

National Information & Communications Technology (ICT) Policy

The Department of Public Enterprises,
Information and Development Co-operation

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FOREWARD BY THE MINISTER

In the past ten years, the use of Information and Communications Technology has transformed the world providing opportunities for businesses, opening access to the global marketplace, delivering a wealth of information, enhancing social interaction, enabling greater community participation and bridges the digital divide that may develop as a consequence of the advancement of technology over time.

The people of Papua New Guinea have much to gain from increased participation in this Information and Communications revolution. Many of the challenges faced by PNG society today, including the economy, geographical isolation, education and health can be greatly assisted through the increased use of efficient Information and Communications Systems.

The opportunities are boundless. Significantly, Papua New Guinea today has the opportunity to create a state of the art infrastructure for ICT which will chart the course for our future at the beginning of a new millenium. This will be the back bone of the industry, commerce and social interaction in Papua New Guinea, and will create the potential to make our country a key player in the our regional information economy and not an incidental spectator.

This document details the PNG Government's objectives for Information and Communications Technology, and sets out a strategic framework for meeting those objectives. The policies set out appropriate and achievable goals against the background of the reality that is Papua New Guinea today. The strategies aim to provide realistic and cost effective improvements in ICT capabilities that will enable all the people of Papua New Guinea, including those in rural areas, to enjoy the social and economic benefits of the Information and Communications Age.

The Government is committed to translate these objectives into action, and looks forward to working with other key stakeholders in PNG, to grasp the opportunities of the information economy for the benefit of all its people.

Signed By

Hon. Arthur Somare MP

Minister for Department of Public Enterprises, Information and
Development Co-operation

PART ONE – PNG & THE INFORMATION AGE

INTRODUCTION

A. BACKGROUND

The term "ICT" includes hardware, systems and processes for creating, storing, managing and sharing information. Some elements of ICT have progressed so quickly that they have changed the lives of people dramatically. Some striking examples are the internet, mobile communication technologies, and innovations in broadcasting.

In October of 1978, the genesis of a process leading to a coherent national policy on information and communication technologies ("ICT") commenced. Since then, a structured national policy has begun to emerge, under the mandate of the then Secretary to the Department of Information and Communication in November 1992. This resulted in the National Policy on Information Communication of Papua New Guinea, which was tabled in Parliament by the then Minister for Information and Communication Services, the Hon. Martin P. Thompson LLB M.P.

The Draft National Information Communication Technology Policy Framework ("the draft Framework") was approved by Cabinet in 2005. In response to the draft Framework, an Inter-agency Taskforce was established under National Executive Council Decision No. 280/2005, to take steps to formulate a National ICT Policy.

Under the Terms of Reference of the Inter-agency Taskforce, a Strategic Technical Advisory Team, reporting to the Acting Secretary for State Enterprises and Information (now the Department of Public Enterprises Information and Development Co-operation), was to develop a policy in consultation with the relevant stakeholders, which would be consistent with the National Government's Medium Term Development Strategy and Millennium Development Goals

Primary national imperatives in this country are good governance, export driven economic growth and rural development, poverty reduction and empowerment through human resource development.

There are significant threats to development in Papua New Guinea, namely, the prevalence of HIV/AIDS, high population growth, unplanned urbanisation, dysfunctional service delivery systems and impediments to land utilisation.

A well designed and implemented ICT Policy will act as an enabler to deliver our national imperatives, and to provide viable and sustainable solutions to these threats. However, the current deficient state of the country's ICT infrastructure presents a major challenge. Until this is properly remedied, service delivery failures at a governmental level are a certainty, and any ICT policy will fail.

Poor ICT infrastructure contributed to the mixed implementation of the previous Medium Term Development Strategy ("MTDS") (1997-2002). In June 2005 the Department of Public Enterprises, Information and Development Co-operation (formally the Department of State Enterprises and Information) conducted an e-readiness and feasibility study. The results of this study resulted in NEC Decision 124/2006 to develop an Integrated Government Information System (IGIS). IGIS

rationale is to first get the Government's in-house administration and management systems in order. Key amongst the recommendations is to establish Uniform ICT Policy & Standards and a Consistent Legal Framework.

This document (the ICT Policy), is the culmination of the above work. It sets out the Government's policy regarding National Information and Communications Technology, and the strategies which the Government has committed to in order to bring it's policies into action.

The ICT revolution presents the least developed countries with a double challenge. They must assign qualified and able people to keep abreast of the latest developments in the ICT field while they assign scarce human, organizational, and financial resources to meet the needs of rural and marginalized people. On the other hand, ICT presents an opportunity for accelerating national development. The development of coherent guidelines for national or regional ICT strategies that reflect their development needs will take a major step toward building ICT capabilities that enable people to benefit from these technologies.

The ICT Policy sets out appropriate and achievable goals against the backdrop of the reality that is Papua New Guinea today. The keystone of this work will be the firm adherence to realistic cost-effective improvements that make significant changes to life in Papua New Guinea.

B. OBJECTIVES AND VISION – BRIDGING THE DIGITAL DIVIDE AND DEVELOPMENT OF AN INFORMATION ECONOMY

In PNG, the digital divide is exacerbated by geography. Rural locations have little or no access to ICT. This situation is less tolerable because most of the inhabitants of PNG live in the rural areas making up to 85% of the entire population of the country. In urban locations, where access is more prevalent, the quality of available ICT is very poor.

One of the key factors compounding the digital divide in PNG is the absence of a National ICT policy framework that is necessary to create an enabling environment and to assist PNG to deploy, harness and exploit ICT for socio-economic development. While many developing countries have moved ahead and developed an effective ICT policy, they fail because very little progress has been made in policy implementation.

Looking to the near future, the Government can envisage a Papua New Guinea where:

- the processes for work, commerce, health, education and training, social interaction and government are assisted by information and communications technologies;
- all Papua New Guinean's are able to take part in the opportunities of the electronic age, by bringing the information economy into their homes;
- all Papua New Guinean's, particular those outside the major population centres, have access to communications, information, government services such as health and education, entertainment and culture, goods

and services from around the country and the world, as a consequence of high quality, easily accessible and affordable ICT;

- the education and training systems which aid the development of it's citizens can confidently take advantage of the benefits of ICT while at the same time harnessing the learning of all social and cultural societies in PNG and the world;
- investment, job creation and export within the information economy make a growing impact on the whole PNG economy, generating revenue, jobs, economic efficiencies and increased wealth for all Papua New Guinean's.
- the burden of distance is lessened for the people of PNG because of better access to ICT and where the reduced isolation promotes the indigenous culture of PNG to wider audiences.

C. MISSION

With the above matters in mind, the Government's mission is:

To bring about realistic, significant and beneficial change to the people of Papua New Guinea through efficient use of ICT.

D. GUIDING PRINCIPLES

The principles which guide this ICT Policy are:

- improving the lives of ordinary Papua New Guineans, in accordance with the National Directive Principles of the National Constitution, which stipulates that there must be equity in participation and benefit in the development of Papua New Guinea;
- facilitating equity of access to ICT by all citizens;
- overcoming the impediments to ICT development to enable PNG to achieve the levels of national development, reflecting the aspirations of its people;
- encouraging the establishment of industry structures for the ICT sector which work most efficiently and effectively; and
- establishing political and administrative institutions and processes which facilitate ICT objectives most efficiently and effectively.

E. GOALS

The goals of this ICT Policy are:

- (a) to create state of the art ICT infrastructure which is available to as many Papua New Guineans as possible. This infrastructure will be the back bone of the country's ICT industry, which can be relied upon to assist in meeting other goals;

- (b) to have a model for telecommunications service delivery which is competitive, but which also ensures wide, affordable access throughout Papua New Guinea;
- (c) to foster widespread use of the internet as a business and life tool;
- (d) to encourage use the internet as a means of educating the nation;
- (e) to ensure that the laws of Papua New Guinea foster confidence in electronic commerce; and
- (f) to ensure that Government departments work in a co-ordinated way to advance the above goals.

F. THE STATUS OF ICT IN PNG

A widespread embrace of ICT in Papua New Guinea has been hampered by a significant shortcoming in the capabilities and availability of appropriate telecommunications services from Telikom PNG ("Telikom", which in this document will be referred to as "the incumbent provider"). This situation has resulted from a lack of ongoing investment and maintenance of the network infrastructure over the past decade, and cannot be improved upon until a major network refurbishment and rebuild has taken place.

The current telecommunications network has serious capacity limitations and difficulty in supporting high speed broadband services. The fixed telephony network currently has a total of approximately 65,000 lines, 65% of which are business lines. This represents one of the lowest penetrations of telephony services in the world. Geographical coverage is extremely low and is limited to the larger population centres. The service quality is poor and has been identified as a serious impediment to business. Charges are high and, consequently, affordability is low for most citizens.

Internet services are slow, unreliable and expensive. Residential subscribers account for a third of the fixed line customer base.

Fixed and mobile teledensity and internet penetration are extremely low and broadband services are not available on the fixed network.

A number of Internet Service Providers (ISPs) have built competitive wireless access networks which allow customers to connect independently of the fixed network although limitations on the overall capacity from the country to the Internet and the rest of the world results in a service that cannot be relied upon for any business critical services. Further, the cost of wireless internet puts it beyond the reach of most of the population.

A GSM cellular network is available, but it is under-dimensioned and can suffer congestion at times of peak use. Global roaming arrangement discussions are progressing but have yet to be completed. The GSM network needs significant expansion both in the number and capacity of the base stations.

The lack of transmission capacity both nationally and internationally has also hindered the adoption of the Internet, both as an information source and as a tool for business and personal communications. The incumbent provider has taken action to add international capacity through the redeployment of the

decommissioned Pac Rim West cable system. This is a positive step, but can only be seen as a short term measure, because the capacity of this cable is relatively low compared to modern photonic systems.

Refurbishment, modernisation and extension of the fixed line network, and substantial extension of the mobile network to deliver efficient services at the lowest possible prices, are basic foundations which are required to allow PNG to adopt and exploit advanced ICT capabilities and remove the distance limitations that exist for over 80% of the population.

G. THE PNG DIGITAL STRATEGY POLICY

The PNG Government is committed to bringing the benefits of ICT to all Papua New Guinean's - to create a society where ICT empowers everyone to create, access, utilise and share information and knowledge, enabling individuals and communities to achieve their full potential.

This ICT Policy document therefore includes a Digital Strategy which provides a unifying vision for using digital technologies to shape an exciting future. As a nation, Papua New Guinea will need to embrace new technologies and with the skills, education and motivation to use them to create wealth and well-being for all.

At the heart of this Strategy is the recognition of the importance of three interrelated enabling conditions:

- **Connection:** Affordable access to viable ICT infrastructure such as telecommunications networks, computers, internet signal, mobile phones and other devices.
- **Confidence:** Developing the necessary skills at all ages, in all parts of society, to use and participate in ICT effectively. Such skills include functional and digital literacy and the ability to take part in an interactive electronic environment. Confidence also encompasses the dimension of trust in using ICT and addressing the challenges that may erode trust in electronic commerce such as spam and electronic crime.
- **Content:** The information which can be made available through digital networks includes national heritage collections, government information, local language resources and research databases. Traditional cultural products such as literature and history and new cultural products from the creative industries can be archived electronically. Through effective use of the internet, the people of Papua New Guinea can gain access to online facilities for entertainment, learning, and business as well as information generated by government, businesses and community organisations.

These three dimensions reinforce one another. Being connected provides the means, confidence provides the skills and trust, and content provides the reason for engaging in the ICT age.



Through this ICT Policy, the Government intends to play a key role in creating the necessary conditions for ICT development. This policy works towards:

- improving connection, by ensuring the availability of affordable and reliable ICT infrastructure for all;
- promoting confidence in the effective use of ICT by individuals, communities and business, through its leadership, by raising ICT awareness, by providing training, and by addressing safety, security and privacy issues; and
- unlocking the social and economic value of content by progressively providing digital access to existing content in public institutions, and encouraging the production of new digital content.



PART TWO – AREAS OF FOCUS

1. ICT INFRASTRUCTURE AND ACCESS

1.1 INTRODUCTION

PNG is a remote country. 85% of its citizens live in rural areas. It has limited financial resources, yet it is abundant with economic opportunities. The first challenge for the Government in providing a policy for ICT is to ensure that there is in place the infrastructure capable of ensuring reliable delivery of telecommunications and internet signal to as many citizens as possible by the most cost efficient means. This infrastructure will be the backbone upon which the country's ICT system can rely.

Access to ICT facilities is rarely equitably provided in rural regions anywhere in the world. In developed nations such as Australia and New Zealand, rural services often suffer from connectivity issues and/or a lack of effective competition causing a pricing imbalance. The same problem will emerge in Papua New Guinea without regulatory intervention.

Rural citizens are disadvantaged for a number of reasons. Connectivity is difficult because of geographical remoteness and because of the economic disincentive to construct viable services in remote areas. This causes follow on effects, such as educational difficulties and a lack of basic information in relation to health, employment and market information.

The International Telecommunications Union passed a global mandate to provide, to every community across the globe with a population greater than 1000, access to reliable telephony service. This has been reflected in PNG's Community Service Obligation (CSO) where the incumbent provider (and any incoming service provider) must facilitate services to the geographically dispersed population. With the current limitations in both transmission capacity and access technologies, support for this CSO in respect of telephony and Internet access is not possible.

This challenging environment has forced both private companies and government departments to look to implement their own private networks, usually through microwave radio and satellite technologies. This is not an ideal solution in Papua New Guinea, as it encourages a duplication of infrastructure and an inefficient use of available resources.

ICT infrastructure must be complementary to other forms of infrastructure – e.g. rural roads are still required. However, unless investment in ICT infrastructure is strategically planned and aligned with government policy and national objectives then the significant benefits seen throughout the developed world will not be realised in Papua New Guinea.

The synergies that exist between utilities within the government sector should be developed to ensure that duplication of the transmission network does not result in redundant upfront and ongoing costs.

As an essential service, the supply of power and telecommunications form part of the social and economic fabric of a country. When these services cannot be supplied or fail to be maintained, disruption occurs to the development of the

country which can, over time, severely effect the maturity of its people, investment and world recognition.

The telephone numbering plan in PNG has been amended over time in a piece meal fashion, resulting in a number of limitations and challenges for widespread adoption of ICT use. The PNG telephone number plan must be changed to accommodate the long term, advanced ICT needs. A major change in a country's number plan is a significant activity and needs to be undertaken with technical and regulatory consideration, coupled with a public education campaign to ensure a seamless change.

1.2 POLICY OBJECTIVES

The Government's policy is to:

- (a) facilitate the building of a common national infrastructure for ICT in PNG;
- (b) ensure that access to the infrastructure is provided to as many citizens as possible with the available resources;
- (c) ensure that basic ICT services are made available at an affordable price;
- (d) improve the coverage and quality of internet connectivity so as to reach the maximum number of areas in PNG, and generally to promote the availability of widespread access to internet services;
- (e) encourage the identification and use of synergies between Government own utilities which are or may be of use in providing an appropriate ICT infrastructure; and
- (f) provide for limited alteration to the country's telephone numbering system to accommodate increased uptake in telephone services.

1.3 STRATEGIES

(a) ICT Infrastructure Refurbishment Plan

The incumbent provider will immediately commence a refurbishment of the telecommunications network (the network), which will:

- (1) provide reliable telephony services to a significant portion of the population throughout PNG;
- (2) provide high speed data services to schools, hospitals and local government departments to facilitate electronic education, health and government services;
- (3) provide communications services to commercial entities (such as facilities) who currently are forced to operate private networks due to the lack of commercial service availability; and
- (4) provide an adequate level of international capacity and connectivity which may be supplemented in the future.

The network will be completed by 31 June 2009.

Ownership of the network will be retained by the incumbent provider, which will in turn be retained by the Government, for the time being.

Approaching the network with the plan to deliver the full suite of services to outlying areas of PNG will not only provide the opportunity to service new customers, but provide these remote villages with telecommunications services that exceed community service obligations and facilitate advancement of the communities. The network will incorporate state of the art high capacity optical transmission systems which will allow both telephone and internet broadband services to be economically delivered. The network will provide ample capacity for new service providers who may require wholesale services to interconnect their customers in a competitive market. Clever use of available infrastructure will provide the lowest cost solution to network modernisation.

(b) Co-ordinating Government owned Infrastructure

The Government will encourage the identification and use of synergies between Government own utilities which are or may be of use in the providing of an appropriate ICT infrastructure by:

- (1) commencing a program for the mapping of Distribution networks for all utilities and the identification of common paths. If possible, future development of distribution channels will be completed jointly with the assistance of the whole of Government Chief Information Officer (CIO);
- (2) identifying and strategically managing ICT synergies through the whole of Government CIO; and
- (3) exploring alternative power generation sources for use in conjunction with the current grid.

(c) Telecommunications Numbering Plan Remediation

There is significant advantage to maintaining what is an effective national number plan that does not require area codes. To facilitate widespread adoption and increased use of all telecommunication services, the current 7 digit number plan will be expanded to 8 digits for all fixed and mobile services. The incumbent provider and Pangtel will co operate in the implementation of this numbering plan.

Network and customer equipment reconfiguration and a public education campaign will commence immediately. The remediation plan will be completed within the next 12 months.

(d) Radio Spectrum Allocation

The allocation and management of spectrum for government, public, and private use is a function that is performed and co-ordinated by the Papua New Guinea Telecommunications Authority (Pangtel). There are currently a number of Telikom and private wireless links, operating in licensed and class licensed spectrum, as well as a number of licensed satellite links. Point to point and point to multipoint links such as these

will continue to be used to provide connectivity within the network, and to locations not adequately served by alternative technologies.

Due to the topography of PNG, wireless is a key technology to cost effective delivery of services in the future. There are emerging broadband wireless standards that can not only provide high speed fixed line replacement services today, but are being developed to support fourth generation (4G) style broadband mobile services in the future.

Appropriate spectrum (2 Ghz, 3.5Ghz and 700 MHz bands), which are necessary for effective delivery of these services, will be reserved by the Government, and allocated for public broadband wireless services.

(e) International Capacity

The incumbent provider will review the short and long term international networks capacity needs of PNG, and will, within 12 months, provide a report to the Minister of the PEIDC, identifying needs, options and opportunities to enhance international capacity of the network so as to allow widespread adoption of ICT and broadband telecommunications services within Papua New Guinea.

(f) Internet Hot Spots

The Government will incorporate, as a part of the ICT Infrastructure Refurbishment Plan, the use of wireless distribution nodes. These nodes will be deployed along the network throughout the country, to provide both public mobile telephony (GSM) and broadband wireless (WiMAX) coverage to surrounding areas.

The position of these nodes will provide services to a high proportion of villages and towns within 10 – 20 kilometres of the backbone network.

Under this system, direct high speed connection will be provided to businesses, government offices, school and health care facilities by means of receiving equipment installed in those premises. In addition, broadband wireless hotspots, using WiFi technology, can be installed on appropriate structures to provide local laptop access to the broadband wireless nodes.



2. COMPETITIVE AND EFFICIENT SERVICE DELIVERY

2.1 INTRODUCTION

Competition in the ICT sector is vital to the people of Papua New Guinea. However, the need for competition must be balanced against the need for basic services to exist in the first place. Moreover, when competition is introduced it must not stall or be rendered nugatory by the technical limitations facing the nation today.

As at the date of this document there exists in place legislation to bring mobile competition into effect on 1 October 2007. The Government is satisfied that this date is untenable for the following reasons:

- (a) the country's ICT infrastructure is presently not adequate to cope with increased usage;
- (b) technically and operationally, the network is not ready to interconnect with another carrier's network. Therefore customers of one carrier would not be able to call customers of another carrier; and
- (c) the historical numbering plan evolution has resulted in a complex and inappropriate switching architecture which further compounds the challenges with interconnection, and makes any changes to the numbering plan difficult to implement without major reconstruction of the system. The current numbering plan is insufficient to support the increased number of subscribers across all market segments which would be expected under a full competitive model.

These technical impediments to effective competition will be remedied by the ICT Infrastructure Refurbishment Plan outlined above, over the next twelve months;

Papua New Guinea has historically possessed a single incumbent infrastructure service provider. As a consequence of this, it now has the unique opportunity to introduce a truly efficient Operational Separation Model for the country, despite it's challenging geography.

2.2 POLICY OBJECTIVES

The Government's policy is to create a sustainable and efficient competitive telecommunications industry, through the adoption of a suitable Operational Separation model for telecommunications service delivery.

2.3 STRATEGIES

(a) Operational Separation Model ("NetCo / ServCo")

PNG's Telecommunications Industry will adopt a "NetCo / ServCo" model under which:

- (1) the incumbent provider will act as a Network Company (NetCo) acting as a wholesaler of Telecommunications signal to service delivery companies (ServCos);
- (2) ServCos will retail telecommunications services to the end user;

- (3) ServCos will be required to pay an annual licence fee in return for a pro-rata share of the network based, in part, on the percentage of customers acquired;
- (4) ServCos will not be required or entitled to build separate telecommunications infrastructure;
- (5) ServCos will compete for customers based on price, service levels and their sales and marketing skills, and this competitive process will ensure that prices are within an acceptable margin above the wholesale price;
- (6) the incumbent provider will create a separate business to act as a ServCo (Telikom ServCo), which will compete with other ServCos for retail business;
- (7) at an appropriate time, the incumbent provider's NetCo and ServCo businesses will become separate companies, either or both of which are capable of being sold to private interests;
- (8) in January 2008, the Government will call for tenders for the granting of at least two licences to ServCos who will compete with the Telikom ServCo business. The tender process will be completed and the licences will commence, by 1 June 2008;
- (9) an independent third party will be appointed by the Government to:
 - supervise the technical development of the incumbent provider's network;
 - supervise the separation of the incumbent provider's NetCo and ServCo businesses;
 - examine the feasibility of creating separate companies to conduct each of the incumbent provider's NetCo and ServCo businesses; and
 - examine the feasibility and timing of private sale of the Telikom ServCo company so as to ensure that the incumbent provider is privatised and opened to competition at an appropriate time.

Under this Operational Separation Model, the Government (through the Independent Public Business Corporation) will retain ownership of both the network company acting as wholesaler, (Telikom NetCo) and the retailer, (Telikom ServCo) for the time being. Eventually, and at the appropriate time, Telikom ServCo will be sold to private interests.

The Government foresees that in time, it may also be appropriate to sell Telikom NetCo to private interests. This will not occur until the ICT Infrastructure Refurbishment Plan has been completed, and the Operational Separation Model has been firmly established, so as to ensure that the full value of the incumbent provider and its network can be realized for the people of PNG.

(b) **Commencement of Competition from 1 June 2008**

To enable the Government's policies as outlined in this document to be brought to fruition, the competitive model referred to above will become operational from 1 June 2008.

3. USE OF THE INTERNET

3.1 INTRODUCTION

The growth of the use of the internet is a modern phenomenon. In 1996, 40 million people of the world were connected to the internet. Today, that figure is about half a billion.

By contrast the number of PNG citizens who are connected to the internet is relatively low. This is mainly due to:

- lack of access to computers;
- poor quality of connectivity; and
- a lack of understanding, on the part of the population, as to how the internet works and how it can benefit their lives.

As a consequence, the people of PNG have not achieved the full benefits of the information economy.

The potential benefits are evidence in all aspects of PNG society.

Business, particularly small and medium enterprises which are the backbone of the PNG economy, are in need of reliable ICT infrastructure in order to grow and increase profitability. Reliable connectivity, the means to engage in e-commerce, and the ability to obtain information from the internet are, in the current day, vital paths to economic prosperity and business success.

Similarly, entrepreneurship can not flourish with bottlenecks in a country's ICT system, where internet access is cumbersome and unwieldy, phone calls are difficult to make and receive and calls are expensive.

These obstacles to business success can be removed with a rehabilitated network followed by a competitive Operational Separation model for service delivery.

The increased ability to engage in electronic commerce will link Papua New Guinea's entrepreneurs with the world, and will enable produce from the nation to be sold at competitive prices all over the region.

The internet can also assist the cultural issues facing Papua New Guinea. In a country as linguistically and culturally diverse as ours, the ability to use the internet as a tool for bringing people together will serve to assist in building national spirit. This will not happen automatically but as regions communicate

more readily and ideas are shared with greater fluidity, cultural boundaries will be reduced.

Where cultural practices need to be altered, for example to reduce the spread of HIV, the internet has the potential to provide an effective medium for exchanging information that is relevant and persuasive.

ICT has the power to facilitate developmental goals in a unique and valuable way, through improved communication and exchange of information, supported by an environment that will create improved and novel economic and social structures.

In education, there are a myriad of ways in which ICT can assist the population. An important attribute of the internet, particularly for Papua New Guinea, is its ability to solve distance learning problems and to build bridges between teachers and students.

Delivering reliable health outcomes across a geographically complex nation as Papua New Guinea is a very difficult task. ICT has provided breakthroughs in this space that will, if supported by the right healthcare structures, redefine the state of medicine in Papua New Guinea.

Effective use of ICT can aid in the empowerment of the people of Papua New Guinea. It is also of assistance to the Government that people can more easily participate on government through the use of ICT systems. This allows an independent validation of the democratic process and provides legitimacy to a government.

ICT vests power in the hands of a population to act as enforcers of environmental change, particularly, through the creation of environmental interest groups developing in cyberspace.

The development of information technology combined with a robust effective communications network enhances the country's ability to obtain economic benefits in both a tangible and an intangible way. In an immediate sense, ICT creates sector-specific job opportunities, process improvements for manufacturers or producers and an increase in economic activity.

3.2 POLICY OBJECTIVES

The Government's policy is to:

- (a) provide the population with greater access to computers;
- (b) encourage increased use of the internet particularly in areas of business, cultural persuasion, development, education, health, empowerment and participation, the environment, economic opportunity, and e-Government; and
- (c) ensure that relevant education and training programmes allow everyone to maximize the opportunities afforded by ICT technologies to improve the quality of their lives and to enhance their work prospects.

3.3 STRATEGIES

- (a) To promote **development** of the use of the internet in PNG the Government will:
- (1) encourage use of the internet by government, commerce, health and educational institutions, as a driver for network development;
 - (2) promote the development of ICT based businesses to address market opportunities both inside PNG and elsewhere in the world;
 - (3) promote entrepreneurial activity in PNG particularly where such activity would enhance the technology sector, the intellectual property of the country or the education of its people;
 - (4) encourage regional centres to create their own "hot spots" or access zones as local Internet Service Providers – the infrastructure required to create pre-paid "hot-spots" will be provided for a fee by the incumbent provider or its agent;
 - (5) design and construct one to two "Telecentres" in an appropriate rural or regional area. These may be sold to entrepreneurs once they are cash flow positive; and
 - (6) make special purpose loans available to entrepreneurs seeking to build "Telecentres" in rural or regional areas.
- (b) To promote use of the internet for **Education** in PNG the Government will:
- (1) encourage online learning in the educational institutions and universities of Papua New Guinea;
 - (2) promote centres of excellence that are held up as beacons of online learning for other institutions to emulate;
 - (3) create awareness of the educational possibilities of ICT enabled learning;
 - (4) facilitate the sharing of e-learning knowledge and resources between educational institutions;
 - (5) encourage vocational training and awareness of vocational training through the use of employer incentives for staff undertaking such training;
 - (6) investigate the provision of computing devices, with pre-loaded literacy and numeracy software, to children and students inside Papua New Guinea under the One Laptop Per Child program;
 - (7) provide incentives to the private sector to donate equipment and sponsor community based privately owned internet kiosks; and

- (8) create a set of applications that are focused on particular areas of society and make them accessible via low cost privately owned kiosks
- (c) To promote use of the internet for **Health** in PNG the Government will:
- (1) encourage the adoption of tele-medicine as a method of bringing medicine to remote communities and allowing medical practitioners to obtain second opinions from overseas surgeons where necessary;
 - (2) explore ways in which national medical conditions (such as malaria) are able to be mitigated or eradicated using ICT as an enabler;
 - (3) encourage the widespread adoption of mobile phones together with an awareness campaign sufficient to assist medical practitioners deal with outbreaks as and when they occur;
 - (4) set as a priority in all public hospitals the development of ICT systems that provide medical information access for all medical practitioners, database and patient management services and other applications as necessary such that medical services in Papua New Guinea are constantly improving;
 - (5) mobilise ICT resources in the fight against HIV/AIDS by developing ICT learning kits in local languages and presenting them in an online format; and
 - (6) improve the NACS web site so that it functions effectively to provide information about HIV.
- (d) To promote use of the internet for **Empowerment and Participation** in PNG the Government will:
- (1) encourage the population at large and in particular minority groups to assemble, interact and exchange ideas through ICT forums;
 - (2) create government platforms which allow access to public information across the full range of government services; and
 - (3) create awareness of these platforms as adoption of ICT increases across the country.
- (e) To promote use of the internet for **Justice** in PNG the Government will:
- (1) expand the PNGInLaw utility of an electronic database of legislation and cases for Papua New Guinea;
 - (2) investigate the workability of migrating from paper based filings to online court documents (including the scanning of all statements, affidavits and exhibits);

- (3) instigate a process of publishing court lists and judgments on court web sites to improve efficiency and transparency in the administration of justice; and
 - (4) add real time transcription to court proceedings with a view to improving access to transcripts and decreasing administration costs.
- (f) To promote use of the internet for the **Environment** in PNG the Government will:
- (1) mandate emergency service personnel including firefighters, emergency rescue and care and health agencies such as the St. Johns Ambulance Service and Red Cross to become ICT enabled with a view to response co-ordination and providing effective command and control structures;
 - (2) promote awareness of environmental reporting authorities and encourage citizens to take action in the face of environmental crimes;
 - (3) investigate the possibility of using ICT to enable better farming and forestry management on a nationwide basis; and
 - (4) promote regional tele-working and decentralization as a viable alternative to excessive congregation inside cities.
- (g) To promote use of the internet for **Economic Opportunity** in PNG the Government will:
- (1) develop the ICT network sufficiently to encompass the maximum number of rural areas that can be reached within realistic economic parameters;
 - (2) foster the development of appropriate applications that make the rural adoption of ICT relevant and attractive;
 - (3) create a government web site for farming communities which provides information about farming practices, weather patterns, crop prices and advice about which crops to plant or animals to farm;
 - (4) promote or encourage this web site's adoption by the rural community;
 - (5) encourage other primary industries to adopt the practice of creating and sharing information through industry specific portals;
 - (6) encourage the use of broadcast infrastructure to enhance the value of primary industry information sharing and extension service creation;
 - (7) encourage and promote e-commerce to the export business community;

- (8) enact e-commerce supportive legislation that allows for electronic signature and electronic agreements; and
 - (9) adopt a government strategy to express a preference for web based supply and service delivery so as to incubate the nation's ICT sector.
- (h) To promote use of the internet for **Agriculture, Mining and Fishing** in PNG the Government will:
- (1) establish an e-marketplace enterprise specifically providing opportunities for participants in the Agriculture, Mining and Fishing sectors to participate in the exchange of goods and services via e-commerce.
- (i) To promote use of the internet for **e-Government** in PNG the Government will:
- (1) target people groups, citizens, businesses that will have an immediate use for online services with the creation of the PNG Government Portal;
 - (2) refine and catalogue all government services so that they can be accessed easily via the PNG Government portal; and
 - (3) consider a multi-technology approach combining not only the internet but radio and newspaper columns where citizens can learn about e-Government;

4. EDUCATING THE NATION

4.1 INTRODUCTION

One of the greatest opportunities which will arise from increase use of the internet by the people of Papua New Guinea is the opportunity for increased access to education.

The ability for ICT to act as a catalyst to support various educational and career advancement programs is essential to the growth of the country and its people.

As with all developing countries the ability to internally train, educate, inform and employ is critical to skill retention and development of programs for all aspects of the community.

When education opportunities are not available locally, alternative offshore sources are explored. These options are often expensive and only available to a small number of citizens. Only a selected few are privileged to be provided with basic education levels to enable them to travel overseas to participate in further secondary or university based education. These individuals often choose to remain in the country of further education to take advantage of opportunities often not available in PNG.

As a result these individuals, who are now highly trained and specialised, defer returning to PNG to pass on the skill sets, education and training achieved overseas in return for well paid occupations in offshore locations. Whilst this may result in a small financial return to some communities, the long term effects have serious implications.

Specialised skill sets particularly in health, education and manufacturing are already in short supply. PNG needs to ensure that skill sets are retained, regionalised and promulgated back into the community to ensure that alternative education locations are not the first choice for those wishing or being able to afford a world class education and resultant career.

The ability for ICT to act as a catalyst to support various educational and career advancement programs is essential to the growth of the country and its people.

People must be supplied with the skills to drive towards the information economy. This includes the leaders and workers with the vision and skills to develop and manage new approaches to learning and to implement coordinated and timely change. Professional development for teachers, trainers, content developers, researchers and all other workers in education and training is essential to allow them to be change agents to achieve the goals of the information economy. Working with other industries to develop the specialist skills needed, will ensure that PNG is able to take its place in the global information economy in the medium to long term.

4.2 POLICY OBJECTIVES

The Government policy is to:

- (a) encourage programs to educate the population on the effective use of the internet as a business and life tool; and

- (b) encourage PNG citizens to engage in education programs available by means of the internet.

4.3 STRATEGIES

- (a) To develop a **National Education Plan** relating to use of the internet. This will be a detailed plan to:
 - (1) ensure that all citizens possess broad literacy, numeracy and technological literacy skills for life, work, and lifelong learning and that there are adequate numbers of people with the specialist skills needed by the ICT industries and other PNG industries to service the needs of the economy;
 - (2) improve people's understanding of the social, cultural and economic impact of the information economy on education, training, research and development;
 - (3) develop a comprehensive framework for education and training, including research and development that supports the information economy and a knowledge society;
 - (4) implement a program which will enable PNG's education and training industry to become nationally effective and internationally competitive in order to retain its children; and
 - (5) reconsider the ways that the people of PNG do business to achieve and maintain their national and international competitiveness.
- (b) To initiate **ICT technical colleges** in which:
 - (1) e-Learning initiatives are established and a framework for content and delivery is developed;
 - (2) based on the above initiatives and framework, customisations based on region, policy and priority are completed; and
 - (3) mapped against these requirements, media types are selected based on geographic location and telco bandwidth availability .
- (c) In collaboration with vendors, development of local resources will be given a **high priority** and skills transfer will be mandatory on all Government related projects. Initial remote learning of concepts and techniques will be complemented with the creation of vendor based user groups and support functions.
- (d) To develop an advanced education and research ICT network which is consistent with, and a component of the Operational Separation Model set out in paragraph 2.3.

5. POLICY, LEGAL AND REGULATORY STRUCTURES

5.1 INTRODUCTION

Once mechanisms for connectivity are in place and use of the internet becomes more widespread, the Internet will provide an economical and simple way for linking citizens with industry and government across Papua New Guinea and the world.

Increased use of the internet in PNG society will present a number of challenges, not merely of a technical nature but also ethical, cultural, legal, economic and organisational.

Telecommunications, intellectual property management models, online content, e-commerce, and a range of other regulatory frameworks need to be in place so that the education and training industry can operate efficiently and effectively and become internationally competitive. The regulatory and technical frameworks will need to reflect international developments and should support and not impede the needs of PNG's education and training industry.

Security is an important component of the policy framework for the Internet. Developing and transitional countries must examine their laws to ensure that they cover cyber-crime and provide law enforcement agencies the investigative tools they need, consistent with privacy protection. But the criminal law is only a small part of the cyber-security framework. Governments and private sector systems need to cooperate in improving the security of those systems by applying sound security practices, improving sharing of information, and raising awareness.

Developing countries around the world rightly see the Internet as a potentially powerful tool to advance economic and human development. At the same time, however, criminals also see the potential of the Internet – as a means to perpetrate fraud and as a communications medium of global reach and low cost. Hackers find a thrill in penetrating networks and destroying data, while terrorists could purposely disrupt the critical infrastructures that are dependent on networked computers. Meanwhile, consumers hesitate from disclosing personal and credit card data on the Internet, with security and privacy their number one concern, and businesses face losses of proprietary data, intellectual property, and online access to customers and suppliers due to security breaches and intentional service interruptions.

In order for the Internet to contribute to economic growth, human development and democratization, it must be trustworthy and secure. Lack of trust and security jeopardizes development goals that could be supported by a widely accessible and widely trusted Internet.

Effective public policy for the Internet is based on a mix of laws, industry self-regulation and technical standards that give users control. Together, these elements create the policy environment supporting investment, innovation and growth. In terms of trust and security, this environment includes the criminal law, laws of privacy and consumer protection, and the commitment of industry to build and operate more secure systems.

Consideration of cyber-crime often leads to questions about the standards under which the government is authorized to obtain access to the electronic

communications and computer data that may constitute evidence of cyber-crime and other types of crime. Many countries have procedural laws granting the government investigative powers to access information stored in computers. These include judicial orders for the production stored data and warrants for the immediate search and seizure of computers and computerized data. Many countries also allow real-time interception of communications and the traffic data or transactional data that shows the origin and destination of communications.

Privacy is widely recognized as a human right. Numerous international policy statements and frameworks for the information age declare that individuals are entitled to fair treatment in the way that personal information is collected and used. This includes personally identifiable information in the hands of government agencies.

Governments are increasingly using the Internet as a means to deliver services and information. This development allows users to register for government services, obtain and file government forms, apply for employment, comment on public policy issues, and engage in a growing number of other functions – all on-line.

The trend towards e-government and the electronic delivery of services has further expanded government collection of personally identifiable data. In providing services to the public and carrying out various functions, governments collect and use a wide range of personal information about their citizens (e.g., health, education, employment and property ownership records, tax returns, law enforcement records, driver's license data, and others).

A government's practices in collecting, retaining, and managing personal data about its citizens pose a wide range of privacy concerns. With this increasing use of technology in government-to-citizen interactions, it is important to ensure that government agencies that collect personal information from citizens adopt and maintain adequate privacy practices.

Trust is a crucial ingredient of any successful online program, whether in the field of e-commerce or in the field of e-government. Privacy and security are in turn key elements of online trust. Individuals will not use services that do not handle personal data responsibly. Privacy is often cited as a major concern of Internet users. It is also the main reason why many non-users still avoid the Internet. Citizens will not entrust sensitive personal, financial and medical data to the government in order to utilize e-government systems (or they will refuse to give accurate information) unless they are assured that the information will be responsibly used and protected against abuse. Therefore, countries seeking to facilitate the efficient online provision of governmental services must protect the privacy of the information they collect.

To build trust, privacy must be addressed in the planning and design of e-government systems since it is much harder to interject privacy protections after a system is built.

5.2 POLICY OBJECTIVES

The Government's policy is to:

- (a) ensure that, under the legal framework of Papua New Guinea:

- (1) Cyber-Crime is not permitted;
- (2) privacy is protected to a degree meeting International Privacy Standards
- (3) consumers and traders who conduct business electronically are adequately protected;
- (4) the Intellectual Property of others is adequately protected; and
- (5) critical ICT systems are protected in the event of war, disaster or civil disturbance.

5.3 STRATEGIES

- (a) **Cyber-crime** – PNG will adopt criminal laws against attacks on the security and integrity of computer systems, thereby criminalizing hacking, illegal interception, interference with the availability of computer systems.
- (b) **Privacy** – PNG will have clear procedures meeting international privacy standards for government access to communications and stored data when needed for the investigation of crimes. Such procedures will allow the government to carry out its investigations but will also assure businesses and consumers that the government cannot unjustifiably monitor their communications. These elements will be embodied in a national law for interception of communications (telephone calls, e-mail, and other electronic communications), and search and seizure orders for computer data.
- (c) **Consumer Protection** – The Government will put in place procedures and laws facilitating the use of credit cards and electronic forms of payment, in a legal framework ensuring that a consumer or small business owner who transacts business online has recourse if the transaction does not go through or if the goods or service purchased online are unsatisfactory. Further, consumers will be assured that data they provide to merchants will not be misused.
- (d) **Intellectual Property** – The Government will review PNG's existing Intellectual Property Laws to ensure that they provide adequate protection in the digital setting.
- (e) **Protecting Critical ICT Systems** – PNG will have a procedure in place to take all critical systems offline in the event of a war, disaster or civil disturbance which might otherwise place those systems at risk.

6. ROLE OF GOVERNMENT IN ICT AND DEVELOPMENT

6.1 INTRODUCTION

The PNG Government has a key ICT role in fostering the development of ICT strategies which will provide the framework for the delivery of ICT policy objectives. These ICT strategies foster economic growth, increased foreign investment and a growth in exports. The benefits of a well defined ICT Policy outworked through an ICT strategic plan also has direct benefits for government in that the ICT sector can offer products and services across all sectors of government which, in turn, enables government to increase frontline service delivery to the community.

The key for PNG will be to "Think big, start small and scale fast."

This policy is focused on the role of governments as an enabler, regulator, and provider of ICT based services.

6.2 POLICY OBJECTIVES

The Government's policy is to ensure that Government departments and instrumentalities:

- (a) engage in co-ordinated activities aimed at furthering the objectives of this ICT policy; and
- (b) do not act in a manner which will hinder or obstruct the objectives of this ICT policy.

6.3 STRATEGIES

(a) **Department Of Public Enterprise, Information And Development Co-operation (PEIDC)**

The Department of PEIDC has the objective of efficient and rapid delivery of ICT Services to the PNG community on behalf of all government departments and state owned corporations. This department will lead the ICT governance and implementation of the objectives detailed in this policy document.

The PEIDC has the overarching responsibility to ensure the implementation of this ICT Policy. It will have the sole power to grant applications for ServCo licences, after consideration of the recommendations of an ICT Licensing Committee;

To this end, the PEIDC will:

- (1) establish the **ICT Policy Overseeing Committee**. The ICT Policy Overseeing Committee will be tasked with the responsibility of overseeing the implementation of the policies and strategies outlined in this document;
- (2) establish the **ICT Licensing Committee**. The ICT Licensing Committee will consider all applications for ServCo licences and

report on the appropriateness of granting such licences to the Minister of the PEIDC; and

- (3) establish the **Information Technology Office (ITO)**. The ITO will be the central coordinating body for IT in government.

(b) ICT Policy Overseeing Committee

The ICT Policy Overseeing Committee will be tasked with the responsibility of overseeing the implementation of the policies and strategies outlined in this document. As part of this task, it will also monitor and report on the incumbent network refurbishment program. It will comprise a representative from each of:

- (1) Department of Public Enterprise, Information and Development Co-operation (PEIDC) ;
- (2) Independent Public Service Corporation (IPBC);
- (3) the incumbent network provider (NetCo);
- (4) Papua New Guinea Telecommunications (PANGTEL) ;
- (5) Independent Consumer and Competition Commission (ICCC) ;
- (6) Department of Treasury;
- (7) Department of National Planning and Monitoring; and
- (8) as Chair, a person who is not a current member of any of the above organisations, as agreed by the above representatives, or failing agreement, as appointed by the Minister for PEIDC.

The refurbishment of the incumbent telecommunications network is crucial to the success of the implementation of this policy. The ICT Policy Overseeing Committee must ensure that the committed dates for implementation of the policy are achieved and provide frequent and regular reporting to the Minister for PEIDC on this progress.

(c) ICT Licensing Committee

The ICT Licensing Committee will consider all applications for ServCo licences and report on the appropriateness of granting such licences to the Minister of the PEIDC. It will comprise a representative from each of:

- (1) Papua New Guinea Telecommunications (PANGTEL);
- (2) Independent Consumer and Competition Commission (ICCC);
and
- (3) as Chair, a person who is not a current member of either of the above organisations, as agreed by the above representatives, or failing agreement, as appointed by the Minister for PEIDC.

(d) Information Technology Office

The Information Technology Office (ITO) will be the central coordinating body for IT in government. It will be tasked with:

- (1) appointing the whole of Government **Chief Information Officer (CIO)**. The CIO will be charged with developing the ICT Strategic Plan in accordance with this policy within 6 months and then driving the implementation of the programs of work identified in the plan over the next 3-5 years;
- (2) creating uniform IT policy and standards and consistent legal framework in accordance with this policy document;
- (3) undertaking a review of IT investments across government with the objective of increasing IT budgets and resources;
- (4) co-ordinating and developing IT human resources in the government;
- (5) providing executive leadership and decision-making for the development of government wide ICT Strategies;
- (6) developing, implementing and promoting government-wide ICT policy, procedures and standards that provide better services to the community;
- (7) establishing and monitoring operation of a shared services organisation for ICT to the whole of PNG Government and government owned subsidiaries to facilitate shared service programs such as the Integrated Government Information System (IGIS) program and the Integrated Financial Management System (IFMS) program.;
- (8) consulting with key government stakeholders in ICT; and
- (9) dissemination of this policy throughout Government.

(e) **IPBC**

The Independent Public Business Corporation (IPBC) is the government body responsible for the management of the State's assets and was established under the Independent Public Business Corporation Act 2002. It is the successor to the previous 'Privatisation Commission of Papua New Guinea'.

IPBC is trustee to the General Business Trust to which a range of state assets including shareholdings in listed and unlisted commercial entities, agri-business, commercial and state properties some statutory bodies of the State is the sole beneficiary. All State owned enterprises are also vested with the General Business Trust.

The IPBC track record is exceptional particularly recently in terms of building asset strength and restoring profitability to state owned enterprises.



Under the proposed Operational Separation Model, IPBC will retain ownership of the Telikom NetCo in its future capacity as asset manager/active shareholder, provided always that a realistic CSO is placed over the asset and the returns are regulated by the ICCC.

IPBC will also retain ownership of the proposed IT shared services company either discreetly or as part of a joint venture.

(f) ICCC

The Independent Consumer and Competition Commission was created under the Independent Consumer and Competition Commission Act of 2002. Stated in general terms, the object of the ICCC is to enhance the welfare of the people of Papua New Guinea by:

- (1) promotion of competition, fair trading and the protection of consumers' interests, and the promotion of economic efficiency in industry structure, investment and business conduct; and
- (2) protection of the long term interests of the people of Papua New Guinea with regard to the price, quality and reliability of any significant goods and services.

Presently, the ICCC has both a regulatory function under the ICCC Act (2002) and also the ability to issue and revoke mobile licences under the Telecommunications Act (1996).

It is the view of the Government that a Regulator should not have the power to both adjudge and enforce its own decisions. It is not best practice, and gives rise to a perception of conflict of interest.

In order to highlight the role of the ICCC as a regulator of competition, the power to grant and revoke licences will, be removed from the ICCC, and will rest with the Minister for the Department Of Public Enterprises, Information and Development Co-operation.

The ICCC will participate in the ICT Licensing Committee and will, through its involvement on this Committee, make recommendations to the Minister for PEIDC for approval and awarding of ServCo licences.

(g) PANGTEL

PANGTEL is the PNG Radiocommunication and Telecommunication Technical Authority. PANGTEL is responsible for:

- (1) developing policies for technical standards;
- (2) representing PNG with accredited international telecommunications bodies (in consultation with ICCC);
- (3) approving and certifying telecommunications equipment for customer use;
- (4) managing telecommunications numbering resources; and

- (5) spectrum management and licensing.

PANGTEL will participate in the ICT Licensing Committee, having technical responsibility in the recommending of the grant of ServCo licences.

(h) Department of National Planning and Monitoring

The Department of National Planning and Monitoring will play a crucial role in the proposed infrastructure rehabilitation project by the incumbent network provider and the introduction of new competition.

The Department of National Planning and Monitoring will be closely involved in the design and implementation phases of the new telecommunications network. As the Department shares future development and expansion programs with the incumbent network provider, any future planning and capacity will be planned well in advance to ensure that services are deployed in accordance with the CSO

(i) Association of Information Technology Service Providers (AITSP)

AITSP was formed to act as a central advisory consultative and coordinating body for the Information Technology Suppliers in Papua New Guinea and to encourage standardisation of terminology used throughout the Industry. Its mandate is to promote the development of Papua New Guineans in the knowledge and use of Information Technology.

The Government will accommodate AITSP on the suppliers sub committee for the ITO, to ensure representation together with protection of current investment and competition to other government based enterprises;

(j) Censorship Board

The rehabilitation of ICT Infrastructure in Papua New Guinea will mean greater access to the world and in particular the internet. Inherent in this are a number of Censorship issues. The Censorship Board will therefore be given an expanded role, namely:

- (1) greater involvement with the Association of Information Technology Service Providers to ensure ServCo's have adequate infrastructure that prevents access to pornographic or seditious material, or material of an offensive or defamatory nature with PNG; and
- (2) the Censorship board will work with the incumbent network provider during the planning stages of the network remediation/rehabilitation projects to confirm that at the carrier level the flow of pornographic or seditious material is also blocked and preventative measures are put in place to stop access to this material.