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Future of Connectivity

The Global Challenge

The internet has finally gone mobile. Today over 300m of us access the web using mobile technology. In 2010 the number of subscribers reaches 1bn, surpassing the number of fixed internet users. In a couple of years the number of mobile broadband connections will be in the order of 4 to 5bn - with the majority of new consumers coming from China and India. By 2020 there may well be as many as 50bn devices connected to each other. These devices will work across different networks which, in turn, will be connected to each other. This global, pervasive connectivity will facilitate new types of services and opportunities for people, industry, and society but it won't be an easy journey. Delivering this vision is a major commercial and technical challenge for the ICT sector, but on the other hand very exciting.

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Technology in itself will not be a restricting factor. Transport, access, storage, and processing will all thrive on the continued effects of Moore's law and miniaturization will continue where beneficial. High performing systems are of course an absolute necessity but the implementation challenge is not straightforward. We need to consider how to deal with the phenomenal increase in capacity both in terms of number of devices to be handled but also in terms of the amount of information that will be exchanged between these devices. Power consumption will also still be an issue because of battery lifetime and sustainability concerns. So, how can we develop a system that is cost - effective, adaptable, easily deployed and, most importantly, simple to use? How can we develop networks that are self-deployed, self-operated and self-maintained? These questions cannot be answered by technology alone; in order to achieve success we need collaboration between network providers, device manufacturers and, of course, policy makers both nationally and internationally.

What will this mean for consumers? Essentially ubiquitous connectivity will continue to change the basic structure and conditions of our lives and, although it has the potential to bring extraordinary benefits, for some it will be a real challenge to adapt to this. Information on almost everything is now widely available making industries and markets much more transparent and efficient. However, the way consumers share information and communicate with each other, utilizing a variety of online social networking tools, IPTV, images and video, means that how we give and receive information is becoming increasingly personalised. This, in turn, means that individuals, more than ever before, have to manage their own public identity. This indicates that concerns around cyber crime and data protection will continue to rise. As a result, security and consumer protection related issues will become increasingly important.

Business will also have to adapt to a changing environment as their services are increasingly delivered online. In a world of endless choice and seemingly complete transparency some will be hard put to differentiate themselves. Of course, communications technology is not in itself a limiting factor for the diffusion of new products and services - in fact evidence suggests quite the opposite - those who are successful will have made the most of the opportunity. This is why brand identity will continue to dominate.

Options and Possibilities

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By 2020 the majority of the world's population will have access to basic telecommunications services. However, even though the current development pace is high, with more connected devices and availability of internet access "everywhere", it is still uncertain how fast this will really impact and change conditions for other value chains, industries and daily lives. This depends on many factors including the rate at which networks can be rolled out and the connection speeds that will be possible. Where there is connectivity, smart phones and devices will enable people to leapfrog a generation of technology, especially for those who never had a land line phone. Mobile voice increase in developing economies may slow down but these markets will add local innovation and stay in the forefront with overall growth consistently higher than in mature markets. It is also likely that Broadband access penetration will increase primarily by means of radio solutions in developing markets outside areas where fixed broadband is economically feasible.

We face rising populations and increased dependency ratios which will be exacerbated by scarcities of resources and environmental requirements. In order to maintain standards of living with substantial and continued global productivity improvements will be needed. This will partly be enabled by the communication industry and, particularly when combined with other vital industries such as transportation and healthcare, will play an important role in addressing this need. For example, scarcity of labour can, to an extent, be mitigated if machine to machine (M2M) communication is used to address labour intensive tasks; automation is specific vertical industries can be enabled by connected sensor networks. In addition, self-service solutions will also continue to grow far beyond today's e-bank and e-retailer services applications into areas such as government and healthcare; and, the increased global use of mobile, video and internet will mean that people can benefit from the services they need more quickly at less cost.

Sustainability is certainly high on the agenda for the next decade and here ICT can make a large contribution. As the world measures more or less everything by new sustainability standards, whether quality of life, business success or government actions, there is potential for connectivity to play a significant role in areas such as carbon mitigation. A recent report (SMART 2020) concluded that, although ICT merely represents 2 percent of global CO2 emissions, it has a clear role to play in reducing the remaining 98 percent from other sources. Therefore expect a boom in innovation of services to meet this emerging demand; e-government, e-health, e-education, e-work, telepresence, logistics and energy management services will all increase. Machine-to-machine and process-to-process communications as well as tools leveraging data mining will all flourish as sustainability efficiency measures will be taken across the board and in all enterprises.

In the corporate world, there will be a blurring of borders between large and small enterprises with large scale companies deploying true global operating models, increased inter-company collaboration and workers increasingly tele-working and being loosely connected to organizations. As creative knowledge workers become strategic assets for companies, IT budgets will increasingly be geared at making them effective. Increased connectivity will enable competitive advantages and new business models to be sought from mining massive amounts of data. For instance real-time business intelligence and statistical experimentation, real-time management of goods in world-wide distribution and logistics chains and targeted advertising solutions will all require data systems that will be enabled by falling prices on data storage, communications and processing.

User generated content will also probably continue to grow strongly, increasing traffic and the abundance of available information, However, the impact on media value chains and the commercial value of that content is unclear. The online advertising market will grow, but will not be of a magnitude sufficient to substitute telecom services revenue streams at the current price levels. That said, as media consumption continues to become more fragmented an interactive, the gap between the rapidly growing online share of media time, and the online share of the global advertising budget, will close.

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Proposed Way Forward

Looking to 2020, we see that, while the technology platforms that will enable global ubiquitous connectivity are clear, the way in which businesses, society and individuals use these could vary significantly. Some examples of scenarios that might occur can be described as follows:

We see an increased separation between the content and services that people use and the means by which it will be delivered. Companies with strong brands will shape the communications industry and their services could be delivered over the top of independent network providers and will be tightly integrated with devices. Simplicity and convenience is the driving force and brand loyalty will win over variety.

The sustainability agenda comes to the fore and changes the conditions for societies, companies and individuals worldwide. In order to reduce travel and energy consumption there will be an acceleration of new mobile internet services for health, government, work and machine-to-machine (M2M) operations. Increased regulation will come into place to secure affordable services and drive industry players to pool their resources to ensure that networks are capable, reliable and robust.

As with many scenarios, we see that the way forward will probably be a hybrid of these. An open application environment will enable new services and applications to combine adjacent scientific fields such as energy, food, water, transport, health and ICT - globally and locally. Everything that could benefit from a wireless network will have one. Industries will become increasingly mobilized and there will be an increasing share of services delivered online. Technology in itself will not be a limiting factor and there will be the introduction of many more new products and services. Usability and simplicity will be in high demand, fixed and mobile broadband will converge and 50 billion devices will be connected globally.

Impacts and Implications

It is possible to suggest that access to advanced communications will be come a "universal right"

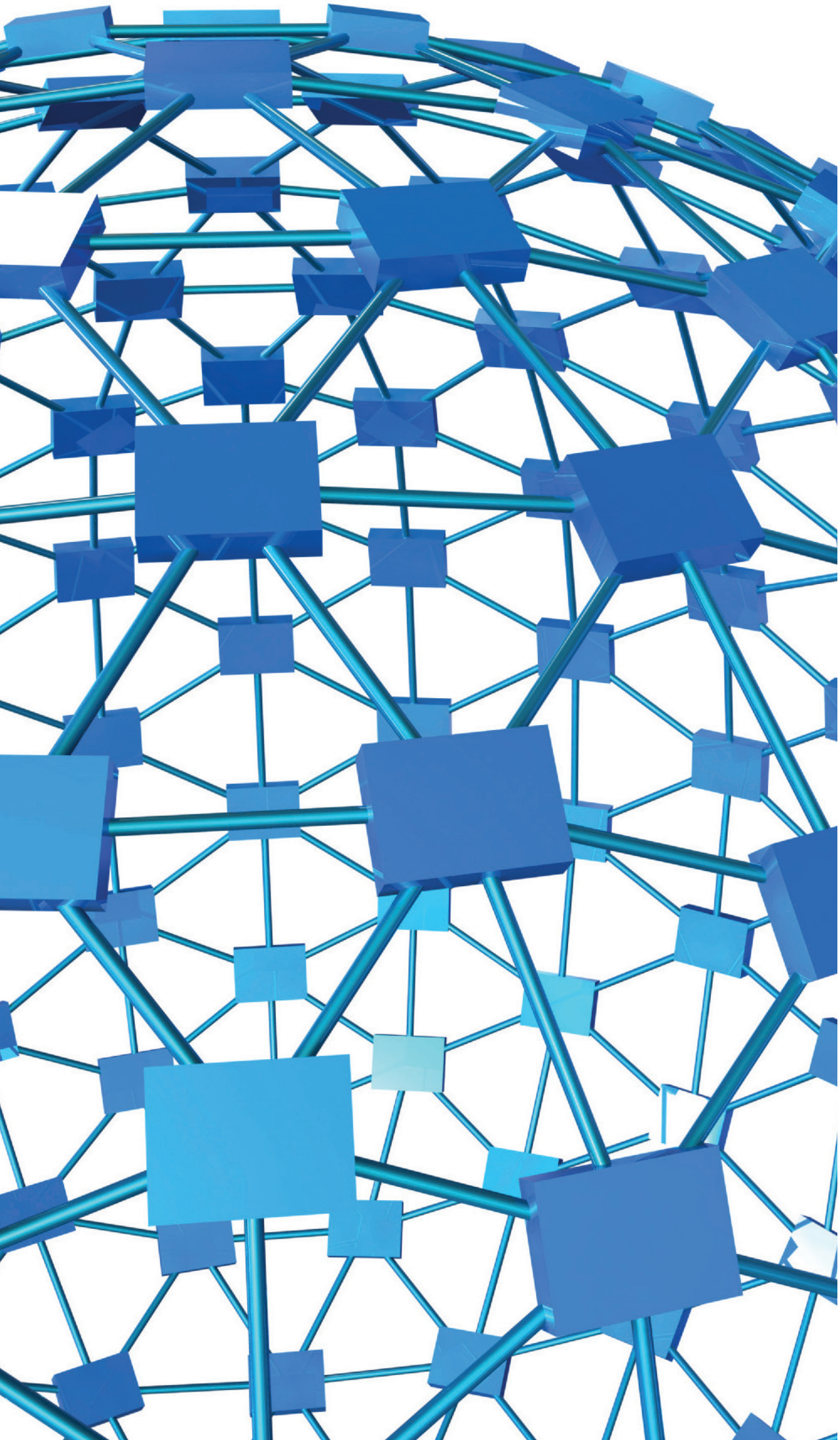
Full global connectivity is already well underway. It has already changed the way we communicate with other people and groups. The amount of information we can share and the speed with which we can share it is increasing rapidly. Indeed, it is possible to suggest that access to advanced communications will be come a "universal right" and that a wide and deep penetration of networks and services is a prerequisite for the continued struggle against climate change and poverty. This suggests that universal services requirements will drive new investments in the industry, while measures to keep services affordable (e.g. price regulation) may reduce revenues and profits leading to increased pressure for lower cost and higher efficiency.

In the next decade, addressing the major global challenges and a continued shift to wireless and online services will bring forward new societal vulnerabilities. 'Cyber crime' and malware may be increasingly common, and dependencies on the availability of information and communication systems will increase. Restricted online anonymity and privacy will also raise integrity concerns. As a result, security and consumer protection related regulation will increase and industries will move to capture these new opportunities.

IP will be the prevailing delivery vehicle for much of our connectivity, and the vertical dependence between services and infrastructures may gradually disappear. Users will access services and content independently of the network provider to a larger extent. Business models will vary, but lower entry barriers and innovation globally will also increase the number of providers offering the same service - but at a reduced cost to consumers of financed by alternative business models, such as increasing advertising revenues.

Most other areas will to some extent be affected by global connectivity: Money, authenticity, transport, travel, mHealth, privacy, identity, energy, cities, migration, food, water, waste. For all these areas you can find a use for connectivity. Global connectivity can change, improve and be used to catalyze innovation in everything.

Real change, however, can only be made when communication technology is properly integrated into adjacent scientific fields. This will open up new services in a wide range of complementary industries such as healthcare, automation, positioning and information management. It is clear that everything that can benefit from a network connection will have one. Not only will more people be connected, but devices for various types of automated services and functions (e.g. energy meters, surveillance, climate sensors, e-health sensors, and industry process automation) will exchange data and change lives.



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