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Irina Bokova,
Director-General, UNESCO, &
Vice-chair, Broadband Commission for Digital Development

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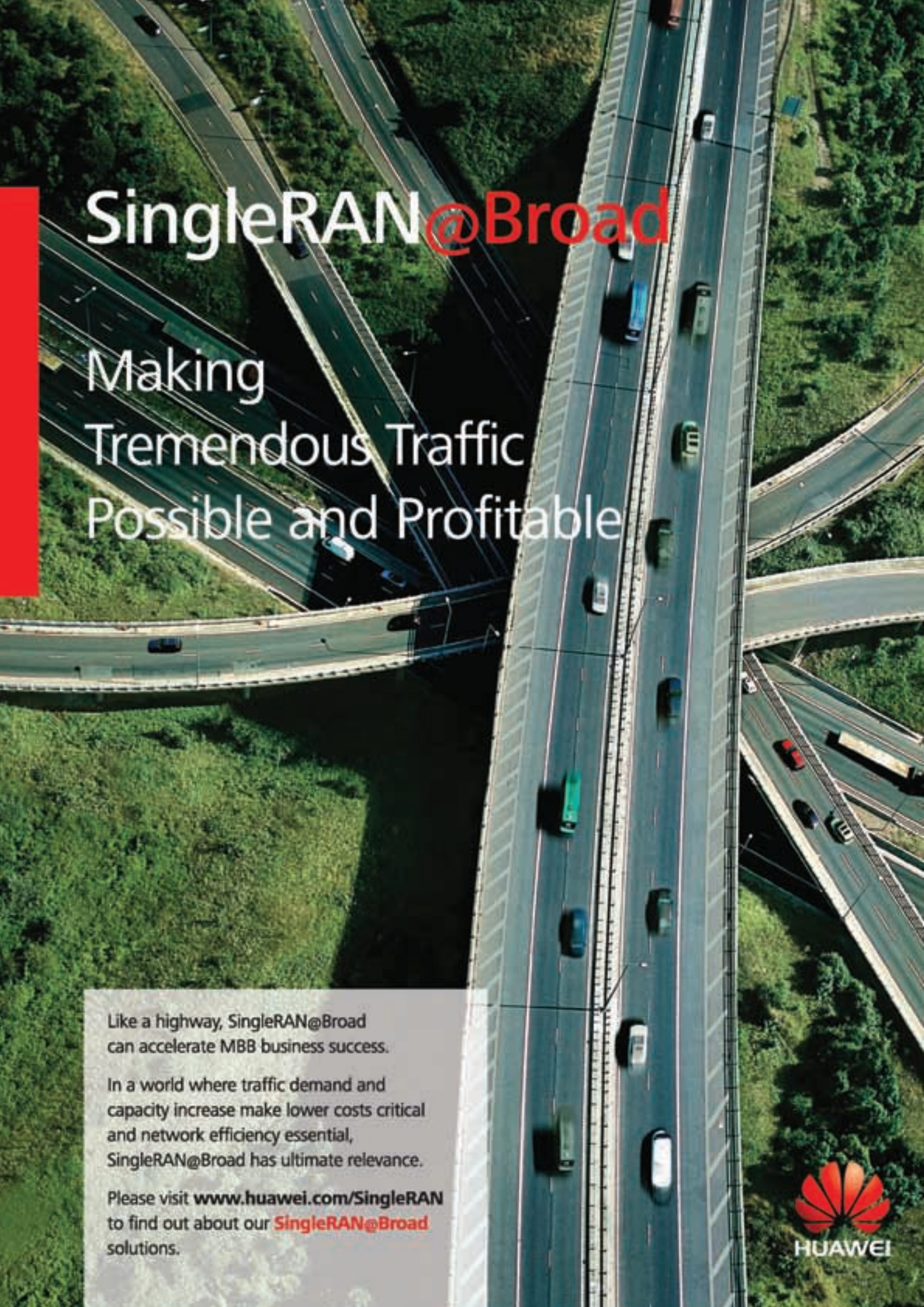
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Connections

We are moving towards an era when everything and everyone is connected at all times. The value of a network expands exponentially as the number of users increases - but so does the traffic, the power consumption and at times its vulnerability. Network growth involves a wide variety of hardware, software and financial planning and practical considerations. There are also profound economic and social consequences to a highly - pervasively - interconnected world.

Connect-World Global Visionaries, Global Visions 2010 examines the not only the astounding impact of the Internet's growth upon the world's peoples, but also the concerted efforts of international institutions, governments and leading sector players to ensure the continued, socially responsible, socially responsive, orderly and productive advance of this history making phenomenon.

For each issue of *Connect-World Global Visionaries, Global Visions*, we invite leaders of government, industry and social institutions from around the world to share their visions. This year we have called upon an outstanding list of leaders to help us understand how connectivity can help people and societies create a better world.
The theme of *Connect-World Global Visionaries, Global Visions 2010* is - *When everything connects*.

Fredric J. Morris,
Editor-in-Chief,
Connect-World

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The vision of broadband for all

by Irina Bokova, Director-General of UNESCO

The Broadband Commission for Digital Development, launched by ITU and UNESCO, seeks to define strategies for accelerating broadband roll-out worldwide and to find applications - a wide range of social services, from healthcare to education, environmental management, safety and more - that could be more effectively delivered using broadband. The Commission's mission is to help ensure that strategic broadband deployment occurs and serves the United Nation's wider mission of furthering "social progress and better standards of life in larger freedom".

Irina Bokova is the Director-General of UNESCO, elected for four years, was Ambassador of the Republic of Bulgaria to France and Monaco, Personal Representative of the Bulgarian President to the Organisation Internationale de la Francophonie and Permanent Delegate to UNESCO from 2005 to 2009. During her long and distinguished career, she also served as Bulgaria's representative to the United Nations and as her country's Secretary of State for European integration and Foreign Minister. Ms Bokova has long promoted the transition to European integration. As Founder and Chairperson of the European Policy Forum, she worked to overcome divisions in Europe and promote the values of dialogue, diversity, human dignity and rights.

Irina Bokova obtained an MBA from the Moscow State Institute of International Relations and studied at the universities of Maryland and Harvard in the USA.

In the ten years since the adoption of the Millennium Development Goals agenda, the number of Internet users worldwide has increased from 400 million to 1.8 billion. The time has come to build on this encouraging trend by realizing the vision of broadband for all so as to unleash the opportunities for economic growth, educational development, health provision, environmental sustainability and social empowerment offered by high-speed Internet access. However, enlightened political leadership will be required if, as proposed by the International Telecommunication Union (*ITU*), at least half of the world's population is to have access to broadband content and communication by 2015.

The Broadband Commission for Digital Development was launched by ITU and UNESCO at the World Summit on the Information Society Forum 2010 in Geneva on 10 May last. The Commission is co-chaired by H.E. President Paul Kagame of Rwanda and Mr Carlos Slim Hélu, honorary lifetime chairman of Grupo Carso; ITU Secretary-General Dr Hamadoun Touré and I as Director-General of UNESCO will serve as joint vice-chairs; and the membership is composed of 52 high-level Commissioners from around the world including eminent Ministers, industry leaders, cultural icons and experts. The aim of the Commission is to define strategies for accelerating broadband roll-out worldwide and to examine applications that could see broadband networks improve the delivery of a wide range of social services, from healthcare to education, environmental management, safety and much more.

The Broadband Commission has come into being at a crucial point in time. It is clear to all that broadband technology complemented by relevant applications and content is a driver of development, one with the potential to transform the lives of the world's poorest people in a multiplicity of ways, as it has revolutionized daily life in the developed world. UNESCO is strongly committed to broadband inclusion for all, believing that strategic deployment of broadband networks will help accelerate the achievement of the

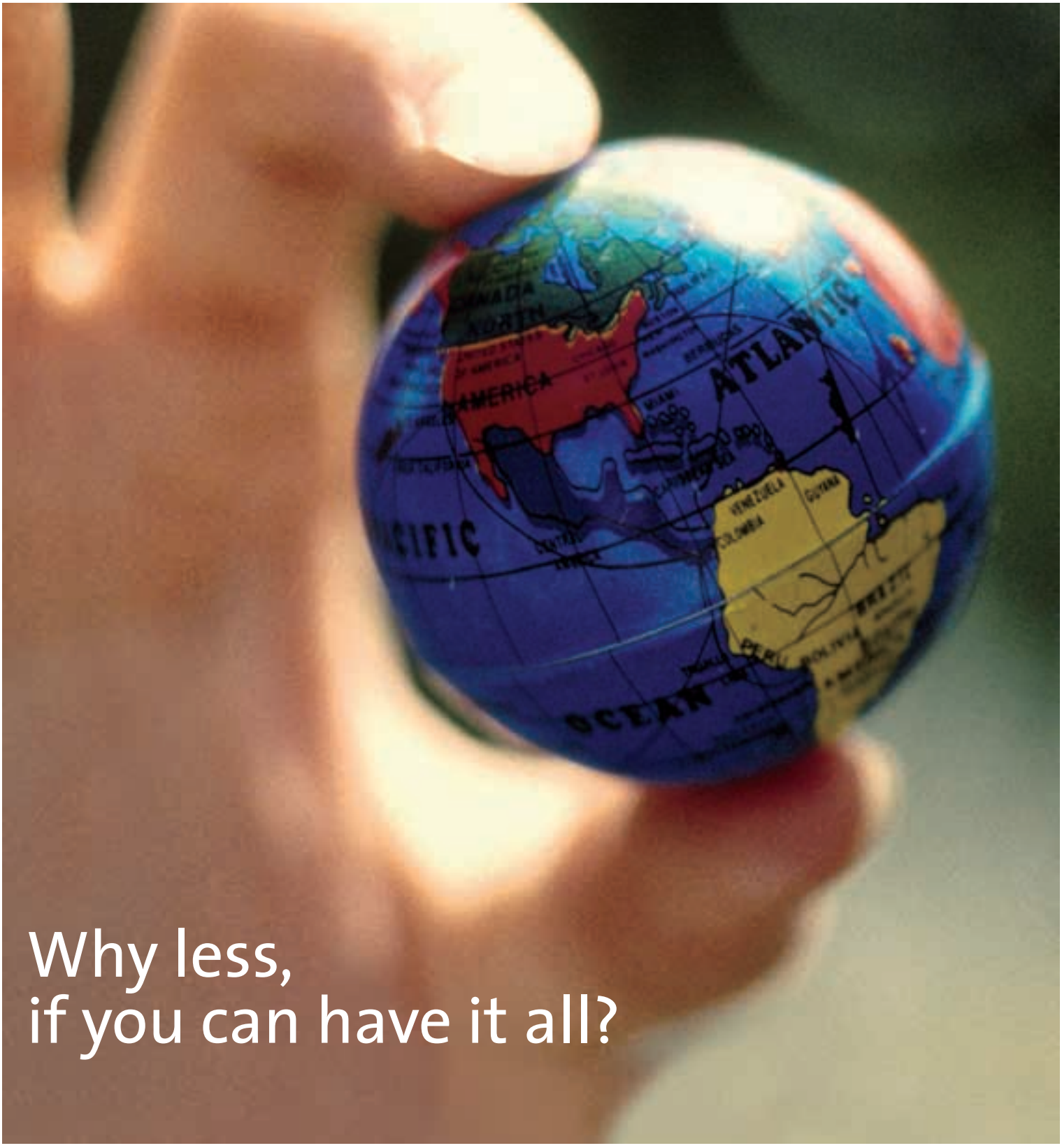
Millennium Development Goals (*MDGs*). However, while broadband infrastructure is crucial, connectivity and content go hand in hand. It is therefore essential that we examine ways to develop local content and applications in order to serve internationally agreed development goals. Promoting access to education, health services, agricultural and environmental information and other crucial information services should thus become an integral part of the strategic deployment of broadband infrastructure.

UNESCO has already launched initiatives to promote access to education through the effective harnessing of information and communication technologies. We are currently developing an Open Educational Resources (*OER*) platform that will provide free and open access by people worldwide to a significant repository of UNESCO's publications. This platform will constitute a unique OER resource since institutions and individuals will have the possibility of adapting, localizing and modifying these resources to suit their own needs. In this connection, UNESCO considers it essential to emphasize the relevance of local content. Local content not only helps preserve and promote linguistic and cultural diversity, but can also be leveraged to develop Internet economies nationally and locally through capacity building in the field of content production, through job creation and through reductions in the cost of access to Internet and broadband infrastructure. UNESCO also has a programme to develop multilingualism in cyberspace through the development of local language content and resources.

The Broadband Commission also endeavours to explore ways in which the deployment of broadband will contribute to the building of inclusive knowledge societies. UNESCO's unique contribution to the World Summit on the Information Society (*WSIS*) has been to emphasize the importance of the human dimension of the Information Society beyond connectivity and infrastructure, to highlight the importance of freedom of expression, education, information literacy, content and multilingualism, as well as to advocate multi-stakeholder approaches throughout the entire process. In keeping with this distinctive focus, UNESCO has argued strongly for the idea of knowledge societies characterized by four key principles: freedom of expression, quality education for all, universal access to information and knowledge, and respect for cultural and linguistic diversity. The concept of knowledge societies was recognized in the 2003 WSIS Declaration of Principles, with its reference to the importance of the creation of a "true knowledge society". Since then UNESCO has been working with its partners to implement this concept across the globe.

The speed of broadband take-off varies greatly between regions, countries and groups within society. UNESCO will propose that the Commission should focus on effective programme creation and resource allocation for priority groups such as girls and women and marginalized populations, as well as for priority regions including Africa, the Least Developed Countries and Small Island Developing States. As 2010 Chair of the United Nations Group on the Information Society, UNESCO will be energetic in coordinating measures by 29 UN agencies to implement the outcomes of the World Summit on the Information Society. It also advocates, as an active participant in the Internet Governance Forum, that the principles of freedom of expression and universal access to information should be central tenets of Internet governance. Finally, in keeping with an agreement signed last December with the Internet Corporation for Assigned Names and Numbers, it is committed to promoting greater linguistic diversity on the Internet by allowing the use of top level domain names in scripts other than Latin.

At the time this issue was going to print, we all have our sights set on the Summit that will be taking place in New York in September 2010 to review progress towards the Millennium Development Goals. I intend to make the point strongly during the MDG Summit that broadband networks, and broadband-enabled applications, have the potential to counteract the negative impact of the crisis and drive progress towards agreed development goals. Equitable and affordable universal access to broadband networks and broadband-enabled services and applications are the key to the delivery of quality education, sharing of scientific information, strengthening of social cohesion and promotion of cultural diversity. The Commission plans to submit its report entitled 'A 2010 Leadership Imperative: Towards a Future Built on Broadband Connectivity and Content" to the United Nations Secretary-General at the 2010 MDG Summit. At the same time, it will provide world leaders gathered at the Summit with "A 2010 Declaration of Broadband Inclusion for All", together with a set of recommendations and a proposed plan of action. I believe that these documents should provide a clear vision and impetus for broadband infrastructure deployment linked to the development of broadband-enabled content, services and applications. The Commission will have fulfilled its purpose if it helps to ensure that broadband deployment is strategic and serves the United Nation's wider mission of furthering "social progress and better standards of life in larger freedom'. ●



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Broadband and the digital divide

by Prof Dr Ali M. Abbasov, Minister of Communications and Information Technologies of the Republic of Azerbaijan

Broadband is the key to bridging the digital divide. There are three interrelated broadband development issues: funding, network neutrality, and affordable access to the Internet backbone. Direct government investment, tax incentives and universal access requirements can provide the funding. The net neutrality issue will require new business models that let telcos profit from rapidly growing P2P, video and cloud-computing traffic. Affordable access calls for local content and services backbones, regional transit networks, regional exchanges and content delivery networks.

Prof. Dr. Ali M. Abbasov is the Minister of Communications and Information Technologies of the Republic of Azerbaijan. Before this assignment he was a Rector of the State University of Economics and a Director of the Information Technologies Institute of the National Academy of Sciences. He is the UNESCO Expert on Information and Telecommunications and a Member of New York Academy of Sciences. He has served as a member of National Parliament and a member of the Parliamentary Assembly of the Council of Europe. He was also President of the Azerbaijan Science and Education Computer Networks Association and coordinator of NATO Science Committee for Azerbaijan.

He attended the Azerbaijan Oil and Chemistry Institute, transferred to the Moscow Energy Institute where he graduated with a specialization automation and tele-mechanics. at post-graduate courses of the He received a post-graduate degree in technical sciences in the field of microelectronics from the Academy of Sciences of Ukraine where he earned the degree of Doctor of Technical Sciences with a thesis on Information Processing and Management Systems. He subsequently was awarded the degree of Professor.

Broadband is becoming a utility, a key infrastructure for participating in global information society. The establishment of the Broadband Commission for Digital Development has become a very significant and valuable milestone for further identification and prioritization of the global broadband agenda in line with MDGs (UN *Millennium Development Goals*). As a Commissioner, I believe that after comprehensive multilateral discussions the Commission will develop a shared and accessible roadmap to encourage further private and public investment into global broadband infrastructure, while developing strategic policy recommendations.

We are at an important historic cross-road, where the global stakeholders make difficult and important decisions on broadband development to ensure continuing innovation, economic freedom, and the bridging of the digital divide. The wider broadband agenda provides a number of policy challenges, including balancing government and private investment, balancing ISP's needs for covering low-income communities, lowering costs of international upstream access and developing local content.

"Global deployment of content delivery networks (*CDN*), data centres, Internet exchanges, proliferation of virtualisation and cloud computing all place a premium on geographic connectivity to decrease the speed of light-related latency. TASIM will take full advantage of the participating country's geographic potential, allowing local businesses to better integrate into the global cloud-computing mesh."

There are three interrelated issues in global broadband development: the funding challenge, the network neutrality argument, and the cost of access to Internet backbone.

Telecom companies are facing the challenge of profitably transitioning to the second generation broadband services. Telcos are concerned that the providers of centralized service and content, virtualization and cloud-computing players will reap the most profits, while they, the telcos, will be relegated to the 'dumb pipe' status. Historically, telcos found it difficult to increase ARPU through increased bandwidth. While telcos can benefit from selling services, they compete with centralized companies that can more easily access the customers via the introduction of second generation broadband. However, the high level of competition in urban developed markets encourages telcos to deploy second generation broadband, and private funding is available. As a result, a new Internet ecosystem of global, regional and local operators, service and content providers, and customers will emerge.

The more difficult challenge is funding broadband deployment in the rural, under-populated areas of the developed world and in many urban areas of the developing world. In the developed countries, a set of government incentives and subsidies should be created to support broadband penetration for underprivileged communities. Innovative economic models should be encouraged, such as advertising-based free broadband services. In the developing world, the key to driving broadband penetration would be a set of government incentives, including direct government investment, tax and tariff incentives, coupled with universal access requirements as part of the service provider operating licence.

The net neutrality issue has been a subject of much debate recently. I believe that the end-to-end principle that has been crucial to rapid Internet development for the past 40 years will continue to play a vital role in encouraging innovation and free competition. New business models that allow telcos to profit from rapidly growing P2P, video and cloud-computing traffic should emerge, while threats such as piracy and spam should be adequately addressed.

Finally, the developing countries face the issue of high Internet upstream costs. Global rollout of broadband means that developing countries need to greatly increase the inbound traffic to stay connected and to access cloud-computing services and media content. The long-term strategy to address this facet of the digital divide problem is to build local content and services backbones. This should be combined with introduction of regional transit networks that will enable regional exchanges and content delivery networks, therefore reducing the upstream load.

One policy initiative that addresses these priorities is the Trans Eurasian Information Super Highway (*TASIM*) initiated by the Republic of Azerbaijan, expected to directly reach more than half of the population of the Eurasian continent. The initiative would promote diversification of the continent's economy, which is currently driven by natural resources, thereby accelerating economic growth by increasing the productivity of non-energy sectors. In December 2009, the creation of TASIM was endorsed by the UN General Assembly resolution A/RES/64/186.

I expect TASIM will also deliver regional macroeconomic benefits by supporting regional economic connectivity and improving regional e-commerce. We expect that the small, underdeveloped countries of the region may choose to employ TASIM as their IP backbone provider to immediately gain high quality, inexpensive, upstream international access and the ability to rapidly deploy local broadband access.

Global deployment of content delivery networks (*CDN*), data centres, Internet exchanges, proliferation of virtualisation and cloud-computing all place a premium on geographic connectivity to decrease the speed of light related latency. TASIM will take full advantage of the participating country's geographic potential, allowing local businesses to better integrate into the global cloud computing mesh.

TASIM will support the regionalisation of traffic, especially by containing P2P and video traffic regionally, thereby reducing the costs of upstream connectivity. Overall, development of local content and resources will improve the peering attractiveness of the region and, accordingly, drive the costs of connecting to IP backbone down.

We are currently working with major regional operators to establish the TASIM Consortium. TASIM will be an operator for operators, primarily addressing regional long-haul IP transit market. We are creating a network architecture that will define how Eurasia, from Eastern Europe to China, connects to the rest of the world. ●

Broadband for all

by Ms Suvi Lindén, Minister of Communications, Finland

Broadband enables sustainable socio-economic development. Today, broadband networks are a basic utility infrastructure - like electricity. In developed countries like Finland as well as in developing countries, the availability of broadband enables the use and development of advanced digital content and services; it plays a crucial role in the development of an information society. The United Nation's Broadband Commission works to promote digital development by creating a bridge between the private sector goals and public sector needs for the benefit of all.

Suvi Lindén is Finland's Minister of Communications; she was previously Minister of Culture. Ms Lindén is a member of the National Coalition Party and has been a Member of Parliament since 1995. In Parliament Ms Lindén has been Chair of the Education and Culture Committee, and Vice Chair of the parliamentary group of the National Coalition Party. She has also been Member of the Speaker's Council, Foreign Affairs Committee, Committee for the Future, Transport and Communications Committee, Environment Committee, and the Finnish Delegation to the Conference of Parliamentarians of the Arctic Region.

Ms Lindén has held positions of trust in a number of organisations. These include positions as Commissioner of the United Nations Broadband Commission for Digital Development, Member of the United Nations Advisory Board of the Digital Health Initiative, Chair of the Ubiquitous Information Society Advisory Board, Member of the Board of the Finnish Cultural Heritage Foundation, Chair of the Vocational Education and Training Board, Chair of the Finnish Cultural Institute for Benelux, and Member of the Oulu City Council, to mention only her more recent duties.

Suvi Lindén holds a Master of Science degree from the University of Oulu.

In the 21st century, broadband networks are basic infrastructure - just like transport or energy networks. The role of ICT and especially that of broadband has become deeply integrated with various aspects of all kinds of economic and social activities. The future will rely on broadband-enabled platforms. Nevertheless broadband infrastructure has been understood as a self-evident truth only in the rich parts of the world. To pave the road for economic growth in developing countries, there has been an enormous need to stress the importance of universal access to Internet and other ICTs. This is where the United Nations Broadband Commission has stepped in.

Good telecommunications access has evolved from a luxury into a necessity. In Finland, citizens require high quality telecommunications access for both work and leisure. We have experienced the first revolution of mobile telephones and Internet access as luxury products and services, but today we face questions of the socio-economic necessity. Consolidating the political will is a key objective in forming a functional and favourable operational environment.

The widespread availability of affordable, high quality and high-speed broadband connections - both fixed and wireless - has been a primary goal of Finnish electronic communications policy for a long time. We have focused on four themes: first, competition within and between all communications networks; second, promoting the provision of electronic services and content; third, stimulating demand for broadband services; and, fourth, continuing special development measures in those areas where there was insufficient demand for the commercial supply of broadband facilities. Availability of broadband connections has enabled the use and development of advanced digital content and services and has thus played a crucial role in the development of Finland's information society.

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For the reasons explained above, the government has readjusted the principles of broadband policy: since July 1st, 2010, a reasonably priced broadband connection has been everyone's legal right in Finland. This means that broadband access has been defined as a basic communications service comparable to telephony or postal services. Last year, the Communications Market Act was amended so that the universal service obligation also included a functional Internet connection. The Finnish Broadband Strategy - coordinated with the regions and municipalities - was regularly reviewed and monitored; it really managed to provide broadband access throughout the country. Our next goal is to make broadband connections of 100Mbit/s widely available for all Finns by 2015. In the remotest areas this will also require public money. The implementation of this ambitious objective started this year.

Thinking in terms of democracy, the greatest benefit that the development of wireless communications can bring society is to ensure basic communication services for everyone. The starting point of a developing country is totally different than it was for us. However, with efficient ICT policy at national and global scale, it is possible to speed up growth and create sustainable prosperity for both, developed and developing countries. The central challenge is to unite industry, government and civil society in an attempt to expand global access to the Internet, and via that, to information, which is essential for participation and competition.

Besides the necessary political will, commitments to growth and to economic development are required to ensure broadband advancement. The Finnish Government is determined that information society policy should continue to be a core element in the pursuit of people's well-being. The government's role in Finland is to facilitate the realisation of benefits from technological development, and to provide a favourable operational environment for businesses. Our aim is to create market conditions and a regulatory environment that will encourage the introduction and use of innovations, new services and new business models. We believe that it is crucial to have effective, flexible, technology-neutral and future-proof communications regulations that pay attention to the rapid change of the technological environment. Citizens and businesses alike should be able to enjoy the benefits of this development, but this development belongs to everyone.

Broadband needs to be regarded as an enabler for sustainable socio-economic development - not as a goal in itself. Our main task in the Broadband Commission is to promote the understanding of the new realities and opportunities for digital development. Working as commissioners, we should encourage the heads of states and governments to give their societies a mandate for further action and to place ICT at the disposal of all the developing countries.

Considering economic growth in terms of communication policy, the opening of competition has had good results in many countries. Well-functioning competition requires fair regulation and strong regulatory bodies. Governments are encouraged to commit to communication and information society policies, which increase the welfare of the users and, at the same time, create a clear and predictable business environment. The benefits of communications markets should be seen in a comprehensive and long-term broadly manner rather than as a means to short-sightedly maximise governments' incomes from the communications companies.

In addition to areas of commercial interest, other means to stimulate broadband, such as public financing, should be considered more systematically. Previous studies have shown that the public-private partnerships are an especially good way to promote the early uptake of broadband services. It is essential to seek new types of partnerships to ensure the widest diffusion of broadband access and service throughout society. Finding new ways to stimulate broadband can also offer alternative incentives for investment. International co-operation in guiding the process in concert with companies and local administration is very much needed. Furthermore, there is a need for investments in technologies that enable innovation and spur economic development in each country. In addition to being the source of innovation, economic growth also depends on the ability of nations to absorb and apply new innovations proved effective elsewhere.

One very concrete thing that developing countries have to think about is the construction of basic network infrastructure. In 2009, the Finnish Government expressed its strong support for joint construction of networks. By simultaneously deploying transport infrastructure, water management networks, electric cables and communications cables, the costs for digging may be divided between network operators. Digging to lay cable can amount to as much as 80 per cent of the overall costs of communications connections.

No one can be left outside the day-to-day functioning of the information society. If the commercial return on investment is too low to recover the costs of improving the telecommunications network, the state, regions, municipalities and, in some cases, the international community, should step in and share the costs. The Broadband Commission will set forth and execute short-, mid- and longer-term objectives in which clear responsibilities and leaderships are defined; bringing together private sector objectives which generally look for commercially viable options, and public sector-led goals that can benefit from commercially driven initiatives. ●

What's the big deal about broadband?

by Ivo Ivanovski, Minister of Information Society, Republic of Macedonia

The Government of Macedonia provided IT free training to anyone that applied. Around 22,000 citizens applied and many went on to obtain Internet services at home, buy their first PC or take private, advanced computer courses. There is a need and a will to develop an information society in developing regions, but where do you start? The United Nations and the Broadband Commission for Digital Development work with national leaders worldwide to help less developed countries find the answers.

Ivo Ivanovski, since 2008, has been the Minister of Information Society, Republic of Macedonia. Mr Ivanovski was appointed by the Prime Minister of the Republic of Macedonia, and elected by the Parliament as a Minister without portfolio (2006-2008); he is responsible for the development of the information society in Macedonia. Previously, Mr Ivanovski was an IT Manager for Plaskolite Incorporated in Columbus, Ohio, one of the world's largest private Plexiglas producers in the world. Mr Ivanovski is on the board of directors of UNGAID and a commissioner of the Broadband Commission for the ITU and UNESCO.

Ivo Ivanovski received his bachelor degree in Computer Science and Engineering from Ohio State University in the USA. He earned his master's degree in computer sciences from Franklin University.

For millions of people around the world, broadband Internet access is a big part of their modern lifestyle. They start their day checking emails, then log-on to a social networking site, upload a few photos, write on friends' walls and view some of their friends' summer vacation pictures. Then they log on to Twitter and add a short line to tell everyone how they feel that day. After they finish these daily responsibilities, they go online again to check if the media stores have the latest and greatest musical album for download. Next, they pay a few bills online and check their bank account balances. They might log-in to their brokerage account online and check the portfolio for possible trades. They might also check the news online and then go to a government site to check their Social Security, Medicare or pension fund status. At the end of the day they get online to play a round of 'Texas hold'em' poker with friends or total strangers, while exchanging chats on how terrible the dealer is and how the odds were in their favour, but the 'river' card (the last card dealt) always plays against them. Unfortunately, this is not the case for two-thirds of the world's population.

"For millions of people around the world, broadband Internet access is big part of their modern lifestyle. They start their day checking emails, then log-on to a social networking site, upload a few photos, write on friends' walls and view some of their friends' summer vacation pictures."

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"The Government of Macedonia had an initiative that provided IT training free of charge for anyone that applied during 2007 and 2008. Around 22,000 citizens applied for basic training in use of the computer, the Internet, basic office applications and email."

According to the latest report of Measuring the Information Society by ITU-D, in 2009 an estimated 26 per cent of the world's population was using the Internet. There are more than 1 billion broadband users around the world, the majority being concentrated in North America and the European Union.

In my country, Macedonia, the latest report by the Agency for Electronic Communication showed that in the first quarter of 2010 41 per cent of the households used broadband Internet - a 28 per cent increase compared to the same period the year before.

Broadband connectivity is becoming a priority for developed and less developed countries alike; all countries understand that broadband can help build their economies, foster the social inclusion of their citizens and minimize the digital divide. However the digital divide is not just among counties; the divide is also found within each country, region, city, and neighbourhood. Undoubtedly, areas connected by broadband have greater opportunities for economic growth, job creation, social inclusion and access to bigger markets.

Information is a priceless commodity, and giving the entire world's people access to information is one of the Broadband Commission for Digital Development's highest priorities. Rapidly changing wired and wireless technologies are opening new opportunities to affordably connect those who are still not connected to the virtual world. The challenge is to stimulate the private sector to invest in rural areas where the market is too small and or costly to provide a sufficient return on the investment.

A World Bank report shows that increasing broadband infrastructure by ten per cent adds 1.3 per cent to the gross domestic product of even highly developed countries.

The existence of infrastructure is a catalyst for the modern information society, but many more parameters must be measured when comparing developed to less-developed countries; these include market environment, political and regulatory environment, individual, business and government readiness as well as the individual, business and government usage.

Part of the role of the commissioners of the Broadband Commission for Digital Development is to provide information to the country leaders, NGOs and the private sector regarding the best practices, policies and strategies for the development of the broadband network that have helped countries throughout the world meet the United Nations Millennium Development Goals.

Creating policy to stimulate the private sector to expand their networks is a good start, but not always enough. Once the infrastructure is there, I believe that educational programmes are necessary to show the population how to obtain endless benefits that the Internet can bring. Even with established educational programmes, the challenge is finding content in the local language. Most of the content on the Internet is in English, which only a fraction of the world's citizens speak. Providing sufficient content for less developed countries will always be a challenge, even after they build the infrastructure.

The Government of Macedonia had an initiative that provided IT training free of charge for anyone that applied during 2007 and 2008. Around 22,000 citizens applied for basic training in use of the computer, the Internet, basic office applications and email. The program was very successful; some citizens, after completing the course, purchased Internet packages for their homes, others purchased their first personal computer, and some continued to take private, more advanced, computer courses. Most of the students were from urban areas where broadband was already present; they just needed to learn about what is out there in the virtual world.

Governments are also investing in online electronic services for their citizens; this eliminates many trips to the local government office and creates an administration that is more transparent, efficient and responsive to citizen needs. Usually, these are investments that less developed countries - which often lack basic infrastructure, electricity and water - find difficult to budget and pay for. eLearning, eHealth, eDemocracy, and eTaxes are just a few of the many projects that can foster the growth of local and national economies. The question - Where do you start? - is what the commissioners of the Broadband Commission help leaders answer in countries which are trying to develop their information society.

The developed countries already have infrastructure, have educational programmes, have plenty of local content, have almost all the eGovernment services that they need and they will continue to develop their information society faster than the less developed countries. This only intensifies the digital divide. If The United Nations and the Broadband Commission for Digital Development are seriously interested in achieving the Millennium Development Goals through ICT, they need to prioritize their investment to help less developed countries leapfrog over a decade of technology and catch up with the others. ●

Government, Internet governance, and the evolution of the Internet

by Magnhild Meltveit Kleppa, Minister, Transport and Communications, Norway

The importance of the Internet has led the world's governments to establish policies regarding Internet governance and the growth and management of the domain name system. The World Summit on the Internet Society (*WSIS*) established the UN Working Group on Internet Governance (*WGIG*) to define Internet governance principles, norms, procedures, and programmes; to preserve open access to the Internet; and to guarantee the security and reliability of the Internet as well as user privacy, the protection of children online and the successful transition to IPv6.

Norway's Transport and Communications Minister, Magnhild Meltveit Kleppa, is responsible for policy related to transport of passengers and goods, telecommunications and postal services. Ms Kleppa previously been Minister of Local government and Regional Development and Minister of Social Affairs.

Ms. Kleppa holds a degree in teaching from Kristiansand College of Education.

The Internet is very different now than it was twenty years ago. The role and importance of the Internet has evolved massively during these years. The effects that the Internet have on our society force governments of all nations to establish policies for how to relate to the Internet. This raises questions regarding how governments should be involved in the future growth of the Internet, how governments should be involved in the management and control of the domain name system, and how the Internet should be governed. These questions lead us to what is known as *Internet governance.*

In the beginning of this century the UN organised the World Summit on the Internet Society. This summit took place in two phases in Geneva 2003 and Tunis 2005 respectively. The UN Working Group on Internet Governance (*WGIG*) was established in order to agree on the future of Internet governance.

In this context WGIG developed a working definition of Internet governance:

> *"Internet governance is the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet."*

In the wake of the WSIS process five Internet Governance Forum (*IGF*) meetings have taken place. At these meetings, Internet governance and public policy issues relevant to Internet governance are discussed in many International organizations and forums.

In 2005 the Internet had one billion users

and thus the challenge of connecting the next billion Internet users was one of the main issues on the agenda at the time. Today the Internet has almost two billion users and we face new possibilities as well as new challenges. The continuing development of network technology, of new ways and types of communications like 'The Internet of Things' and use of smartphones has increased traffic, problems and network complexity. As more and more automated devices and objects are connected to the Internet, the complexity and policy issues also increase. This fact highlights the need to establish proper Internet governance structures.

Internet policy issues

Four key public policy areas relevant to Internet governance were identified by WGIG, in 2005, as:

1) issues related to infrastructure and the management of critical Internet resources;
2) issues relating to the use of the Internet;
3) issues relevant to the Internet, but that also have an impact much wider than the Internet and for which existing organizations are responsible;
4) issues relating to the developmental aspects of Internet governance, in particular capacity-building in developing countries.

These key public policy areas are still of importance today. However, I believe we now see some new challenges for the future of the Internet.

Firstly I would like to draw attention to the importance of an open and accessible global Internet platform. This must be preserved in order to stimulate global participation and economic growth and to enhance the freedom of expression and human rights. Norwegian policy states that it is imperative to ensure and preserve the Internet as an open and non-discriminatory platform for all types of legal and not harmful communication and content distribution. Therefore, Norway participates actively in the Body of European Regulators for Electronic Communications (*BEREC*)'s work on shaping the European policy on Network Neutrality.

Secondly the security and resiliency of the global Internet must continue to be a high priority in all relevant organisations and among all stakeholders. On this issue the Norwegian policy is very much in line with the European Commission's policy, maintaining a strong emphasis on the need for security and stability in the global Internet.

Furthermore we need to enhance privacy for all Internet users. The Internet and new communications platforms will be important in the future development of our societies, so it is important to make the Internet safer, especially for our children. We must ensure the protection of children online; if we fail in this task, we could jeopardize the trust in the Internet as a vital communications platform for years to come.

Finally, I believe that a successful transition to IPv6 Internet addresses and continued professional address space management is important. The IPv4 addresses we have depended upon since the beginning have almost all run out; the conversion to IPv6 will provide the new addresses needed to allow the entrance of new users, especially from the developing countries. This conversion is also important to ensure that innovative Internet applications can emerge. That is why governments must engage actively in the policy development processes for address space management.

Government participation

The fast evolution and growth of the Internet challenge us to not only keep our policies up to date, but also to manage future development. The Internet has become an important factor for the development of our society and it is too vital to be left without governmental involvement. Governments must safeguard the privacy of Internet users and maintain a certain level of security for both private users and enterprises so that the Internet will remain an attractive arena for content and service providers.

The Internet will, of course, continue to evolve with or without Internet governance mechanisms. However, I believe that good and effective governance mechanisms are needed to shape the future evolution of the Internet. We need to ensure that the Internet continues to play a role in improving the quality of life for the citizens of the world and to be a catalyst for the development of commerce, education, social services and everyday life in all the countries in the world. The Internet also has an important role in ensuring freedom of speech, democracy and the protection of human rights for citizens all over the world.

In the past, the development of the Internet encompassed mainly technological and administrative decisions. The success of the Internet has created a new role for the Internet. This implies a more active role for governments in defining models for governance. The agenda from the WSIS meeting in Tunis 2005 focused on the roles of the different stakeholders. Improvements have indeed been made; however we still have to find the right balance between the various stakeholders. In Norway, the private sector takes a lead in operational parts of the Internet; however the government has a responsibility to safeguard its overall functional framework.

Safeguarding public interests

Governments represent their citizens and have a mandate to safeguard the public interest. Therefore governments must participate in and take the lead in defining the public policy issues and in ensuring the public interests.

As stated by WGIG, one of the main public policy issues of Internet governance is to manage critical Internet resources. The Internet Cooperation for Assigned Names and Numbers (*ICANN*) is responsible for the efficient management of the Domain Name System and IP-addresses and Autonomous System numbers. In order to enhance future growth of the Internet, to facilitate economic growth, world participation and development and to ensure that critical Internet resources are managed in accordance with public policy, Norway takes an active part in the Governmental Advisory Committee (*GAC*) of ICANN.

Norway works with Brazil and the Netherlands to establish a hybrid model for a new Secretariat for GAC and aim at a more independent GAC not biased by other stakeholders, but influenced only by the governments participating in the GAC. This will enhance the ability of governments to address the public policy issues and safeguard the public interest in their territories in accordance with the Tunis Agenda.

The way ahead

In my view, we have not yet reached stable global structures of Internet governance, but a better understanding among all the relevant stakeholders for roles and responsibilities has been established. Governments must actively continue to build the foundations of a global Internet governance structure and address the public policy issues. Together with all stakeholders we should aim at establishing the best environment for the Internet and its applications to flourish. ●

When everything connects - the synergy of big science and ICT

by Professor Rolf-Dieter Heuer, Director General of CERN

CERN has long been at the vanguard of ICT. CERN's Tim Berners-Lee invented the World Wide Web to foster scientific collaboration; the Web brought the Internet to the public at large and changed our world. To process the colossal amounts of data generated by the Large Hadron Collider, CERN pioneered 'grid computing' - sharing massive amounts of processing power and data storage at institutes around the world. The Web changed information access and the world. Will the Grid do the same with computing?

Professor Rolf-Dieter Heuer is the Director General of CERN. His five-year mandate at CERN, which began in January 2009, covers the start-up phase of the laboratory's new flagship facility, the Large Hadron Collider (LHC), whose physics research programme got underway in March 2010. Prior to CERN Professor Rolf-Dieter Heuer was the Research Director at DESY, Germany's largest particle physics research centre.

Professor Rolf-Dieter Heuer began his career working at the University of Heidelberg, working on the JADE experiment at the DESY laboratory in Hamburg. He then moved to CERN, where he held a number of key positions, culminating in becoming spokesperson for the OPAL collaboration, one of the laboratory's flagship experiments. He later returned to Hamburg to take up a Professorship at the University until named to the Research Director post at DESY.

Professor Rolf-Dieter Heuer earned a PhD in physics from the University of Heidelberg.

When I first came to CERN in the 1980s, the Laboratory was a regional centre with a 30-year tradition of hosting large international collaborations. It still is today, but the definition of large has evolved. In the 80s, large meant maybe 100 people. Today, it means thousands. It's perhaps this demographic shift that has done more than anything else to propel the science of particle physics into the digital age.

CERN has always been in the vanguard of ICTs. In the 70s and 80s, our computer scientists strove valiantly to equip the lab with networks to replace the manual transport of 6250bpi tapes, and the control systems of our accelerators were computerized. These developments brought a number of developments that were well ahead of their time, like touch screens and trackballs, and it set the scene for Tim Berners-Lee to invent the World Wide Web at CERN at the end of the 80s, when collaboration sizes had grown to several hundreds and a new way of sharing information was needed.

The Web brought the Internet to the public at large, and made it a platform for information exchange. Today, CERN again finds itself at the cutting edge of Internet technology, this time in developing Grid computing. What the Web did for information, the Grid does for computing resources - sharing processing

"To give just one example of an EGEE success story, the Wisdom project has used Grid computing infrastructure to identify molecules that could form the basis of new anti-malarial drugs, cutting down a process that normally takes 15 years to just three. After screening a million potential molecules, 30 were identified for further investigation and are now undergoing testing in the lab."

power and data storage. It's a nice little historical twist that this is precisely what the first computer networks were built for. In the 1960s when computers were large, specialized devices networks were designed to allow people to access them remotely. It was only later with the advent of personal computing, email and, ultimately, the Web, that the Internet became more dominantly used for sharing information.

At CERN, the concept of Grid computing was an obvious choice for data handling and analysis for our current generation of experiments. Today's collaborations involve hundreds of universities and thousands of individual members around the globe. The particle detectors they have built are of enormous complexity, with up to a hundred million readout channels.

The purpose of these detectors is to study high-energy particle collisions that allow researchers to address fundamental questions about our Universe. Some of the phenomena the researchers will address are extremely rare, demanding an extremely high collision rate to maximize the detectors' chances of finding them. All this has led to the construction of a particle accelerator of unprecedented complexity: the Large Hadron Collider, LHC. The LHC collides particles with about seven times more energy than its predecessors, and will reach around a hundred times more intensity in its beams, generating up to 600 million proton-proton collisions per second.

This adds up to a colossal amount of data, and even after filtering the 600-megahertz initial collision rate down to around 200 hertz of data to store, it still equates to some 15 petabytes of data per detector per year. The solution CERN and its partners have put in place is called the Worldwide LHC Computing Grid, *WLCG*, and it federates computing power around several hundred institutes all over the world. CERN is the centre of the WLCG, with about ten per cent of the total CPU capacity and the ability to store all the data. CERN's computer centre is connected to a number of large 'tier 1' computer centres via dedicated 10 gigabit per second optical fibre links, and these in turn connect across the Internet to well over a hundred 'tier 2' centres. To the user, however, it appears as if all this power is on the desktop.

With the LHC running smoothly since March this year, the WLCG is proving itself well up to the task of serving the particle physics community, and it is also playing an increasingly important role in other areas of science. Particle physics is not the only field of research that can benefit from the Grid's distributed computing infrastructure. As a consequence, particle physics is not only at the forefront of this exciting new field, but also finds itself in the spotlight of other sciences, and we're actively working to share our know-how with them.

With support from the European Union, CERN led the Enabling Grids for E-science project (*EGEE*) from 2001 to 2010. EGEE's goal was to build on the Grid infrastructure put in place for the LHC to bring in other sciences, and it has been a resounding success with fields as diverse as drug discovery, detection of breast cancer through mammography, Earth observation and mineral exploration taking part. EGEE's success is underlined by the fact that this activity has been spun-off to a new organization called the European Grid Initiative, www.egi.eu, which will coordinate a federation of national grid infrastructures in Europe for multiple sciences.

To give just one example of an EGEE success story, the Wisdom project has used Grid computing infrastructure to identify molecules that could form the basis of new anti-malarial drugs, cutting down a process that normally takes 15 years to just three. After screening a million potential molecules, 30 were identified for further investigation and are now undergoing testing in the lab.

Shared infrastructure naturally nurtures the kind of interdisciplinarity that EGEE has come to exemplify, and that's something that particle physics is no stranger to. When CERN built a unique low-energy antiproton facility for fundamental physics studies in the 1990s, little did we know that a decade later it would be put to use to explore a novel approach to cancer therapy. And when the laboratory's first large accelerator came on stream in 1959, no one suspected that it would eventually host a collaboration of particle physicists, climate and aerosol scientists making important measurements about the nature and formation of clouds. These are the kinds of serendipitous results that come from openness, shared infrastructures and patience. In the future, similar multi-disciplinary teams and shared computing infrastructure will be necessary to address a spectrum of major societal problems ranging from the supply of essential utilities such as energy and water to population demographics.

Will grid computing find its way into our homes? It's probably too early to say, but it certainly has the potential. If Grids can bring scientific data to scientists around the world, why not to school students or even interested lay people? CERN has already initiated a similar initiative called LHC at home, which allows people to use their PCs to carry out calculations of importance to the LHC. This approach to citizen-based science shows very clearly that there's a very high level of public interest in getting involved and has led to the creation of a new Citizen Cyberscience Centre, hosted in the United Nations Institute for Training and Research (*UNITAR*) offices at CERN. Another way that Grid technology is already being felt in business is through cloud computing which builds on many of the technologies and approaches developed for grids.

In science, we are so used to connections that we use them instinctively. All regions participate; all fields are welcome. The combination of science and ICT naturally promotes serendipity, interdisciplinarity and openness. Taken together, these ingredients add up to progress. ●

Mobile and the connected lifestyle

by Rob Conway, CEO and Member of the Board, GSMA

Mobile broadband is growing wildly; there are now more than 287 million HSPA mobile broadband connections and more than 14 million connections are added each month. By 2013, analysts expect that there will be 72 million users of LTE mobile broadband and smartphones and browser-equipped mobile devices will overtake PCs as the dominant Internet access device. The growth of mobile broadband will be accompanied by rising 'app store' sales of a vast number of new mobile applications and a rise in mobile advertising.

Rob Conway is the CEO and a Member of the Board of the GSMA. Mr Conway was an executive at Motorola, first in its handset group and then as board member of several of their key subsidiaries as well as serving as a CEO. Mr Conway was instrumental in the 1990s introduction of the first GSM deployment in Latin America with the mobile operator in Chile. Mr Conway worked on the creation of operator Mobinil in Egypt and led Motorola's efforts in establishing a mobile operator in Brazil and helped sustain Motorola's mobile operations in Mexico and across the rest of Latin America as well as engagements in Thailand, Vietnam and elsewhere.

In addition to his membership on the Carmel Advisory Board. Mr Conway has participated in numerous industry and governmental panels and workshops in India, China, Singapore, Brazil, US and elsewhere. He is a noted industry speaker who has spoken at many industry events.

The world's population now stands at more than 6.8 billion people. How are all these people connecting, getting their services and information? There are more than a billion fixed lines in the world, but they address only a very small portion of the global population, and many in emerging markets will never have fixed line access. Conversely, there are currently five billion mobile connections, and that number continues to grow dramatically. Just as mobile networks are connecting the world, mobile broadband will connect the world to the Internet, changing the way we work, live and play.

Mobile broadband - building the foundation

The adoption of mobile broadband has vastly exceeded all predictions, and this growth is expected to continue. Mobile broadband is enabling more and more people to connect to the mobile Internet. For instance, according to Wireless Intelligence, at the start of the third quarter of this year, there were more than 287 million HSPA (*High Speed Packet Access*) connections spanning 127 countries globally, and more than 14 million connections were being added each month around the world. At the same time, there were nearly 2,100 HSPA devices, including handsets, smartphones, dongles, notebooks and tablets, available from 175 suppliers.

This momentum is set to continue, as additional HSPA networks are deployed, and operators make the move to LTE (*Long-Term Evolution*). LTE is widely regarded as the de facto mobile broadband technology of the future that will be adopted by the vast majority of mobile operators globally and is expected to experience substantial growth over the next few years. Industry research firm Infonetics Research predicts that the number of global LTE connections will exceed 72 million by 2013.

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However, more important than the technology itself is what mobile broadband enables; it allows users to enjoy services ranging from video and music downloads, Web surfing and social networking, to exchanging slide presentations and transmitting medical scans, all on the go.

Smartphones on the rise

The rapid growth in the mobile broadband market is also fuelling a significant increase in the smartphone market. Smartphones dramatically transform the user experience so that information and content can be more richly delivered, personalised and localised. Research by leading industry analyst firm Gartner underscores the popularity and increasing usage of the mobile Internet. Gartner forecasts that mobile phones will overtake PCs as the dominant Internet access device by 2013. By then, there will be approximately 1.82 billion smartphones and browser-equipped mobile devices, versus 1.78 billion PCs.

The application explosion

As a result of the growing availability of next-generation mobile broadband networks, as well as the penetration of smartphones, we're seeing a tremendous increase in the number and types of applications available to users today. One only needs to look at statistics on Apple and the iPhone to see how this market is exploding. Nearly 60 million iPhones have been sold since its launch in 2007, and Apple sold more than three million iPads in the first 80 days since its introduction. There are more than 225,000 applications from more than 125,000 developers in the Apple App Store, including 11,000 new apps available for the iPad. Overall, users have now downloaded more than five billion apps and five million e-books. To put this in perspective, there were only 500 apps available when the App Store was launched just two years ago!

However, while perhaps the most popular, Apple is not alone. For instance, we saw that Android app downloads have recently surpassed the one billion milestone. Overall, Gartner forecasts that in 2010, worldwide downloads from mobile application stores will exceed 4.5 billion, and will surpass 21.6 billion by 2013. At the same time, worldwide mobile app stores' download revenue, which includes end-user spending on paid-for apps and advertising-sponsored free apps, is expected to grow from US$6.8 billion USD in 2010 to US$29.5 billion USD by the end of 2013. Further, advertising-sponsored mobile apps will generate nearly 25 per cent of mobile application stores' revenue by 2013.

There are other initiatives underway that will serve to accelerate the market for mobile applications. The Wholesale Applications Community (*WAC*), launched in February 2010, is a global alliance formed by leading organisations within the telecoms sector; it is designed to unite a fragmented applications marketplace. Importantly, WAC will simplify application development by giving developers the opportunity to write applications that can be deployed across multiple platforms and multiple operators, and address a potential global market of more than three billion users. Further, it will enable developers to utilise both device and network capabilities to create a richer experience. WAC will also provide greater choice for end users as it enables portability of apps across devices, OS and network operators.

Mobile advertising – an eyeball magnet

Clearly, the market for applications is expanding rapidly. Moreover, it's creating something else that is very important - a magnet for eyeballs. According to a study by Nielsen, the average smartphone user has downloaded an average of 22 apps, with iPhone users downloading an average of 37. App stores provide a significant level of 'stickiness', as users return again and again for updates to their current apps and to purchase new apps. People are also spending more and more time with their favourite apps.

Major brands have recognised this and are getting in on the act, extending their advertising campaigns to the mobile app domain. Brands are focusing on developing apps that are useful to their audience, so users see them for their practical value rather than as blatant advertising. Companies such as Starbucks, The North Face, Nike and Chipotle Grill have all developed apps that provide the user with useful information and capabilities, while extending brand recognition. The growth in apps, combined with the rise of the smartphone, makes mobile very ripe for advertising.

Looking at the numbers for mobile advertising today, one may wonder what all the fuss is about. It has certainly been over-promised in the past, and is currently just a fraction of online ad spending and of ad spending overall. However, this overlooks the trends and significant momentum in mobile advertising. Mobile advertising has evolved dramatically, going beyond the simple offers via SMS text to highly contextualised experiences.

Recent developments attest to how the mobile advertising market is heating up; more than US$1 billion USD has been spent on the acquisition of companies strictly focused on mobile as an advertising medium. In May, Google completed its acquisition of AdMob, and in January, Apple acquired Quattro Wireless, and Opera Software purchased AdMarvel. These acquisitions are already starting to bear fruit; Apple launched its mobile advertising platform, iAd, in April.

One of the main challenges with mobile advertising is that mobile has not defined common metrics to measure value, such as those for print, broadcast and online advertising. However, the mobile industry has made significant strides in this area through the GSMA's Mobile Media Metrics service.

Mobile Media Metrics is based on 'anonymised', census-level data for mobile Internet usage across mobile networks. This data is augmented with demographic data that has been collected with the consent of a representative sample of mobile Internet users. The Mobile Media Metrics service provides a rich, aggregated view of mobile Internet usage behaviour, enabling market-level analysis of site visitation and engagement metrics, such as page views, time spent on specific sites, and device types and features. Finally, for the first time, we have comprehensive insights into mobile media consumption, empowering brands and agencies to plan effective and focused campaigns for the mobile medium.

Making the connected lifestyle a reality

We all know that users want to be able to access all of their services, content and applications whenever they want, wherever they are. We need to create a seamless experience on a mobile device, on a PC or on home entertainment systems, so that users can take their content with them, regardless of time or place. That's the big opportunity – creating a truly connected lifestyle. With the advances in mobile broadband technology, the proliferation of feature-rich smartphones, the creation of innovative new applications and the ability to deliver personalized and contextual user experiences, mobile is making this a reality.

Broadband for global communications

by Walter B. McCormick Jr., President and CEO of the United States Telecom Association

Broadband is a powerful communications tool in great demand as people find it essential to their daily lives. Demand for broadband is driving investment in the communications sector, which has stayed strong even throughout the global economic downturn. There are challenges ahead in making sure that broadband services can reach all parts of the world. Since this could require significant investment, government and industry will need to agree on goals and a means of investment to encourage future growth.

Walter McCormick is the President and CEO of the USTelecom Association; he is a Washington veteran with more than 25 years experience in telecommunications. Prior to joining USTelecom, Mr McCormick served as President and CEO of the American Trucking Associations. His background includes service as General Counsel of the US Department of Transportation; as General Counsel of the US Senate Committee on Commerce, Science and Transportation; and as a partner with Bryan Cave LLP. During Mr McCormick's tenure on the professional staff of the US Senate, Roll Call magazine named him as one of the 50 most influential staffers on Capitol Hill. He has been widely recognized by Who's Who *in America and Who's Who in American Law. Mr McCormick is a member of the President's National Security Telecommunications Advisory Committee, the Board of Trustees of Rockhurst University, the Federal Communications Bar Association, the District of Columbia Bar, and the Missouri Bar.*

Walter McCormick holds degrees in journalism and law from the University of Missouri. Mr McCormick has studied international economics and political science at Georgetown University, and has completed the programme for senior managers in government at Harvard University's John F. Kennedy School of Government.

Broadband Internet access is the world's fastest growing communications technology. Just as the telephone revolutionized communications 130 years ago, broadband is transforming the way people communicate and do business across the world. Broadband connections enable efficient use of the Internet to order goods and services, view bank accounts, communicate with schools, store medical records and keep connected to friends. A family in Indonesia can chat by online video connection with relatives in Britain. The bulk of important communications are done over the Internet, driving demand for more and better high-speed broadband connection services, and creating a strong, vibrant sector of the global economy

In the United States, Americans have adapted to broadband faster than any other technology. It took less than nine years for half of the country to become regular broadband users. By comparison, it took mobile phones 16 years to reach the tipping point, and the personal computer and cable television 20 years. Instant data communication tools are an accepted, expected way of life.

The popularity of broadband is driving the robust growth of the communications industry, a sector that has stayed strong even throughout the global economic downturn. Last year alone, broadband providers in the United States invested more than US$60 billion in communications infrastructure, even as the overall economy slumbered. Over the last ten years, US industry has invested more than $700 billion building broadband infrastructure. Demand for broadband is worldwide, growing by the day as more people incorporate Internet use into their daily lives.

The United States is a world leader in Internet innovation - in advancing cutting-edge technologies and applications. Social networking - through applications like MySpace, Facebook, and Twitter; Search engines - such as Google and Bing; Internet commerce - through Amazon and eBay; new devices - such as the iPhone, iPad, Nook and

"The United States Telecom Association has consulted with the Federal Communications Commission about the idea of going out into a few US cities and experimenting with different offerings to see what types of programmes might be most effective in getting non-adopters to make the leap into broadband."

Kindle; and new communications media, such as YouTube, are driving increased use of the Internet, and each originated in the United States. From garage inventions to Wall Street powerhouses, Internet companies have grown up in a policy environment that has encouraged competition and private sector investment. Entrepreneurs have been able to realize their dreams on the Internet, and their inventions have created millions of new and high paying jobs in the US.

Worldwide investment is responding to that demand. Among countries belonging to the Organization for Economic Co-Operation and Development (*OECD*), investment reached US$185 billion in 2007, an increase of nine per cent a year since 2005, according to the OECD's 2009 Economic Outlook report. Broadband is now the dominant fixed access method in all OECD countries, the report said. In 2008, Japan and Korea became the first two countries to have more fibre-based subscriptions than either DSL or cable.

The sector has declined slightly during the recent economic downturn, but has fared better than other industries. In 2009, US investment in telecommunications declined at a rate of 5-10 per cent, compared with 18 per cent for overall private capital investment.

Policy challenges

With the power of broadband so evident, the need to expand service to all parts of the country is the next challenge. President Barack Obama made broadband deployment a goal during his presidential campaign. The US Federal Communications Commission staff carried out his vision through the creation of a National Broadband Plan. The US telecommunications industry supports the plan's goals of expanding broadband usage. About five per cent of the US population does not have access to fixed-line broadband at a speed threshold specified in the National Broadband Plan.

Building more infrastructure is only one part of the solution. Some people simply are not subscribing to services even if they are available. The latest US government studies show that about a third of those who have access to broadband connections at home don't subscribe. Interestingly, cost isn't the primary reason people don't subscribe to broadband even when it is available. According to the Pew Internet and American Life Project, only about five per cent of adult Americans cite price as the reason they don't have broadband. For many, the issue is perceived value; nearly 40 per cent of those who choose not to have broadband say it is simply not relevant in their lives. There also are technology barriers. Consider that 95 per cent of US homes have broadband availability - but only 80 per cent of homes have a personal computer.

Digital literacy comes into play, too, especially in making sure that older generations and those lacking technical education can participate in this new and fast-emerging online world. These issues are ones that industry, lawmakers and policy officials all agree need to be addressed. President Obama's Administration, the Federal Communications Commission, and leaders in both parties of Congress all believe in the potential broadband adoption has for jobs, for the information economy and for improving quality of life.

The United States Telecom Association has consulted with the Federal Communications Commission about the idea of going out into a few US cities and experimenting with different offerings to see what types of programmes might be most effective in getting non-adopters to make the leap into broadband. Some options discussed include a discount for a certain period of time, subsidies for the cost of computers, and providing training to help people use the services in a way that makes sense for them. Many USTelecom members directly or indirectly help low-income families purchase and learn how to use computers or provide a place where people can have access to broadband.

A challenge facing policy-makers and industry is the cost of expanding broadband infrastructure to truly remote areas where there is no business case for building a network. There is a positive role for government to play with regard to broadband deployment and adoption. US companies are making investments in rural areas using private funds and the help of a governmental universal service programme, which is slated for revisions so it can expand support for broadband services.

Yet there is also a risk. If regulators adopt policies that discourage investment, growth could stall and competition could decline. The World Telecommunications Union studied these issues at a conference in June. "A careful balance will be needed between a hands-on and hands-off approach to regulation, based on assessment of the broader impact on the whole of the society," concluded the final report.

What lies ahead?

An article in the *Guardian* ten years ago accurately predicted that there would be a growing social benefit with the ability of being able to make a phone call anytime from anywhere. Today, it is more than a social benefit. Businesses, government and consumers demand the fast, high quality transmission speeds. Driving this demand is the rapid innovation occurring on the Internet. Creation of new applications, online shopping, education and health all require robust and flexible broadband networks.

The future is bright for faster and better communications tools and for some that we can't foresee today. It would have been unthinkable 40 years ago to imagine connecting with friends and family in far-flung regions of the world through live video, instead of waiting days for letters. With an Internet that is robust, continually evolving and accessible to the entire world, new broadband communications tools will provide an important part of the global economy's foundation. ●

Smart devices need smart networks - and smart operators

by Rajeev Suri, CEO, Nokia Siemens Networks

Few in the telecommunications sector expected the phenomenal growth of social networking sites and, based upon the traffic generated by notebooks with dongles, fewer expected the signalling that traffic smartphones would generate. No one expected that smartphone applications would take the network equivalent of 1000 short phone calls per day, or more, to keep updated. In addition, this many connections quickly drain battery power. Efficient architectures, networks optimized for smart devices and properly configured smartphones will save both signalling and energy.

Rajeev Suri is the CEO of Nokia Siemens Networks; he has more than 20 years of international experience. Previously, Mr Suri was Head of Services at Nokia Siemens Networks; he has held numerous executive level positions in the company.

Prior to joining Nokia, Mr Suri worked with ICL in India and the RPG Group in corporate business development for new ventures and strategic planning. He also worked for a large conglomerate in West Africa where he headed their corporate commercial and international imports division.

Rajeev Suri has a Bachelor of Engineering in Electronics and Telecommunications from Mangalore University, India.

The future isn't what it used to be

Five years ago, those of us in the telecommunications industry clearly understood the importance of networks, mobile phones, the Internet, and computers. We knew we had to build out networks to meet growing demand, we could see the importance of wireless communications, and there was a growing awareness that computer social networking sites were developing. We also knew that mobile phones were rapidly moving from a business tool to an integral part of everyday life - not just in developed countries, but in the developing world as well.

But few understood or could predict the impact of smart devices (smartphones and iPads) five years ago. At that time we still believed in messaging-based communication. Who would have thought that Facebook would become one of the most popular Internet sites in existence?

The reality is that it often takes a long time for business models to catch up to technology, and for toys and fads to be separated from true technological innovations.

Some things that were considered novelties when they were first introduced, like the automobile or television, went on to become integral parts of our lives. We have often seen inventions occur decades before they became even close to a real business. Think about the car, TV, movies, and the videocassette recorder. Although smart devices have been around for two decades (a prototype was introduced by IBM in 1992 at the COMDEX trade show), a relatively recent confluence of technological advancements (faster and smaller microprocessors, better screens, and longer lasting batteries), combined with a younger, more sophisticated user, has driven rapid smart device adoption over the last three years.

Network traffic explosion and customer expectations

There are some 400 million smart device users in the world today. This proliferation, along with the rapid increase of computer social networking sites such as MySpace, Facebook, Bebo, and Twitter, has created a real challenge for the telecom and networking industries, the magnitude of which few saw coming. In many mobile broadband networks the annual data volume growth rate has been 3- to 4-fold (in some even 5-fold), even though real 'broad' band isn't yet available.

In spite of this huge growth in data, people demand a seamless communication experience, no matter what kind of device they own. The usage patterns of some of our newer end-users have taken some of us by surprise. According to a recent study by Pew Research, a typical 21-year-old in the United States entering the workforce today has played video games for 5000 hours, exchanged 250,000 e-mails, instant messages and phone text messages, has 10,000 hours of cell phone use and has spent 3,500 hours online. If you just calculate the cell phone time on eight-hour workdays, this is equivalent to over four years of constant talk time. The study also stated that communication patterns

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of an average young American are not very different from an average young European or Chinese people. These are our future customers and we can expect them to have high demands and high expectations.

Then came the smart devices

Until relatively recently, the mobile broadband industry has been focusing on providing laptop and dongle users with simple data capacity. But the arrival of the iPhone and other smart devices ushered in a brand new world of usage - now people were able to use applications that were always connected to the network and stay in touch with friends via instant messaging, Facebook, and other universally popular applications. At first, operators were pleased when they saw that smart devices were, on average, generating only about one-sixth of the data traffic that laptops were.

Then the trouble started. End-users in the US and Europe began complaining that the quality of their voice and data services had diminished. In some densely populated cities, this issue was particularly obvious, and the end-user complaints particularly loud. Analysis of the network traffic showed that smart devices were the problem. We have learned that the most popular applications used on smart devices can take up to the equivalent of 1000 short phone calls per day to keep updated - and in some cases considerably more than that. Some networks became seriously overloaded in 2009 after the launch of some popular smart devices.

Smart devices don't behave smartly in networks
But how could that be? If the average smart device generates one-sixth of the traffic of a laptop, how can it degrade the quality of an entire network? End-users were also bitter about how short the battery life of smart devices seemed to be.

The answer lies in the different ways that laptops and smart devices are used and how they behave in the network. Laptops consume large amounts of mobile data in big chunks as users browse Web pages or download files. Smart devices, on the other hand, make many small connections to the network, carrying small amounts of data each time. Some push e-mail applications, for example, and can be set to look for new e-mails as often as every 30 seconds, generating many connections to the network, but not much data. Each time any device connects to the network, no matter how much data is involved, there is background-signalling traffic that opens and closes the data session.

All those little pings to the network, looking for the latest MySpace update or instant message, combined with always-on applications, generate signalling traffic that is, on average, eight times as much as laptops generate. While operators were dimensioning their networks to cope with large amounts of laptop-generated data, no one was planning their networks to cope with large amounts of signalling traffic. When the network elements that handle signalling traffic overload they are no longer able to handle additional data or voice calls - thus leading to the significant degradation of quality seen in many smart device-heavy operator networks globally.

In addition, each connection requires battery power. An application that sends one 'keep alive' message every minute uses the same battery power in eight hours as keeping a handset's backlight on for a full hour - and that is a real power-eater! The more connection setups, the shorter the battery life.

What can be done?

It is a cliché in the telecom industry to say that operators are just becoming dumb pipe providers. In reality, handling the traffic caused by smart devices requires a lot of intelligence in the network. Simply put, smart devices require smart networks.

There are several ways to make networks smarter

First, there are certain radio network features that can help smart devices have a longer battery life and generate less signalling traffic. These features are built into the standards, so it is just a question of the network vendor implementing them in their products. If all devices allowed the networks to use these features, the signalling load on the network would be drastically reduced, and reduced signalling traffic directly translates to savings in radio network hardware for the operator.

Second, network elements should be designed so that the capacity is scalable to match the requirements of the network traffic. If capacity is allocated smartly, there are fewer congested bottlenecks.

Third, choosing the right network architecture can further improve network operator efficiency and the overall end-user experience. So-called flat architectures, with a reduced number of network elements, help set up network connections faster and reduce the delay experienced by end-users between pressing a button and seeing the response. Thus applications originally designed for the fixed Internet can connect quickly and be used more efficiently on mobile devices as well.

All in all, choosing efficient architectures and smart software features results in networks optimized for smart devices that are cheaper to build, simpler to upgrade and that use less energy.

There are also individual network solutions, such as ensuring that smart devices have the right settings. Without the right data settings on a phone, a consumer can't connect to the Internet at all. This is not only frustrating for the consumer, but is also expensive for the operator, as calls about incorrect settings can generate 20 per cent or more of all customer care calls. In addition, incorrect settings can generate large amounts of unproductive signalling traffic. One operator found that a single smart device with incorrect settings polled e-mail 25,000 times a month - all of it unnecessarily. Implementing an automated data setting correction solution reduced signalling traffic by 85 per cent overnight.

A never-ending job

Network planning and optimization play key roles in the mobile browsing experience. The two most frequently performed activities on the mobile Internet are browsing the Web and reading e-mails, according to a recent global survey. One respondent found that when they improved the download speed of their mobile Internet service, users stayed online longer, viewed more pages, and data revenues doubled in only three months.

We shouldn't forget the business model when thinking of the requirements to support a successful customer experience. Operators can act smartly by leveraging the data they have about their customer and network behaviour and by implementing the right billing models and quality of service differentiation: reinforcing fair use of flat rate packages, introducing different packages for business, VIP and best-effort users, and prioritizing the applications they use.

For the foreseeable future, creating telecommunications networks will be like painting the Golden Gate Bridge - as soon as you think you're finished, it's time to start again. Who knows what technological innovations and software applications, either invented or as yet unimagined, will affect the design and structure of our telecommunication networks ten or 20 years from now.

But we know this: we must be more nimble and more forward thinking than ever before. Networks and network operators play an important role in making smart devices smart. ●

A view into the near future

by Ben Verwaayen, CEO, Alcatel-Lucent

By 2015, Internet devices as powerful as today's laptop computers will replace all the world's mobile handsets. Subscribers will rely on documents and content stored in a cloud of servers that will be accessed through the net. The network capacity needed will be orders of magnitude higher than what we have today. Attempts to outlaw business driven network management should be discouraged so that new capacity can be financed by selling different levels of quality of service for different applications.

Ben Verwaayen is the CEO of Alcatel-Lucent. Previously, Ben Verwaayen was a member of the Board of Directors of BT, its Chief Executive and Chairman of the Board's Operating Committee.

Before joining BT Group, Ben Verwaayen was at Lucent Technologies where he held various positions including Vice Chairman of the Management Board, Executive Vice-President and Chief Operating Officer, and Executive Vice-President, International. Prior to joining Lucent, Ben Verwaayen worked for KPN in the Netherlands as President and Managing Director of its subsidiary PTT Telecom. Mr Verwaayen also worked at ITT in Europe.

*Currently, Ben Verwaayen is also Chairman of the Confederation of British Industry (*CBI*) Climate Change Board and was recently elected member of the World Economic Forum's Foundation Board. Mr Verwaayen is an Officer of the Order of Orange-Nassau, an Honorary Knight of the British Empire (*KBE*), and a Chevalier de la Légion d 'Honneur.*

Ben Verwaayen, a Dutch national, graduated with a Master's Degree in Law and International Politics from the State University of Utrecht, Holland.

The period between January 1999 and January 2000 was marked by great optimism. Computers became mass-market products, professional e-mail became wide spread, and mobile phones were embraced by the consumer market. It was indeed an inspiring period, and like in all human ventures, its short-term benefits were over estimated and its long-term consequences overwhelmingly underrated. Seeing the year 2000 from today's perspective helps us understand the present and prepare for the future ahead. In the year 2000, slow, buggy and heavy computers were connected to sluggish dial-up Internet. The euphoria generated by these new products was reflected in the phenomenal rise of stock markets, and then followed by a disappointing bubble burst. Today, another Internet tidal wave is about to hit us all, and surprisingly, very few warnings have been made visible. The telecom stock markets are rather calm, and yet one of the most formidable feats in the history of technology is both at our fingertips and relatively off the headlines.

The landscape clears up when one tries to imagine how the world would look if everybody had Internet in the pocket. It is worth thinking about this, as in less than five years every citizen living in the 400 largest urban concentrations of the world will have an Internet device in the pocket. This, regardless of whether the country in question is developed or not. The far-reaching implications of this require some thought.

By the year 2015, 4.2 billion wireless Internet devices will be used replacing entirely all the world's mobile handsets in use today. The number of HDTVs in the world will be close to 1.5 billion in 2015, and the desktop PC as we know it will no

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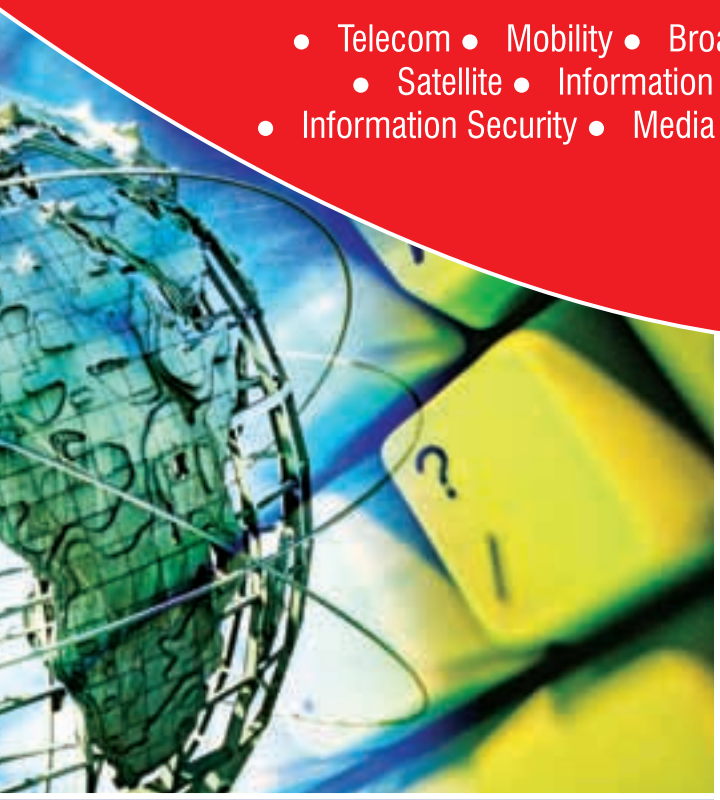

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"The economic variables that govern wireline and wireless networks have a linear dependency between network capacity and capital investments. Since the demand for connectivity in both wireline and wireless grows geometrically or exponentially, the only way to arbitrate between competing access services and subscribers is through the implementation of access priority policies and network management."

longer exist. Touchscreen smartphones sold for less than US $50 will be as powerful as today's laptop computers and subscribers will rely on documents and content stored in a cloud of servers that will be accessed through the net. Under these conditions, the network capacity needed for high speed Internet, fixed and mobile, will be orders of magnitude higher than what we have today. Applications will drive network usage, and their success will push human dependence on networks one step further.

In order to guide our thoughts, it is useful to look at the way that Internet users are concentrated in cities. The most insightful parameter to build a strategy to tackle the future of Internet is the number of Internet access devices per square kilometre. Be it in wireline or wireless networks this number is increasing dramatically. Let us analyse the particular case of mobile Internet. If we take a city with a daytime floating population composed of workers and dwellers, we can see that more often than not, the number of individuals per square kilometre in cities can be from eight to thirteen thousand. And in cities like Paris, London and Shanghai, this number could be as high as twenty thousand subscribers per square kilometre. This has been dealt with in the case of voice connectivity, but when we consider mobile Internet, and devices that connect and interact intensively with networks even when the subscriber is not aware of it, the fulfilment of the connectivity demand and the right strategy for application enablement become crucial not only for the business of service providers but for the healthy working of society as a whole.

Part of the problem at hand is that large portions of current networks were not originally dimensioned for the newer devices that are in the market today. With the constant evolution of human-to-machine interfaces and the ever-increasing processing power of handheld devices, the supply of mobile network capacity is lagging behind the demand for connectivity generated by newer smartphones, USB dongles, and laptop PCs. Also, the deflationary trend in PC prices has boosted the number of connected computers per household; moreover the disappearance of the cumbersome box-TV set is quickly inducing major market changes. The average number of TVs per household is prone to double within few years in various segments of the world population. Added to this, the replacement of voice handsets by smart phones, the replacement of box TVs by flat TVs, and the overwhelming democratisation of laptop PCs are three domains that exert pressure on the software industry, the microelectronic industry, and the content industry.

These three industries by their very nature constantly adjust to market pressure. The telecom service industry, with a sizeable hundred-year-old voice service model requires a new way to leverage its assets, and through high-leverage networks, proceed to empower the new business models behind creative applications, the telecom industry will have to reinvent itself as the driving force of application enablement. New devices and applications using high-speed Internet, IPTV, and mobile access are pushing the world to the verge of a major capacity crisis - and this is the right time to act.

The economic variables that govern wireline and wireless networks have a linear dependency between network capacity and capital investments. Since the demand for connectivity in both wireline and wireless grows geometrically or exponentially, the only way to arbitrate between competing access services and subscribers is through the implementation of access priority policies and network management. Wireline and wireless networks will need to be much more than a dumb pipe to cope with the upcoming capacity demand. Smart network management, along with increased investment in enhanced capacity, will become a key business driver, and intelligence will be the hallmark of new networks.

Attempts to outlaw business-driven network management should be discouraged. Having applications, content, and specialized usages in mind, network management providing differentiated services, will be part of the daily bread of the telecom industry. The capacity enhancement needed in the near future can be financed by the commercialisation of different levels of quality of service for different applications. It will be eventually understood that banning, or severely limiting, network management is equivalent to banning traffic lights and speed limits in the streets of our cities. The solution to the congestion conundrum appears to be solvable both by new investment in higher capacity networks and by service differentiation and the monetisation of priority rights for those who are ready to pay for the access to faster lanes. Like in an airplane, all passengers with a ticket ride in it, but those who can afford business class board first and have more leg room; the economy passengers are a bit tighter, and while they can lie down if the seat next to them happens to be empty, they are not allowed to grab any empty business class seats. Of course adequate balance has to be found and guaranteed by regulation to avoid any harmful discrimination to open competition.

Now that mobile broadband Internet will be readily available anytime, anywhere, handheld Internet devices will change most human activities taking efficiency to new levels. A highly connected, truly personal computer in everyone's pocket will bring people together for business, pleasure and learning. Beyond Western Europe and North America, mobile Internet will trigger financial inclusion for low-income individuals, increase social involvement where cooperation is needed and deliver remote medical assistance in places thus far unreachable. Phones will read web pages aloud for the visually impaired, will teach illiterate users to read and write, will have biometric sensors to unambiguously identify individuals and protect their privacy and will help subscribers with critical health issues to get treatment in case of emergency. One mobile broadband connection per individual will bring change to the world in heretofore unimaginable realms. The near future is exciting and the potential for each of us to be part of it has never been greater. ●

When everything connects

by Pieter Uys, CEO, Vodacom Group

The 400 million mobile phones in use in Africa have transformed the way that Africans connect with each other and the world. An aggressive rollout of mobile data capacity in many African countries means much of the continent will finally be able to take its rightful place in a world in which everything connects. The keys to ensuring that Africa never again lags behind the rest of the world in the communications sphere are quality and affordability.

Pieter Uys is the CEO of Vodacom Group. Prior to his appointment as CEO, Mr Uys served as Vodacom Group's Chief Operating Officer and, earlier, as Managing Director of Vodacom SA. Mr Uys joined Vodacom Group as a member of its initial engineering team.

Pieter Uys holds Bachelor of Science and Masters of Science degrees in engineering from the University of Stellenbosch and a Master of Business Administration degree from Stellenbosch Business School.

On a street choked with pedestrians and vehicles near the centre of the sprawling city I come across a queue of people waiting patiently outside a shop. The shop turns out to be a coffee shop, but it's not caffeine the people are lining up for. They're queuing for knowledge, and the chance to learn about what is happening elsewhere in the world.

The city is Mwanza in northern Tanzania. Internet hotspots, it seems, are all over this ramshackle city on the shore of Lake Victoria - in the main thoroughfares, in the markets and in many of the side streets. Across Africa I have witnessed similar scenes in towns, villages and cities; ours is a continent that wants to know and needs to connect.

When the great and the good meet in Geneva or New York to discuss how a 'connected world' can contribute to achieving the UN's Millennium Development Goals, this is the reality they are addressing; ours is an economically deprived continent that has an insatiable hunger for knowledge, and a fervent belief that access to information promises a better life for all.

Traditional fixed-line telephony failed Africa miserably. Just one per cent of Africans have access to a landline, but Africa is embracing mobile telephony with gusto. Today there are some 400 million mobile handsets in use in Africa, more than in North America. It is mobile that is helping Africa to connect with itself and the world. It is mobile that has the power to kick-start a continent-wide economic renaissance.

There is simply no disputing the connection between mobile penetration and economic growth. Persuasive research points to an almost one per cent boost to gross domestic product for every ten per cent increase in penetration. Africa needs this kind of development. It needs mobile.

"Until recently, a tradesman in Africa would open a small business once he had amassed enough capital to afford the tools of his trade, the rent on a small shop or workshop and the all-important sign advertising his services. Then, when he acquired a mobile phone he put his number up on the sign. Now he can write on that sign his email address so that customers can contact him even with his phone switched off and he is busy earning a living."

Outside Mwanza and many African cities like it, rural schools are crammed with children eager to learn, but the textbooks their teachers use were published decades ago. They're out of date, and such learning as they may impart puts these youngsters at an immediate disadvantage relative to their peers in Europe or North America. The up-to-date information they need, and the latest teaching aids and techniques are available - free of charge - on the Internet. If these youngsters and their teachers could be connected, they could catch up with the rest of the world in an instant.

This, in a very real sense, is the digital divide - the gap between people and the knowledge they need to improve their lives. The most practical and most affordable bridge across this divide is mobile. Those in our industry who are committed to development and to Africa are investing in giving historically deprived schools in many countries the tools to open up a whole new world of learning: computers, printers, mobile devices, email and the Internet. Not only are these children learning languages, sciences and mathematics, they are learning to feel at home in a technological, connected world; they are becoming our customers of the future.

Until recently, a tradesman in Africa would open a small business once he had amassed enough capital to afford the tools of his trade, the rent on a small shop or workshop and the all-important sign advertising his services. Then, when he acquired a mobile phone he put his number up on the sign. Now he can write on that sign his email address so that customers can contact him even with his phone switched off and he is busy earning a living. As the tradesman establishes himself and attracts more customers, mobile operators can take his business to higher and higher levels: hosting a website so he can advertise his business more extensively and more cheaply than he ever dreamed possible. Perhaps, one day, he will establish a virtual private network to connect his various workshops and offices.

The world is connecting at breathtaking pace; daily advances in hardware and stunningly innovative applications mean that for many of us there is no longer any reason to be disconnected from anyone with whom we care to be connected. The social networking phenomenon is becoming so pervasive that tweeting is happening in what were once the most remote regions of the world, including Africa.

By 2020, I believe, we will be living in a connected world of 50 billion or so SIM cards; your car will have three or four SIMs, your refrigerator perhaps as many, doing things like detecting when you're about to run out of milk, and ordering more.

For Africa the opportunities to use this technology to swiftly overcome decades of underdevelopment are staggering. By democratising the Internet and email we can afford the continent better education, more efficient work and trade, improved government and more effective delivery of health and social services. But there is always a cost attached to innovation and the critical question is - can Africa afford to catch up, and then keep up, with the rest of the world?

It used to be that the cost of mobile handsets was a major barrier to entry. Mobile operators in Africa, aware of the critical importance of achieving massive penetration, have worked hard to bring these costs down. Today in South Africa we have reached the point where a basic entry-level handset can be retailed for between US$10 and US$15. My company has become one of the leading sellers of notebooks in its home market, offering an open-source notebook with 300MB of data for under US$25 per month. The priority now has to be to make smartphones as affordable and as pervasive as ordinary mobile phones. Quite simply, I want everyone in Africa to have a smartphone, to be able to access the benefits of broadband data communications and the benefits of connectedness.

Is this merely a pipe dream or are we actually moving in the right direction? I believe Africa is making huge strides towards becoming connected. As in the rest of the world, Africa's mobile data traffic is rapidly overhauling voice traffic. In South Africa, real data prices have been declining for some years and consumers and business have responded; data traffic for the three months prior to June 2010 soared - up 55 per cent in comparison to the same period last year. The FIFA World Cup certainly contributed to this increase, but by no means explained an increase of such staggering proportions. It was certainly no coincidence that smartphone sales rose a bit more than this same percentage in the same period.

Creating meaningful connectedness is not just about putting affordable tools in the hands of individuals, learners, teachers and entrepreneurs. It is about having the quality network infrastructure to support a robust growth in broadband data usage. In Tanzania, Lesotho and Mozambique we have spent hundreds of millions of dollars on 3G networks while in South Africa we are rolling out HSPA+ sites with theoretical speeds of 21Mbps. In South Africa alone we have 3,600 3G base stations; an enormous investment in infrastructure that is now paying dividends as customers take up the opportunities presented by broadband coverage of a quality and reliability that gives them a meaningful experience they can afford.

Until very recently, Africa lagged some five or more years behind the world in its adoption of ICT. That is no longer the case. The difference has been mobile. Now we have the opportunity to use mobile to change the lives of ordinary people in Cape Town, Soweto and Mwanza. It's up to us Africans - governments, regulators, operators and citizens - to determine how we employ our growing connectedness to help create a better, healthier and more successful Africa. ●

Latin America 3.0

by José María Álvarez - Pallete López, Chairman and CEO of Telefónica Latinoamérica

Latin America is a leader in the rush towards 'world 3.0'. Technological diffusion, especially in telecommunications, has been faster there than in other regions. Latin America has one of the world's highest mobile penetration rates, Internet usage is taking off and mobile broadband is rapidly growing. Machine-to-machine technology has a huge potential in the region. Future products, processes, and applications, will increasingly be designed and scaled up from emerging markets, with Latin America, in many instances, leading the way.

José María Álvarez - Pallete López is the Chairman and CEO of Telefónica Latinoamérica; he is the General Manager of Telefónica Latinoamérica as well as member of the Board of Telefónica, S.A. Mr Álvarez joined the Telefónica Group as a General Manager of Finance for Telefónica Internacional, S.A. and shortly thereafter was named General Manager of Corporate Finance for Telefónica, S.A. Prior to his current position, Mr Álvarez-Pallete was named Chairman and CEO of Telefónica Internacional in 2002.

He began his professional career with Auditors Arthur Young. He later worked at Benito & Monjardín / Kidder, Peabody & Co. At Company of Cementos Portland (Cemex) he served as the as head of the Investor Relations and Studies Department, Financial Manager for Spain, General Manager for Administration and Finance of the Cemex Group´s interests in Indonesia and member of the Board of Cemex Asia, Ltd. He is, or has been, a member of the board at innumerable major companies throughout the world.

Mr Álvarez-Pallete has a degree in Economics from the Complutense University of Madrid. He also studied Economics at the Université Libre in Belgium, holds an international Management Programme from IPADE and an Advance Research Degree from the Complutense University of Madrid.

Telecommunication technologies have forever changed the way we live and work. In less than a quarter of a century our concepts of space and time have altered beyond even the wildest imaginations. And in this new world of communications, speed is now king.

More than ever before, we live in a connected and fast-moving world. Small and unknown start-ups overtake established incumbents with increasing speed. In all sectors, business and product lifecycles keep shortening. Less than a decade ago, it would have been scarcely conceivable that, in 2010, three of the largest telecommunication companies by market capitalization would be from China, Mexico and India. Yet China Mobile, América Móvil, and Bharti Airtel have achieved just that. The 90 names listed in the Standard and Poor's index of major US companies in the 1920s remained there for an average of 65 years. By 1998, a company listed in the S&P 500 could only expect, on average, less than 10 years stay. Speed is therefore at the very heart of the corporate universe and business is moving faster every day with no signs of slowing down.

Ever-shortening timescales and speed of communication also impact our concepts of space and distance. Social networks are expanding on the Web, creating what political scientist Benedict Anderson called 'imagined communities' (at the time referring to nation states). By some measures, digital networks are becoming larger than countries. MySpace, for example, with 300 million registered users, or Facebook, with more than 500 million by mid-2010, already have a greater 'population' than Brazil, the largest Latin American country. Frontiers and boundaries are crossed every second on the Web and even the most remote corners of the planet are instantly connected with world events.

Latin America has not escaped this great transformation. In many respects it leads this rush towards a 'world 3.0'. Technological diffusion has been faster here than other regions, with telecommunications being a stellar example. In 2010, Latin America is a highly connected continent - in countries like Brazil or Mexico, 75 per cent of Web users are connected via social virtual networks, among the highest ratios worldwide.

Latin America connected

Worldwide there are now around 4.6 billion mobiles in an estimated global population of 6.4 billion people. The most striking statistic is that in 2010, two-thirds of those phones are located in developing countries. The benefits for developing economies are manifold. The World Bank has found that mobile adoption contributes massively to growth and development. An extra 10 mobile phones per 100 people tends to boost Gross Domestic Product (*GDP*) growth by 0.6 per cent. Mobile technologies are therefore becoming a major

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driver in reducing poverty and inequality while boosting productivity. Mobiles enable buyers and sellers to connect, and quickly identify and satisfy supply and demand regardless of time and location. Farmers in the pampas of Argentina or Peruvian fisherman in tiny ports benefit equally from this connected world. [1]

More than 500 million of people are now connected to mobiles in Latin America. A region enjoying one of the highest mobile penetration rates in the world - almost 93 per cent of the population, compared to 55 per cent in Asia Pacific or 50 per cent in the Middle East and Africa. Latin America now has penetration rates similar to North America. The largest mobile markets in Latin America are Brazil, Mexico and Argentina, with subscriptions numbering 170 million, over 83 million and almost 50 million respectively.

In 2010, the total number of Internet users in Latin America reached the threshold of 200 million, enjoying the largest penetration rate (31 per cent) of all emerging markets. In Chile, Argentina and Colombia, Internet penetration rates are already comparable to those of Italy, Poland or Greece; while Brazil's are higher than those of China, Indonesia and India.

The future also looks bright. Internet usage is taking off and mobile broadband is becoming a particularly fast-growing market. Mobile content services, in particular, are just beginning their expansion; they reached around US$2.4 billion in 2009 with about 63 million users across the region. In some countries like Brazil or Colombia, mobile content services markets are expected to grow by a double-digit rate, one of the main drivers being the acceleration of smartphone penetration. Globally, it is expected that mobile data traffic will double every year through 2014, increasing nearly 40 times between 2009 and 2014 and Latin America will have one the strongest growth of any region, beating Western Europe.

Last but not least, machine-to-machine (*M2M*) technology is improving and will be used by more verticals sectors such as healthcare, education, security, logistics government, and banking[2]. Smart sensors, trackers and cameras interconnected by mobiles or other tech devices, for example, will help predict and ease traffic jams and congestions in cities. In Latin America, the potential is huge, as the pain of the daily commute from city to city is among the highest in the world with Mexico City topping the index of car commuter pain, just behind Beijing and two other cities of the continent, São Paulo and Buenos Aires[3]. In healthcare, new mobile technologies will reach many of the region's previously unconnected rural areas and save valuable time for patients located in urban Latin American areas.

Speed and technological diffusion

Speed, as mentioned previously, is king in the connected world. We are experiencing an impressive acceleration in the adoption and diffusion of new technologies.

The speed of convergence for technologies developed since 1925 has been three times higher than those developed before 1925. The median speed of convergence for technologies invented after 1950 has been about six per cent per year, while before 1925 it was about 2 per cent per year[4]. It took 89 years to reach 150 million fixed-line telephony users, while it took just 17 years for personal computers to reach this number and a mere 14 years for mobiles. Today's metrics are a matter of days, minutes and seconds. Mind-boggling statistics from 2009 saw 600,000 new users connected to Facebook in one day; ten hours of videos uploaded onto You Tube in one minute; and an incredible 50 million blogs posted worldwide in just one second.

In recent decades, the speed of technology adoption across countries declined dramatically. In some Latin American countries cell phone growth has been even faster than many OECD countries[5]. The adoption of technologies and applications in the 21st century is becoming nearly simultaneous. Facebook, You Tube or Twitter were adopted without time lags, at the same time, in the US, Mexico or Brazil. This summer, for example, Facebook reached 500 million users worldwide, of which 400 million were located outside the US (among them 60 million in Latin America, which accounts for 17 per cent of total users and boasts some of the highest penetration ratios worldwide). Mexico and Argentina, in 2010, already have as many users as Spain. Regarding Twitter, in June 2010, Brazil and Venezuela, have been, after Indonesia, the countries with the highest Twitter penetration in the world on a yearly basis, according to ComScore.

Reverse innovation

The spread of new technologies is clearly accelerating and Latin America is participating in this global trend more actively than many other emerging regions. In a world that is changing quickly, where speed and innovation are key strategic assets, we are convinced there is a lot to learn from emerging countries. Innovation is no longer produced in the 'core countries' and diffused towards the 'periphery'. More and more *reverse innovation* will come from emerging countries and be adopted in OECD markets. In Peru we recently launched mobile payment services jointly with Visa, and a similar service in Colombia with the *Federación de Cafeteros*[6]. Emerging markets are becoming hotbeds of business innovation, coming up with new products and processes that are dramatically cheaper than their Western counterparts: US$3,000 cars, US$300 computers and US$30 mobile phones that provide nationwide service for as little as 2 cents a minute.

Such reverse innovations are not only invented, adopted or adapted by emerging multinationals but also by leading OECD multinationals that are increasingly sourcing innovation from emerging countries[7]. Emerging economic regions represent a huge opportunity because they bring disruptive innovations into play that will be vital for Western multinationals. Latin America will undoubtedly make a growing contribution to these breakthrough innovations. In the future, products, processes, applications, will increasingly be designed and scaled up from emerging markets, with Latin America leading the way in many instances.

In the 20th century, products and processes were produced in OECD countries and exported to emerging markets. Today, that traditional multinational business model is being turned upside down as emerging markets are increasingly supplying innovations and services for the entire world. This change is a blessing and another good reason to bet more than ever on this continent. ●

[1] See for more examples on Latin America, Raúl Katz. 2009. El papel de las TICs en América latina. Propuesta de América latina a los retos económicos actuales. Madrid: Ariel and Telefónica Foundation. Available at http://www.fundacion.telefonica.com/debateyconocimiento/media/publicaciones/papel_tic_desarrollo.pdf

[2] Globally, according to ABI Research and Cisco, The mobile machine-to-machine (M2M) market is expected to grow from approximately 71 million cumulative connections globally in 2009 to roughly 225 million connections by 2014. See http://www.cisco.com/en/US/solutions/collateral/ns341/ns523/ABI-CISCO_M2M_Operator_Opportunity.pdf

[3] See the index tracking the car commuter pain computed by IBM: http://www-03.ibm.com/press/us/en/pressrelease/32017.wss

[4] See Diego Comin, Bart Hobijn, Emilie Roveto. January 2006. "Five Facts you need to know about technology diffusion", NBER Working Paper, 11928.

[5] Early 2000s, cell phone usage in 32 out of the 145 countries in fact exceeded that in the U.S. See Diego Comin, Bart Hobijn, Emilie Roveto. December 2008. "World Technology Usage Lags", Journal of Economic Growth, 13 (4): 237-256. Available also at http://www.people.hbs.edu/dcomin/lags.pdf

[6] See, on Latin America's mobile banking experiences and potentials, the report and methodological note available at http://www.iadb.org/mif/forum/mbanking.cfm

[7] See Immelt, Jeffrey, Vijay Govindarajan and Chris Trimble. October 2009. "How GE is disrupting itself", Harvard Business Review: 1-12. Available at http://www.gereports.com/reverse-innovation-how-ge-is-disrupting-itself/

The revolution is mobile

by David Thodey, CEO, Telstra

High-end smart phones - such as the iPhone and Android phones - generate about 14 times more data than basic mobile devices and wireless broadband customers consume ten times more data than these devices. Most of this traffic goes to social networking sites. Simple interfaces, powerful devices, an explosion of digitised data and applications, and faster, more affordable mobile data are driving this traffic. It is also the beginning of a new medium - text-based communication is being replaced by video.

David Thodey is the CEO of Australia's largest telecommunications and media company, Telstra. Mr Thodey joined Telstra as Group Managing Director of Telstra Mobiles and Telstra Enterprise and Government; he came from IBM Australia/New Zealand where he started as a systems engineer and rose to become CEO.

David Thodey studied at Victoria University in New Zealand where he earned a Bachelor of Arts in Anthropology and English. He also attended the Kellogg Post-Graduate School General Management Program at Northwestern University in Chicago.

Australians have always loved communications technologies. From the bush telegraph to broadband, Australians have been early adopters and enthusiastic adherents of new technologies. In the 1950s, for instance, we sent more telegrams per-capita than any other nation on Earth. The love affair shows no sign of abating, either. The past year in Australia has seen wireless broadband services increase by 162 per cent and 3G mobile services increase by 43.6 per cent. The average time people spent online at home jumped by 21 per cent, and traffic on broadband mobile networks are doubling every eight months.

The increasing number of smart devices and the increased data appetite of smart device users are driving much of this traffic increase. High-end smart phones - such as the iPhone and Android phones - exhibit around double the usage of other PDA devices, which consume seven times more data per unit than basic handset devices. Smart phones are not the only cause of data traffic; wireless broadband customers consume ten times more data than high-end smart phone users.

Where is that extra data traffic heading? It's going to social networking sites such as AirG and Facebook. Interestingly, iPhone and Android device users have similar appetites for data. In addition, approximately one-fifth of 3GSM subscribers are using WBB (*wireless broadband*) cards or USB dongles.

As a consequence, the mobile Internet is bigger than anyone predicted. All of which begs the question, what will be the mobile Internet's killer app? Every great leap forward in telecommunications needs a killer app - an application that proves or defines or unlocks the core value of a new technology. 'Killer app' is, after all, just another term for innovation. The

"We won't have fully made the leap into the next generation of technology until we have either delivered a totally new customer experience, such as the digital telephony 2G delivered, or the data 3G delivered, or achieved a quantum change in the cost structure to deliver the service. Creating a new customer experience or a new cost structure are the true measurements of technological progress."

Net's killer app was email. The Web's killer app was search engines. As for the mobile Internet, the killer app is its convenience - being able to get the Internet from the device that is always with you, your handset.

Only time will tell what impact the iPad - and the plethora of other tablet devices that follow in its wake - will have on the mobile Internet. Tablets like the iPad may well provide the killer platform for apps, and, in the process, do for the mobile Internet what the iPhone did for mobile phones. There's no doubt the iPad is fundamentally changing the print media, entertainment and publishing industries, opening the mass market door to other devices such as Amazon's Kindle and Plastic Logic's QUE ProReader.

But why is all this happening now? What has changed to cause the prodigious rise in the number of people using the mobile Internet? I think there are three primary drivers of this change: simpler interfaces on more powerful devices, an explosion in the amount of digitised data and applications, and faster, more affordable mobile data prices.

The simpler interfaces, combined with powerful processing power, make devices like the iPhone and Android irresistible. Although innovative smart devices are not innovation - they are mobile platforms for innovation. What makes smart devices tools for innovation is the explosion in the amount of digitised data and applications, underwritten by faster, more affordable wireless data networks.

The three forces of simple interfaces and powerful devices, more data and apps than ever before, and faster wireless networks are heralding a new era of growth in mobile networks. We are on the cusp of a tsunami of data that will make future applications such as immersive 3D environments accessible in businesses and homes for everything from business meetings to remote education and healthcare.

We are on the verge of what economist Kenneth Boulding called a "break boundary" - where the old text-based means of communication is being replaced be a new primary medium, video. What we are seeing is the creation of a hybrid medium - a convergence of video and text - as our primary source of communication. The written word is morphing with the capabilities of video.

What does this historic shift mean for the way we live and work? It means that everything that can change will change. It means we will be able to take our information with us seamlessly, from smart device to smart device, as we go about our daily lives. It means students living hundreds and even thousands of kilometres away from a school or university will be able to sit in on classroom lectures remotely, with a world of information literally at their fingertips. It means more people with chronic illnesses will be able to be cared for at home using remote diagnostics, analysis, real-time data transfer and immediate diagnosis. It means mobile workers won't have to return to their head office for mundane paperwork, and more business people will be able to hold face-to-face meetings via video conference, rather than flying interstate or overseas.

There's no doubt the mobile Internet revolution is creating new opportunities for consumers, businesses and the telecommunications industry. However, we're yet to see the full impact of next generation communications.

We won't have fully made the leap into the next generation of technology until we have either delivered a totally new customer experience, such as the digital telephony 2G (*second generation*) delieverd, or the data that 3G (*third generation*) delivered, or achieved a quantum change in the cost structure to deliver the service. Creating a new customer experience or a new cost structure are the true measurements of technological progress.

That leap forward is close at hand. The mobile Internet is moving towards a 4G(*fourth generation*)-like experience, but it's not 4G yet. And, let's be clear, the rise of the mobile Internet and the coming leap to 4G does not spell the end of wired networks. Wired networks will not go away, it's just that, increasingly, wired and wireless networks will - from a user's perspective - become difficult to tell apart.

These are exciting times for our industry. We are at the beginning of a new era - an era that will finally provide information on any device and any location at any time. ●

Connected homes for tomorrow's lifestyles

by Fran Shammo, President and CEO of Verizon Telecom and Business

Tomorrow's connected homes will be a sophisticated ecosystem. In addition to sophisticated communications, access to information and entertainment, the applications that drive these devices will provide security, health monitoring, and connect people-to-machines, as well as machines-to-machines, to provide a range of services barely imaginable today. 4G wireless technology will increase data speeds by up to 10 times - comparable to today's wired broadband. Sophisticated smartphones will let users manage their homes, access media and connect to anything from anywhere.

Fran Shammo is the President and CEO of Verizon Telecom and Business, responsible for sales, marketing and customer service excellence for the company's consumer, small business, enterprise and wholesale customers worldwide. Previously, Mr Shammo was President of Verizon Business and prior to that appointment, he served as Senior Vice President and Chief Financial Officer for Verizon Business. Mr Shammo has also served as President - West Area for Verizon Wireless, and Vice President and Controller of Verizon Wireless. Prior to Verizon, Mr Shammo joined Bell Atlantic Mobile as General Manager for Accounting Operations, and later held a series of positions of increasing responsibility in finance, mergers and acquisitions, logistics, facilities, regional operations, and planning. Mr Shammo sits on the Board of Micrus Endovascular Corporation and is Chairman of its Audit Committee.

Fran Shammo holds a Bachelor's degree in Accounting from Philadelphia University, and a Master's in business administration from La Salle University and is also a Certified Public Accountant.

In an earlier issue of Connect-World North America, I described how advanced technology can enable a global enterprise to become an ecosystem of unified communications platforms that drive efficiencies and improve productivity across the business. For these companies, mere connectivity is no longer enough. They require integrated wireless and wireline technologies, a consistent communications experience across all platforms, and reliable access to their data and applications regardless of where they are or what device they're using.

Today a similar transformation is occurring in the consumer market. Previously distinct voice, television, Internet and mobility services are evolving into an integrated offering that promises to dramatically enhance users' lifestyles. This 'quadruple play' service takes formerly unrelated activities and integrates them into the household living space.

Not long ago, a home network consisted of two computers sharing the same printer. Today consumers can have dozens of digital devices in their homes that are capable of sharing media. This level of interconnectivity makes the home network look more like a corporate LAN. Just like the needs of businesses to share data throughout the corporation, consumers need to be able to move their media and other digital content between their devices. As the lines between business and home networks fade, users will be able to move content between their professional and personal lives, such as working on a presentation at home or monitoring household security from the office.

The 'connected home' requires massive amounts of bandwidth - both upstream and downstream - to manage all of the content consumed and created by its residents. Families need to download multiple streams of HD content on televisions and computers, especially for new bandwidth-intensive applications like 3-D video. Multi-player gaming, video sharing and other interactive applications require fast uploading capabilities. Teleworkers and home businesses send and receive large files and need high-quality videoconferencing, and more students are participating in virtual classes as schools and universities move additional course work online.

As these and other multi-media applications grow in popularity, we expect to see a substantial increase in video services, all in higher definition than is possible today. In addition, technology platforms will continue to evolve and the barriers between wireless and wired networks around the world will begin to disappear. As a result, consumers and businesses will expect their applications to work the same, no matter which network they connect to. They will demand access to their digital content - regardless of where it's stored - anytime, anywhere, and on any device.

In less than a decade, broadband technologies have radically changed the world around us; it is amazing how much has happened in our industry during this time, and we've only scratched the surface. In keeping with the spirit of Moore's law, we'll continue to see broadband speeds rise, network capacity increase and connectivity spread around the globe. All of which will mean more innovation and greater opportunities for consumers and businesses to benefit in the years ahead.

A key enabler for the connected home is an ultra-broadband network, such as fibre-to-the-home. These smart networks provide the highest quality and reliability, and are easily upgradable to provide additional speed and capacity, making them ideal for the bandwidth-intensive applications that will be developed in the years ahead.

Intelligent broadband networks are also engines for job-creation and economic growth through greater productivity. For example, look at how these networks have dramatically changed the media landscape and its business models. Today virtually anyone with a broadband connection can be a writer, filmmaker, software designer or entrepreneur, with the ability to reach hundreds of millions of people worldwide.

As fourth-generation (*4G*) wireless technology enters the mainstream, data speeds on wireless networks will increase by up to ten times, making the wireless experience comparable to today's wired broadband solutions. Sophisticated smartphones will enable users to manage their homes, access their media and connect to nearly anything from virtually anywhere.

But 4G connectivity will deliver more than a faster smartphone experience. In the 4G world, wireless has the potential to connect just about anything, from lamps and thermostats to cars and parking meters. As 4G capabilities get embedded into our environment, there's really no limit to the number of connections that can take part in the network. This 'Internet of things' will infuse intelligence into all our systems and present us with a whole new way to enhance our lives, our homes, our businesses and our economy.

Going forward, the home network can be used as a platform to deliver and manage a vast array of applications for the connected home. These converged services have the potential to provide life-altering benefits in areas such as health care, security and sustainability.

For example, tomorrow's digital home can include valuable applications for remote medical monitoring. Devices that measure a patient's vital statistics and automatically transmit critical data to doctors will provide independence to the patient and peace of mind to family members.

Security services for fire and flood detection will notify residents and emergency responders of problems quickly and accurately. Imagine a security camera that instantly sends your smartphone a photo of a person ringing your doorbell, giving you the option to unlock the door remotely for a family member or a repairman.

In addition, the home network could include applications and devices for green initiatives like smart meters, appliance sensors and remote monitoring that enable users to maximize energy efficiency. Consider the energy savings of a home that uses sensors and GPS technology to automatically turn off your lights and air conditioner when you leave, and then turns them on when you pull into your driveway.

As more smart devices and applications become interconnected, the value of our broadband infrastructure expands exponentially.

In the communications industry there's something called the 'network effect', which means the more connections you have on a network, the more beneficial it is to its users. This network effect is an extremely powerful force. If a network is useful when it connects you to a million users, it's significantly more valuable when it has a hundred million users.

In the past, we thought of all those connections in terms of people. But today's broadband networks also connect people to machines, as well as machines to machines, and create billions of potential nodes on this increasingly intelligent, increasingly valuable grid.

Tomorrow's connected homes will be a sophisticated ecosystem that will be at the centre of people's lives. The intelligence of this system will be available to every device, offering people instant access to the things that matter most to them. The applications that drive these devices will provide unique opportunities for each of us to better manage and enjoy the world around us. ●

Debunking the top three telco industry myths

by Vinod Kumar, President and COO, Tata Communications

Although growing demand for telecommunication services creates many opportunities for telcos, the sector continues to experience the pressures of price erosion, disruptive technologies and soaring capital expenditures. Many telephone companies (telcos) believe that 'managed services' will resolve every problem, that the Next-Gen label makes everything good and that they need better ways to trump the competition. Nevertheless, managed services cannot cure all, demand for Next-Gen services may not generate an adequate ROI and cooperating with competitors often brings better returns than fighting them.

Vinod Kumar is President and Chief Operating Officer for Tata Communications, part of the Tata Group. Mr Kumar is responsible for expanding Tata Communications' roadmap and charter in the global communications market and leads the company's efforts in service creation, marketing and delivery. Mr Kumar is also President of Data and Mobility Services and Managing Director for Tata Communications International. He has a wide range of cross-functional experience in the telecommunications industry. Prior to joining Tata Communications, Mr Kumar held senior management positions in several telecommunications companies including Asia Netcom, WorldCom Japan and Global One.

Vinod Kumar graduated with honours in Electrical and Electronic Engineering from the Birla Institute of Technology and Science in India.

Jumping on the bandwagon is easy to do, but it's often the gumption to defy conventional wisdom that pays off richly. Telcos may want to examine managed services, next-generation platforms and their competition under a new light.

The growth in demand for telecommunication services in this digital age is more real than ever before. The Internet is transforming not only the way we run our businesses but also how we communicate and interact as individuals living in an increasingly interconnected society.

While this creates a barrage of opportunities for telcos, the industry continues to experience the triple pressures of price erosion, disruptive technologies and capex (*capital expenditure*) intensity. Telcos the world over, without exception, are in a perennial process of changing their stripes to survive in this jungle - engaging almost anybody who has a panacea or an innovative shortcut to create a cutting edge offering or reduce their cost structure.

Too many telcos have been sold the idea that 'managed services' is the answer for every problem, that the Next-Gen label makes everything good, and that they need to find better ways to trump the competition. While there is an element of truth to each of these statements, it is vital for these to be viewed, applied and implemented in the right context.

Managed services is not a 'cure all'

Contrary to a widely held view, managed services is not a guaranteed cure for all traditional telco ills. Everyone from telcos and system integrators to IT sourcers, hardware and software providers is aiming to add value to their existing offerings with a suite of managed services. What many of them don't realize is that it's an extraordinarily tough transition to make from their traditional business, and there's plenty of competition waiting for them in the wings.

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"A reality of the new world is that no one can do it all. Both capital and talent are in short supply, thus the days of super-everything conglomerates or vertical integration have ended. As businesses reclaim their areas of strength, they also need to develop ecosystems of partnerships to meet market demand."

Additionally, customers are much more savvy today in buying managed services, many of which are standard and undifferentiated. Providing a differentiated value proposition to customers requires close synergies with existing services, a substantial commitment of both time and resources, and an open partnership approach with the right vendors to deliver meaningful value to the business.

Therefore, before telcos move into managed services, they need to do their sums carefully to assess if the chosen services align well with their existing services and support models. It is also essential that the adequate level of technology, operations, marketing and sales resources are available to see them through the transformation. Do not expect to easily repurpose an organization designed for network services into one that can support network and IT using managed services. It's also critical that they manage the expectations of all stakeholders around what could well be long timelines to ensure that support for this transition doesn't wane when things get rough.

Challenges behind the Next-Gen hype

People in the telecom industry attach the Next-Gen label to every other thing they talk about. In fact Next Gen is probably in its fourth or fifth guise, in just the past decade. The truth is that problems don't vanish the moment you call them Next-Gen. You need to put in some serious investments, and make some real changes to your solution offerings for them to truly stand up to their namesake.

Should an operator decide to take the leap into true next generation platforms, it needs to do thorough research in two areas.

First, they should ascertain if the market holds enough demand to pay back the investment made, and second, assess whether the rest of the systems, processes and go-to-market capabilities are equipped and ready to support the new Next Gen platforms or services.

Industry reports are not infallible indicators. Very often, timing and direct feedback from customers on elements such as whether they are ready for advanced features and if they have the budgets to pay for them, are more reliable gauges. Technology maturity and industry standards are also vital considerations.

Keep in mind that what gets your internal engineers excited may not always be the same things that get your buyers excited.

The newness of the technologies involved can also present an added layer of challenge. Stability is often an issue and standards can change with large players' efforts to pull the market in different directions. Betting on the 'wrong' technology can send your investment down the chute.

Balancing competition and cooperation

A reality of the new world is that no one can do it all. Both capital and talent are in short supply, and thus the days of super-everything conglomerates or vertical integration have ended. As businesses reclaim their areas of strength, they also need to develop ecosystems of partnerships to meet market demand.

No longer can we think in terms of value chains, upstream and downstream - we are moving towards networks of players, collaborating with each other, and usually, competing as well. In order to grow sustainable businesses in the new world, companies need to recognise their competitors' strengths and cooperate with them. Such adversary partnerships can be highly effective in expanding new markets and extracting value from them.

For example, wholesale and enterprise services can enjoy a symbiotic relationship. Working with other service providers can increase one's scale and reach at a lower per unit cost, putting an organisation in a better position to compete in the enterprise space. Working directly with enterprises, meanwhile, allows companies to better understand their needs and helps them create more relevant services for businesses. These services can then be sold to service providers on a white label basis.

Evolving the stripes of a telco is no easy task. Yet for service providers to thrive in the new world of communications, they must reject industry hype, challenge long-established notions and explore new operating models. ●

The Internet of Things - what it means for the networks

by Gary Smith, President and CEO, Ciena

‘The Internet of Things’, or machine-to-machine communications (*M2M*), will automate and improve the many processes surrounding us - our electricity supply, traffic management, at home healthcare and much more - ultimately making life more convenient. Nevertheless, the Internet of Things will greatly tax network capacity, so accommodating these capacity demands on future networks is critically important. A transition to next-generation network infrastructures will be necessary to support the new services that the Internet of Things will bring and to fully realise its benefits.

Gary B. Smith is the President and CEO of Ciena; he is a 20-year veteran of the telecommunications industry, having first served as its President and Director, Chief Operating Officer, Senior Vice President, Worldwide Sales and as Vice President, International Sales. Prior to joining Ciena, Mr Smith was Vice President of Sales and Marketing for INTELSAT, and Vice President of Sales and Marketing for Cray Communications, Inc. Mr Smith began his telecommunications career at CASE Communications. He has extensive international experience having been based at various times in Asia, Europe, and North America.

Mr Smith currently serves on the board of directors for CommVault Systems, Inc., is a commissioner of the Global Information Infrastructure Commission, is a ‘Broadband Ambassador’ for the Internet Innovation Alliance and participates in initiatives with the Center for Corporate Innovation. Mr Smith has also been a member of the Board of Directors at the American Electronics Association (now TechAmerica).

Gary B. Smith received his M.B.A.from Ashridge Management College, United Kingdom, where he graduated cum laude.

As the car passes the traffic lights closest to home it contacts the oven, switching it on to warm the supper. The heating also switches on in the house while the fridge, which is almost a year old, books itself in for an annual service.

This may sound like science fiction, but according to some analyst predictions, we are about to witness a true rise of phenomena like those described, otherwise known as Internet of Things. Sometimes referred to as machine-to-machine communications (*M2M*) - although definitions of that term vary widely - the concept promises a world in which the equivalent of an autonomic nervous system, working in the background and keeping the world around us healthy and functional, delivers a range of value-added services to consumers and businesses alike.

The benefits of autonomous and adaptive M2M communications are still being explored, but the possibilities are vast. One example involves vehicles communicating with roadside equipment and one another, allowing for better traffic management, reduced congestion and a reduction in accident rates. Projects of this type, relying on telecommunications technologies, are already underway and well advanced in their research. A good example is the European Union co-funded CVIS Project (www.cvisproject.org), aiming to tackle the next big challenge in the world of automotive electronics - intelligent co-operative systems, which promise improvements in both the efficiency of transport systems and safety of road users.

The development of the smart grid is another good example. The smart grid will see electrical devices equipped with connectivity so they can report back on elements such

as power consumption and monitoring equipment within utility providers' networks. This promises higher efficiency in our power distribution networks in the form of more availability of power to homes and factories at a lower cost. It will also allow distributed power generation, including local solar and wind generators.

The potential of Internet of Things doesn't stop there however. In the logistics sector, quick and automated processing of packages is already based on 'talking' packages and appliances equipped with RFID tags so that they can share information about destination and size. The evolution, therefore, has already begun - and in multiple industries.

However, while this progress is important to our society as a whole, there are certain network implications to take into account for The Internet of Things to be truly successful. Most importantly, networks will need to be secure and reliable, as many of the autonomic functions that will run across them will be critical.

Remote healthcare is a growing sector in which the security and reliability of The Internet of Things must be of unquestionable quality. Remote patient monitoring is already becoming increasingly more sophisticated and prevalent due to the lower costs of wireless devices, the wide availability of broadband networks and healthcare providers' need to find new ways to streamline patient care and costs. One possible healthcare application could be a heart rate monitor notifying the hospital when certain pre-set levels are reached. Necessary steps to deal with the medical situation could then be set in place automatically without the need of human intervention - for instance, increasing the dose of medication to an IV drip.

The remote patient monitoring market is on a dynamic growth trajectory. In fact, Juniper Research estimates it is likely to reach nearly US$1.9 billion globally by 2014. Still, none of this potential growth and improved patient care is possible if networks can't accommodate absolute performance perfection. Just imagine the consequences if that heart rate monitor loses connectivity with the network, or if patient monitoring information is unable to get through a congested or unreliable network.

The exponential increase in the number of network-connected devices exchanging information will drive a need for additional bandwidth. In fact, the proliferation of networked devices changes the nature of the network by significantly raising the threshold of 'baseline' Internet traffic. Operators struggling to cope with 3G or rising broadband demands will need to consider 'intelligent' ways of growing the network without increasing costs. Furthermore, networks must be prepared to simultaneously deal with multiple services and increasingly rigid quality requirements. The need to differentiate between high and low priority traffic will be just as important as dynamically adapting the network to changing capacity requirements on-demand and in real time. Service-driven networks that meet these requirements will allow the flexible use of existing capacity without impacting the quality of service.

Today's network infrastructures, largely based on SONET/SDH, cannot physically or economically support the evolving demands caused by this overwhelming increase in bandwidth and the transport of IP traffic, as well as the need for more flexible connectivity, higher resiliency and network automation. To address this concern and remain competitive, service providers have been investing heavily in modernizing their networks.

The benefits and applications promised by Internet of Things are vast, and many network operators have already begun to adapt their infrastructure to support them. However, depending on business or networking pain points and technological and service imperatives, their current approach to the problem may not be truly effective. If we are to truly benefit from the promise of Internet of Things, it will be essential to put next-generation network architectures in place.

A critical component of any modernized infrastructure is the switching and aggregation function. To fully reap the benefits of next-generation infrastructures, an unprecedented level of switching system modularity and optimization is required. Given the importance of switching and the intelligence it must possess, there are many technological solution options that operators must consider.

Some key technologies have emerged as common components of these new switching architectures, including Carrier Ethernet, Multiprotocol Label Switching (*MPLS*), and Optical Transport Network (*OTN*). In addition, software-based automation of the network - via intelligent control plane - is essential to realizing this next-generation network and associated technologies. The result, when implemented appropriately, is a service-enabling infrastructure that facilitates the convergence of networks and allows for resource optimization.

There are countless applications of Internet of Things that can help automate and improve the many processes surrounding us - ultimately making life more convenient. However, we need to ensure that we implement all aspects of the required technology needed to fully support this societal evolution.

The Internet of Things will tax the capacity of future networks, and thus accommodating the huge capacity demands on future networks is critically important. A transition to next-generation infrastructures will be necessary to support the new services The Internet of Things will bring and to fully realise its benefits. ●

South America - a new interconnection frontier

by Erick W. Contag, COO GlobeNet

IP traffic, industry experts say, is growing fastest in Latin America and the growth is likely to continue. Local operators are seeking international bandwidth to provide the high-speed connectivity that content hungry users want and businesses need. Much of the international IP traffic increase is driven by the astonishing growth of local financial markets, such as the BM&F Bovespa. HD coverage of the World Cup and Olympic Games (Rio de Janeiro 2014 and 2016 respectively) will also increase traffic greatly.

Erick Contag is the head of and Chief Operating Officer for GlobeNet. Mr Contag brings more than 20 years of sales, marketing, business development, strategy and corporate management expertise to GlobeNet. His responsibilities include strategic management of the company's business operations as well as growing the business into new regions. Mr Contag has held executive positions in the US and Latin America including as founder, president and CEO of DataViz, CSO/CTO of Simbacom, and VP of Engineering for Protokol Sistemas. He also has served on the Board of Directors of several companies and organizations.

Erick Contag holds a B.S. degree in Electrical Engineering from the University of Tulsa, and an Executive Engineering Management certification from IESA.

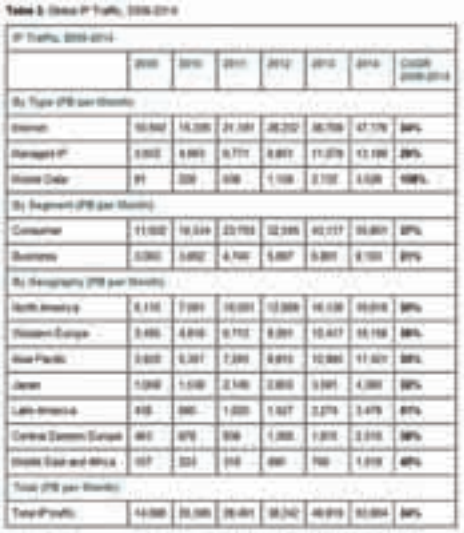
The rapidly expanding South American marketplace has experienced growth in recent years, led in part by widespread adoption of new technologies, telecommunications advancements, increased cooperation and partnership amongst service providers, along with the increasing activity by financial trading communities in this region, to name a few.

According to Cisco traffic forecasts, IP traffic is growing fastest in Latin America, followed closely by the Middle East and Africa. According to their expectations, traffic in Latin America will grow at a CAGR (*compound annual growth rate*) of 51 per cent between 2009 and 2014.

The drivers

Let's take a closer look at what end-user clients require and how they want it delivered. With the influx of new content globally and the voracious appetite by the end-user to consume the content, service providers are seeking new platforms and creating new service bundles to provide the content over a variety of devices and transmission mediums such as 3G and 4G wireless networks, smart-phones, ultra high-speed broadband, and digital TV.

We are also witnessing exponential demand growth for high capacity HDTV and 3DTV



Source: Cisco traffic forecasts, per DSL Prime

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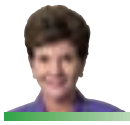

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live video content. The recent World Cup held in South Africa was a small taste of what we can expect for the World Cup and Olympic Games to be held in Rio de Janeiro in 2014 and 2016 respectively, where we expect all events to be covered in HD. Service providers need to anticipate the demand for high-bandwidth terrestrial and submarine fibre-optic networks. Optical fibre content transport is ideally suited, reliable, fast and cost-effective to complement, but most likely to substitute, existing copper, satellite, and wireless solutions. At the edge, end-users will expect to watch games and replays on wireless HD devices for instant gratification.

In order to accomplish this, more and more carriers and content providers are partnering to create multi-service relationships to address the growing demand throughout the Americas for broadband access by households, as well as businesses demanding increased capacity and services. With the region experiencing commercial, social and technological integration, providers are embarking on projects that will further integrate networks and connect countries - increasing traffic, expanding capabilities, and uniting the people of the region. This is the interconnected world we live in today.

An example of this is that, as reported by ABI Research in 2010, Latin America will become one of the fastest growing mobile capital expenders with over ten per cent compound growth between 2009 and 2015. In response to customer needs - namely, wide-spread access to cellular services - mobile operators and carriers are increasing capital expenditures to improve and expand their networks. Operators are seeking to expand their data and IP networks to interconnect countries within the continent, and to upgrade their ability to operate submarine cable fiber networks between continents. These improvements, while increasing access and availability to the end-user, should also double capacity on existing routes, to the benefit of all.

The market opportunity

There is a large opportunity in South America for high quality IP to address the demand for global content, and to provide wireless services for both small and large businesses. Carriers that target residential users also experience growth as more and more households are adopting broadband access and services as prices become more affordable. Smartphones are growing at a very fast pace in Latin America; smartphone manufacturers such as RIM, for example, announced they are now manufacturing Blackberry devices in Brazil due to local market demand.

Another need to consider is due to the growing popularity of South American trading entities such as the Brazilian-based BM&F Bovespa, one of the largest exchanges in the world in terms of market value, the second largest in the Americas, and the leading exchange in Latin America.

Generic Financial Exchange picture from iStockphoto

Today's trading entities require very low latency and redundant network connectivity to ensure that their financial transactions will be processed with speed and accuracy. Traders and exchanges also require global access so they can quickly move transactions from one exchange floor to the next, with the necessary speed, service availability, and precision required to remain competitive in the financial field.

International carriers which provide international capacity between North and South America over advanced fibre-optic cable system have seen a boom in recent years connecting carriers serving the financial industry, especially to and from Brazil. Traders, financial institutions and investment companies throughout South America rely on advanced networks to conduct trades faster and more efficiently to gain competitive advantages in serving their client bases. Carriers rely upon secure capacity to access other key trading cities throughout the Americas, for fast and direct connectivity.

GlobeNet network map

One connected world

So how are carriers and wholesale providers ensuring that capacity is reliable and available in these bandwidth-driven times? Perhaps the most important technological asset we have is the ability to interconnect. Today, more than ever, service providers are partnering together to hand-off data seamlessly and to better manage the end-user's experience. In Brazil, subsea networks seamlessly interconnected with national terrestrial networks, to provide end-to-end, fiber-based services to local carriers.

Finally, as networks sprawl across the globe and back, the human experience - the relationships between us and the need to communicate - are still the very core of telecom - of our interconnectedness. Whether from one financial exchange to another or a streaming video of a sports event, there's a basic need for human connectivity - and we all expect superior quality with this experience. It's the relationships between carriers, the deployment of the latest network technologies and low latency routing, and the support that engineers and technical support teams give customers that ensure this high quality, human experience. ●

Reshaping lives through connectivity

by Rashid Khan, President and CEO, Mobilink

In developing countries like Pakistan, mobile phones have brought cutting-edge services and enhanced the speed of communications. Increased accessibility has enabled unprecedented convenience and accelerated social, commercial and industrial activity. In addition to traditional voice and message services, mobile phones will soon provide a wide range of otherwise unavailable services in developing regions. Mobile banking, mCommerce, medical support services, eGovernment, travel and transport arrangements, literacy programmes and social networking are but a few of the services that mobiles will facilitate.

Rashid Khan is the President and CEO of Mobilink, part of the Orascom Telecom Holding, in Pakistan. Prior to this he was the Managing Director and CEO of Banglalink, a cellular operator in Bangladesh. Earlier Mr Khan was the Executive Vice President and Chief Commercial Officer of Mobilink. Mr Khan has extensive experience in telecommunications, IT, and other technologies in both developed and emerging markets. Mr Khan has been associated with various international companies and has been awarded patents in the United States of America for his inventions.

Rashid Khan holds a Masters Degree in Electrical Engineering.

The human race has always sought a wider spectrum of connectivity for more frequent, closer and more economical communications and interaction throughout the global society. This creates and strengthens relationships, enables quicker execution of tasks and coordination among organizations and groups. Today, our society relies increasingly upon machines, electro-mechanical systems and devices, for smooth functioning in daily life. There is a growing need to remotely control, monitor and maintain such equipment.

Over the past two decades, rapid developments in connectivity have been made across the globe. With the telecommunications revolution and the reduction in size of the embedded communication chips, communications devices are becoming smaller every day. Microprocessors are connected to numerous networks, linking a wide range of gadgets to centralized communication systems. These networks enable the creation of sophisticated communication facilities and services. What began as a luxury is a commodity today.

Billions of cell phones now provide constant and instant connectivity via telecom networks spread around the world. Hi-tech networks establish cross-continental link adding a new dimension to global accessibility. Recent developments suggest that using embedded communication chips connectivity devices will soon shrink almost to invisibility. Soon, everything will be truly connected and interactivity between person and machine will move to the next level. This will enable complete control, care and maintenance of machines and buildings from afar.

Highly evolved connectivity is enabling the creation of virtual organizations that can perform myriad tasks with unmatched agility and execute projects with immaculate finesse. Virtual companies can operate globally in a diverse range of businesses through electronically created and transmitted data. The inputs and outputs of a virtual company are the same, but its lean structure enables superior efficiency and proactive functioning, resulting in unmatched value addition. These organizations use a bare minimum of human resources. In the developed world, there are virtual companies managed by a single entrepreneur, alone.

The virtual office is another cutting-edge concept based on connectivity and efficiency. In a virtual office, working rooms are not permanently allocated to specific employees. Every workstation is flexible, convertible and well connected allowing any employee from any department to carry out his tasks comfortably. These workstations provide accessibility to the relevant software and electronic files authorised for the employee working on it. Operating in a virtual office environment entails substantial savings on office space and other overhead costs.

In developed regions of the world, the third generation of mobile telecommunication (*3G*) provide wireless download speeds ranging between 3.6Mbps and 7.2Mbps. These 3G networks deliver enhanced information services more efficiently, including wireless accessibility

to interactive websites in their original format. Fourth generation (*4G*) networks are also emerging; they provide even higher speed Internet access on computers as well as cell phone handsets. Technologically advanced countries with extensive cellular penetration and ample demand for cutting-edge services are deploying 4G networks; these will better support mobile commerce ventures, branchless banking, advanced multi-media applications and the like.

In developing countries like Pakistan, revolutionary advances in IT/Telecom have enabled the introduction of cutting-edge services and enhanced the speed of communications across the nation. This has enabled unprecedented convenience to speed up the social, commercial and industrial activity, with increased accessibility and reduced distances.

The introduction of mobile banking offers great economic advantages for developing countries like Pakistan. According to the State Bank website, only 15 per cent of the population has access to formal bank accounts, whereas telecommunication facilities are being used by over 60 per cent of Pakistan's population. The cellular operator' networks are ideally positioned to fill the gap between the unbanked population and access to financial services. Cellular connectivity has enabled the rapid and economical establishment of branchless banking networks in rural areas. Branchless banking is an effective medium for delivering banking services to the remotest villages. This enables the underprivileged population to participate freely in mainstream commercial activity and expands the business community by enhancing market access.

In developing countries, the rural-urban migration is always high; millions of rural workers migrate to cities or go abroad in search of better livelihoods. They rely heavily on money-order services or other informal channels to remit their income to their families back home. Conventional money order facilities are reliable, but somewhat inconvenient, and involve a time-consuming process of physical money transfer. Using cellular connectivity, the first Mobile Money Order (*MMO*) service has already been introduced in Pakistan. MMO enables instant, simple and highly secure transfer of funds to remote locations across the country, as it operates through secret PIN codes and electronic transfer of amounts.

Based on mobile connectivity, many types of transactions are available using remote M-Banking facilities. For example, Mobilink Genie enables instant payment of utility bills through secured and convenient applications. Such services have facilitated the lives of many.

Business functions, processes and methodologies have seen a total transformation based on mCommerce dynamics. Using mCommerce facilities, tomorrow's customers, sitting anywhere, will be able to locate, procure and buy any imaginable merchandise or service, within minutes - at any hour. Robust financial institutions ensure the security of mCommerce transactions. Still an emerging phenomenon, branchless banking will generate tremendous benefits for customers dwelling in sub-urban and rural areas.

Internet connectivity also enables airline reservations through mobile devices. A whole range of online travel facilitation services help one make quick journey arrangements - book your seats, reschedule your flights or book hotel accommodation - without visiting a travel agent. Subscribers can also receive important news, offers and quick updates on their mobiles to stay informed and alert.

Modern cellular networks offer other useful features like conference calling, voice mail, GPRS/Edge and call forwarding facilities. With the increase in number of subscribers, cellular companies have gained economies-of-scale over the past two decades, and the cost of using cellular and Internet connections has gone down. Moreover, innovative uses of technology via mobile phones - such as special services for farmers that deliver farming advice, weather forecasts, commodity prices and market updates etc. - are driving social change.

Due to disparity in the incomes and privileges of various population segments in developing nations, a digital divide has formed. Some segments of society use information and communication technology (*ICT*) to gain fabulous advantages for themselves, whereas, the less privileged population is deprived of the benefits that ICT brings. However, all segments of the next generation are increasingly tech savvy; they will help narrow the digital divide; we foresee well-integrated, technologically aware and robust societies in the developing world.

The latest smartphones have converged highly innovative, user-friendly applications and offerings into mobile devices. These include Internet connectivity, push mail services, searches, high-resolution cameras and displays, Bluetooth, WiFi and real-time messengers. With cutting-edge smartphones, users can indulge in social networking on the move. It allows complex task-performance and rapid transmission of data including high quality graphics.

The use of telecom technology for medical purposes is also bringing great benefits. In Pakistan, this is in its initial stages but the uptake is increasing. To give an example, cellular connectivity has played an instrumental role in the fight against Polio - a deadly but avoidable disease that remains endemic in only four countries including Pakistan. With the help of SMS messages, broadcasts and short codes that link users to the Polio Control Cell, parents can report children who were not vaccinated during Polio rounds to ensure maximum immunization. In the past year, many parents, especially those residing in high-risk districts have been informed regarding Polio vaccination rounds and the Polio Cell has dispatched teams to thousands of parents who have contacted them through SMS to have their children vaccinated.

A literacy-promotion project launched by UNESCO and Mobilink, implemented with the help of a NGO, is using SMS messaging on cell phones as a tool to disseminate educational programmes and boost female literacy in underprivileged areas throughout Pakistan. This innovative initiative offers a mobile phone solution to an important question; mobile phones have become the most desired daily means of communication among the youth population. The project delivers a mobile-based, distance post-literacy programme. Newly literates receive post-literacy materials via SMS messages on their mobile phones, read, and respond to them.

The method proves to be far more effective than conventional print-material-based post-literacy programmes in keeping up the literates' interest in literacy communication. The learners have shown significant improvement in their literacy skills through the SMS literacy program.

In the near future, we foresee the scope of these products and services will expand to offer much more value. Public transport companies will issue charge cards to the passengers and fit special card-reader devices on all buses; using ICTs they will then monitor on-the-road automatic ticketing processes. Home, building and premises security are already being raised to the next level with the advent of wireless connected systems, so it is now possible to access an entire security system via a computer or cell phone and view a security camera feed online.

There are pros and cons to everything. We must evaluate the features, possible health hazards and potential of misuse posed by innovations. The unintended consequences of a technological breakthrough sometimes far outweigh the positive impact. For communication and connectivity to make a deep, resounding impact, it must be safe, secure and should add true value to life, as we know it. ●

Energy and space - a pragmatic connection

By Dmitry Sevastiyanov, Director General, Gazprom Space Systems

In Russia, the oil and gas industry is a major factor in the country's economy. It is Russia's main export, a source of taxes and the sponsor of social initiatives; its development is vital for the country. Today, Russia's economic modernization calls for migrating from a raw material extraction driven economy to a hi-tech economy. It is no accident that Russia's largest energy sector player anticipated the current model many years ago and now its largest space sector player as well.

Dmitry Sevastiyanov is the Director General, Gazprom Space Systems. The GSS team operates the Yamal satellite communication and broadcasting system, provides satellite capacity and services, builds Yamal-300K and Yamal-400 telecommunications satellites and satellite ground infrastructure. He has spent most of his career at Gazprom Space Systems, formerly Gascom, where he has in the implementation of all the company's major projects including building the Yamal-100 and Yamal-200 communication satellites, satellite communications networks and satellite digital TV system deployment. He began as an engineer in GSS's Northern Operation Unit.

Dmitry Sevastiyanov graduated from Ivanovo Energy Institute where he also earned his PhD in engineering.

Obviously, everything in the world is basically interconnected, but the nature of some connections is worth wondering about. Energy and satellite telecommunications, for example - just what connects them? Is it pure chance or something more?

Similar philosophy

The star of our company went up in the 1990s, so to say, from a gas torch; our parent company is the largest Russian energy company. And we, working at the juncture of gas, space and telecommunication industries believe that this relation bears deep if not cosmic character.

Let me explain.

Large energy companies have global aspirations. Each of them, strategically, in its own way aims at gaining or preserving world leadership.

In the world ratings, top positions in terms of revenues are held by companies from the energy sector. But the global reach of these companies is defined not only by their incomes, but also by the geographical scale of their activity. Here, again, oil and gas and power companies, working worldwide, are far ahead.

What about satellite communications?

The revenue of the satellite communications sector is noticeably inferior to the energy-producing sectors. The turnover of the entire world satellite communications industry might be compared to that of a single, and not the largest, energy company.

Still, it does not give the satellite players an inferiority complex - on the contrary, they are both global and both profess almost the same business philosophy. Satellites cover vast territories; they reach practically any point of the Earth and quickly deliver reliable communications in remote areas including those where major oil and gas extraction operations are expanding - regardless of climate, the existing communications infrastructure, or lack thereof.

People need energy at every corner of the Earth. Communications satellites provide essential support for the technology and operations of energy production, transportation and distribution; satellites help energy companies carry out their socially significant mission. In addition, satellites link populations in remote areas to another highly important component of civilized life - information. The information gaps, the almost total lack of information, in some parts of the world, make the populations of these regions non-competitive - indeed, almost non-existent - in a global context. Satellite communications are the most effective tool for smoothing this inequality.

It is no accident that the most prominent decorations in the offices of both power and satellite telecommunications companies are world maps.

Pragmatism

Well, this is just philosophy, but business is pragmatic. What are the mutual practical interests of the energy and space sectors?

The main driving force of satellite telecommunications today are the TV and broadband services that give the population access to information and entertainment. Of course, these applications are important, but there are also other more serious reasons for satellite communications development. These include governmental services, such as, unfortunately, accompanying government operations in 'hot points', corporate communications and, first of all, helping maintain oil, gas and energy production.

The share of the corporate sector in the total volume of satellite communications services is estimated by experts as a bit more than ten per cent, but satellite operators assign considerably much greater importance to their portfolio of corporate sector. Besides the fact that, as a rule, companies are good sized clients, their use of telecommunications services is expected to grow considerably with time.

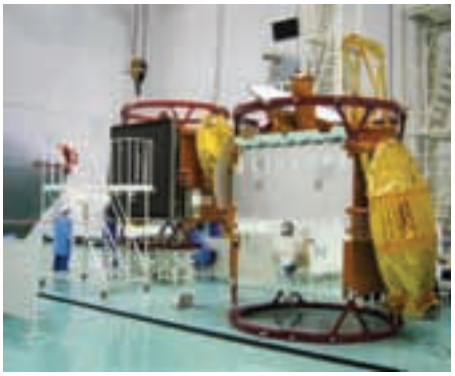
The world oil and gas industry has to keep developing very quickly to meet growing demand. The steady increase of world energy resources needs stimulates sector companies' efforts to prospect for oil and gas deposits to drill wells and extract hydrocarbons. So, in some regions the quantity of exploited wells increases by 15-20 per cent a year. These operations, as a rule, take place in areas with underdeveloped or totally absent infrastructure - including those on the World Ocean shelf, where now about a third of the world oil and gas volumes are produced. The share of shelf deposits is expected to increase. Indeed, the production of land-based deposits is already declining and the wells newly opened on land are considerably inferior to shelf deposits.

It is a promising niche for satellite communications. Although platforms will not use satellite exclusively, it is likely to remain the pre-eminent solution for most off-shore communications. Modern oil and gas corporations live in the epoch of the integrated solutions, inseparable from information systems, and satellite communications show maximal effectiveness in combination with ground fibre-optic, radio-relay, cable and wireless networks. In practice, the deployment of such integrated communications structures almost always stipulates the use of satellite technologies.

Russian experience

It is well-known that today the oil and gas industry is the basis of Russia's economy. It is the main export component of the country, the basic source of taxes and the sponsor of social initiatives. Therefore the development of this sector is vital for the country.

Like the energy production, satellite telecommunications in Russia bear a significant social responsibility. Satellite communications reduce distances, which is especially important in Russia whose huge territory is both a competitive advantage and a big problem.



There is another aspect of extractive and hi-tech industries connection, seen distinctly in Russia. There is, so to say, a certain inverse relation. Our country's leaders have determined the course that Russia will follow for its economic modernization; a transition from the model of raw material extraction driven the economy to a vision of a hi-tech oriented economy. In addition to the direct state financial support of this transition, there is a sound appeal to big business, including that of oil and gas, to take an active part in this process. As an oil and gas company entering the satellite business, we anticipated this shift in strategy by many years - and it has been worth it; satellite telecommunications is quite a profitable business with a good return on investment.

There is another reason why space technology is playing a growing role in the energy sector. Most oil and gas companies have a huge infrastructure; its effective functioning requires not only reliable communication, but also a constant monitoring. That is why the space-based systems for remote sensing of the Earth, in combination with other monitoring technologies, for example, UAVs (*unmanned aerial vehicles*) will be more and more in demand by the energy sector, so those in the space sector are all developing or considering these capabilities.

Our experience suggests that energy and space are decisively connected by mutual practical interest. ●

Multimedia metamorphosis

by Erik Bettermann, Director General, Deutsche Welle

Two-thirds of the world's people live in countries with limited freedom of expression and less access to information. Citizen journalism is seen in many areas of crisis and conflict - users are filming, blogging, tweeting and posting via mobile and the Internet, when a connection exists. The expanding reach of broadband around the world is giving people access to a wider selection of content, and to multimedia distance-learning, but many regions lack broadband acces, so traditional radio and TV broadcasts serve a vital function.

Erik Bettermann is the Director General at Deutsche Welle. Germany's international broadcaster it produces news, background information and cultural highlights worldwide. Mr Bettermann came to DW from the Free Hanseatic City of Bremen, where he worked as a Representative for Federal Affairs, European and Developmental Cooperation. Early in his career, he worked as a freelance journalist for several daily newspapers in Cologne and for a newspaper published by the Evangelical church.

Erik Bettermann studied philosophy, pedagogy and social pedagogy at the Universities of Cologne and Bonn, as well as the Academy of Economics and Administration in Cologne.

The benefits of global broadband have been well documented. And while we are excited about the possibilities, we realize that as an international broadcaster that broadband is just one way to reach an audience that varies by region, country and sometimes even city. Deutsche Welle, along with many other broadcasters, needs to make use of all forms of media - and that includes the radio transmissions that we started nearly 60 years ago.

Deutsche Welle has a history that goes back nearly 60 years beginning with radio in the 1950s. As an international broadcaster, we respond and react to the demands of the changing media markets. Until the 1990s, the broadcasting landscape was to a large extent clearly defined: broadcasters simply produced and transmitted TV and radio programming. The situation has changed significantly.

The rapid change that we have witnessed in the last ten years is like nothing we have seen before. Content is now widely available on the Internet, blogs, podcasts and branches into to portals like YouTube, Facebook and Twitter. New technologies, digitalization and especially the Internet have changed the distribution and consumption of content. There is a general trend towards more mobility and time-independent usage of media. Moreover, viewers, listeners and users have become active participants, rather than mere consumers. They want to decide when, where, what and how they consume content. Many even produce it, share it and discuss it. Interactivity is on the move, Web 2.0 applications generate new, exciting forms of communication.

If we have learned anything from the past it is that those who want to succeed in the future need to be able to adapt to changing conditions. This is especially true for the media. Some say, that newspapers are becoming the dinosaurs of our generation - something that was unimaginable 20 years ago. This isn't just a matter of paper

"Life is quickly changing in Africa: education is the key to development, but schools and universities are still rare in Africa. Internet and mobile phone usage continues to grow, yet thousands of people are still cut off from the digital world. Young Africans search for their perspective in a globalized, knowledge-based society and wonder which path will lead them to a successful career or education. For instance, many ask what opportunities for learning and studying are available online and what opportunities globalization has to offer."

vs. digital; this is much more. We are talking about a paradigm shift in media consumption - and media entities must examine what is the 'right' content and the 'right' platform for the 'right' target audience.

Where does broadband fit in? We have seen how consumption is moving more and more towards all-digital, all the time. By connecting the world to broadband networks, you create an open market for opinions, perspectives and ideas. By broadening the scope of broadband around the world, we can include even more people in the conversation - and more people are getting involved.

Two-thirds of the people around the world still live in countries with limited freedom of expression and freedom of the press, as well as less access to information. With the expansion of broadband, the media can be instrumental in the realization of human rights. Citizen journalism has already been seen in action in many areas of crisis and conflict. Users are filming, blogging, tweeting and posting via mobile and the Internet, when a connection exists. Obviously, the expansion of broadband will benefit 'new media' and social media is putting the user in the forefront - a new form of distributor for news and information.

The international media can highlight alternative perspectives and expand the range of information and the diversity of opinion. The media must live up to its responsibility by making impartial and nonpartisan information available - and not just opinion based. This will become more and more important as it is possible to distribute up-to-the-second news and events from one end of the globe to the other.

However, what many forget in this rapidly changing media environment is that in many parts around the world, people still rely on classic forms of media for information. With regards to distribution, broadband is just one way to reach a given target audience. In Africa, radio has remained one of the most prevalent forms of broadcast media and Deutsche Welle, along with many other broadcasters, still relies on radio to reach its target audience there. That is the main reason why, when we implemented our multimedia distance-learning programme called Learning by Ear, we wanted something designed to bring knowledge to every corner of Africa. We decided to focus on radio. As Frank-Walter Steinmeier, the former German Foreign Minister, said about the project: "When children can't go to school, schools have to come to the children."

Life is quickly changing in Africa: education is the key to development, but schools and universities are still rare in Africa. Internet and mobile phone usage continues to grow, yet thousands of people are still cut off from the digital world. Young Africans search for their perspective in a globalized, knowledge-based society and wonder which path will lead them to a successful career or education. For instance, many ask what opportunities for learning and studying are available online and what opportunities globalization has to offer.

We want to use Learning by Ear to reach out to people in areas with little or no computer and Internet access - nevertheless, it was created so that content could be easily expanded to online platforms and with our series on computers and the Internet, we are prepping them for the future. We have now expanded the programme to Afghanistan - another country that relies on radio.

Still, it doesn't stop with just individual measures for education. In many regions around the world, the online footprint, as we know it in the Western world, just isn't as large. For example, in the Arab world, the market for television over satellite remains the most prominent. In many countries there, more than 90 per cent watch television daily. In Southeast Asia, in countries like Bangladesh and Indonesia, more people are accessing the Internet via mobile. In Indonesia, the number of households with broadband connections is on the rise, but many predict that it will only reach 12 per cent by the year 2018.

There is no cookie-cutter approach to reaching audiences around the globe. Media entities need to adapt their platforms, content and delivery methods to meet the needs of the viewers, listeners and Internet users around the world. By expanding the reach of broadband around the world, many audiences will finally benefit from more freedom of choice - with a wider selection of content, more access to education and new perspectives. But we aren't there yet. ●

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Gazprom Space Systems' orbital fleet consists of two mid-size satellites under the Yamal brand. The Yamal-201 satellite operates in 90E position. This satellite serves mainly the Russian/CIS market. The Yamal-202 satellite operating in 49E orbital slot has a wide service area covering most of the Eastern Hemisphere and caters to the international satellite market. The Yamal-300K (90E) , 401 (90E) and 402 (55E) satellites are under construction, while the Yamal-601 (49E) is in development.

Gazprom Space Systems' ground infrastructure consists of four teleports in the city of Moscow and in the surrounding Moscow region, which are connected to the main telecom backbones by means of fiber-optic lines. The company also has a wide network of earth stations across Russia.

In Russia, Gazprom Space Systems is not only a satellite operator but also a service provider and system integrator. Within Russia, along with satellite capacity, it provides satellite services including satellite links, video distribution, Internet access, network development and management.

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