio. It might also, with the movement of a cursor and click of a button, provide a label on selected buildings in the video stream. The market for location-based services has begun a healthy trend by attracting developers to create highly interactive apps for games, learning environments, environmental models, way-finding, shopping and entertainment.

**Consumer engagement:** In response to consumer demand, 54 per cent of developers working on apps for mobile devices are fitting their apps with location-based and mapping services, according to a survey of more than 400 mobile app developers by Evans Data, an IT industry market research firm. Although some users of location-based services (such as soldiers) are not consumers, and although mobile devices provide many free services, the



Gettyimages

location-based service market is driven largely by consumers.

**Machine-to-machine (M2M) communication:** The falling size, cost and energy requirements of sensors and actuators mean that we can expect to see many new applications using location-based services in which people can remotely adjust settings on a device. One example would be setting a thermostat and then letting the device function autonomously by communicating with another system, in this case a heating and cooling system.

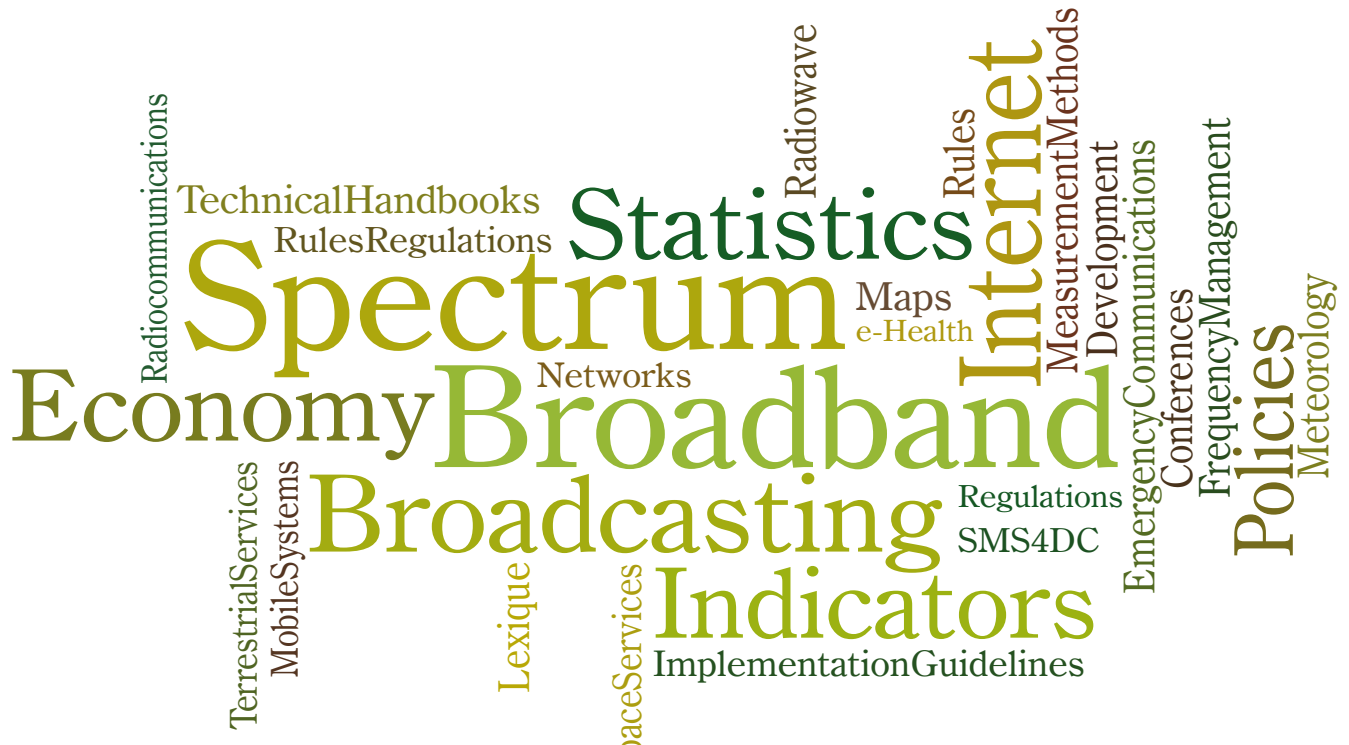
## Standards landscape

Harmonization of how location content is modelled and encoded through the standards stack for location-based services is critical to ensuring interoperability, ease of implementation, and network effects. The Open Geospatial Consortium is collaborating with ITU Telecommunication Standardization Sector (ITU-T) Study Group 11 (Signalling requirements, protocols and test specifications) towards formalizing Open GeoSMS as an international standard (ITU-T Recommendation) before the close of 2013. Open GeoSMS uses short message service (SMS) to exchange location-based information and is valuable in providing relief to individuals affected by natural disasters.

Location is particularly relevant to ITU-T standardization work on the Internet of Things, Web of Things, and Ubiquitous Sensor Network. Location is also of integral importance to M2M communications, which is being tackled by the ITU-T Focus Group on M2M Service Layer.

An efficient framework for location-based service standards will usher in tremendous social, economic and environmental benefits. In the next phase of standards development, emphasis will remain on enhancing cooperation between standards-developing organizations, as well as with governments, industry and academia.

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## **■ m-Powering Development Initiative**

### ***A better tomorrow***

Empowering people through mobile technology is a shortcut to a better future — we call it “m-powering”. Seeking to leverage the ubiquity of mobile technologies beyond basic communications by delivering business, education, health, banking and other services, ITU has launched its m-Powering Development Initiative. “Mobile cellular technologies have reached people in the remotest corners of the world. The time is now ripe to leverage

this phenomenal growth to empower people to meet their goals for sustainable development and shape the future we want”, says ITU Secretary-General Dr Hamadou I. Touré.

Progress in m-Powering will lead to socio-economic development in urban, semi-urban and remote rural areas. ITU’s initiative aims to provide an international, multistakeholder platform to make sure that happens.

Dr Touré has called for partners to join ITU’s m-Powering initiative to help achieve sustainable development, in line with the United Nations Millennium Development Goals and the principles of the information society. The m-Powering Development Initiative is the result of a series of ITU activities aimed at expanding and enhancing telecommunications services, with a focus on the developing world.

Advisory Board members of the m-Powering Development Initiative during their first meeting on 15 October 2013 at the ITU headquarters



ITU/ J. Wood

Mobile technology can act as a catalyst for national, regional and international development, fostering growth and eliminating socio-economic barriers. It can help stimulate economic growth for all nations, thereby contributing to a truly inclusive information society that improves the daily lives of all citizens.

### Advisory Board sets strategy

The first Advisory Board Meeting of the m-Powering Development Initiative took place on 15 October 2013 at ITU headquarters and was opened by ITU Deputy Secretary-General Houlin Zhao. Leaders in the telecommunication community with a track record of making a real difference in the field of m-powering development

have joined the Advisory Board. They include eminent personalities from diverse backgrounds with a range of interests and expertise in the mobile industry.

“The objective of this initiative is to create an ecosystem around mobile technologies that will help bring a human face to ICT”, said Brahima Sanou, Director of ITU’s Telecommunication Development Bureau. Harnessing the capabilities of mobile technology for citizens in the developing world and creating win-win outcomes for all involved is an important task, he said, concluding that “For a better world, a more peaceful world, we must harness the power of mobile communications to empower every global citizen to realize and unleash his or her full potential as a productive human being.”

Under the chairmanship of Dr Sam Pitroda, Founder and Chairman of the Board of Directors, C-SAM and Advisor to the Prime Minister of India on Public Information Infrastructure and Innovations, the Advisory Board will provide strategic direction for the development and implementation of the m-Powering initiative. “The launch of the m-Powering initiative by ITU is very timely and innovative. The initiative has a sense of urgency and provides a unique opportunity for us and other partners to democratize ICT and eradicate poverty across the globe. It is an initiative that has at heart those who are at the bottom of the pyramid”, said Dr Pitroda.

Board members agreed on the importance and timeliness of the m-Powering Development Initiative and on the significant impact that mobile ICT have on the way that people work, interact and live. Recognizing that the pace of industry change, project financing, the ability to scale up pilot projects and the promotion of successful models are critical factors to be considered, the Advisory Board discussed and agreed on the following strategy:

**Creating an ecosystem:** An ecosystem should be put in place to help attain the objective of extending the benefits of ICT to all citizens.

**Setting up a sustainable network:** To make use of information for effective decision-making it is important to reach out to key stakeholders at the right time.

**Converging technologies and services:** Technological convergence and neutrality should be kept in mind so as to ensure inclusive coverage of all viable current and future technologies.

**Considering social, cultural and political dimensions:** In addition to commercial and financial aspects, it is important to consider the social and cultural dimensions and take the political landscape into account.

**Sharing success stories and good examples:** The m-Powering Development Initiative and its Advisory Board could be a platform for the exchange of ideas as well as the sharing of best practices — especially those achieved in difficult areas and under challenging circumstances — to help others replicate and scale up successful solutions.

**Promoting public-private partnerships:** Creating incentives for public-private partnerships could be facilitated and further backed up with an outreach activity.

**Establishing trust:** Ensuring that practitioners such as teachers and doctors understand the opportunities that mobile technology and service delivery offer is a necessary step in achieving development through ICT.

The integration of tools and a regulatory framework can only nourish the ecosystem that the Board desires to establish.

## Platform for action

The Advisory Board will meet twice a year, and its work will not duplicate that of other initiatives. ITU can act as facilitator to bridge the gap between governments, operators and service providers. At the same time, ITU can provide solutions in the field of standardization and interoperability, which will enable the optimum use of frequency resources.

The Advisory Board, which will meet again in the first half of 2014, decided to create the following working groups to survey the landscape and take stock of the activities being carried out in their respective fields: Working Group on m-Health, led by Dr Marie-Paule Kieny, Assistant Director-General of the World Health Organization (WHO); Working Group on m-Education, led by Professor Tim Unwin, Secretary General of the Commonwealth Telecommunications Organisation (CTO); Working Group on m-Sports, led by Iñigo Arenillas, Director of Africa and Middle East, Real Madrid Foundation; Working Group on m-Commerce, led by Evgeny Bondarenko, Vice-Chairman of the ITU Telecommunication Development Sector Study Group 2, and Deputy General Director of Intervale; Working Group on Advocacy, led by Kathryn C. Brown, former Senior Vice President of Verizon Communication Corporation; and Working Group on Business Models, led by Mokhtar Mnakri, Chairman and CEO of Tunisie Télécom.

An Executive Report of the Advisory Board meeting is available at <http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Pages/default.aspx>. Videos and interviews with the Chairmen and Board members are available at <http://www.youtube.com/playlist?list=PLpolPNIF8P2P-kFrTaMkiXoelcbjkk320>

*The frequency and magnitude of natural disasters has substantially increased over the years. These events have serious implications for both developed and developing countries and the lives of their citizens*



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## **Smart Sustainable Development Model Initiative**

### ***Disaster response and social progress***

The frequency and magnitude of natural disasters has substantially increased over the years. These events have serious implications for both developed and developing countries and the lives of their citizens. The poor and the vulnerable are severely weakened, and the impact is even worse for those living in remote and isolated areas with no access to basic information and communication facilities.

Information and communication technologies (ICT) and emergency telecommunications can help alleviate the negative repercussions of disasters and can be used to achieve sustainable development goals and stimulate economic growth.

Emergency telecommunications play an integral part in predicting and detecting disasters, and sending out alerts. There are four main aspects to this process:

mitigation, preparedness, response and recovery. When combined with emergency telecommunications, ICT can act as important tools in these processes. Technological advances can help reduce the impact of natural disasters, loss of life and disruption of national economies, and can help prevent crises from spiralling into disasters that impede sustainable development.

## The initiative

ITU's Smart Sustainable Development Model Initiative aims to create long-term partnership agreements that facilitate the deployment of telecommunication infrastructure for rapid assistance during natural disasters. The idea is to use the same infrastructure both for disaster response and for socio-economic development within regions.

The focus of this initiative is sustainability to meet present and future societal needs. Instead of requiring separate investments for disaster preparedness and social progress, the approach is to optimize the use of new and existing resources both for disaster prevention and management, and for development.

"Leading edge information and communication technologies provide new opportunities to fast track sustainable development. Smart technological solutions can help combat climate change while improving our capacity to respond to natural disasters and, at the same time, provide improved access to basic needs, such as health, education and nutrition," says ITU Secretary-General Dr Hamadoun I. Touré.

The Smart Sustainable Development Model Initiative has three pillars — using ICT for emergencies, for development and for capacity building. The purpose is to establish a link between rural telecommunications and ICT used for general purposes (communications, business, education,

health and banking) and efforts aimed at reducing disaster risk or managing disasters when they occur. Thus ICT infrastructure used to support rural development will also be used for public safety, and an optimal use of technology will be encouraged to avoid duplication.

## Advisory Board holds first meeting

On 18 October 2013, industry and government leaders from the telecommunication sector including satellite operators, policy-makers, regulators and service providers met at the ITU headquarters to form an Advisory Board that will work to promote the Smart Sustainable Development Model Initiative.

Advisory Board members have a range of interests and expertise in emergency telecommunications and sustainable development. They will leverage the transformational power of ICT to push forward innovation and change at all levels. Brahim Sanou, Director of ITU's Telecommunication Development Bureau, reiterated the importance of harnessing the power of ICT, noting that "ITU acts as a facilitator and provides a platform for stakeholders to map strategies that will be transformed into action with the aim of providing socio-economic development and saving lives using modern ICT."

Under the chairmanship of John Nasasira, Uganda's Minister of Information and Communications Technology, the Advisory Board issued a call for action to urgently address the needs of those who are most vulnerable to natural disasters.

"It is both a pleasure and a challenge to chair the Smart Sustainable Development Model Advisory Board, an ITU initiative that links ICT for development with humanitarian work. Through this initiative we will explore ways of unmasking technology and showing the human face behind it in terms of our efforts to deliver socio-economic development through effective disaster management", Mr Nasasira said.

## Objectives and strategies

Advisory Board members identified the main objectives and strategies needed to create an operational sustainable development framework that will mobilize key resources and actors (national and local governments, civil society, business and academia) to incorporate innovative projects that make use of new and existing infrastructure to optimally prepare for, mitigate, prevent and respond to unforeseen disasters. They also identified the following areas as being particularly important: infrastructure; regulation and policy; financing, partnerships and business models; new technologies; and advocacy.

Advisory Board members of the Smart Sustainable Development Model Initiative during their first meeting on 18 October 2013 at the ITU headquarters



The Advisory Board will take two main approaches in order to push the initiative forward. The first is to enhance, scale up or extend the capabilities of existing projects. The second is to devise innovative approaches within the existing framework of the Smart Sustainable Development Model — in other words, to look for alternative ways of meeting the challenging confluences of social, technological, environmental, economic, and political factors and conditions. This approach also seeks to take into account the development of emerging technologies.

### The Board's working groups

In order to move forward in the areas identified as important, the Advisory Board set up the following working groups:

- Working Group on Infrastructure and New Technologies, led by Donna Bethea-Murphy, Vice President of Regulatory Technology, Iridium Satellite.
- Working Group on Policy, Regulation and Advocacy, led by Christian Roisse, Executive Secretary, Eutelsat IGO.

- Working Group on Financing, Partnerships and Business Models, led by Flavien Bachabi, Vice President of Business Operations and Intergovernmental Initiatives, Intelsat.

The Advisory Board will meet again in 2014 to review progress and address strategic issues.

More information on the Smart Sustainable Development Model Initiative is available at <http://www.itu.int/en/ITU-D/Initiatives/SSDM/Pages/default.aspx>. Videos and interviews with the Chairmen and Board members are available at <http://www.youtube.com/playlist?list=PLpolPNIF8P2P-kFrTaMkiXoelcbjkk320>

# Official Visits

During October 2013 courtesy visits were made to ITU Secretary-General Dr Hamadoun I. Touré by the following ministers, ambassadors to the United Nations Office and other international organizations in Geneva, and other important guests.



Dr Hamadoun I. Touré, ITU Secretary-General and His Excellency Sheikh Abdullah Bin Mohammed Bin Saud Al Thani, Chairman of the Board of Directors of Ooredoo (formerly Qtel Group), after signing the Agreement for ITU Telecom World 2014 to be held in Doha, Qatar



Dr Hamadoun I. Touré, ITU Secretary-General and Bahiat Massoundi, Minister of Posts and Telecommunications, Information and Communication Technologies, Transport and Tourism, Comoros

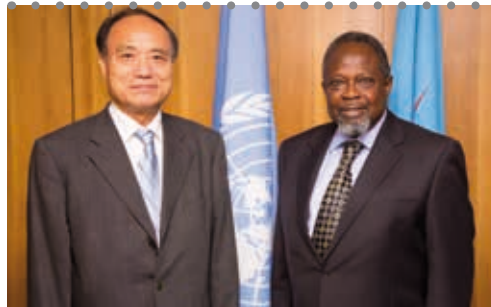


Houlin Zhao, ITU Deputy Secretary-General and Yoon Jong-lok, Vice Minister of Science, ICT and Future Planning, Republic of Korea



Houlin Zhao, ITU Deputy Secretary-General and Fidel Castro Díaz-Balart, Scientific Advisor, Council of State, Cuba

.....  
*All photos are by Ivan Wood/ITU.*



Houlin Zhao, ITU Deputy Secretary-General and Kingston Papie Rhodes, Chairman of the International Civil Service Commission



From left to right: Milan Janković, Director, Republic Agency for Electronic Communications (RATEL); Houlin Zhao, ITU Deputy Secretary-General; Stefan Lazarević, State Secretary, Serbia's Ministry of Foreign and Internal Trade and Telecommunications; and Vladislav Mladenović, Ambassador of Serbia



Houlin Zhao, ITU Deputy Secretary-General (second left) and Mohamad Benrasali (third from left), then Deputy Minister of Communications and Informatics, Libya, with his delegation

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*All photos are by Ivan Wood/ITU.*

## Tells you what's happening in telecommunications around the world

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