

Table of Contents

Overview	iii
.....	iii
.....	iii
STRAND 1: Computer Systems	0
Important Trends in ICT.....	2
Information System (IS).....	6
ICT Infrastructure	9
STRAND 2: USING PC APPLICATIONS	15
Using PC Applications	17
STRAND 3: COMPUTATIONAL THINKING AND PROGRAMMING	27
Computer Programming	29
Microprocessor programming.....	41
STRAND 4: SAFE PRACTICES in ICT	45
Safe practices in ICT.....	47
STRAND 5: CAREERS AND CONCERNS IN ICT	52
Social Issues.....	54
Environmental Issues	58
References	64

Important Trends in ICT

1. Existing trends in ICT

ICT stands for Information and Communication Technology.

ICT is made up of information technology and communications technology. Information and communications technology refers to all the technology used to handle telecommunications, digital media, information management systems, transmission systems, and network-based control and monitoring systems.

ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. For example, personal computers, digital television, email, robots, web services, mobile phone systems and audiovisual systems.

In business, ICT is often categorised into two broad types of product:

- Traditional computer-based technologies (things you can do on a personal computer or using computers at home or at work)
- Digital communication technologies (which allow people and organisations to communicate and share information digitally)

2. Impacts of existing trends in the use of ICT

Tonga is going through rapid changes in the use of computer and digital technologies in recent years. ICT is being used in the homes, schools, government agencies and businesses. Tonga is now enjoying access to high speed internet with the use of the sub-marine fiber optic cable. This has allowed many people in Tonga full access to much more information and online resources.

Existing ICT Trends in Education

Mobile Learning: Using mobile devices with internet access and computing capabilities as learning tool.

Cloud Computing: Moving from using desktop computers to using internet applications allowing cheaper access for learning.

Anywhere, Anytime learning: With much faster Internet and cheaper computers, school systems around the world are developing the ability to provide learning opportunities to students “anytime, anywhere”.

Personalised learning: The use of ICT to personalised learning to suit the student.

New learning spaces: Learning spaces are being redefined to suit the use of ICT removing traditional style classrooms.

Smart student profiling system: The collection, management, sorting, and retrieving of data related to student’s learning will help teachers to better understand students’ learning needs.

Interactive learning: Using of ICT has become an interactive tool for learning allowing both teachers and students to share learning resources and content.

Existing ICT Trends in Health

E-health: health services and information delivered or enhanced through the Internet and related technologies. In terms of funding for e-Health in Tonga, there is both public, private and donor funding allocated to ICT equipment and software. However, pilot projects, skills training and ongoing support are only funded by donor/non-public funding in Tonga.

Tonga Hospital Information System (THIS): a web-based patient administration system (webPAS) with modules for outpatients, inpatients, medical records, theatres, maternity, accident and emergency, billing, and results reporting; as well as a clinical information system (CIS).

Tonga Civil registration system: electronic recording of live birth and death reporting certificates, policies and procedures.

E-Learning: using of web access for training of health officials in Tonga and in teaching health sciences mainly through access to the Pacific Open Health Learning Network (POHLN).

Tonga Government Initiatives

A lot of information about Tonga Government's ICT development can be found on the Ministry of Information and Communication website or from their office. <http://www.mic.gov.to/media-a-ict>

E-Government: Tonga has publicly announced Government's plan to connecting all Government Ministries, Public Enterprises and Agencies by fibre optic to provide online services.

Tonga Cable Limited: *NUKU'ALOFA, TONGA (21 AUGUST, 2013) The World Bank Group, the Asian Development Bank (ADB), and Tonga Cable Corporation (TCC), media and others joined the Government of the Kingdom of Tonga at a ceremony at the Tonga Cable Limited building today to celebrate the arrival of high speed internet in Tonga.*

"Today marks a historical occasion for Tonga and the beginning of a new era, as the Kingdom for the first time connects to high speed Internet which has been a dream of Ha'a Mohefo," said Prime Minister Lord Tu'ivakano. "Faster Internet speed and higher bandwidth at cheaper and more affordable prices is a real opportunity for Tonga." <http://www.worldbank.org/en/news/press-release/2013/08/21/high-speed-broadband-goes-live-in-tonga>

Tonga ICT Policy: Tonga has developed an ICT policy to guide its development in ICT. This is Tonga Government's commitment to improving the use of ICT for economic and social development.

Fighting Cyber Crimes: *01 Aug. 2012. Following recent incidents of alarming cases of the increasing social issues associated with the misuse of the internet and mobile technology to disseminate and distribute obscene and pornographic materials, especially with Tonga's targeted young and vulnerable age groups, the Government's Transnational Crime Unit (TCU) and Tonga Serious Crime Unit (TSC Unit), a special taskforce of the Ministry of Police reacted and call for immediate attention.*

Led by Assistant Police Commissioner Viliami 'Unga Fa'aoa and Chief Inspector Kalisi Kafo'atu Tohifolau, the Ministry of Police sought the assistance of the Government's communications regulator, the Ministry of Information and Communications (MIC) to meet with telecommunications carriers, broadcasters, church leaders, educators and media operators to address this serious issue.

<http://www.mic.gov.to/media-a-ict/ict-development/3958-safeguarding-our-youths-and-fighting-cyber-crimes-is-everyones-business>

Existing ICT trends contribution to the economy

<http://www.mic.gov.to/news-today/press-releases/5414-effective-ict-use-can-support-economic-development>

Tonga and many Pacific Island nations have gained access to ICT and a lot of economic and social benefits have been possible. Such possibilities are shared across sectors including agriculture, fisheries, tourism, education, health and financial services.

A new report "Economic and Social Impact of ICT in the Pacific" was launched in Tonga in 2015 highlighting the impacts of improved access to telecommunications infrastructure and services now being seen across the South Pacific and potential for greater information communications technology (ICT)-enabled development across the region.

The report also examines the economic and social impact of high speed internet, mobile phone usage and telecommunications market liberalisation that has been underway throughout the Pacific Islands region in the past decade.

The report highlighted the following changes;

- Mobile coverage across Fiji, Samoa, Solomon Islands, Tonga and Vanuatu has jumped from less than half of the population in 2005 to 93% of the population in 2014.
- The cost of mobile calls declined by one third between 2005 and 2014.
- The percentage of cell phones in Pacific households rose from 49% in 2007 to 93% in 2014.
- International internet bandwidth jumped over 1500% between 2007 and 2014, rising from less than 100 Megabits per second to over 1 Gigabits per second (excluding Fiji, which was already connected to submarine cable in 2000).

Some of the major ICT development included in the report are;

- Development of basic digital literacy amongst the general public.
- Putting the Pacific online: Support for increased communications technology use by governments to deliver services directly to citizens and business.
- Support for applications such as online health, education, trade facilitation services
- Investments in information communications technology skills – including government-industry partnerships – to build employment opportunities that are now possible with the increased availability of affordable broadband internet.

3. The Pacific

Economic and Social Impact of ICT in the Pacific

A new report has highlighted the impacts of improved access to telecommunications infrastructure and services now being seen across the South Pacific and potential for greater information communications technology (ICT)-enabled development across the region.

This past decade has seen an extraordinary increase in access to mobile phone services in the region, including to some of the Pacific's most remote areas and islands, as significantly improved market conditions have encouraged investment by the private sector and existing operators.

“Here in Tonga, where we landed a submarine cable financed by the Asian Development Bank and World Bank in August 2013, we have seen greatly improved access to high-speed Internet (particularly mobile) and falling prices,” said Deputy Prime Minister Sovaleni.

“Yet this report is not just about the technologies themselves; it's about the impact they are having on our communities and economies, enabling us to leapfrog over more traditional, outdated and expensive systems of the past, and transform our lives.”

The High Commissioner for Australia, Brett Aldam, said Australia was pleased to be co-financing the ICT study through its support for the PRIF, because “Australia recognised the critical need to modernise communications in the Pacific in order to generate increased economic growth and social development.” Sanjivi Rajasingham, Director of the Pacific Region Infrastructure Facility (PRIF), said the report would help Pacific governments, telecoms operators, regulators and the private sector to identify opportunities for investment in technology-enabled services. This includes a list of 10 specific ‘intervention points’, which include the further strengthening of international connectivity through submarine cables, new pricing structures and competition, to the use of e-government and applications designed to boost tourism and exports, small industries, and innovative job creation.

“As the Pacific has gained access to significantly improved technology, better access, far cheaper mobile phones, calls, text and data, the pace of change in the Pacific has been extraordinary,” said Natasha Beschomer, Senior ICT Policy Specialist at The World Bank and Lead Coordinator of the PRIF ICT Sector Working Group, who introduced the report's key findings.

“The changes have been widespread across sectors including agriculture, fisheries, tourism, education, health and financial services. “Importantly, this report shows the opportunities that are now possible in the Pacific, and makes recommendations for governments, policy-makers and the private sector to answer the question, ‘Where to next?’”

Changes already seen in the Pacific, which have been highlighted in the Economic and Social Impact of ICT in the Pacific report, include:

- Mobile coverage across Fiji, Samoa, Solomon Islands, Tonga and Vanuatu has jumped from less than half of the population in 2005 to 93% of the population in 2014.
- The cost of mobile calls declined by one third between 2005 and 2014.
- The percentage of cell phones in Pacific households rose from 49% in 2007 to 93% in 2014.
- International internet bandwidth jumped over 1500% between 2007 and 2014, rising from less than 100 Megabits per second to over 1 Gigabits per second (excluding Fiji, which was already connected to a submarine cable in 2000).

Recommendations for governments, policy-makers and development partners for the coming years that are in the report include:

- Strengthening of government and regulatory agencies to ensure that access to communications technology remains competitive, fairly-priced and accessible to all.
- Development of basic digital literacy amongst the general public.
- Putting the Pacific online: Support for increased communications technology use by governments to deliver services directly to citizens and business.
- Support for applications such as online health, education, trade facilitation services
- Investments in information communications technology skills – including government-industry partnerships – to build employment opportunities that are now possible with the increased availability of affordable broadband internet.

*To read the Economic and Social Impact of ICT in the Pacific report, visit
www.theprif.org/index.php/resources/document-library/121-prif-ict-study-report-2015*