



***Global Digital Innovation & Investment Summit 2013-2015:
Scaling Science, Technology & Culture to
Meet the Millennium & Sustainable Development Goals***

Background Paper

September 23, 2013

Global Digital Innovation & Investment Initiative 2013-2015: Scaling Science, Technology & Culture to Meet the Millennium & Sustainable Development Goals

Abstract

An unparalleled confluence of forces is shaping the grand challenges of our generation. This paper outlines the need for radically new mindsets in tackling the unique convergence of digital technology and global development

The digital revolution; the fragmented state of global health and education; the explosion of ageing populations and the enduring gaps in gender equity and youth employment; the daily truth of climate change and complexity of future energy options; the heady rise of the emerging economies and the global financial system in freefall; the cruel persistence of poverty, hunger and conflict in sub-Saharan Africa and elsewhere; and the sweeping changes across Central and Eastern Europe, and now the Middle East.

Few could have predicted or planned for the seismic demographic shifts or democratic upheavals witnessed over the past two or three decades. Yet the sheer magnitude and volatility of change during this period is straining the established international order and its chosen institutions almost to breaking point. From the United Nations to the World Bank and International Monetary Fund, or the African Union, European Union, ASEAN, G8 and now G20 to the G77 nations, common vision and purpose are needed more urgently than ever.

Indeed, the stakes could hardly be higher. In the race to meet the Millennium Development Goals (MDGs) by 2015, and with the challenge of designing an overarching framework for the Sustainable Development Goals (SDGs) post-2015 that will take us toward the midpoint of the century, the importance of decisive leadership now in prioritizing digital innovation and investment as a strategic imperative for scalability and sustainability at all levels of global development, in both developed and developing nations, cannot be over-estimated.

From the eight existing MDGs covering poverty, education, gender, health, environment, and global partnerships, the post-2015 SDG agenda is currently being formulated around eleven global thematic consultations: health; education; water; food and nutrition; inequalities; governance; environment; population dynamics; growth and employment; energy; and conflict, violence and disaster. Although the implicit assumption seems to be that science, technology and cultural innovation will automatically be harnessed as cross-cutting enablers for all these themes, the fact this is as yet nowhere concretely articulated is a cause for serious concern, as is the lack of specifics on a global partnership for development component.

In retrospect, perhaps the biggest failing of the original MDGs was that they did not begin to meaningfully engage with the private sector – despite explicit reference to partnering with the Information and Communication Technology (ICT) and pharmaceutical communities in MDG 8 – until as late as 2005, while mainstreaming of science, technology and culture and maximizing inter-linkages between Goals were simply not treated as priorities. Currently, worries are surfacing that the ongoing SDG consultations and the key SDG Reports to the UN Secretary-General have grossly under-estimated the impact of the digital revolution, are far too broad in scope, and also risk competing in a dual track process with the *Rio+20 Summit* outcomes. All these issues must, as a prerequisite, be addressed before the planned *World Humanitarian Summit* in 2015.

This paper describes the proposed outcomes of the “*Global Digital Innovation & Investment Initiative 2013-2015: Scaling Science, Technology & Culture to Meet the Millennium & Sustainable Development Goals*”, that will include a conceptual framework and development dynamic for *Digital Health, Digital Education* and *Digital Jobs*, validated by a new set of data metrics for radical connectedness in a changing world. In support of the MDGs and forthcoming SDGs, and 2013 ECOSOC thematic debate of science, technology and culture for development, the *Initiative* is launched today at the first annual “*Global Digital Innovation & Investment Summit 2013: Scaling Science, Technology and Culture to Meet the Millennium and Sustainable Development Goals*”, as an Official Side Event to the 68th Session of United Nations General Assembly, and prior to the Heads of State and Government High Level Meeting (HLM) on September 25, 2013, to review progress made towards the achievement of the Millennium Development Goals, and to chart the way forward.

Project Premise – Towards Democratized Human Development

Wrestling with the kind of “known unknowns” now confronting all peoples and populations is an unenviable task for which there are no easy answers. We can, for example, imagine a future where concerns about sustainability and the environment might give way to worries about individual health and wellbeing! Where “smart” becomes the new “green”, and “innovating to zero” (removing what we do not want) or “value for many” (exploiting network externalities) become the basis for radically new business models. What is certain is that the old means of production and productivity are being rapidly outgrown by the advent of all things digital.

Take the great inventions of the late 19th and early 20th centuries that have made the modern world what it is today: electricity, the motor car, television and radio, the telephone and computer, the vacuum cleaner, the refrigerator, penicillin, the aeroplane – just to name a few. All entered a period of industrialized mass production after World War II that resulted in a consumer boom creating huge employment and wealth for the developed nations. More recently this model has been replicated as the engine of growth for emerging economies in Brazil, Russia, China, India and elsewhere.

Unfortunately, it is an economic and social model not only cyclical and vulnerable in nature but also one that has limited relevance in the new digital age, where scientific, technological and cultural knowledge grows exponentially and is jumping increasingly between disciplines. The pre-digital technologies that created jobs, growth and wealth in abundance are a shadow of their former selves. While this was disguised by the credit boom that helped create jobs in the service sectors over the 30 years leading to the financial crash of 2008, it is highly unlikely that credit will grow so rapidly over the coming decades.

By 2020, however, we can expect the world will see some 80 billion connected devices, nine billion mobile phones and five billion Internet users, of whom 50% connect through handheld devices. This creates a seamless network that amounts to a world without borders, where tasks can be completed at the blink of an eye and the touch of a finger, and where online video, social media and digital imagery create an era of radical connectivity and convergence that will change future human interaction in every aspect of life. Global democracy and development – or democratized human development – is at a new dawn.

Against this background, it is puzzling that perhaps the key question of the new digital age has so far either been ignored or left largely unanswered by governments, business and civil society alike. Namely, *what new and truly innovative digital goods and services in the public and private domains will entrepreneurs be able to create using transformational technologies, and just how will they be monetized for payment and payback?* Indeed, the failure to fully address this question is one reason the international development community has had such difficulty in integrating ICTs across the MDGs to date, and why it should also be a primary concern in shaping the post-2015 SDGs agenda.

In general, while governments have in many cases paid lip service to the importance of innovation and investment in science and technology, as well as the potential of culture, as drivers of growth and employment and the imperative to exploit them, the private sector has *de facto* been given the remit to chart the course of the “Net of All Things”. This in itself is acceptable up to a point, and we know it takes time to fully comprehend the best methods to use new technologies. And, even at the relatively immature age of some 20 years, the Internet has already unleashed profound creative destruction across so many businesses and sectors.

Today, the first wave of the maturing Internet has led us to *networks as nations* with billions now connected seamlessly and always-on through smart phones, search engines and social media. With the advent of the broadband cloud for content, applications and connectivity, the next great wave is suddenly moving us from a purely supply-led consumption model to a demand-led stimulus model for the digital economy and society. This will be driven in great measure by the delivery of **digital public goods and services** for health, education, gender, government, enterprise, employment, energy and environment, among others.

Overall, the underlying shock of the digital power shift will throw the dynamics of 21st century economic and social development into a seemingly permanent state of flux – *a somewhat surreal state that combines the discontinuity of disruptive change with the continuity of total connectedness and convergence. A state where the democratization and decentralization of digital power to the individual somehow co-exists with the concentration and centralization of digital assets among industry leaders.* In this brash and brazen new digital world, any debate on the final push toward achieving the MDGs by the 2015 timeline or on the future architecture of the post-2015 SDG environment must include a timely and substantive discourse on the fundamental interplay between core network and development dynamics.

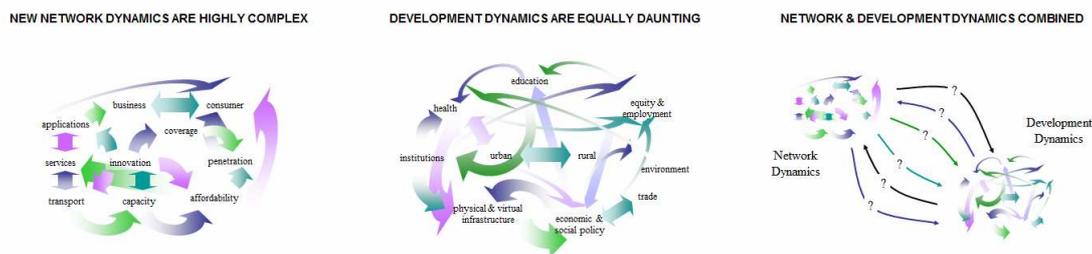
Project Thesis – Deconstructing Network and Development Dynamics

Today it is important to recognize that, just two decades into the new digital age, we still have only a partial understanding of the nascent and complex nature of digital or *network dynamics*. The perennial complexity of socio-economic or *development dynamics* is equally daunting, and assessing the interaction of network and development dynamics becomes a highly subjective enterprise (see Figure 1).

Part of the problem lies in the *vicious cycle of digital development* that combines the cult of “innovation for innovation’s sake”, the lip service paid by all stakeholders (but most particularly by governments) to timely and adequately invest in science, technology and cultural innovation at all levels of education and training, and with the persistent false promise of multi-stakeholder partnerships as the delivery mechanism of choice. In moving forward we need to deconstruct both the vicious cycle of digital development to re-think and re-calibrate the wellsprings of innovation, the conditions for science, technology and cultural investment, and the parameters for multi-stakeholder partnerships as the key elements for a *virtuous cycle of digital development*.

Indeed, the unprecedented explosion in mobile and Internet growth – fuelled by smart phone, search engine and social media mass consumption – has almost certainly had the effect of dulling our comprehension of the essential cause and effect behind the digital revolution, and just what the evolving criteria will be for innovation and investment in the networked world. We feel the drumbeats of disruptive technology that will lead inevitably to creative destruction for individuals, institutions and industries, and we understand that being digital citizens, communities and countries will increasingly equate to being global. But beyond these basic tenets, just what do we really know of the forces that are shaping the anticipated democratization of human development?

Figure 1 – Maelström of Network and Development Dynamics



The “*Digital Innovation & Investment Initiative 2013-2015: Scaling Science, Technology and Culture for the Millennium & Sustainable Development Goals*” will be launched on the afternoon of Monday, September 23, 2013, as an official side event to the 68th Session of the United Nations General Assembly. It will also act as a follow-up outcome to the UN Economic and Social Council (ECOSOC) Annual Ministerial Meeting on “*Science, technology and innovation and the potential of culture, for promoting sustainable development and achieving the Millennium Development Goals*”, July 1-4, 2013, in Geneva, and will support the High Level Special Event of the UN General Assembly on the *MDGs & SDGs*, September 25, 2013, in New York.

The *Project Troika* will focus on the overwhelming risks and rewards of the digital revolution in the three acknowledged, and closely inter-related, crisis issues of *Global Health, Global Education* and *Global Employment*. Clearly, and significantly in the context of the forthcoming SDGs, these multi-dimensional crises have and will continue to ruthlessly expose the profound inequities and vulnerabilities of social and economic inclusion in developed as well as developing nations. Enter *Digital Health, Digital Education* and *Digital Jobs* as the agents of transformational change. With these digital game changers for *total access, affordability* and *applications*, we are at a defining point in human history for scientific, technological and cultural progress.

Now, to understand and unleash the full potential of digital innovation and investment, we urgently need to design reliable metrics for *radical connectedness in a changing world* – that is, *total personal connectivity via ubiquitous mobile and broadband access to limitless content and applications, and at near-zero cost*. The *Digital Innovation & Investment Project 2013-2015* is intended to deliver a set of practical and breakthrough metrics that will combine ongoing analysis of disruptive ICT innovation and mega-trends, mapped to the inter-linked MDG and SDG agendas. In September 2013, the *Project* will kick-off with a *Global Roundtable Forum* among Heads of State and Government, CEOs and civil society leaders to determine what can and should be done and by whom to realize a *virtuous cycle of digital health, education and jobs for all and everywhere*.

Project Polemic – Balancing Raw and Soft Digital Power

As universal access to Science, Technology and Innovation (STI) and ICT has become so strategic, being digital is increasingly synonymous with being global. The paradigm shift toward a ubiquitous mobile and broadband Internet has happened far faster than predicted, raising a host of positive and negative socio-economic issues for the stability and security of both developed and developing countries.

At one level, the reality of *raw digital power* will be measured by the availability of real-time networking, ubiquitous mobile and broadband, big data analytics, online collaboration, social media, and cyber-security. At another level, *soft digital power* will reside in more subtle assets like *scalability and sustainability* through universal health coverage, education for all, data privacy, child protection, and situation awareness for conflict resolution and disaster response. In essence, *resilience and responsiveness* to human development needs will require an amalgam of raw and soft power in the delivery of digital public goods and services.

At all levels of the converging network and development value chains, the desired expectation is that the challenges posed by poverty and jobs are matched only by the opportunities for economic and social empowerment that the democratization of science, technology and culture will unleash. Now, in the new digital era, these challenges can at last be addressed *en masse* in even the poorest of resource-poor settings with the strategic and innovative use of cross-cutting ICTs to bridge the poverty, gender, health, education, and employment gaps, and accelerate achievement of the MDGs by 2015 and beyond toward the forthcoming SDGs.

In this scenario, imagining the possible will allow us to employ STI and ICT to transform service delivery across sectors, support ICT innovation for jobs and competitiveness across industries, and scale up affordable access to broadband Internet in a manner that will benefit the many rather than the few. Plainly, the first great leap forward in this direction has been the so-called “mobile miracle”, with over 6 billion mobile phones, including more than 1 billion smart phones, now in the hands of people around the planet, and with connection to the 2.5 billion global Internet users.

These mass market phenomena are enabling *technology and innovation for equity* that reaches to the very bottom of the pyramid in bridging the digital divide. In contrast to the 1990s and 2000s, when ICT for Development (ICT4D) became stigmatized by an acute lack of scalability and sustainability in endless pilot projects, the mobile miracle is finally allowing for the mainstreaming of ICT4D across national policies and programs. However, the bottom line is that unless mainstreaming rapidly becomes a reality among practitioners and policy-makers, it is highly unlikely that the MDGs will be achieved by 2015 or in the post-2015 timeframe.

In this regard, the case for the economic benefits of strategic ICT spending by governments and business is progressively being backed by hard data. The World Bank estimates that the ICT sector now accounts for 7.5 percentage points of gross domestic product (GDP) worldwide, and an even higher proportion of GDP growth.

Box 1 – Big Data Analytics and Digital Power

Data has fast become an essential economic asset, with big data potentially rivaling the likes of big oil in strategic importance. Just follow the data itself. From the beginning of recorded time until 2003, we created 5 billion gigabytes (5 exabytes) of data. In 2011, the same amount was created every two days. By 2013, it's expected that the time will shrink to 10 minutes. There as nearly as many bits of information in the digital universe as there are stars in our actual universe.

Today, over 80% of all humanity owns a mobile phone of some sort. Out of over 6 billion mobile phones more than 1 billion are smart phones. Every day 247 billion emails are sent, of which up to 80% are spam. English is the dominant language of the web, but by 2014 it will be Chinese if its current rate of increase continues. Every hour we create enough Internet traffic to fill 7 billion DVDs.

Just as a study of activity on Twitter gave residents, family members, and journalists advance warning of details about the devastating earth quake and Tsunami in Japan, high-frequency traders, with the help of computer algorithms, use Big Data to follow trends and to act quickly on their findings. These specialized algorithms make split second decision to buy or sell a commodity.

New fiber optic cables being laid under the Atlantic will shave 5 milliseconds from the current 65 milliseconds for the round trip time it takes trading instructions to travel between New York and London. The 5-millisecond saving is worth many millions of dollars to the trading firms who use the cables, and will pay millions to do so.

Source: Adapted from The Human Face of Big Data, AAO, 2012

Strikingly, with every 10% increase in the penetration of mobile communication services, there is a 0.8% increase in GDP growth. Because of the greater reach and density of mobile phone usage, mobile currently has a larger aggregate effect than broadband. But this will soon change with the impending “broadband miracle”. Of some 120 countries surveyed in 2009, the World Bank also estimates that a 10% increase in broadband penetration will yield a 1.3% increase in GDP – almost twice that of mobile – and the impact will be even more robust once broadband penetration reaches a critical mass. In the 21st century, universal broadband must be regarded as basic national infrastructure – just like transport, energy and water utility networks.

The global economic crisis has intensified pressure on governments around the world to develop policies and programs that will result in the highest possible return, both in jobs and revenue. Clearly, any further investments made by national governments to support their economies should also address longer-term economic needs. Many countries that have evaluated the merits of investments in traditional industries such as manufacturing, textiles, and automotives are discovering a better and longer-term Return on Investment (RoI) in the burgeoning ICT sector. In advanced economies, for example, for every single percentage point increase in broadband penetration in a specific area, employment growth is estimated to increase by 0.2% to 0.3% per year.

Research and implementations around the world have repeatedly shown that STI and ICT investments can positively impact jobs, productivity, GDP growth, and innovation. The demonstrated effects of investment in core ICT infrastructure, or raw digital assets, are allowing for the scaling up of vital soft digital assets including:

- Creation of high-skilled, high-paying jobs
- “Spillover and Ripple Effects,” creating opportunities in many other industries
- Managed healthcare in poor, ageing or isolated populations
- Potential delivery of the best possible education to future generations
- Stronger, more competitive small and medium enterprise (SME) businesses
- Development of an ICT workforce with knowledge and skills to export technology to trade partners

As these and other benefits of STI and ICT investments have become more evident, the challenge has become identifying the wisest investments – those most likely to increase GDP, put people back to work, lower costs, and positively impact innovation – both in the immediate future and for years to come.

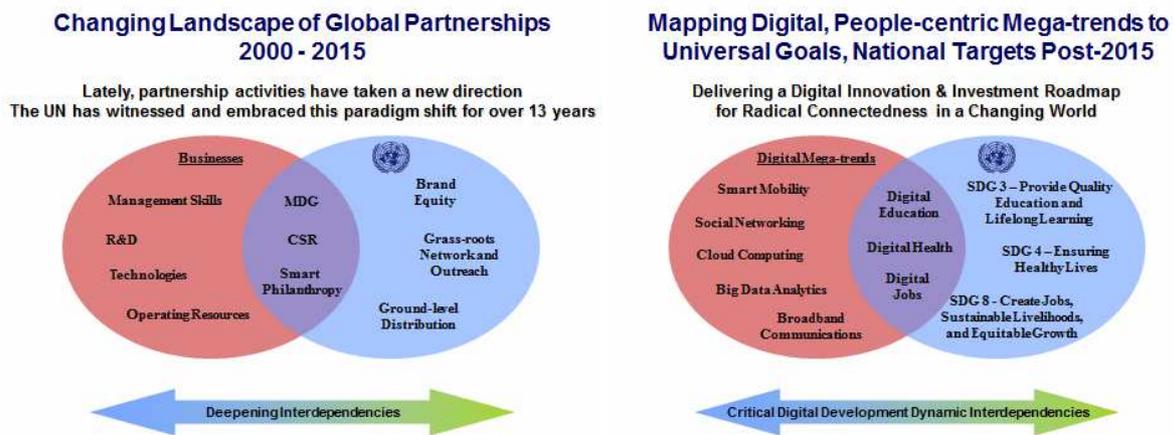
Significantly, in many cases the social returns of broadband content and connectivity – of radical connectedness – are potentially much larger than the costs of building networks, but operators have not invested because their private quarterly returns would not justify the investment. According to the OECD, savings in the health sector alone could justify the cost of rolling out a fast broadband network if health costs were to fall between 1.4% and 3.7% as a direct result of having the new network in place. In other words, while the technology has been available since the late 1980s, the inability of markets and regulators to take into account network externalities has clearly led to non-optimal provision of services and limited innovation and investment.

The sudden explosion of smart phone, search engine and social media data traffic is placing immense pressure on regulators and operators to ensure adequate bandwidth and radio frequency spectrum are available to users and at more affordable rates. We now have the kind of penetration metrics needed to justify a nuclear response to increased broadband investments in fixed fiber optic and wireless LTE (Long Term Evolution) 4G and 5G networks. The next step is to construct a matrix of metrics and indicators for the economic and social determinants of radical connectedness and associated network effects. To do that we will need a new brand of multi-dimensional and multi-stakeholder thinking that embraces the emerging mega-trends of both the network and the development sectors.

Project Framework – Bridging Network and Development Mega-Trends

As mentioned earlier, although there has been an underlying assumption that science, technology and cultural innovation should be harnessed as cross-cutting enablers for accelerating achievement of the MDGs, this has been far too slow to occur in practice. The fact that no plan of action yet exists to remedy this situation in the SDG consultations is a cause for serious concern, as is the apparent lack of a specific STI and ICT global partnership for development component. Worries also persist that the ongoing SDG consultations are far too broad in scope, and in some areas actually competing in a dual track process with the *Rio+20 Summit* outcomes. All these issues must, as a prerequisite, be addressed before the planned *World Humanitarian Summit* in 2015.

Figure 2 – Global Digital Innovation & Investment Initiative Dynamic



This will be no easy task. The faltering global climate change talks in Copenhagen and Rio de Janeiro did little to instill confidence in the multilateral negotiating process. If a future that includes increased frequency and severity of climate-related shocks, disasters and pandemics (likely with zoonotic origins) cannot bring world leaders to the head table, the general public is entitled to ask, “What will?” How leaders can craft sound development policies in a time of austerity and limited financial resources is of course problematic. But global warming is just one of the socio-economic mega-trends that governments, business and civil society will be forced to confront in the short- to medium-term.

The demographic revolution is obviously another. According to the United Nations, the population aged 60 years or older is estimated to reach nearly 2 billion by 2050 when it will be as large as the population of children aged 0-14. With this shift, there will be accompanying changes in disease patterns such as the spike in chronic non-communicable diseases (NCDs) and associated risk factors. Likewise, we are witnessing the rise of “mega-cities”. More than 50% of the world’s population currently live in urban areas and this is expected to increase to 70% by 2050. The World Health Organization (WHO) estimates the majority of this urban population growth will occur in cities of developing countries.

At the macro-level, we can already see social and economic development converging. The relationship among the state, citizens and business is increasingly dynamic and systems are changing. The correlation between social and economic development is reflected, for example, in the inclusion of health and education in development policies and in other inter-sectoral approaches. At the same time, frontiers of public sector reform are shifting. In the future, there will be increased interaction by and amongst institutions in various sectors as well as heightened informality within global labor. Silos will be broken down leading to a deeper complexity of mixed systems – both public and private – particularly in the health and education sectors.

Our social futures are altering beyond recognition as the digital revolution races ahead. Personal, radical connectedness to free flows of ideas and information will continue to place stress and, in some cases, distress on many established industries and institutions. Changes in the access to information and modes of communication will continue to empower citizens, yet as the “Prism” revelations have shown, also raise major privacy concerns, as will the growing social isolation and exclusion. New ways of learning with massive open, online courses (MOOC) offer opportunities for scalable, sustainable and profitable forms of skills, training and education. Game-changing advances in scientific research and medical science will likewise transform health care.

In fact, we are fast approaching a strategic inflection or tipping point in digital development. Technology and innovation actors who accelerate – and, indeed, enable – the vision of “development everywhere and for all” by bringing to market the needed products and services will be well positioned to participate in an historic solution to one of humanity’s most pressing issues in poverty reduction. And they will be able to realize a tremendous growth opportunity as the epicenter of the development shifts from the government to wherever the citizen happens to be. Not only are the technology and innovation available, but consumers, governments, institutions and society at large are increasingly ready for a digital power shift in global development.

However, for development everywhere and for all to work in practice, emerging network and development mega-trends will need to coalesce (see Figure 2). In terms of STI and ICT, the technology and innovation

mega-trends with the potential to enable a new digital development dynamic will be driven primarily by the proliferation of **Broadband Communications** in combination with the four other currently converging, and some might argue most fashionable, ICT mega-trends: smart mobility; social networking; cloud computing; and big data analytics – in theory all working together and in concert:

- **Smart Mobility** – a collective term to describe various wireless devices (smart-phones, tablet computers, and mobile-enabled devices), their networks and the applications that drive their usage.
- **Social Networking** – interactive network communities that allow people to develop relationships and discover relevant information in both personal and business contexts.
- **Cloud Computing** – a model for enabling on-demand access to a shared pool of computing resources (networks, servers, storage, applications and/or services) that can be rapidly provisioned and scaled.
- **Big Data Analytics** – the computer resources, software, techniques and business strategies necessary to mine business data and transform it into actionable insight.

The question of how the existing and new Goals will institutionally and in practice address these network and development mega-trends will require a step change in thinking, commitment and action from all stakeholders. The trick will be retaining the best of the old while ushering in the shock of the new. Indeed, thinking digitally about what the great social scientist Ithiel de Sola Pool called the “*Technologies of Freedom*”, which could equally evolve as the “*Technologies of Incarceration*”, may offer us a unique opportunity to open so many traditional issues around health, education, gender, youth, age and employment that have remained shrouded in stigma and taboo in the development field since the birth of the Breton Woods and United Nations family.

Project Mission – Mainstreaming STI & ICT in the MDGs and SDGs

So where do we stand with the MDGs *circa* 2013, with less than 900 days to go to the 2015 timeline, and what must happen to re-energize focus on delivery? Identifying replicable lessons and key gaps for scaling up and fast tracking joined-up implementations of the MDGs remains a persistent challenge for the international development community:

- Firstly, it must be recognised that the intrinsically inter-linked MDG agendas of poverty, education, gender, health and environment have been held back by inter-agency disconnects, and the woeful lack of adequate incentives for innovation and investment by the private sector.
- Secondly, the at once immensely disruptive yet hugely collaborative nature of the mobile, Internet and high-speed broadband technology and innovation for equity value chains must be embraced and exploited for jobs, growth and the delivery of digital public good and services without delay.
- Thirdly, advocacy for science, technology and cultural innovation in exploiting the use of communications technologies to accelerate joined-up delivery of the MDGs must be used to reignite the MDG agenda and put it once again at the forefront of the global economic and social agenda.

Regarding the status of the post-2015 Sustainable Development Goals (SDGs) deliberations, the three critical reports to the UN Secretary-General have now been delivered: “*A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development, The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda*”; “*An Action Agenda for Sustainable Development: Report for the UN Secretary General, Leadership Council of the Sustainable Development Network, A Global Initiative for the United Nations*”; and, “*Corporate Sustainability and the United Nations Post-2015 Development Agenda: Perspectives from UN Global Compact Participants on Global Priorities and How to Engage Business Towards Sustainable Development Goals*”.

While all three reports naturally overlap in many areas, the politically-orientated High-Level Panel Eminent Persons report proactively suggests twelve “Universal Goals, National Targets” for the SDGs, the academically-oriented SDSN Leadership Council recommends ten priority challenges, while the business-oriented *Global Compact* report makes recommendations in the three areas of determining the core of a post 2015 agenda, outlining how to engage business and investors towards sustainable development goals, and recommending ways that governments can advance inclusive and sustainable markets (see Box 2).

Box 2 – High-Level Panel of Eminent Persons Universal Goals, National Targets Post-2015

1. End Poverty
2. Empower Girls and Women and Achieve Gender Equality
3. Provide Quality Education and Lifelong Learning
4. Ensure Healthy Lives
5. Ensure Food Security and Good Nutrition
6. Achieve Universal Access to Water and Sanitation
7. Secure Sustainable Energy
8. Create Jobs, Sustainable Livelihoods, and Equitable Growth
9. Manage Natural Resource Assets Sustainably
10. Ensure Good Governance and Effective Institutions
11. Ensure Stable and Peaceful Societies
12. Create a Global Enabling Environment and Catalyze Long-Term Finance

Source: "A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development, The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda", May 2013

SDSN Leadership Council Priority Challenges Post-2015

1. End Extreme Poverty Including Hunger
2. Achieving Development within Planetary Boundaries
3. Ensure Effective Learning for All Children and Youth for Life and Livelihood
4. Achieving Gender Equality, Social Inclusion and Human Rights for All
5. Achieving Health and Wellbeing at All Ages
6. Improve Agriculture Systems and Raise Rural Prosperity
7. Empower Inclusive, Productive and Resilient Cities
8. Curb Human-Induced Climate Change and Ensure Sustainable Energy
9. Secure Ecosystem Services and Biodiversity, and Ensure Good Management of Water and Other Natural Resources
10. Transform Governance for Sustainable Development

Source: An Action Agenda for Sustainable Development: Report for the UN Secretary General, Leadership Council of the Sustainable Development Network, A Global Initiative for the United Nations, June 2013

UN Global Compact Suggested SDG Issues Post 2015

The Poverty Apex: An end to extreme poverty and a strong start on extending prosperity to the majority of the world's people are now achievable. The hallmarks of this campaign should be sustained economic growth that is inclusive and more equitable; more and better jobs; and access to credit and entrepreneurship opportunities, especially among the poor.

Human Needs and Capacities: Progress and unmet challenges in the core MDG areas of education, health and advances in the standing of women and girls need to continue past 2015 – all closely related to poverty and its eradication.

The Resource Triad: The resource triad of water and sanitation, energy and climate, and agriculture and food bring together the three pillars of sustainable development. Each meets basic human needs, has the capacity to power sustainable economic growth and is directly related to climate change.

Enabling Environment: Good governance and respect for human rights, settings of peace and stability, and more modern and greener digital and physical infrastructure are enabling factors important enough to be elevated to worldwide goals.

Source: "Corporate Sustainability and the United Nations Post-2015 Development Agenda: Perspectives from UN Global Compact Participants on Global Priorities and How to Engage Business Towards Sustainable Development Goals", June 2013

First, consider the Eminent Persons Report. By omitting the vital role of digital networks, goods and services from this report, the Report loses an important focus on the vital tertiary economy, which developing countries need to master to become or remain competitive in the digital era, based on the experiences of, for example, China, Estonia, Ghana, India, Ireland, Malaysia, Rwanda, Senegal, Singapore, South Korea, among many others.

Digital innovation is hinted at in the Report, where it is stated "Every country that has experienced sustained high growth has done so through absorbing knowledge, technology and ideas from the rest of the world, and adapting them to local conditions", but again the vital role of communication networks in innovation,

exchanging knowledge and developing technology is omitted. There are only two references to the Internet in the entire Report! The Internet, mobile and broadband are the greatest platforms for “inevitable innovation”, access to information and knowledge, that the world has ever known.

This is global development systems thinking in the dark ages. The future, for good or ill, will be anchored in universal digital development across developed and developing countries alike.

The lack of awareness of the digital revolution strips the Report of much credibility. The equivalent would be writing a report about development one hundred years ago, omitting the role of industrialization, trade and manufacturing, leaving developing countries to continue on an agrarian path in perpetuity. Simply assuming STI and ICT will be mainstreamed as cross-cutting enablers for scalability and sustainability across all the new Goals, Targets, and Indicators with negligible reference to the seismic nature of the digital power shift in the socio-economics fabric of all nations is a missed opportunity of serious, even embarrassing proportions.

Even the specific Report’s call for a “data revolution for sustainable development, with a new international initiative to improve the quality of statistics and information available to citizens”, while welcome, also misses the bigger digital picture. The Report recommends actively taking advantage “of new technology, crowd sourcing, and improved connectivity to empower people with information on the progress towards the targets”. Improved data monitoring and measurement of the Goals is a step forward, but the first order priority must be in mainstreaming digital interventions on the ground and into all national policies and plans at their inception.

Yet these omissions are all too reminiscent of the failure to act on the call of the lost decade of MDG 8 to deliver on a “global partnership for development, in cooperation with the ICT and pharmaceutical communities”. That said, the proactive decision by the Report to actually name twelve illustrative Universal Goals, National Targets at this early stage must be applauded, and time for radical revision still exists.

With regards to the SDSN report, while this is an outstanding piece of academic work in synthesizing the generic challenges of sustainable development, and purports to mobilize global scientific and technological knowledge for that purpose, there is an acute lack of reference to STI, ICT and mobilizing private sector and investor support to implement the SDGS. Indeed, in both the Eminent Persons and SDSN Reports there is NOT ONE dedicated STI or ICT Target for ANY of the proposed Goals. Similarly, while the Global Compact Reports eloquently reflects the perspective of the business community, only fleeting reference is made to digital innovation and investment.

Project Paradigm – Creating a Digital Development Dynamic

If we assume that digital innovation and investment must play a dramatically enhanced role in the final push toward achieving the MDGs and implementation of the forthcoming SDGs, it should be recognized that much work needs to be done by the STI, ICT and development communities to *form a consensus for scaling up digital interventions*. In theory, STI and ICT have become strategic imperatives because they ensure the free flow of information as the engine of economic growth and open innovation, capable government institutions and open societies by allowing people to self-organize, create economic options, and act in real time.

Today, the great self-sustaining, self-replicating and multi-stakeholder enterprise that constitutes the global Internet has acquired almost by accident *the attributes of a global public good* and impinges on precisely the areas of difficulty and contention in meeting the MDG 2015 and post-2015 agendas, including the need for:

- ***New Approaches to Scientific, Technical and Cultural Intellectual Property Rights – via open innovation, open source, freeware, social licensing, and new forms of creative remuneration;***
- ***Convergence of Enabling Environment Conditions – via cohesive and coherent legal, regulatory, policy, human capacity, content and connectivity frameworks;***
- ***Youth, Age, Gender and Citizen Empowerment – via knowledge sharing and collaboration in health, education, enterprise, and political engagement, among others; and***
- ***Viral, Low-cost and Bottom-up Growth Models for inter-linked MDG and SDG Initiatives – via the cell-phone and cyber-space models that scale very quickly to critical mass through network externalities and network effects.***

Fundamentally, *digital access technology allows for the creation of enabling environments quickly, effectively and relatively cheaply.*

The general purpose platform for innovation and investment offered by mobile, Internet and, increasingly, broadband networks, is the multi-sector enabler for connected nations and national transformation. The “network effect” – the more people connected to the network the more powerful it becomes because of the network multiplier externalities of web platforms – means that digital platforms are increasingly breaking application and infrastructure bottlenecks and short-circuiting the traditional development cycle.

Delivery of shared knowledge interactively and instantaneously across the globe is unleashing people and community power by moving from dependency to self-help models. Yet the “ripple” or “spill-over” benefits of digital network investment for innovation and cost-savings in other sectors of the economy other than ICT, traditionally highly protective industries in nature, including health, education, energy, and transport, have still to be fully understood at the highest political levels. The problem here is twofold:

Firstly, and as mentioned previously, the excitement surrounding the “Net of All Things” is put into perspective with the knowledge that the vital interplay between the building blocks for new network and development dynamics – the building blocks of technology, infrastructure, policy, innovation, people, government, content and applications – remains highly complex and subjective in nature, only partially understood, and open to quite different interpretation by business, government, civil society, and multilateral organizations.

Secondly, we are all struggling with the central paradox of the digital revolution – that while on the one hand computer networks appear to be disrupting centralized power of all kinds and devolving that power to individual citizens, on the other hand we sense the big brother concentration of the power of networks among an elite group of corporate giants and government bureaucracies. A complex balancing act of power redistribution will need to be performed in and by our generation if the digital economy is to grow and prosper in an equitable way.

While many industry pundits predict that the way ahead in the creation of a digital development dynamic will likely result in a *broadband solutions cloud* supporting a *development solutions cloud*, neither concept is anywhere near consensual agreement among STI, ICT or development partners. All actors acknowledge the competitive and collaborative stakes for playing in the digital, networked economy and society have been raised beyond measure. But the intellectual and practical tools with which to strike the critical balance in policy, plans, practice and programs between raw and soft digital power are at a relatively early stage of progress.

This is evidenced by the frequent rallying cries from key stakeholders for “new business models” in the new digital age that fall on deaf ears because they appear so disingenuous in nature. Too often, these same stakeholders have become gridlocked in anachronistic tariff, trade and telecommunications regulations or legislation and arcane patent and intellectual property laws – or for that matter, anachronistic development systems thinking – based on policies and plans dating as far back as the 19th and early 20th centuries. And from which, in the short term at least, each stakeholder believes it stands to gain the most to avoid disintermediation.

This old-school mindset shared for varying reasons by diverse stakeholders is hardly going to deliver on the “Net of All Things” where bandwidth should be open, access unimpaired, pricing affordable to all, and policy oriented toward the provision of digital public goods and services for job and growth demand stimulus.

To be fair, selective myopia and collective amnesia are the stuff of natural monopoly and international institutions past and present. But for STI and ICT champions, who profess to be governed on first principle by the tenets of Moore’s Law and Metcalf’s Law, and the international development community, who preach open, viral growth models, this solipsistic behavior is testament to a disappointing lack of long term vision on how best to nurture and grow digital markets for inclusion. But it is also endemic of the acute lack of practical models for how monetizing digital public goods and services will work in practice.

At some point someone will have to take responsibility for paying to build and maintain the global information super-highway and someone will have to pay for the ownership and use of the content that rides over it. The most likely scenario will ultimately be through some system of digital micro-payments, but the current stalemate among the main stakeholders of raw digital power – whether they are telecom carriers and equipment suppliers, or search engine and social media providers – will require massive policy and regulatory intervention that seems a distant prospect at the present time.

Box 3 – ECOSOC 2013: Science, technology and innovation, and the potential of culture, for promoting sustainable development and achieving the Millennium Development Goals

Global context for science, technology, innovation and culture:

Open innovation; Internationalization of research and development; Increased openness, transparency and participation in science, technology and innovation

Shaping the course of development: the role of science, technology and innovation:

Integrating science, technology and innovation into sustainable development; Information and communications technologies; Sustainable agriculture and food security; Sustainable energy for all; access to fresh water; Climate change adaptation, mitigation and disaster risk reduction; leapfrogging makes sense

Potential of culture for sustainable development:

Culture for poverty reduction; education and culture; Culture and gender equality; Culture and environment

Strengthening multi-stakeholder collaboration and partnerships:

Strengthening science-policy-society interface; Public-private partnerships for science, technology, innovation and culture

An enabling environment for transformative change towards sustainable development through science, technology, innovation and culture:

National level: National science, technology and innovation strategy: culture of innovation; Quality education to foster innovation; Policies to foster research, development and demonstration; Good governance: accountability and transparency through open access; Integration of culture into development

International levels: South-South cooperation Science, technology and innovation ecosystems; Improving institutional coherence on science, technology and innovation and culture in the United Nations system; Labour mobility and knowledge transfer; International technology transfer; Measuring capacity for innovation

Towards coherent policy and action frameworks: the Economic and Social Council as a “thought leader”

Source: Report of the Secretary-General, April 2013

Put bluntly, both the established and emerging vested interests in the global digital power game presently wield such political influence and lobbying power that we are unlikely to see any public policy breakthroughs in the near future. It may be inevitable that with the breathless pace of digital innovation and investment, legal, regulatory and development frameworks will from now on be apt to play a constant gambit of catch-up. But the fundamental questions of who owns ideas, information and infrastructure, who pays for it, and who gets paid, will require rapid multi-stakeholder vision and leadership at the national, regional and global levels.

Against this complex and convoluted background, where does the United Nations stand today in the vision and leadership stakes? Clearly, the Report of High Level Panel of Eminent Persons on the post-2015 agenda as reviewed above is in critical need of basic homework with regards to STI and ICT. This year’s ongoing UN ECOSOC Annual Ministerial Review, however, has wisely taken “*Science, technology and innovation, and the potential of culture, for promoting sustainable development and achieving the Millennium Development Goals*” as its 2013 theme. Box 3 summarizes the main points under discussion. The perennial question is whether this litany of familiar yet laudable aspirations for STI and ICT can be acted upon either by the member states or ECOSOC and associated agencies in real digital time, and on the ground, or simply gather dust on the shelf.

Project Priorities – The Case of Global Health

We know of the convincing logic for tackling spiraling health care costs and shrinking education budgets with the application of digital innovation and investments, as is the prospect of cleaner and greener energy, transport and environment networks. Yet the real world effects on jobs, employment and skills also raise a host of human development and labor market issues that need careful consideration.

Similarly, broadband itself brings with it a redefinition of the “digital divide” beyond disparities in basic access and connectivity. Whether the almost limitless availability of content, knowledge and information will lead to greater wisdom may be a moot point, but it clearly calls into question the traditional role and responsibility of the qualified professional in so many fields.

Digital health and education are potentially huge game changing industries at the intersection of technology, medicine and academia, and will radically change how we access and use personal and general information and

knowledge. The flip side of the coin is that they are the harbingers of radical disintermediation and will redraw our most simple understanding of how we define a doctor, teacher or professor, a hospital, school or university.

Box 4 – Progress Report on the Health-related MDGs

MDG 1: In low- and middle-income countries, the percentage of underweight children under five years old dropped from 28% in 1990 to 17% in 2011. The MDG target may be met, but improvements have been unevenly distributed between and within different regions and countries.

MDG 4: Globally, the number of deaths of children under five years of age fell from 12 million in 1990 to 6.9 million in 2011. The global rate of decline has accelerated in recent years: from 1.8% per annum during 1990-2000 to 3.2% during 2000-2011. Despite this improvement, the world is unlikely to achieve the MDG 4A target by 2015.

MDG 5: While the proportion of births attended by a skilled health worker has increased globally, fewer than 50% of births are attended in the WHO African Region. Despite a significant reduction in the number of maternal deaths – from an estimated 543,000 in 1990 to 287,000 in 2010 – the rate of decline is just over half that needed to achieve the MDG 5A target by 2015. In 2008, 63% of women aged 15–49 years who were married or in a consensual union were using some form of contraception, while 11% wanted to stop or postpone childbearing but were not using contraception.

MDG 6: Globally, new HIV infections declined by 24% between 2001 and 2011. In 2011, an estimated 2.5 million people were newly infected with HIV, of whom 70% live in sub-Saharan Africa. More people are living with HIV: an estimated 34 million people in 2011. A little over 8 million people in low- and middle-income countries received antiretroviral therapy in 2011, but there is still a long way to go to achieve universal access. Several malaria endemic countries have reported a more than 50% reduction in either confirmed malaria cases or malaria admissions and deaths. Use of insecticide-treated nets and indoor residual spraying has greatly increased, and will need to be sustained in order to prevent the resurgence of disease and deaths caused by malaria. There were an estimated 8.7 million new cases of tuberculosis in 2011, of which about 13% involved people with HIV. Globally mortality due to tuberculosis has fallen 41% since 1990 and should reach 50% by 2015. Treatment success rates have been sustained at high levels, at or above the target of 85%, for the past four years.

MDG 7: The world has met the MDG target on access to safe drinking water, but much more needs to be done to achieve the sanitation target.

MDG 8: Most of the targets are not on track, including 8E. Effective treatments exist for the majority of conditions causing the global chronic disease burden, yet universal access remains out of reach. Many people in low-income countries continue to face a scarcity of medicines in the public sector, forcing them into the private sector where prices can be substantially higher. Patient prices of lowest priced generics in the private sector averaged five times international reference prices, ranging up to about 14 times higher in some countries. Even the lowest-priced generics can put common treatments beyond the reach of the poor.

Source: WHO, 2012

It is no surprise that of all the MDG targets, ICT was the first to be achieved, and in fact is now outperforming to the extent mobile communications uptake in Africa has today reached some 280 million subscribers compared with 277 million in the United States and Canada combined. But to obtain a more representative picture of progress across the core MDGs, it is highly instructive to look at specific progress on the health-related MDGs, with healthcare prone to institutional inertia as one of the most protective of all industry sectors.

So why, among all the MDGs, have we seen a breakthrough in global health in the past decade? This is because the healthcare and development communities were the first to join forces in forging a truly global response to the HIV/AIDS, malaria and TB pandemics (MDG 6), and more recently has implemented a concerted global strategy toward improved women's and children's health (MDG 4 and 5), under the leadership of the UN Secretary-General and The Partnership for Maternal, Newborn and Child Health (PMNCH).

In taking stock, we can see that while some countries have made impressive gains in achieving the health-related targets, others are falling behind. Often the countries making the least progress are those affected by high levels of HIV/AIDS, economic hardship, or conflict (see Box 4). Significantly, one of the great lessons learned from work on the health-related MDGs – which is applicable to all the other Goals – is that in talking about poverty or sickness, we are dealing with highly complex social systems consisting of political, socio-economic, cultural and other components. The conditions into which people are born, grow, work, live and age determine the state of health much more than any other factors.

These conditions are shaped by the distribution of money, power and resources at global, national and local levels. These in turn are influenced by policy choices. Political governance, and the future choices for how raw and soft digital power is utilized, are major factors determining the differences in the health status between and in countries. In other words, the realization of basic health rights of people, including the world's poor, encompasses addressing underlying health determinants – adequate nutrition; sanitation; safe water; adequate housing and working conditions; a healthy environment; a functioning health system with good emergency services; an appropriate referral system; and well-trained teachers and equipped schools and universities.

However, good governance is also an essential factor. In fact, the influence of good governance is clearly measurable. Countries with a comparable resource base (land, water, soil quality, climate, etc.) are making widely different economic and social advances. Good governance matters, not only for sustained economic growth, but also for its social performance, manifest in the state of health and education in a country. Political participation, stability, government effectiveness, regulatory quality, the rule of law, freedom of the press, the control of corruption, and the absence of violence – all have a very high dividend for poverty reduction and the improvement of health.

Accountability – associated with good governance – helps to fairly allocate public and private resources for health and education, and avoid or correct irrational spending patterns. No external intervention can substitute for good governance. Here, the importance of data and big data analytics in underpinning good governance was one of the principle reasons for the establishment of the *Commission on Information and Accountability for Women's and Children's Health*, and whose work is ongoing. This *Commission* reflects the growing awareness of the vital importance of data capture and analysis across the public health sector, and for all the MDGs.

Project Model – Why Digital Health Matters

Digital health matters because public healthcare is becoming unaffordable and is a far-reaching solution.

In the developed countries, healthcare costs are set to account for a fifth of total government spending by 2020 (the US is already at 18%, twice that in most Western European countries, and about 20 times more than in most developing countries). Consequently, the age-old model of treating symptoms will give way to more holistic solutions that involve early diagnosis of disease, methods that can predict future ailments, efforts to prevent disease in the first place, and ongoing monitoring of patients to ensure medical intervention takes place at an early stage when it is generally cheaper to do so.

Digital health is simply the convergence of electronic health, often thought of as telemedicine, and mobile health (eHealth + mHealth). It harnesses the transformational power of modern ICTs for improving health and healthcare throughout the world to make it better, more affordable and more efficient. It will be applied across the spectrum of disease and care, from chronic to acute, and from preventive to curative. Already it is becoming clear that many globally applicable applications of digital health, particularly using mobile, Internet and broadband can reverse the traditional orthodoxy of developed countries leading in technology and innovation.

In the recently published “*Health in the Post-2015 Agenda: Report of the Global Thematic Consultations April 2013*”, it is noted that “the notion of good health is evolving, shifting towards creating and maintaining good health and well-being, rather than only preventing and treating disease. Health systems must adapt to higher expectations and new demographic, environmental, and health challenges. Of key importance are: addressing the social, cultural, environmental, economic, and political determinants of health; improving the health of disadvantaged and marginalized groups; and meeting the specific health needs of people at different stages of life”.

Furthermore, “New ways are emerging to improve health: new technologies, opportunities for connectivity, and models of citizen participation in decision-making. Transformative changes will be driven by 1.8 billion young people acting in their own right and living in a digitally interconnected world, with unprecedented access to information. The linkages and relationships between health and education, climate change and other environmental threats, financial and natural resource constraints, less poverty but greater inequities, population growth and rapidly ageing populations, unplanned urbanization, and new diseases will all affect progress on health and well-being”.

All countries can indeed learn from each other about how to strengthen health systems. But the critical point that the playing field is being levelled for developing countries and in real digital time is woefully represented, not just in the Report, but across the entire spectrum of consultations themselves.

Box 5 – Digital Health Technology & Innovation Futures

Global Communications and Information Infrastructure – Today we see: Electronic Patient Record and Electronic Health Records (EHR); Hand-held devices for access of summary records and low resolution images; Simple timing and alerts in EHRs; and, Improving human-machine interfaces, including voice recognition, enabling more people to use ICTs. In the medium term we see: Broadband networks of at least 100Mbps, allowing complex patient monitoring in the home; Hand-held devices delivering higher resolution diagnostic images; Full motion video via cellular phones used in diagnostics; and, Wireless Local Area Networks (eg, allowing staff to contact each other through voice activated hands-free devices). By 2020 and beyond we see: Hand-held devices involving full EHR; Mobile scanner technology in primary care practice; and, Data from EHRs to measure health outcomes and epidemiological studies.

Personal and Ubiquitous Technologies – Today we see: Radio Frequency Identification Devices (RFIDs) to track pharmaceuticals; Over-the-counter personal health care devices and sensors; and, Use of mobile phones to improve self-management of chronic conditions. In the medium term we see: RFID technology used in conjunction with home-based monitoring equipment to assist with taking of medicines; RFID used to track hospital equipment; High-definition TV becoming standard, improving videoconferencing and allowing high quality images to be sent to patients homes; the Introduction of new testing kits for a wider range of infectious agents and illness such as appendicitis and for generic testing; Networking of body sensors to monitor physiological states; Smart homes enabling more people to live independently; Printing of electronic, ie smart pill packages; and, smart toilets. By 2020 and beyond we see: Cheap, disposable sensors distributed throughout the environment, with applications such as early detection of infections in hospitals; Using RFIDs for dietary monitoring of individuals/families; and, Remote monitoring of a wide range of patient conditions, anticipation of illness (extensive use of mobile phones for self-management of chronic conditions).

Data Capturing and Imaging – Today we see: First-generation molecular imaging techniques based on nuclear medicine; Fast protein sequencing commercially available; Continuing developments in imaging, eg 3D mammography; and, Medical image analysis and computer aided detection of disease. In the medium term we see: Imaging of cellular and molecular processing leading to new therapies; and, Combination of molecular imaging with DNA micro-array technologies; Image-based clinical trials. By 2020 and beyond we see: Virtual reality in 3D and 4D body imaging; Virtual reality to train doctors; and Molecular imaging begins to integrate with bio-nanotechnology for novel therapy delivery methods.

High-performance Computing – Today we see: Grid technology used in health care enabling better use management of large data sets or “big data”; Supercomputer models relating to spread of avian/ swine influenza and HIV treatments; and, Latest EHR access automatically logged, enabling audits trails to be produced, enabling security. In the medium term we see: Middleware and Web Services incorporated into every PC, laptop and hand-held devices with a wide range of health care applications; and, models relating to heart and lung disease. By 2020 and beyond we see: Semantic web enabling richer use of large datasets; Real-time computation of complex wide spatiotemporal scale models of disease; and, Intelligent Data mining from a mixture of text, images, and signals.

Autonomous and Robotic Systems – Today we see: Pharmacy Robots; and Robots in image-guided surgery. In the medium term we see: Low-cost mobile and wearable devices for drug administration and anesthesia; Carebots and robotic teddy bears; and Robots in homes for chronically ill and elderly. By 2020 and beyond we see: Patient at home interaction with humanoid and mechanical pets; Development of fully robotic systems; and Permanent artificial prostheses.

Source: Royal Society, 2007

Information is the lifeblood of health and healthcare. And healthy population in the new digital age will mean healthier digital economies and societies. Yet the global health establishment continues to be so slow to adopt the use of STI and ICT through a combination of institutional inertia, lack of interoperability and international data standards, and identification of investments with best economic returns. As a result, there has been a lack of productivity improvement in healthcare, which stands in stark contrast to robust growth in other sectors of the world economy, and health systems risk falling even further behind.

Digital health is part of the solution as it is estimated some 20% to 40% of health care spending is wasted due to lack of information. Indeed, the revolutionary short-, medium- and long-term impact of digital health was brilliantly identified by the multi-stakeholder report of the Royal Society as far back as 2007 (Box 5).

In caring for individual patients, managing healthcare systems, controlling and preventing HIV-AIDS, NCDs or other epidemic illness, or conducting cutting-edge clinical research, we are only as good as the information we have about the health and healthcare of people and populations. Digital health releases the power of health-related data by applying the most advanced STI and ICT to the collection, sharing and use of information that can improve health and healthcare. And that data is growing exponentially as more people are connecting to the global information infrastructure.

The economic and clinical value of digital health has been documented in several countries and by many health systems. The documented value is diverse: cost savings, improved health status, increased provider productivity, improved patient access to care, and higher levels of care safety. Over the last few decades the lives of almost every human have been touched by technology. Digital health should harness the use of technologies and networks by all stakeholders (doctors, patients, scientists, payers and providers) to enhance collaboration and personalization, and to reduce the cost of healthcare.

Overall, of all of the network mega-trends, high-speed broadband is the natural and transformational change agent for 21st century healthcare. Broadband and mobile broadband embodies the ripening of the digital revolution with the potential to jump a generation in local development within a generation. It will play a pivotal role in helping spur innovation in healthcare applications delivery which will address some of the key challenges facing both developed and developing countries, including chronic non-communicable disease and rapidly ageing populations, principally through remote diagnostics.

Broadband is not a solution in and of itself. Some of the greatest challenges in delivering digital health care are not technology or network related, but rather tied to ethical and legal questions surrounding remote care, and these will need to be addressed. Access to a secure, fast and reliable broadband network will lay a foundation for innovation in the health sector, but will need to be coupled with progress with financial and logistical and social obstacles as well.

Whatever barriers are currently impeding the uptake of digital health, this tidal wave of converging network and development mega-trends will ultimately engulf the global health profession, and in ways we have not even conceived of yet. For example, nanotechnology may become more important than immunizations in preventing and curing disease. Private health insurance schemes will change to reward individuals who stay healthy rather than get sick, and the private sector will increasingly sell gadgets, drugs and services that help them do so.

Global Health provides an excellent barometer to gauge the generic data gaps in how digital innovation and investment can be harnessed to eradicate extreme poverty and transform economies through sustainable development – within our generation and by our generation. Beyond global health, we must now see how network mega-trends map to the dozen development mega-trends currently being suggested for the SDG agenda that will take us to the year 2030 and beyond.

Selected Reading & References

- The Geopolitics of Information: How Western Culture Dominates the World*, by Anthony Smith, OUP, 1980
- Technologies of Freedom*, by Ithiel de Sola Pool, Harvard University Press, 1983
- The Missing Link – Report of the Independent Commission for Worldwide Telecommunications Development*, ITU, 1985
- The Networked Economy*, Proceedings of the *Communications Week International Conferences*, 1990-1995
- The Twilight of Sovereignty: How the Information Revolution is Transforming Our World*, by Walter B. Wriston, Scribner, 1992
- Business & Technology in the Next Millennium*, The Wall Street Journal, 1996
- Toward the Global Internet Infrastructure: the Twilight of Telecommunications*, by Denis Gilhooly, World Bank Group, in *Masters of the Wired World*, FT Pitman Publishing, 1999
- Report of the High Level Panel on Information and Communications Technologies*, United Nations, 2000
- Digital Opportunities for All: Meeting the Challenges – Final Report of Digital Opportunity Task Force (DOT-Force)*, (Lead Authors, Denis Gilhooly and Bruno Lanvin), G8 Summit 2001
- Creating a Development Dynamic – Final Report of the Digital Opportunity Initiative*, Accenture, Markle Foundation, UNDP (Lead Authors, Mike Yates, Jim Steinberg, and Denis Gilhooly), 2001
- The End of Poverty: Economic Possibilities of Our Time*, by Jeffrey D. Sachs, Penguin, 2005
- Innovation and Investment: ICTs and the MDGs*, by Denis Gilhooly, UN ICT Task Force report prepared for the Science, Technology and Innovation Task Force of the UN Millennium Project, United Nations, 2005
- Innovation: Applying Knowledge in Development*, United Nations Millennium Project Task Force on Science, Technology, and Innovation, 2005
- Creating an Enabling Environment: Towards the Millennium Development Goals*, edited by Denis Gilhooly, United Nations, 2005
- The Connected Republic 2.0: New Possibilities & New Value for the Public Sector*, Cisco Systems White Paper, 2007
- Digital Health: Impact of Information & Communication Technologies on Health & Healthcare*, Royal Society, 2007
- Confronting the Diseases of Poverty to Meet the MDGs: Digital Health and African Development*, by Denis Gilhooly and Joanna Rubinstein, United Nations, 2008
- Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health*, Final Report of the Commission on Social Determinants of Health, WHO, 2008
- Network Developments in Support of User Needs*, OECD, 2009
- Telecommunications and Economic Growth*, The World Bank, 2009
- The Economic Benefits of Strategic ICT Spending*, Intel, 2009
- Challenges and Opportunities in Scaling Up Digital Health*, Ericsson/Global Digital Health Initiative, 2009
- Global Strategy on Women's and Children's Health: Every Women, Every Child*, United Nations, 2010
- A 2010 Leadership Imperative: The Future Built on Broadband*, A Report by the Broadband Commission for Digital Development (Lead Author, Denis Gilhooly), ITU and UNESCO, 2010
- Women & Mobile: A Global Opportunity: A study on the mobile phone gender gap in low and middle-income countries*, GSMA Development Fund and Cherie Blair Foundation for Women, 2010
- mHealth Value Chain Infrastructure View*, by Sinclair Stockman, Active Minds, 2010
- Commission on Information and Accountability for Women's & Children's Health: Keeping Promises, Measuring Results*, WHO, 2011
- Building on our inheritance: Genomic technology in healthcare*, A Report by the Human Genomics Strategy Group, 2012
- Children in an Urban World: The State of the World's Children 2012*, UNICEF, 2012
- Big Data for Development: Challenges and Opportunities*, UN Global Pulse, United Nations, 2012
- Post-2015 Health MDGs and Post-2015 Education MDGs*, Results for Development Institute & Overseas Development Institute, 2012
- Poverty, Diseases, and Medicines in Low- and Middle-Income Countries: The Roles and Responsibilities of Pharmaceutical Corporations*, by Prof. Dr. Klaus M. Leisinger, *Business & Professional Ethics Journal* Vol. 31 (2012) No. 1, pp135–185

The Future We Want, Resolution 66/288 adopted by the UN General Assembly, UNGA, September 2012

The Broadband Bridge: Linking ICT with Climate Action for a Low-Carbon Economy, A Report by the Broadband Commission for Digital Development, 2012

Touching Lives Through Mobile Health: Assessment of the Global Market Opportunity, GSMA, 2012

Mobile Technology Poised to Enable a New Era in Healthcare, Ernst & Young, 2012

Social Media Likes Healthcare: From Marketing to Social Business, PWC Health Research Institute, 2012

The Impact of Broadband on the Economy: Research to Date and Policy Issues, Cisco and ITU, April 2012

Towards Universal Health Coverage, by David de Ferranti and Julio Frenk, International Herald Tribune, 2012

Technology Will Replace 80% of What Doctors Do, by Vinod Khosla, Fortune Magazine, December 4, 2012

Global Burden of Disease (GBD) Report 2010: a multi-investigator collaboration for global comparative descriptive epidemiology, The Lancet, December 15, 2012

Technology, Broadband and Education: Advancing the Education for All Agenda, A Report by the Broadband Commission for Digital Development, 2013

Human Development Report 2013, The Rise of the South: Human Progress in a Diverse World, UNDP, 2013

The key challenges to 2030/2050: Mapping out long-term pathways to sustainability and highlighting solutions that should be scaled up, by Peter Bakker and Klaus Leisinger, UNSDSN, 2013

Captive Audience: The Telecom Industry and Monopoly Power in the New Gilded Age, by Susan Crawford, Yale University Press, 2013

The New Digital Age: Reshaping the Future of People, Nations & Business, by Eric Schmidt and Jared Cohen, Knopf, 2013

Health in the Post-2015 Agenda: Report of the Global Thematic Consultation On Health, United Nations, April 2013

Science, technology and innovation, and the potential of culture, for promoting sustainable development and achieving the Millennium Development Goals, Report to the Secretary General, UN ECOSOC, April 18, 2013

A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development, The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, United Nations, May 31, 2013

Fixing the Digital Economy, by Jaron Lanier, The New York Times, June 9, 2013

An Action Agenda for Sustainable Development: Report for the UN Secretary General, Leadership Council of the Sustainable Development Network, A Global Initiative for the United Nations, June, 2013

Corporate Sustainability and the United Nations Post-2015 Development Agenda: Perspectives from UN Global Compact Participants on Global Priorities and How to Engage Business Towards Sustainable Development Goals, Report to the United Nations Secretary-General, Global Compact, June 2013

Draft Outcome Document for the Heads of State Meeting of the UN General Assembly on the Achievement of the Millennium Development Goals (Scheduled for September 25, 2013), UNGA, July 2013

A life of dignity for: accelerating progress towards the Millennium Development Goals and the and advancing the United Nations Development agenda beyond 2015, Report of the Secretary-General to the Sixty-eighth session of the UN General Assembly, United Nations, 26 July 2013

Transformational Solutions for 2015 and Beyond: The Report of the Broadband Commission Task Force on Sustainable Development, ITU and UNESCO, September 21, 2013

Acknowledgements: This Concept Note was written by Denis Gilhooly with special thanks to Carol Bellamy, Amir Dossal and Joanna Rubinstein, and insights from esteemed colleagues including Najeeb Al-Shorbaji, Caroline Anstey, John Aske, Orlando Ayala, Mark Barasch, Seth Berkley, Tim Berners-Lee, Sunil Bharti, Kathy Brown, Yuvan Beejadhur, Barbara Bulc, Flavia Bustreo, Kathy Calvin, Vint Cerf, Dianne Davis, John Davies, Djibril Diallo, Kathy Egan, Gary Fowlie, Richard Gabuka, K. Ganapathy, Tore Godal, Heather Grady, Angel Guria, Francis Gurry, Paul Hengeveld, Sylvia Hesse, Richard Horton, Mo Ibrahim, Paul Jacobs, Malcolm Johnson, Don Jones, Neil Jordan, Richard Jordan, David Kanamugire, Janis Karklins, Robert Kirkpatrick, Rosemary Leith, Klaus Leisinger, Emily Livesay, Chris Locke, Francis Lorenzo, Karen Lynch, Khalid Malik, Mark-Malloch Brown, Pat McCaffrey, Frank McCosker, Kevin McGovern, Jay Naidoo, Eli Noam, Anders Nordstrom, Denis O'Brien, Robert Orr, Robert Pepper, Sam Pitroda, Nii Quaynor, Scott Ratzan, Ellis Rubinstein, Jackie Ruff, Jeffrey Sachs, Michel Sidibé, Gabriel Solomon, Sinclair Stockman, Klaus Stoll, Mark Suzman, Coumba Touré, Hamadoun Touré, Tim Unwin, Ben Verweyaan, Hans Vestberg, Lesley Wade, Elaine Weidman, Lawrence Yanovitch, Muhammad Yunus, Ken Zita, and *Global Digital Innovation & Investment Initiative* Partners. (Copyright: GDIII, 2013) www.GDIII.org

NOTES

NOTES