Briefing Note 4

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ICT Trends for Government Leaders

United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT)

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Summary

A quick succession of technology breakthroughs has revolutionized how we communicate and exchange information. But where did all these technological developments come from and where are they headed? With the wide array of information and communication technology (ICT) applications, what are the factors to consider when making a selection? The first section provides some insights into some of the key ICT trends that have taken place, and the ways that they are shaping the present as well as the future. The next section identifies policy considerations relevant to building today's modern communication systems, to the continued development and evolution of the Internet, and to socio-economic advancement and achieving development goals.

This briefing note is drawn from the fourth of nine core modules of the Academy of ICT Essentials for Government Leaders (Academy). The Academy is a comprehensive ICT for development training curriculum that aims to equip policymakers with the essential knowledge and skills to fully leverage opportunities presented by ICT to achieve national development goals and bridge the digital divide. More information on the Academy is available at http://www.unapcict.org/academy.

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1. Introduction

In just a short few decades, the use of information and communication technologies (ICTs) has completely transformed how we live, work and play. A quick succession of breakthroughs in technology has completely revolutionized how we communicate and exchange information. From the invention of Morse code in 1837, to the invention of the telephone in 1875, to the availability of AM radio stations in the 1910s, followed by television in the 1940s, people were discovering and learning new ways to communicate and exchange information. The invention of the microprocessor in the 1970s was the start of another era of rapid change, where in just some three decades, we have arrived at today's modern communications systems, of which the Internet is probably the most pervasive, and increasingly becoming the primary medium of communications in many instances.

The creation of the World Wide Web was an important catalyst in the Internet transitioning from a research project to mass global, public acceptance. Today, the Internet and its related technologies drive businesses and economies globally. But the evolution has not stopped there. The Internet is making possible new ways of doing things. The use of the Internet to send and receive voice communication is a prime example. Cloud computing, which is now coming to the fore at a rapid pace, is perhaps the next evolutionary stage in computing for the masses, where low cost access devices are used to access and manipulate information stored and processed within the network.

It is therefore important that current trends in technology form an important part of the decision-making process when deliberating ICT policy and direction.

2. Current Status

ICTs play an important role in any economy today. Some governments use ICTs to improve administration and management functions. Others use ICTs for health and education. And then there are some economies that have capitalized on the economic returns that ICT-based industries can offer. India's ICT outsourcing sector, which is expected to generate some USD 75 billion in revenues from software and services exports by 2010, is a prime example of building an industry around ICT.[1]

To compete in an increasingly globalized marketplace, economies need to not only use ICT, but also ensure the availability of ICT to all sectors of the economy. This requires a significant investment in infrastructure and capacity building, and a policy environment that fosters innovation and growth. Infrastructure and capacity building have been long-standing issues in the developing world in particular, and when coupled with a closed and restrictive policy environment, an economy in such a situation is rarely able to fully maximize all the opportunities offered by ICTs.

3. Key Considerations

3.1 Network Building Blocks

Technology evolves, and is embraced, at a rapid pace, particularly in the developed world. This is a challenge for the developing world where users have to cope with

[1] NASSCOM, *NASSCOM Strategic Review 2008 Executive Summary*, http://www.nasscom.in/upload/SR2008_Exec_%20Summary.pdf.

these rapid changes often without the necessary resources, and they are either forced to adapt to new technology or miss out on it altogether, which further widens the digital divide. Voice-over-Internet-Protocol (VoIP) is one example of this, as are today's video-based websites (such as YouTube) which require significant bandwidth to operate efficiently.

In order to appreciate the technical challenges in delivering some of today's rapidly evolving technology, it is important that policymakers and decision makers in developing countries understand and take into account the basic building blocks that make up modern communication networks. It is also important to look at approaches that have been successful in other economies and explore how best to adopt and adapt these to suit local conditions. These include:

- Using appropriate technology to 'future-proof' infrastructure — for example, deploying optical fibre networks instead of copper-based networks for critical backbone connections;
- Exploring the possibility of regional and sub-regional cable networks to provide for system redundancy and stability;
- Assessing the benefits that a robust national cable infrastructure can provide, including looking at how this would help build investor confidence, strengthen the service delivery and reliability of service and networks providers, and how all these would translate to providing better services and opportunities to the general public; and
- In situations where terrain and deployment costs hamper service provision, using cable-based systems, the use of wireless systems and/or satellite-based delivery of services, and putting fair regulatory mechanisms in place to allow feasible delivery of such services.

3.2 The Internet

The growth and influence of the Internet in the past decade has been phenomenal, to say the least. At the time of writing, it is estimated that there are some 1.5 billion Internet users in the world, and this is constantly increasing.[2]

Voice communication over the Internet, blogging, Internet radio, Internet television, social networking sites, cloud computing, and Internet-based user applications have all contributed immensely to the rise in popularity and acceptance of the Internet as the primary communication method for many. The Internet has also given rise to many businesses and industries generating billions of dollars in revenue, which makes the Internet an integral part of the global economy.

As such, it is important to ensure that the policymaking process looks at the Internet as an important component of the economy's infrastructure. Indeed, many economies now consider the Internet as part of critical national infrastructure, much like water supply, electricity and transportation services. When considering the Internet, the policymaking process needs to ensure that Internet services are reliable and secure, and provide an environment that allows Internet growth and innovation to continue. Such process needs to address the following:

- Fostering competition in Internet service provision and ensuring that there is appropriate 'unbundling' of local loop services (i.e. separation of infrastructure from the services that run over it);

2 Internet Usage Statistics, "The Big Picture from Internet World Stats," http://internetworldstats.com/stats.htm.

- Interconnecting government agencies and institutions using appropriate infrastructure, and promoting commitment to online delivery of as many government services as possible;
- Ensuring security and stability of national Internet infrastructure through such means as domain name system root server mirrors, Internet Exchange Points and international connectivity redundancy;
- Encouraging legislative responses to cyber security (e.g. anti-SPAM legislation and consumer protection on the Internet);
- Providing appropriate regulatory flexibility to ensure the continued evolution of Internet technologies and their use (e.g. liberalization of VoIP and development of broadband Internet from both access and cost perspectives); and
- Building an environment that is conducive to the development of community-based networks, particularly in rural environments where commercial provision of services may not be feasible.

3.3 Connecting the Modern Organization

Today's modern information technology systems are able to provide improved process control and management, as well as enhanced general operational efficiency. But given the bewildering range of hardware and software available, it is important to ensure that the right choice of hardware and software platform is made. Some factors which need to be considered holistically include:

- Ensuring that procurement and purchasing decisions take into account technology trends, as well as the lifespan of the system, including its total cost of ownership;
- Assessing the benefit of adopting free and open source software in terms of economic savings, as well as the potential to localize such software to suit local conditions;
- The use of new and emerging application delivery methods that require less in-house technical resources to operate and maintain, such as Software as a Service and Enterprise Resource Planning tools, to provide 'whole of organization' application integration and access;
- The potential to reduce interconnectivity costs by employing virtual private networks as a means of connecting remote locations/offices; and
- The potential benefits of implementing intranets as an organizational information resource.

4. Conclusion

More than ever before, ICTs are being looked at as means to deliver improvements in socio-economic conditions, and as a potential tool for achieving the Millennium Development Goals (MDGs).

As technology continues to evolve, it is important to ensure that the policymaking process is thorough and it ultimately contributes to socio-economic advancement. The following are some key actions that can contribute to this process:

- Establishing a National ICT Taskforce that considers advances in technology in a critical manner and provides timely and relevant input into the overall national planning process;
- Ensuring that the ICT regulatory and policymaking arm of government is proactive in its approach and engages with stakeholders from all sectors, and that it has the capacity to research and assess new technology trends so they

can be rapidly adopted where appropriate;

- Formulating a national ICT strategy with balanced input from all stakeholders, and taking into account both global technology trends and local needs;
- Collecting national statistics that include an ICT aspect to aid in planning and development;
- Promoting policy reform efforts underpinned by market liberalization and competition, but balanced by access cost structures and service provisioning, to ensure that service providers offer the required services in a reasonable manner;
- Policymaking that explores alternative forms of access and, in particular, the potential of mobile telephony and convergence;
- Adopting new technology and deploying forward-looking strategies for infrastructure development and the use of appropriate technology to maximize the availability and use of information and services; and
- Using open standards in system procurement and deployment to ensure continued interoperability among systems.

The policymaking process needs to carefully explore various options to provide an outcome which is holistic, practical in the local context, and at the same time, is in line with regional and global trends and best practice.

The **APCICT Briefing Note Series** aims to provide at-a-glance information on key information and communication technology for development (ICTD) agendas for high-level policymakers and stakeholders. The series includes: 1) highlights of conventional research papers, assessment and survey reports and publications; 2) policy considerations drawn from the Academy modules; and 3) key challenges and lessons learned based on analyses of best practices and case studies.

APCICT, a regional institute of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), was established and inaugurated on 16 June 2006 in Incheon, Republic of Korea. The role and mission of APCICT is to strengthen the efforts of the 62 ESCAP member and associate member countries to use ICTs in their socio-economic development through building the human and institutional capacity for ICT. In pursuance of this mandate, APCICT's work is focused on three inter-related pillars – Training, Advisory Services and Research. The Briefing Note Series is part of the research pillar. Also under the research pillar is a Case Study Series that provides analyses and compilations of best practices and case studies on different aspects of ICTD and capacity building in the Asia Pacific region.

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