

International Telecommunication Union

# **BULA INTERNET: FIJI ICT CASE STUDY**

**June 2004**

This report was prepared by Michael Minges and Vanessa Gray. It is based on research carried out from 26th June to 2nd July 2003 as well as articles and reports noted in the document. The assistance of the Ministry of Communications and Abel Caine, Jale Curuki and Josua Turaganivalu was indispensable. Equally, the report would not have been possible without the cooperation of Fijian organizations. The list of organizations met is attached in the annex to this report.

The report is one of a series examining the Internet in developing nations. Additional information is available on the ITU's Internet Case Study web page at <http://www.itu.int/ITU-D/ict/cs>.

The report may not necessarily reflect the opinions of the ITU, its members or the government of the Republic of the Fiji Islands.

The title refers to the popular Fijian greeting generally translated as "Hello".

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### 1. Introduction

Information and communication technologies (ICT) are an important issue for members of the International Telecommunication Union (ITU), the United Nations' specialized agency for telecommunications. In that respect, the ITU has embarked on a series of case studies researching the Internet in different nations.<sup>1</sup> This study looks at the diffusion of the Internet in the Republic of the Fiji Islands. It touches on specific problems including isolation and undersized markets that small island developing states such as Fiji face in adopting information and communication technology.<sup>2</sup> The study also examines how Fiji is evolving into an information society, particularly relevant in the context of the World Summit on the Information Society (WSIS), the first phase of which took place in Geneva, Switzerland in December 2003.<sup>3</sup>

The organization of this report is based on a framework developed by the Mosaic Group<sup>4</sup> for characterizing the state of the Internet in an economy. The scope has been widened to incorporate telecommunication networks such as the fixed-line and mobile telephone networks. Mosaic considers six factors as follows:

- **pervasiveness:** a measure based on users per capita and the

degree to which non-technicians are using the Internet.

- **geographic dispersion,** a measure of the concentration of the Internet, from none or a single city to nationwide availability.
- **sector absorption:** a measure of the degree of utilization of the Internet in the education, commercial, health care and public sectors.
- **connectivity infrastructure:** a measure based on international and domestic backbone bandwidth, exchange points, and user access methods.
- **organizational infrastructure:** a measure based on the state of the Internet Service Provider industry and market conditions.
- **sophistication of use:** a measure characterizing usage from conventional to highly sophisticated and driving innovation.

The report also considers other factors not included in the above framework such as the evolution to an information society, pricing, and government policies.

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- <sup>1</sup> Resolution 31, "Telecommunication infrastructure and information and communication technologies for socio-economic and cultural development" calls upon the ITU to "organize, conduct or sponsor necessary studies to bring out, in a different and changing context, the contribution of ICTs to overall development." ITU. *Final Acts of the Plenipotentiary Conference (Marrakesh, 2002)*. 2003.
  - <sup>2</sup> The ITU notes, "that small island nations and communities face particular problems in bridging the digital divide." See Resolution 129 (Marrakesh, 2002) in ITU. *Final Acts of the Plenipotentiary Conference (Marrakesh, 2002)*. 2003. Small island developing states (SIDS) form an official grouping in the UN system. For a list of the 45 SIDS see <http://www.un.org/special-rep/ohrlls/sid/list.htm>. [Accessed 18 June 2004].
  - <sup>3</sup> The second phase of the Summit will take place in Tunis, Tunisia, in 2005. For more on WSIS see the web site at: [www.itu.int/wsis/index.html](http://www.itu.int/wsis/index.html). [Accessed 18 June 2004].
  - <sup>4</sup> Since the Global Diffusion of the Internet (GDI) project's inception in 1997, the Mosaic Group has studied the Internet in nearly 30 countries. See <http://mosaic.unomaha.edu/gdi.html>. [Accessed 18 June 2004].

## 2. Background

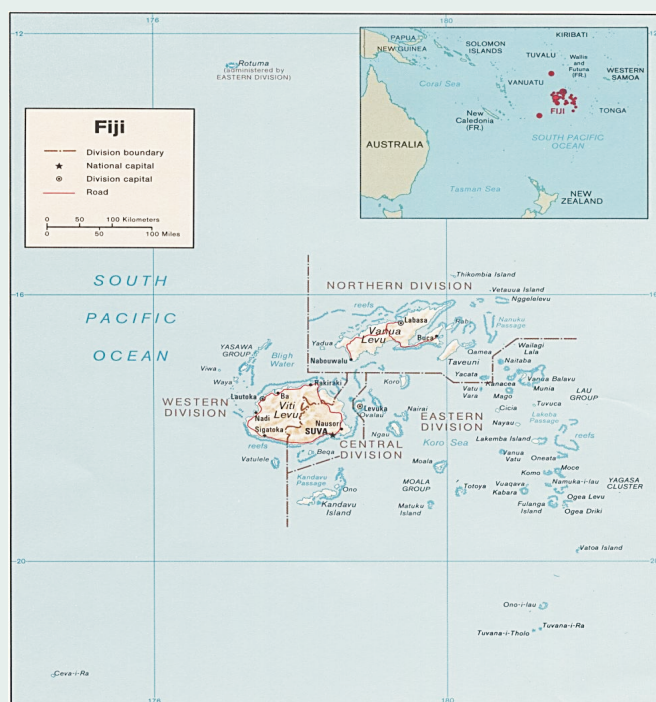
### 2.1 Overview

The Republic of the Fiji Islands is located in the Pacific Ocean, midway between the Equator and the South Pole. The island group is situated 3'000 kilometres northeast of Sydney, 2'000 kilometres north of Auckland and 5'000 kilometres southwest of Hawaii (Figure 2.1). Covering a land area of 18'333 square kilometres, Fiji comprises 332 islands of volcanic origin of which around one third are inhabited. The name of the country appears to be derived from Viti, in reference to the largest island pronounced Fisi by Tongans and then referred to as Fiji by Captain James Cook, the British explorer.

Fiji is a cultural mosaic, with a blend of Melanesian, Polynesian, Micronesian, Indian, Chinese and European influences. During the 19<sup>th</sup> century Fiji was the trade centre of the South Pacific and in 1874 the British claimed it. Tens of thousands of indentured Indian labourers were brought to Fiji under British colonial rule, mainly to work on the sugar plantations.

Fiji's two major islands are Vanua Levu and Viti Levu. Suva, the capital, as well as Lautoka and Nadi, the other main urban centres are located on Viti Levu. Administratively, Fiji consists of 14 provinces.

Figure 2.1: Map of Fiji



Source: [www.reliefweb.int/w/map.nsf/home](http://www.reliefweb.int/w/map.nsf/home).

### 2.2 Population

According to the 1996 Census, Fiji had a population of 775'000, spread over about one third of the islands. The population growth rate has dropped from two per cent in the year 1976-1986, to 0.8 per cent between 1986-1996. It is estimated that by July 2002 the population had increased to 820'000. Fiji has an average household size of 5.3 people with some 155'000 households. The country has a population density of roughly 44 persons per square kilometre. Almost 80 per cent of the population live on the two major islands and 53.6 per cent of the population lives in rural areas. Fiji has a relatively young population, with over 35 per cent under the age of 15 and only 5.1 per cent above the age of 60. Almost 55 per cent of the population is below the age of 25 (Table 2.1).

According to the last census 51 per cent of the population was ethnic Fijian and 44 per cent was

of Indian descent. Other ethnic groups include Rotuman, Chinese, European and other Pacific Islanders. More than half of Fiji's population (53 per cent) are Christians, about 38 per cent are Hindus and eight per cent are Muslim.

Fiji's official language English is used in government, business and school. However most Fijians are bilingual as they also speak one of local languages at home. The indigenous Fijian language is most widely spoken and consists of several dialects. The Indian community speaks the hybrid Hindustani Fijian.

### 2.3 Economy

Fiji is one of the most industrialized Pacific Island countries. Its 2002 per capita Gross National Income of US\$ 2'160 was the highest of the eight fully independent Pacific Island states. The World Bank classifies Fiji as a Lower Middle Income economy.

Its open economy is relatively diversified. Services accounted for 67 per cent of Gross Domestic Product (GDP) in 2002 with the remainder split almost equally between the primary and secondary sectors. The main

export items are sugar and garments (accounting for half of exports in 2002) while tourism is a significant source of foreign exchange with some 400'000 tourists generating F\$ 568 million in 2002 (Figure 2.2, left).

Fiji's economic growth has declined from an average of eight per cent a year in the 1970s to under three per cent in the 1980s and 1990s. The drop in economic growth has exasperated disparities between indigenous and

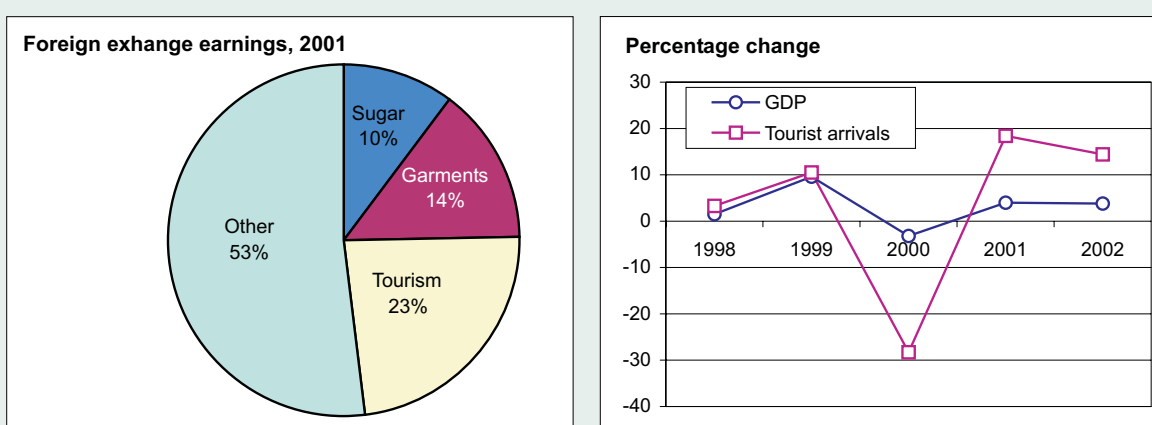
**Table 2.1: Population indicators**

Total population	820'000 (2002)
Urban population (%)	46 (1996 Census)
Population Density (per/km2)	44 (1999)
<i>Age distribution, 1996, %:</i>	
Below 15 years	35
15-59 years	60
Above 60	5

Source: Fiji Islands Statistics Bureau.

**Figure 2.2: Fiji's economy**

Distribution of foreign exchange earnings, 2001 (left) and percentage change of GDP and tourist arrivals (right)



Note: In the right chart, foreign exchange earnings defined as exports plus balance of payments service receipts.

Source: ITU adapted from the Ministry of Planning and National Development.



other communities and between rural and urban areas. Around a quarter of the population is estimated to be living in poverty. Although ethnic Fijians have retained ownership of over 80 per cent of the total land area, they are underrepresented in the business sector.<sup>1</sup> According to the 1996 Census, ethnic Fijians' average weekly household income was 20 per cent below that of Indo-Fijians and 13 per cent lower than the national average.

The military coup in May 2000 had serious repercussions on Fiji's economy. Gross domestic product (GDP) fell by 3.2 per cent, sugarcane and garment production dropped sharply and the number of tourists plunged 28 per cent (Figure 2.2, right). Many workers lost their jobs and emigration rose sharply with the majority of Indian descent, many of them highly skilled professionals.

Since the end of political crisis, the economy has made a significant recovery. GDP grew by 3.8 per cent in 2002, and is expected to have reached five per cent during 2003. Tourist arrivals are almost back to pre-coup levels.

## 2.4 Quality of Life

The United Nations Development Programme (UNDP) ranked Fiji 81<sup>st</sup> out of 175 countries in its 2003 Human Development Index (HDI) (Table 2.2).<sup>2</sup> Fiji's HDI ranking has worsened from 44<sup>th</sup> in 1998 to 66<sup>th</sup> in 2000 and 81<sup>st</sup> in 2003. The ranking is based on a composite of four indicators: life expectancy, literacy, school enrolment and GDP per capita. The position of Fiji, which places the country in the top third of the Medium Human Development group, is 11 points higher than its GDP per capita rank, suggesting that it is doing better than its income level would suggest. Education indicators compare favorably with the average for countries classified under Medium Human Development. Adult literacy for Fiji was reported by UNDP as 93.2 compared to 78.1 for the Medium Human Development average. School enrolment stood at 76 per cent compared to the average of 64 per cent for Medium Human Development countries.

## 2.5 Recent history and politics

After 96 years of British rule Fiji gained independence in October 1970. Fiji is a

**Table 2.2: Ranking Fijian human development**

UNDP 2003 Human Development Indicators, 2001 data

Fiji Human Development Indicators			Ranking within groups					
			Oceania		Middle Income		Small Island States	
Rank	Indicator	Value	Rank	Country	Rank	Country (PPP)	Rank	Country
81	Overall		4	Australia	74	Thailand	36	Seychelles
95	Life expectancy	69.3	20	New Zealand	78	Jamaica	71	St. Lucia
51	Literacy	93.2	70	Samoa	<b>81</b>	<b>Fiji</b>	62	Mauritius
61	School enrolment	76	<b>81</b>	<b>Fiji</b>	92	Guyana	<b>81</b>	<b>Fiji</b>
92	GDP per capita (US\$, PPP)	4'850	132	P.N. Guinea	103	Cape Verde	86	Maldives

Note: GDP per capita is in US\$ Purchasing Power Parity.

Source: ITU adapted from UNDP.

republic with a President as the head of state, a Prime Minister as the head of government and a bicameral parliament. The 55-member Great Council of Chiefs (Bose Levu Vakaturaga), consisting of the traditional chiefs, has considerable moral and political influence. Its advice is sought on major issues and it appoints the President.

Tensions between the two main ethnic groups – the native Fijians and Fijians of Indian descent – have led to two coups, in 1987 and 2000. Those behind the 2000 coup have been convicted and democratic elections in 2001 confirmed a new Prime Minister, native Fijian Laisenia Qarase.

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<sup>1</sup> A significant characteristic of Fiji's economy is its traditional form of land ownership. Similar to the Solomon Islands and Samoa, some 85 per cent of Fiji's land is under communal title. Derived from customary forms of land ownership and kinship traditions of sharing resources, this distinct institutional structure stipulates that land, an important part of cultural and socio-economic heritage, should not be sold or privately owned. Since 1940 the Native Land Trust Board (NLTB) has been the centralized authority in charge of managing native land. The land issues have also contributed to the larger socio-economic conflict along ethnic lines.

<sup>2</sup> See the United Nations Development Programme "Human Development Indicators 2003" available at: <http://www.undp.org/hdr2003/indicator/index.html>. [Accessed 18 June 2004].

### 3. Pervasiveness

This chapter examines individual, household and community access to Information and Communication Technology (ICT) (fixed and mobile telephones, computers, Internet as well as newspapers, radios and televisions).

#### 3.1 Telephony

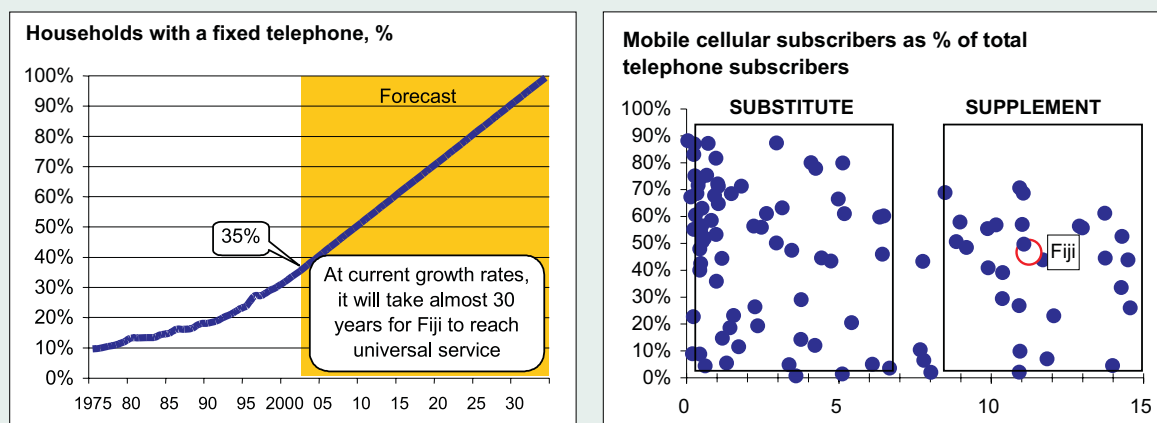
At the end of 2002 it is estimated that a little over one third (35.5 per cent) of Fiji's households had a fixed telephone line.<sup>1</sup> Household fixed telephone penetration is growing less than two per cent a year so it would take another seven years for half of Fiji's households to have a fixed line and almost thirty to reach *universal service* or over 90 per cent of households with a telephone line (Figure 3.1, left). It appears there has been little substitution of mobile for fixed lines in households, unlike many other countries (Figure 3.1, right).

Though the extent of substitutability has not been measurable, this will now be possible when the results of the *Household Income and Expenditure Survey 2003* are compiled (Box 3.1). In any case, it is not believed that there are many households that have only a mobile telephone.

Fiji's growth in main telephone lines between 1997 – 2001 was 32 per cent, ten per cent less than the world average and only half the rate for countries at a similar level of economic development. Fiji is performing roughly at the average for its income level in terms of household telephone penetration. The average number of residential telephone lines for Lower Middle Income countries was 35.8 in the year 2000. Household telephone penetration has tended to match the growth in per capita income. However it does not appear that telephone tariffs—which have been at the same

**Figure 3.1: Universal telephone service in Fiji**

Households with a fixed telephone, Fiji and mobile cellular subscribers as % of total telephone subscribers, 2002



*Note:* In the left chart, residential telephone lines per 100 households are used as a proxy for household telephone penetration. Forecast is based on current growth rates. In the right chart, each dot represents a country.

*Source:* ITU World Telecommunication Indicators Database.

**Box 3.1: Measuring household ICT**

One of the shortcomings of analyzing ICT use in Fiji is the lack of official surveys. An accurate measure of household ICT penetration and individual use of ICT can only be obtained through surveys. This is being addressed by the Household Income and Expenditure Survey 2003 (HIES) conducted by the Fiji Islands Bureau of Statistics. When the results are in, Fiji will for the first time have a picture of the level of ICT usage in households. Policy makers will be able to analyze the results by locality and other variables.

The Survey asks about the availability of various household conveniences as well as expenditure on the items. The areas covered include electricity, fixed telephone, fax machine, mobile phone, pay television, Internet and credit card. Unfortunately the survey does not ask if the household has a personal computer but hopefully this will be

redressed in the future. The survey also asks when the household began the service which can provide an indication of how long it has been available and the degree of growth. One question the survey will uncover is how many households have a mobile phone. It would have been useful to know how many households have only a fixed line, only a mobile phone, both a fixed and mobile and no telephone to understand the degree of substitutability. This can be extracted from the individual questionnaires but will add to processing time.

The HIES is just the first step in understanding ICT usage in Fiji. Future surveys will be needed on individual Internet use, the extent of ICT use in business and ICT sector production, investment and employment to have a more complete picture of access and trends.

level for almost a decade—are a major barrier to fixed telephone access. Fiji's local telephone tariffs are among the lowest in the world at F\$ 2.84 (US\$ 1.30) a month for residential subscription and a flat 12 Fiji ¢ (5.4 US ¢) for a local call of unlimited duration. Assuming 60 calls per month, the total cost for local service would amount to 2.8 per cent of per capita income. The main barrier to a higher level of universal telephone service appears to be a lack of infrastructure rather than affordability.

*Universal access* refers to coverage of telephone service. There are various ways of measuring universal access such as the number of localities with telephone service, payphone availability and mobile cellular population coverage. There are roughly 1'650 villages in Fiji.<sup>2</sup> Of those some 900 do not have service or 55 per cent. Larger size villages would tend to be covered by telephone service so the actual percentage of the population covered by telephone service is higher. One proxy for universal access is mobile population coverage with 50 per cent of the inhabitants of Fiji capable of receiving a signal. Thus a minimum estimate for the percentage of the Fijian population with potential easy access to telephone service is 50 per cent.

The figure is higher when factoring in mobility. This includes people in rural areas visiting a town with telephone service or inhabitants with a mobile phone residing in areas without coverage but using the phone when they travel into covered areas. An estimated 25 per cent of inhabited islands do not have direct connection to the telephone network and use high frequency radio for emergency communications.

There are around 2'000 payphones in Fiji. Some 500 are "Drua" payphones that resemble the double-hulled war canoes of the same name. In the past, these canoes were the only form of inter-island communication explaining the symbolic link to a payphone. There are another 1'000 wall-mounted phones and some 500 booths.

Perhaps the major universal service policy is the subsidization of local fixed line tariffs. This is sustained by higher priced international and mobile communications that are shared with the domestic operator. It is debatable how well this policy is working since universal service is growing slowly. Part of the problem is a lack of infrastructure investment in local service due to market structure with international, mobile and domestic services operated by different entities.

### Box 3.2: Rotuma

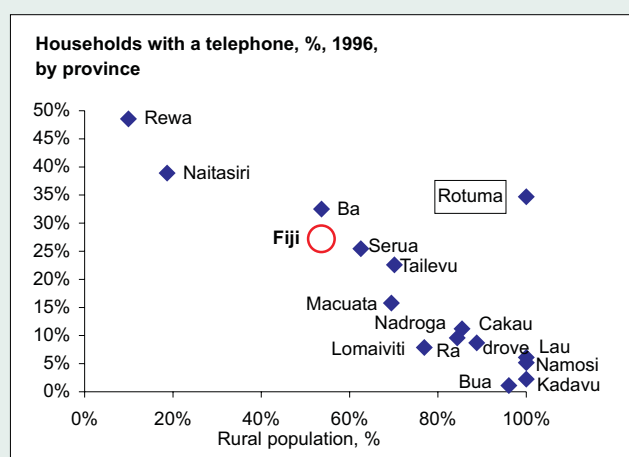
The island of Rotuma, with some 2'500 inhabitants, lies some 465 kilometres to the north of Fiji's main islands. While most places in Fiji can be reached in less than an hour by plane, it takes 2 hours and 15 minutes to fly from the capital Suva to Rotuma. The 43 square kilometre island is considered to be 100 per cent rural. Rotuma is not on the electricity grid with energy created from self-generated sources.

The northernmost island holds a special status in the country. Unlike other provinces, Rotuma has one seat in Parliament.<sup>4</sup> It also holds a special telecom status as the only part of the country to currently be connected by a satellite system for domestic communications. Installed in 1995 at a cost of F\$ 2 million, the earth station connects to Australia where calls are rerouted back to Fiji. Given Rotuma's remote location and limited transportation and power facilities, the project was a logistical challenge. The earth station is powered by solar

panels and a diesel generator and can be monitored remotely, a real plus given that there is only one flight a week.

As a result of this link, residential telephone service can be provided in Rotuma and it has the third highest home telephone penetration in Fiji. Other ICT are appearing. The high school has had computers since 1998 as a result of British aid and a computer lab is being installed with the assistance of an Australian church group. The local hospital also recently received a computer that will facilitate record management; it also has a CD containing information on medical treatments. Rotuma is also present on the Internet with a web site run out of the University of Hawaii.<sup>5</sup> However Internet access from the island of Rotuma itself is expensive since there is no local Internet point of presence. If costs can be reduced, Rotuma will be ready, already having translated a number of computer terms to the local language.<sup>6</sup>

Box Figure 3.2: Rotuma



Source: Air Fiji and ITU adapted from 1996 Census.

For example, the rate of telecom investment to revenues in Fiji is 25 per cent compared to over 50 per cent for Lower Middle Income economies. The other government universal access policy is payments to Telecom Fiji (around F\$1 million per year) to extend service in rural areas. Assuming an average cost of around F\$20'000 per installation it would require around F\$18 million to provide telephone service to all of Fiji's

unconnected villages.<sup>3</sup> At the current level of government contributions, it would take another 18 years to provide telecommunication access to all of Fiji's villages.

In many developing nations, mobile has played a major role in enhancing telecommunication access. The results in Fiji have been mixed. During the early years of mobile in Fiji, growth was unexceptional and in line with

forecasts which predicted only around 1'000 new subscribers a year. At the end of 1998, there were only some 8'000 subscribers. This changed with the introduction of pre-paid in 1999. Subscriber growth was almost 200 per cent in 1999, the highest in Fiji's mobile history. Growth has since slowed reaching its lowest level ever of 16 per cent in 2002.

There were 93'583 mobile cellular subscribers at March 2003 for a penetration rate of 11.4; 91 per cent of customers are pre-paid. Mobile penetration is probably close to saturation, given current levels of coverage and tariffs. Mobile is more of a complement than a substitute in Fiji with most people that have a fixed line also possessing a mobile phone. The number of mobile subscribers has not passed fixed and thus mobile is not greatly extending access to those without fixed lines. Mobile population coverage stood at 51 per cent in 2002. If there was 100 per cent coverage the market might be at least twice as high as it is now or some 200'000 customers.

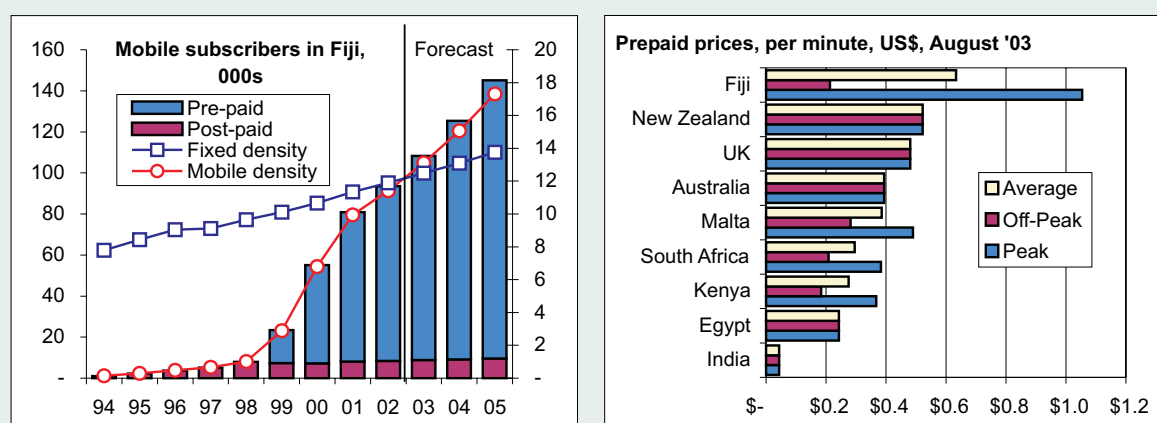
The mobile operator, Vodafone Fiji plans to accelerate roll-out of rural

coverage. At the moment, population coverage is almost exclusively in urban areas. One difficulty in extending the mobile network is land ownership. Vodafone often has to pay a lot of money to land owners for the installation of a base station. Sometimes the demands are unreasonable and it would not make economic sense to install the network.

Another barrier to increased mobile penetration is pricing. While Fiji has some of the lowest fixed line prices in the world, it also has some of the highest mobile ones. Fiji's pre-paid peak rate call charge of F\$ 1.98 (US\$ 1.05) per minute is the highest of any Vodafone network (Figure 3.2, right). The off-peak rate is much lower at 40 Fiji cents (21 US cents). A Short Message Service (SMS) costs 20 Fiji cents (11 US cents). The lowest denomination pre-paid card is F\$ 11 (US\$ 5.86) with a validity period of six months. In July 2003, a new entry-level mobile phone was being advertised for F\$ 199 (US\$ 106) (including Subscriber Identity Module (SIM) card and F\$20 of talk time). Prepaid cards are available at a variety of outlets including post offices and petrol stations and can

**Figure 3.2: Fiji mobile market**

Number of mobile subscribers, 1994-2002 and forecast 2003-2005 (years ending 31 March) (left) and mobile pre-paid price per minute, US\$, August 2003, selected countries where Vodafone operates (right)



Note: Left: Forecast based on 2001-2002 growth rate. Right: Pre-paid prices converted to US\$ using exchange rate of 13 August 2003.

Source: ITU adapted from operator information.

also be recharged at bank ATM machines.

### 3.2 Computers and Internet

There are no official statistics on the number of computers or Internet users in Fiji. According to one report, there were 40'000 personal computers (PCs) in Fiji in 2002.<sup>7</sup> Other data based on sales estimates, suggest a lower figure. For example Courts, the biggest retailer, sells about 200 PCs a month. Including other retailers, there are around 3'600 PCs sold per year. Assuming replacement every five years that would equal around 18'000 PCs in entire country. The value of computer imports in 2001 was reported as US\$ 6 million, a 25 per cent increase over the previous year.<sup>8</sup> Assuming an import value of US\$ 1'000 per PC, there would be an estimated 24'000 PCs in the country (assuming a five year replacement rate). The rounded average of the various estimates suggests a figure of around 30'000 PCs in Fiji or 3.6 per 100 inhabitants. The ratio of the world average of home to total computers is 50 per cent. Applying that figure to Fiji, there are an estimated 15'000 homes with a computer or 9.7 per cent.

The number of Internet users has been estimated based on the number of subscribers multiplied by three. This would result in an estimate of some 23'000 Internet users in 2002 or 2.8 per cent of the population. However the ISP—Connect—now estimates that there are 50'000 users in Fiji raising penetration to some 6.1 per cent.<sup>9</sup> Connect multiplied the 8'000 subscribers—most of which are home accounts—by three and added to that estimates of users in government, the University of the South Pacific and business. Connect plans to carry out a study on the home market to find out why people are not online, which might give a more accurate indication of the number of Internet users. The *Household Income and Expenditure Survey 2003* also asks households if they have Internet service but the results were not available at the time of this report.

Connect's estimate of 50'000 Internet users in Fiji correlates to a number of other indicators. For example, the estimated newspaper circulation in the country is 49'000, the number of salaried workers is 42'393, the number of people aged 20 and above who have tertiary education is 43'580 and those in secondary school between the ages of 15-19 is 43'391. This suggests that Fiji's Internet penetration could fairly easily be doubled (by getting all those with either tertiary education or all those currently in secondary and tertiary education online). The number of inhabitants with a secondary education is around 400'000. This gives some indication of Fiji's potential Internet market.

As in many developing countries, barriers to increased Internet penetration include a lack of infrastructure (electricity<sup>10</sup>, personal computer, telephone line). Affordability is an issue particularly for purchasing a PC. Although import taxes on PCs have been eliminated and prices have fallen, the price of an entry level PC is around F\$ 1'000 (US\$ 457), still steep for most people.

The price of Internet dial-up service has been reduced several times since the launch of commercial service in December 1996. Connect offers seven time-based dial-up subscription packages. The entry-level package costs F\$ 10.40 (US\$ 4.75) for three hours of usage per month. Fiji ranks 21st out of 33 Asia-Pacific countries in terms of dial-up Internet pricing but compares favourably to other Pacific nations. Flat-rate local call pricing is an advantage since a dial-up Internet session will not incur telephone usage charges beyond F\$ 12 (US\$ 5.4). Nonetheless, despite the reduction in charges and flat-rate local calls, Internet access is still perceived as expensive for the average Fijian.

There is not yet any formal government plan for providing community Internet access at public locations although there have been several trials in rural locations and some libraries have access. There are around



50 privately operated Internet cafes in Fiji, with most outside Suva primarily catering to tourists. Connect operates two in Nadi and Suva. FINTEL operates an Internet kiosk at its building in Suva charging 10 Fiji cents per minute. Fiji Posts operates an Internet café at the main post office in Suva. They had a second one in Lautoka but it could not be maintained so it was shut down. The postal service would like to become an ISP and use its network of post offices to provide Internet access. There are 52 post offices in the country of which 26 support counter sales and would have PCs and a telephone for dial-up access. The major problem for the other offices is a stable power source; some only have four hours of electricity per day. Fiji Posts currently has a 64 kbps connection to the Internet that they soon plan on doubling. They are making upgrades to the computer network and if their proposed network is implemented within the next year, then they could feasibly provide Internet access at post offices after that.

#### **3.3 Mass media**

Radio broadcasting began in 1935. The Fiji Broadcasting Corporation Limited operates six stations: two each in Fijian, Hindi and English.<sup>11</sup> It offers national public broadcasting service on two of the stations through an arrangement whereby the

government buys airtime. Other commercial radio stations are also available. There are no recent official statistics on the number of radios or households with a radio. The United Nations Educational, Scientific and Cultural Organization (UNESCO) reported half a million radio sets in 1997. Projecting forward, there were some 550'000 sets in 2002 or 68 sets per 100 inhabitants. Assuming four radios per household, then 90 per cent of households have a radio.

Television broadcasting in Fiji started in October 1991. Fiji Television Limited (Fiji TV) was established in June 1994 and offers a free-to-air channel and terrestrial-based pay television channels (known as Sky TV).<sup>12</sup> Broadcasts are in Fijian, Hindi and English. Fiji TV's broadcast exclusivity recently ended but no other stations have yet launched. The 1996 Census reported 46 per cent of households with a television set. Projecting forward, it is estimated that 57 per cent of Fijian households had a television set in 2002.

There are several English-language daily and Fijian- and Hindi-language weekly newspapers available in Fiji. The daily circulation of the three newspapers audited by the Australian Audit Bureau of Circulations was 49'124 in 2001 or six per cent of the population.<sup>13</sup>

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- <sup>1</sup> Household telephone penetration is not compiled on an annual basis in Fiji. The 1996 Census reported that 27.2 per cent of households had a telephone. According to Telecom Fiji, the percentage of residential to total main telephone lines is 56. An estimate for the number of households with a telephone is derived from the number of residential telephone lines.
- <sup>2</sup> There are conflicting figures regarding the number of villages. The figure of 1'650 was provided by Telecom Fiji however their 1995 Annual Report mentions a figure of 1'066. The 1996 Census reported 1'346 Enumeration Areas (the smallest geographical unit for which statistical information is collected) with 688 in rural areas and 658 in urban ones.
- <sup>3</sup> The figure of F\$ 20'000 per installation was provided by Telecom Fiji.
- <sup>4</sup> The House of Representatives consists of 70 members. Thirty-seven Members of the House are elected from among persons registered on the roll of voters who are Fijians. Twenty-seven Members of the House are elected from among persons who are registered on the roll of voters who are Indians. One Member of the House is elected from amongst persons who are registered on the roll of voters who are Rotumans. Five Members of the House are elected from among persons who are registered on the roll of voters who are neither Fijians, Indians nor Rotumans (ie. General Electors Roll). See: <http://www.parliament.gov.fj/mp/hr.aspx>. [Accessed 18 June 2004].
- <sup>5</sup> <http://www.hawaii.edu/oceanic/rotuma/os/hanua.html>. [Accessed 18 June 2004].
- <sup>6</sup> <http://www.hawaii.edu/oceanic/rotuma/os/NewsArchive/Archive2003/RotumaFiji03/RotumaFiji03.htm>. [Accessed 18 June 2004].
- <sup>7</sup> Fuatai Purcell and Janet Toland. *ICT in the South Pacific: Shrinking the Barriers of Distance*. Victoria University of Wellington (New Zealand). 2002. <http://www.fdc.org.au/files/toland-2.pdf>. [Accessed 18 June 2004].
- <sup>8</sup> <http://www.intracen.org/tradstat/sitc3-3d/ip752.htm>. [Accessed 18 June 2004].
- <sup>9</sup> This figure is greater than the estimated number of PCs suggesting a high degree of sharing.
- <sup>10</sup> According to the 1996 census, 96'756 households in Fiji had electricity or 66.9 per cent.
- <sup>11</sup> <http://www.radiofiji.org>. [Accessed 18 June 2004].
- <sup>12</sup> <http://www.fijitv.com.fj>. [Accessed 18 June 2004].
- <sup>13</sup> <http://www.business.vu.edu.au/bho2250/Top20Media/TopmediaPacific.htm>. [Accessed 18 June 2004].

## 4. Sector absorption

This chapter identifies the degree of utilization of ICT in different sectors of the economy.

### 4.1 Business

There have not been any official surveys about the extent of ICT usage in the business sector. The sentiment is larger businesses are the biggest users of ICT in the country. Businesses in sectors such as tourism and finance appear to be intense ICT users. Five of Fiji's six banks have web sites and according to the Fiji Islands Trade and Investment Bureau (FTIB), more than 80 per cent of hotel operators have their own websites.<sup>1</sup> According to FTIB, Small and Medium Enterprises (SMEs) are less intensive users and face difficulties adopting ICT.

### 4.2 Government

The use of ICT within the government developed gradually and without an overall guiding strategy. *Information Technology and Computing Services*, (ITC, [www.itc.gov.fj](http://www.itc.gov.fj)) which started out as a small unit within the Ministry of Finance has since expanded its role and today is the official ICT department for the whole of the Fiji government.<sup>2</sup> By the end of 2000 ITC had connected most ministries and departments in Suva to the Internet through the government network GOVNET. ITC provides different services including application development, training and a customer support centre. Database management systems are one of the most frequently used government applications. They have been set up for a number of ministries and include information on immigration, land rental and youth activities.

At mid-2003 GOVNET provided Internet access to about 3'000 (out of a total of 17'000) civil servants. Its objective is to connect up to 10'000 government users. It will require

significant effort to connect all public entities since besides the ministries and related agencies in Suva there are government offices in other locations as well as 19 local councils. The only public entities outside Suva connected to GOVNET are libraries.

One of the major problems that GOVNET faces is the high leased line cost it has to pay to Fiji Telecom, a total of F\$ 9'000 per month. As a result, broadband connectivity is limited and many ministries connected to GOVNET, which provides bandwidth up to 128 kbps, complain about the slow speed. Some government agencies have chosen not to be part to GOVNET, typically because of quality of service concerns. One example is the Public Service Commission, in charge of human resources, which has its own ICT team. Thus government entities end up with the choice between free but slow access through GOVNET or an expensive but better quality connection through the private ISP. In order to reduce costs and provide better services, ITC is planning to build its own private network. It has applied for an ISP license but the request is still pending.

Another constraint ITC faces is lack of qualified staff. The F\$ 12'000 (US\$ 5'479) that ITC received for training in 2002, is insufficient.<sup>3</sup> A total of 14 employees left during the last year causing the abandonment of several ongoing projects.<sup>4</sup>

### 4.3 Education

The Ministry of Education (MoE) has about 80 employees, ten per cent of which have a personal computer with access to the Internet (through the government network, GOVNET). Most other staff have personal computers, but no Internet access. Like most ministries connected to GOVNET, the

**Table 4.1: Fiji at school**

2001					
	<i>Institutions</i>	<i>Students</i>	<i>Teachers</i>	<i>Student: Teacher ratio</i>	<i>Net enrolment ratio (%)</i>
<b>Total</b>	<b>1'462</b>	<b>210'743</b>	<b>9564</b>	<b>22:1</b>	
Pre-primary	563	7076	558	13:1	26 (1996)
Primary	700	142'913	5'112	28:1	98.2 (1996)
Secondary including vocational	199	67'830	3'894	17:1	80 (1996)

*Note:* Enrolment ratio calculated by ITU based on 1996 Census data on school attendance.  
*Source:* Fiji Ministry of Education.

MoE complains about the slow connection and inadequate services. To optimise the available bandwidth, the MoE, like other ministries, has been asked to limit its use to between 2-4 hours and to a certain time of day. The MoE does not have its own web site.

#### 4.3.1 Primary and secondary education

Only 19 out of a total 899 primary and secondary schools — just over two per cent — are government-run and directly under the Ministry of Education. Although the government pays most teachers and establishes the curriculum and examination requirements, religious and community based organizations own and operate the schools. In 2001, 210'743 students — representing over 25 per cent of Fiji's total population — were attending pre-primary, primary or secondary school (Table 4.1).<sup>5</sup>

There is no precise data on the number of schools with PCs and Internet access. The Ministry of Education estimates that only about 30 secondary schools have a well-equipped computer lab with access to the Internet. This suggests that less than three per cent primary and secondary schools provide students with access to the Internet. Other schools use computers for administrative purposes only. If all 67'830 secondary school students had access to the Internet, this would

represent around eight per cent of the total population.

Some 100 secondary schools (50 per cent of all secondary schools) offer ICT courses to a limited number of students through the Technical Vocational Education programme.

The medium-term Strategic Development Plan 2003-2005 stipulates that "*Education also needs to be aligned to technology developments and future skill demands such as Information Technology*" and "*computer education needs to be strengthened for all students, and in particular for secondary school students who will be entering tertiary institutions and the world of work in the near future*".<sup>6</sup> The Plan's educational policy objectives call for reviewing the curriculum to include IT by 2004 and increasing access to computers in schools. The MoE has requested funding to equip more schools with PCs and another ten schools with computer labs and the Internet by 2004. Concrete policies and rules on connecting educational institutions are lacking and schools establish their own ICT budget. Unlike some other countries, there are no reduced Internet access prices for schools. Another barrier is a lack of electricity in an estimated 300 mainly primary schools. Since it is unlikely that many schools will have Internet access within the next few years, the

government has mandated ITC to connect all public libraries. The libraries could be used as a public access point for school children.

At the College for Secondary Teacher Education, there is a computer lab where teachers can take ICT courses. While the MoE intends to set up a computer lab in the primary teacher education college, there are no concrete plans to integrate ICT training in the teachers' education program.

### 4.3.2 Post-secondary education

Fiji is home to the main provider of higher education in the Pacific region, the University of the South Pacific (USP, [www.usp.ac.fj](http://www.usp.ac.fj)).<sup>7</sup> Apart from a branch of Australia's Central Queensland University ([www.suva.cqu.edu.au](http://www.suva.cqu.edu.au)), USP is the only university in Fiji. The number of USP students has increased steadily, from 5'228 in 1988 to 18 in 2004. In 2002 over half of these were studying on-campus with the remaining following courses at USP branches on other Pacific islands. Almost three quarters of USP students are Fijians.

USP is largely computerized, including student records, employee information and financial and purchasing systems. Administrative data can be updated and is accessible from any one of its centres. The University has more than 1'500 PCs and every student and teacher has their own email account. There is a fibre-optic local area network on the Suva campus and a one Mbps connection to the Internet.

USP is the leading provider of distance education in the region with 4'772 students in a dozen Pacific island nations (Box 4.1).

### 4.4 Health

The Ministry of Health (MoH, [www.health.gov.fj](http://www.health.gov.fj)) is one of the few ministries with a web site. It provides information on health related projects, links to press releases and other health related organizations, as well as email contacts. The ministry's headquarters has a two Mbps leased

line connection to ITC. Like other ministries, it complains about the slow speed. The MoH estimates that it has about 500 computers, most of which are used for PATIS (see below). Internet access and email are limited to some 150 managers, only about five per cent of the total MoH staff.

The Ministry has become one of the most computerized in Fiji. Its Patient Information System (PATIS) provides computerized health care management and is part of an Australian funded Health Management Reform Project (1999-2003).<sup>9</sup> PATIS is currently used in 12 of Fiji's 20 hospitals. It includes a unique identification number for each patient through which medical records can be retrieved and modified from all connected hospitals. Because of high leased line costs, the PATIS network uses dial-up communications between the ministry headquarters in Suva and participating hospitals. For security reasons, this connection is only used to update PATIS and not to access the Internet.

As part of the Health Reform and connected to PATIS, the MoH is also the first government entity to pilot the Financial Management Information System (FMIS). Launched in mid-2003, the pilot project aims to improve financial management and includes information on inventory, public expenditure and a human resource database. Eventually, the plan is to implement FMIS within the entire government.

There are no official telemedicine projects carried out by the Fiji government. The Fiji School of Medicine (FSM, [www.fsm.ac.fj](http://www.fsm.ac.fj)), a private organization that is the major regional health institution, has been involved in several ICT projects. This includes a web site ([www.pachealthnet.org](http://www.pachealthnet.org)) allowing health professionals across the region to exchange information, including data and images, for remote consultation and diagnosis. The Pacific Telepathology service ([www.fsm.ac.fj/PWS/telepath.htm](http://www.fsm.ac.fj/PWS/telepath.htm)), which was set up at FSM in June 2003, provides for the exchange of medical information

#### Box 4.1: The University of the South Pacific- successful distance learning

Twelve Pacific countries spread over 33 million square kilometres of ocean, an area more than three times the size of Europe, own the University of the South Pacific (USP).<sup>8</sup> Its three main centres, located in Fiji, Vanuatu and Samoa and eleven local ones offer decentralized tertiary education. Centres are located in 11 of the 12 member states. Sixty per cent of its students make use of the distance education program.

Especially over the last few years enrolment at USP has increased substantially, from 10'452 students in 2002 to over 18'000 in 2004. Students can chose among some 160 courses. All courses are taught in English and degrees range from undergraduate certificates to doctorates. Member countries largely finance the university, which was established in 1968.

The distance education programme is supported by USPs satellite communications network, USPNet. The network has evolved from radio communications, to itinerant use of the PeaceSat satellite and finally to 64 kbps leased lines and an upgraded HF radio communications system. A few years ago, these technologies were replaced by USPNet-2000, a new VSAT telecommunications network. USP has permission to bypass the international telecommunication service provider and to connect its 12 member states directly through INTELSAT.

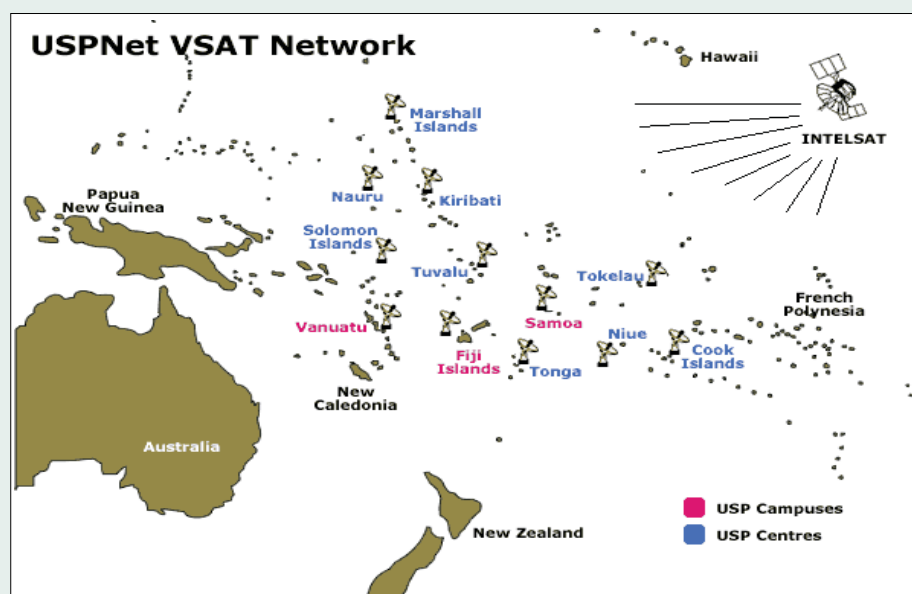
Some courses are completely available by distance while all exams are taken under supervision, in one of the centres. The university has committed itself to making the entire computing science programme available by distance education by the end of 2005. The course will be a combination of print-based, multimedia and on-line methods. While most courses are still print-based, live video broadcast started in 2000. Although students and staff have access to email and the Internet, only few web based online courses have been delivered in collaboration with foreign universities and the principal use of the Internet is electronic mail, research, and file transfer.

While web based courses would further expand the university's curriculum and increase educational quality, the high costs of Internet bandwidth has restricted progress in this direction. High costs and limited bandwidth have also forced the university to restrict Internet access among its students. This is a major problem and has seriously restricted the university's ability to fully take advantage of the Internet. USP's management is looking into possibilities of expanding the IP platform, as well as to increase the number of centres by connecting more places through dial-up access.

*Note:* The satellite master station is at the campus in Fiji with a 7.6 metre antenna and a transmit power of 100 watts. Smaller hubs are located in Samoa and Vanuatu but with reduced transmission capacity. All centres need their own earth station and local remotes have sufficient capacity to participate in audio and video conferencing and receive video broadcasts. Data and audio services between all centres are provided through the permanently assigned 64 kbps two-way data circuits. The system also supports up to three simultaneous video transmissions or two simultaneous videoconferences.

*Source:* University of South Pacific, Information Technology Services (<http://www.usp.ac.fj/index.php/its>).

Box Figure 4.1: Distance learning through the USPNet VSAT Network



*Source:* Small Islands Developing States Network (SIDSNET).

through the use of dial-up Internet access. The Fijian experience shows that basic Internet services accessible to those with narrow bandwidth connections—email, web pages and the attachment of still images—are the

most commonly used telemedicine / telehealth type applications. More sophisticated applications such as live videoconferencing for remote diagnosis, would involve a higher degree of technical expertise and bandwidth.

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- <sup>1</sup> Shiu Raj. *E-Commerce in Fiji Islands*. Regional Seminar on E-Commerce, 11-14 December 2001, Bangalore, India.
- <sup>2</sup> ITC was originally called the Electronic Data Processing Unit (EDP) within the Ministry of Finance. When it expanded its role to the rest of the government, it changed its name to ITC.
- <sup>3</sup> This amount refers to government funding only and does not include training financed through foreign assistance.
- <sup>4</sup> This is highlighted in ITC's two annual publications, the corporate plan - which outlines upcoming projects — and the annual report — which summarizes the results of projects. Both are available online, at <http://www.itc.gov.fj/publications.html>. [Accessed 18 June 2004].
- <sup>5</sup> Primary education roughly covers those aged 6-11; lower secondary those between 12 and 15 and upper secondary usually those between 15 and 17.
- <sup>6</sup> Government of Fiji. *Rebuilding Confidence for Stability and Growth for a Peaceful, Prosperous Fiji*. Strategic Development Plan 2003-2005. November 2002. <http://www.itc.gov.fj/docs/Strategic%20Development%20Plan%202003%20-%202005.PDF>. [Accessed 18 June 2004].
- <sup>7</sup> Only Western Samoa and Tonga have small universities.
- <sup>8</sup> Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu.
- <sup>9</sup> See "Fiji — Health Management Reform Project" on the Aus Health International web site at [http://www.ahi.com.au/projects/1014161718\\_22071.html](http://www.ahi.com.au/projects/1014161718_22071.html). [Accessed 18 June 2004].

## 5. Connectivity

### 5.1 International backbone

Fiji has international telecommunication connectivity through Intelsat satellite and the Southern Cross undersea fibre optic cable.<sup>1</sup> Fiji connected to Southern Cross in November 2000 (Figure 5.1).<sup>2</sup> FINTEL's investment to connect to the undersea cable was F\$45 million.

All of Fiji's international Internet bandwidth is via Southern Cross with satellite only used for voice. Total bandwidth used by Fiji on Southern Cross is 20 Mbps including private data lines; Internet bandwidth is 10 Mbps. Fiji's Internet traffic on Southern Cross is terminated by UUNET in the US and by Optus in Australia.

There is some confusion whether Connect, the ISP, can obtain bandwidth directly from FINTEL or must go through Telecom Fiji. The current arrangement is that it currently gets two Mbps directly from FINTEL (for which it pays less) and the rest through Telecom Fiji (which

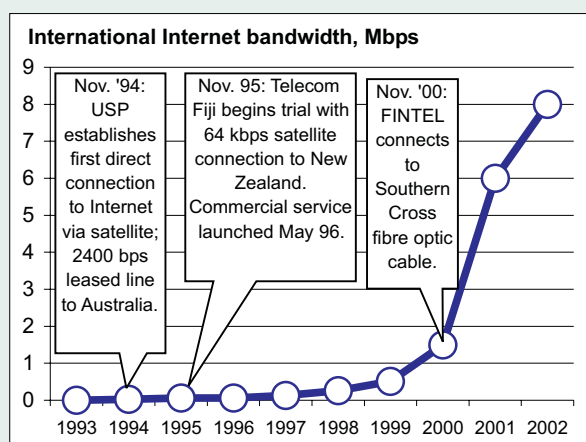
in turn procures the international bandwidth from FINTEL).

Prices for international Internet bandwidth that Fiji is paying seem high by global comparison (Figure 5.2, left). Prices have not fallen dramatically despite the Southern Cross connection. There also appears to be a lack of transparency in bandwidth pricing with different rates being charged depending on the customer.

Despite the increase in Internet bandwidth made available by Southern Cross, a number of indicators suggest that it is still not sufficient. These include gauging potential demand by taking the ratio of international telephone traffic in minutes to international Internet bandwidth. If the results of the so-called Bit Minute Index are over one, then there is probably sufficient Internet bandwidth. In the case of Fiji, the value is only 0.09. On a per capita basis, Fiji's international Internet

**Figure 5.1: Southern Cross**

Fiji international Internet bandwidth, Mbps and route of Southern Cross fibre optic submarine cable

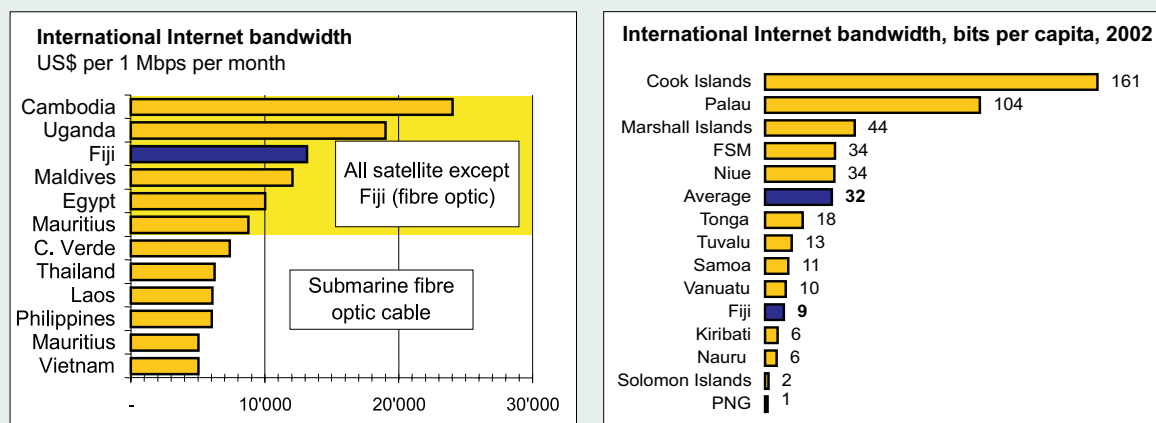


Source: ITU research and Southern Cross.



**Figure 5.2: International Internet bandwidth capacity and pricing**

International Internet bandwidth, selected Pacific economies, bits per capita, 2002 and International Internet bandwidth prices, US\$ per Mbps per month, various dates (Fiji = June 2003)



Source: Left chart: ITU adapted from Pacific Forum Secretariat. Right chart: ITU Internet Case Studies.

bandwidth is some three times less than the Pacific region average (Figure 5.2, right).

In addition to the ISP, there are other potential customers for bandwidth such as call centres. Another potential user could be Fiji's budding movie industry with the idea of digitally transferring films to Hollywood for overnight editing.<sup>3</sup>

FINTEL has been backing the Pacific Cable project that would link all South Pacific countries to Southern Cross. It is not proposed as a commercial scheme since the small islands cannot generate sufficient revenues to finance the project. Instead the idea is being promoted as important for development. The total project cost is estimated at US\$ 450 million. Discussions have been held with the European Union, World Bank and Asian Development Bank. The project would involve two extensions from Fiji to other countries.

## 5.2 Domestic backbone

Telecom Fiji's domestic backbone covers most of the major islands and is primarily microwave. Around one quarter of inhabited islands are not

covered by the microwave network and have no direct connection to the Public Switched Telephone Network (PSTN). Most would have an HF radio service for communications. There are strips of fibre on the main island (Viti Levu, Nausori-Suva, Suva-Pacific Harbour and Nadi-Rakiraki). Plans call for installing a fibre ring around the whole island placing the cable next to the main road; this should be complete within the next two years. There is also a fibre ring being created around the Suva Central Business District. A domestic satellite system is used for the island of Rotuma, home to 2'800 inhabitants.

A VSAT project has just been signed; the first phase will be completed by March 2004. This will be IP based with speeds of 128/256 kbps. It calls for around 300 VSAT locations and will cost F\$19 million. The government is allowing accelerated depreciation for the project that makes it marginally economic. The VSAT terminals are from NERA (a Norwegian company) whereas INTELSAT is used for the space segment.<sup>4</sup>

Data protocols used on the domestic backbone include frame relay using

Cisco routers. The theoretical bandwidth is 155 Mbps but actual speeds are much slower. It is used mainly for leased lines. Internet traffic is routed over Telecom Fiji's backbone network (so-called DDS service) at 2 Mbps with a planned upgrade that would double speeds.

The Fiji Electricity Authority (FEA) has its own microwave telecommunication network connecting the islands of Viti Levu, Vanua Levu and Ovalau. FEA is planning to install fibre optic cable in the Suva area. Although FEA would like to lease excess telecommunication capacity to others, they are forbidden from doing so. According to FEA, it was cheaper to construct their backbone network than lease from Telecom Fiji.

### **5.3 Exchange points**

There has so far not been a need for a national Internet exchange since FINTEL has a monopoly on international traffic and there is only one ISP. In addition, most Fiji Internet traffic is to web sites abroad given the English proficiency of the population and the volume of content available overseas.

### **5.4 User access methods**

The majority of Internet subscribers use dial-up. At the end of 2002, there were 7'600 dial-up subscribers in the country compared to 80 leased lines (speeds between 64 kbps to 1 Mbps with around half the tourist resorts subscribing) and 10 Integrated Services Digital Network (ISDN) subscribers. Consumer broadband access methods such Asynchronous Digital Subscriber Line (ADSL) or cable modem are not available. Fiji Telecom claims that ADSL is not financially viable and is instead pursuing ISDN, launched in 2002. This is in contrast to most other countries where ISDN is declining and ADSL use is growing rapidly. Pay television using coaxial cables is not available. Fiji TV provides an encrypted terrestrial pay TV service with around 7'000 subscribers. Several companies have expressed interest in providing pay television services but using wireless MMDS. One possibility for pushing broadband

access would be to allow pay television companies to also provide high-speed Internet services as an incentive to encourage them to build a Hybrid Fibre Coaxial network. Another possibility for broadband access would be Power Line Communications using the electrical wiring of FEA.

Mobile and other wireless access to the Internet is limited. Neither Wireless Access Protocol (WAP) nor General Packet Radio Services (GPRS) are available. There are plans to launch GPRS in 2004. GPRS will be offered by "long lining" back to Australia through the Southern Cross fibre optic cable. The main local investment will be to upgrade base stations with software for GPRS. The experience of running off of servers in other countries already exists with Australia routing Multimedia Messaging Services (MMS) from servers in New Zealand. Around 200 mainly corporate users are accessing the Internet via the mobile network (for example by using Bluetooth to connect a mobile phone to a PDA and check e-mail). Text messaging is also going up in use with the number of Short Message Service (SMS) doubling to 6.1 million in 2002 (5.6 per subscriber). Around a third of mobile subscribers are using SMS.

Internet access through wireless Local Area Networks (LANs) using the popular IEEE 802.11b standard (i.e., Wi-Fi) is not commercially available. One uncertainty is whether Telecom Fiji, Vodafone Fiji or Connect (the ISP), should pursue this technology. Another issue is demand with most Fijians unable to afford a laptop computer. The regulatory status of the 2.4 GHz frequency used by Wi-Fi is also unclear.<sup>5</sup> Wi-Fi does not have to be used only for hotspot services. It is a promising technology for connecting computers in government and educational institutions to local Internet backbones as well as in public Internet access facilities.<sup>6</sup> Connect is looking at 802.16a technology in the 3.5 and 5.5 GHz frequency.<sup>7</sup> Speeds can reach 268 Mbps depending on various factors.

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- <sup>1</sup> For more information about Southern Cross, see <http://www.southerncrosscables.com> [Accessed 18 June 2004] and <http://www.alcatel.com/submarine/refs/cibles/pacs/southerncross.htm>. [Accessed 18 June 2004].
  - <sup>2</sup> The Southern Cross cable is named after the plane that made the first trans-Pacific Ocean crossing in 1928. The cable parallels the plane route from Oakland (near San Francisco) to Brisbane, Australia with stops in Hawaii and Fiji. <http://www.austehc.unimelb.edu.au/tia/505.html>. [Accessed 18 June 2004].
  - <sup>3</sup> Mere Tuqiri. "Move Over Hollywood. Here Comes Fiji's Follywood." *Pacific Magazine*. September 2002. <http://www.pacificislands.cc/pm92002/pmdefault.php?urlarticleid=0037>. [Accessed 18 June 2004].
  - <sup>4</sup> Telecom Fiji. "Rural Telephone Penetration to Grow Through New Satellite Network." *Press Release*. 22 July 2003. [http://www.telecomfiji.com.fj/newsroom/2003\\_press\\_release/22july03.shtml](http://www.telecomfiji.com.fj/newsroom/2003_press_release/22july03.shtml). [Accessed 18 June 2004].
  - <sup>5</sup> Although the term unregulated frequency is not used in ITU texts, the implication is that frequencies for industrial, scientific and medical use should not require licensing.
  - <sup>6</sup> Indeed the UN has hailed Wi-Fi as a promising technology for developing nations and hosted a recent conference on the issue. See <http://www.w2i.org/pages/wificonf0603/PressRelease3.html>. [Accessed 18 June 2004].
  - <sup>7</sup> It has been looking at equipment from Aperto Networks. See <http://www.apertonet.com/index.html>. [Accessed 18 June 2004].

## 6. Market

### 6.1 Overview

The *Ministry of Information, Communications, and Media Relations* with eight staff, is responsible for telecommunication regulation and policy. The current law governing the telecom sector — the Post and Telecommunication Decree — dates from a 1989 cabinet decision (there was no parliament between 1987-1992). The decree established Fiji Posts and Telecommunications Limited (FPTL) as a corporate entity spun off from the Department of Telecommunications. The decree also granted 25-year exclusive rights for national telecommunications to FPTL and for international telecommunications to Fiji International Telecommunications (FINTEL). In July 1996, post and telecommunications were separated and FPTL renamed Telecom Fiji Limited.

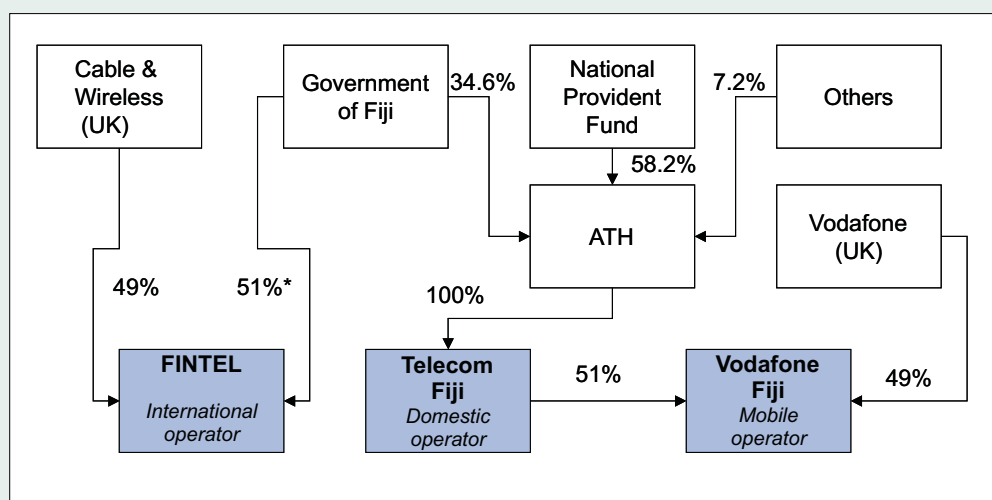
In March 1998, the government created Amalgamated Telecommunication

Holdings Limited (ATH) to manage its assets in the telecommunication sector. This included 100 per cent of Telecom Fiji, the fixed line and national long distance operator as well as 51 per cent of Vodafone Fiji, the mobile operator. The government wanted to include its 51 share in FINTEL—the international operator—in ATH but its other owner, Cable and Wireless of the UK objected. However the government's management rights in FINTEL are carried out by ATH.

In 1998, Credit Suisse First Boston was hired to carry out the steps for a partial private sale of ATH. The sale took place in December. The best offer was received from the Fiji National Provident Fund (FNPF)—the country's pension system—who bid F\$254 (US\$ 130) million for 49 per cent of ATH. FNPF paid an extra F\$23 million premium for the right to acquire an additional two per cent for majority ownership

**Figure 6.1: Ownership of Fiji's telecom sector**

June 2003



Note: \* The Government of Fiji shares in FINTEL are managed by ATH.

Source: ITU adapted from ATH, FNPF.

that it exercised in September 1999. In March 2002, additional government shares were offered to the public and institutional investors and ATH was listed on Suva's South Pacific Stock Exchange (SPSE).

A new telecommunications bill is under preparation. The draft bill calls for establishment of a telecommunication regulator and a licensing framework.

The Minister of Communications is charged with establishing advisory groups to assist in the formulation of industry policies. The *Information Technology Advisory Council* (ITAC) is composed of around a dozen government and private organizations, including several ministries, telecom operators, the ISP and the university. The ITAC is currently preparing an ICT Development Policy document.

## 6.2 Fixed networks

### 6.2.1 National operator

*Telecom Fiji*, the domestic telecommunication company, operates the nation's fixed line and the national transmission network. It also owns Connect, the only ISP in operation at the time of this report. Telecom Fiji is fully owned by Amalgamated Telecommunication Holdings (ATH). It is also the joint venture partner with Vodafone Fiji, the mobile operator, owning 51 per cent (Figure 6.1). Telecom Fiji is the nation's largest operator in terms of revenue and staff.

Telecom Fiji traces its roots back to 1910 when the government took over the telephone network owned by Colonial Sugar Refinery Company (which introduced Fiji's first telephone system in 1895). In 1990, Fiji Post and Telecommunications Limited (FPTL) was created to take over the government's telecommunication and postal services and granted a 25-year exclusive license for domestic telecommunications. In July 1996, FPTL split into two separate entities, Post Fiji Limited and Telecom Fiji Limited. Government ownership in Telecom Fiji was transferred to ATH in March 1998 with the latter later listing

shares on the South Pacific Stock Exchange.

All operators are obliged to use the Telecom Fiji domestic network. It shares revenues with FINTEL and Vodafone Fiji for terminating international and mobile calls. These payments help Telecom Fiji keep domestic line rentals and local call charges low which it states are significantly below cost. This situation is not sustainable in the long run.

### 6.2.2 International operator

*Fiji International Telecommunications (FINTEL)*,<sup>1</sup> formed in December 1976, is the operator for international services. It is 51 per cent owned by the government of Fiji. Cable and Wireless of the UK, which has operated international telecommunication services in Fiji since 1902, owns the remainder. FINTEL has an exclusive license for international services until 2014. FINTEL had 78 employees at the end of 2000.

FINTEL has a revenue sharing agreement with Telecom Fiji with the latter receiving 53 per cent for terminating international calls. These payments in effect subsidize local telephone charges. Despite the worldwide trend towards reduced international calling prices, Fiji's international call prices have only changed once over the last ten years. FINTEL pricing is constrained due to the political sensitivity of raising local call charges, the inevitable outcome if international prices were to be reduced. FINTEL favours an interconnect arrangement rather than the current revenue sharing system.<sup>2</sup> It is also in favour of rate rebalancing since volume will go up.

Fiji's high international call charges make it an attractive target for alternative calling schemes such as call back and Internet Telephony since they can significantly undercut FINTEL. Though deemed illegal by the government, these practices seem to be having an impact on FINTEL. Its revenues declined 19 per cent in the 2002 financial year (though ironically profits rose 15 per cent). A local call

back company, TELPAC, is charging up to less than 44 per cent less than FINTEL and reportedly has captured 15 per cent of the market.<sup>3</sup>

The impact of call back traffic (which shows up as incoming traffic) coupled with high domestic international calling prices is reflected in Fiji's international traffic statistics. The ratio of incoming to outgoing international traffic (in minutes) has grown from 2 in 1997 to 2.5 in 2002 (Figure 6.2, right). A large part of this increase is due to incoming traffic from the United States, hub for call back traffic. Incoming traffic from the United States grew 268 per cent between 1995 and 2001 and its share in Fiji's total incoming traffic rose from 18 to 38 per cent. In the meantime, Fiji was forced to apply benchmark accounting rates by the United States telecommunication regulator. It was obliged to reach an accounting rate of 38 US cents by 1 January 2001, a reduction of 82 per cent from 1995 (Figure 6.2, left). As a result, though Fiji is receiving much more traffic from the United States, it is making less money than before.

FINTEL needs to diversify to overcome declining revenues from traditional international telephony and to recoup

its investment in the Southern Cross cable. Provision of international Internet connectivity, though not a major source of revenue yet, is growing. FINTEL has also obtained an ISP license but has had problems providing service due to the lack of an interconnect agreement with Telecom Fiji. For the time being it has reached agreement to provide service through an Internet kiosk at its headquarters in Suva.

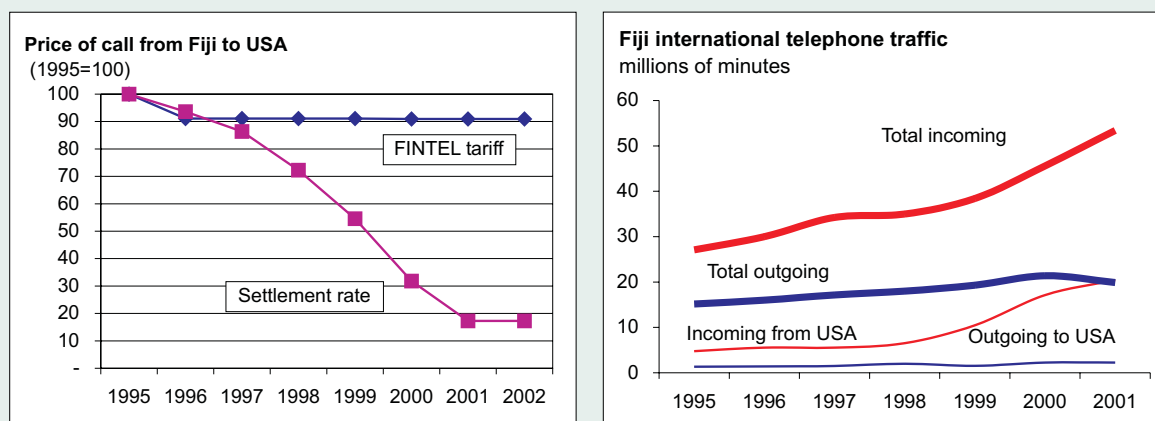
### 6.3 Mobile services

*Vodafone Fiji* is the nation's mobile operator.<sup>4</sup> The company is 49 per cent owned by Vodafone, the UK international mobile operator with the remainder held by ATH, the Fijian holding company for telecommunications. Vodafone Fiji launched digital GSM service in the 900 MHz frequency in July 1994. Interestingly, Vodafone Fiji does not have a mobile license but claims exclusivity for mobile services until 2014 through its association with Telecom Fiji. The company had 104 staff at March 2003.

There is close collaboration with the Vodafone group particularly with its

**Figure 6.2: International telephone price and traffic trends**

Trend in price of retail call and settlement rate from Fiji to US, 1995-2002, 1995 = 100 (left) and Fiji international telephone traffic, total and with US, millions of minutes, 1995-2001 (right)



Source: ITU adapted from Direction of Traffic database, FINTEL and FCC data.

other Pacific operations in Australia and New Zealand. There is also operational collaboration with for example, Vodafone Fiji's post-paid billing outsourced to Vodafone Australia. The Vodafone connection is cited as one of the reasons for Vodafone Fiji's strong market orientation and the company notes that it has the Vodafone group "ethos."

Vodafone Fiji faces two constraints in raising mobile penetration: pricing and coverage. Peak time call charges are among the highest in the world. Part of the problem is negotiating an appropriate interconnection rate with Telecom Fiji. The current interconnection rate is 60 Fiji cents for local calls and 44 Fiji cents for long distance. Interestingly, the off-peak mobile rate is cheaper (and less than the interconnect charge) than the fixed rate for long distance calls. Another source of friction is the use of CDMA phones in a mobility mode by Telecom Fiji's wireless local loop customers.

Half of the population is within range of the Vodafone Fiji network. Efforts to extend coverage have been hampered by reaching agreement with landowners for installing base stations. Another constraint is electricity, which is not available

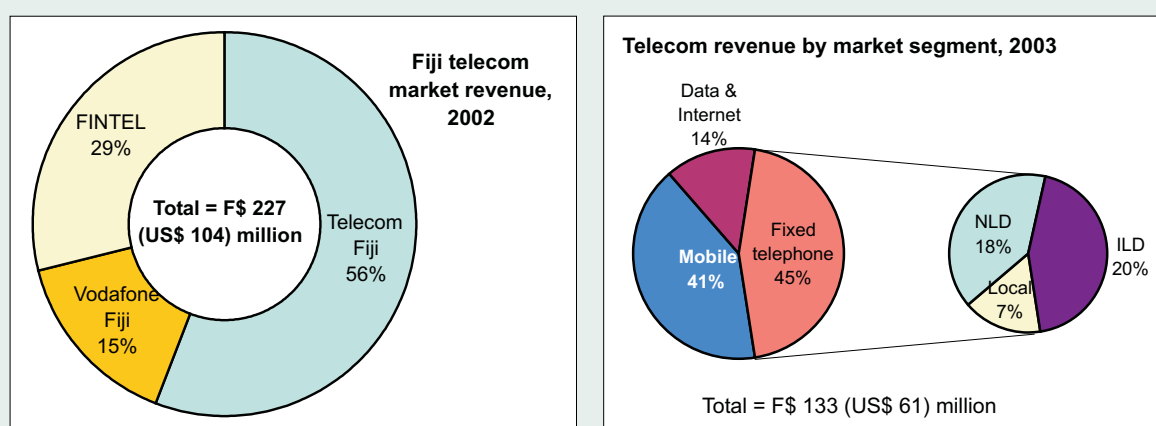
throughout the country. In addition, Vodafone Fiji is not allowed to install its own long distance transmission network but must use Telecom Fiji. Vodafone Fiji is also not allowed to deal directly with FINTEL for international service but must go through Telecom Fiji.

Fiji's tourism industry has a favourable impact on Vodafone Fiji with many overseas visitors bringing their mobile handset with them. Vodafone Fiji has 72 roaming agreements and international roaming accounts for around 15 per cent of revenues. Some 60 resorts and hotels have mobile coverage and Vodafone Fiji hopes to expand this. International SMS usage is expanding with local users finding it cheaper to send messages to friends and relatives abroad than to call.

#### 6.4 Internet access

Commercial Internet service was introduced by Telecom Fiji in December 1995. In June 2002, Telecom Fiji's Internet operations were spun off into a new company called *Connect*. Like Vodafone Fiji, Connect does not have an ISP license but claims a legal monopoly through its parent Telecom Fiji which has an exclusive license for domestic telecoms through 2014. Connect has

**Figure 6.3: Fiji's telecommunication market**

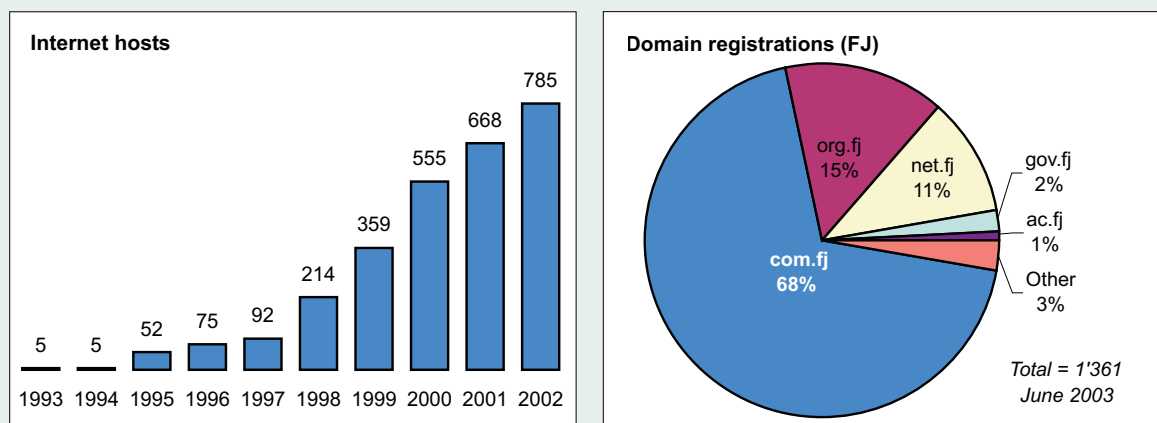


Note: Year ending 31 March.

Source: ITU adapted from operator reports.

**Figure 6.4: Internet hosts and domains**

Number of Internet hosts, 1993-2002 (left) and distribution of FJ domain registrations, June 2003 (right)



Source: ITU adapted from The World Factbook, Central Statistics Office.

around 35 staff. The government has issued eight ISP licenses but none have been activated due to a lack of interconnect arrangement with Telecom Fiji. Connect has an interconnect arrangement for using Telecom Fiji's network with pricing dependent on the volume of traffic.

One of the reasons given for establishing an Internet subsidiary is to make it more customer oriented and to provide better quality by focusing on Internet issues. On the other hand, Connect does not have full independence. For example, it would like to procure international bandwidth directly from FINTEL to lower costs but Telecom Fiji insists it must go through them. The current situation is that Connect buys from both. Connect is also keen to provide high-speed service but is constrained by the Telecom Fiji network. As a result, it cannot launch broadband services such as ADSL until Telecom Fiji agrees. One option is to offer high-

speed access through fixed wireless but here too it must obtain the approval of Telecom Fiji.

#### 6.4.1 Domain name

The University of the South Pacific (USP) is responsible for Fiji's domain name (.FJ). In 1990 USP asked to register the domain name and the Internet Assigned Number Authority (IANA) delegated it to them.<sup>5</sup> USP registers all second level domains in Fiji, except for the academic sector, which is entrusted to Connect (school.fj for high schools). Although the government (gov.fj) domain is technically the responsibility of the public sector, USP carries out this task. It costs US\$50 to register a domain and US\$25 per year after that. Registration details are on online.<sup>6</sup> There were 1'361 registered domains at June 2003 with com.fj having the most. Network Wizards reported 785 Internet host computers using the FJ domain name in its January 2003 survey (Figure 6.4).



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<sup>1</sup> <http://www.fintel.com.fj/home.html>. [Accessed 18 June 2004].

<sup>2</sup> For more on interconnection issues see "Round 2 is over inter-connect." *The Review* (Fiji). 1 June 2003.

<sup>3</sup> Robert Keith-Reid. "Fiji Telecom Row's Heading to Court." *Pacific Magazine*. January 2003.  
<http://www.pacificislands.cc/pm12003/pmdefault.php?urlarticleid=0039>. [Accessed 18 June 2004].

<sup>4</sup> <http://www.vodafone.com.fj>. [Accessed 18 June 2004].

<sup>5</sup> At that time, USP had dial-up connectivity through the University of Waikato in New Zealand. In 1993, USP got a direct connection through AARNET at University of Melbourne. In 1996, USP switched over to Telecom Fiji's Internet service. <http://www.iana.com/root-whois/fj.htm>. [Accessed 18 June 2004].

<sup>6</sup> <http://whois.fj/public/index.php?USP-DomReg=979d618c621af64eb6151b6b76415abf>. [Accessed 18 June 2004].

## 7. Information society

### 7.1 Economic impact

The contribution of the communication sector to Fiji's Gross Domestic Product (GDP) has risen from 2.7 per cent of GDP in 1989 to 3.6 by 2002 although it has declined from a high of 4.2 per cent in 2000 (Figure 7.1, left). This is partly attributed to a drop in international telecommunication revenues the last several years. Another measure often used to weigh the impact of the telecommunication sector is the share of telecommunication revenues to GDP. The value for Fiji in 2001 is 5.9 per cent, ranking it 16<sup>th</sup> in the world (Figure 7.1, right). This figure is more of a reflection of high prices caused by the monopoly situation rather than widespread use of telecommunications throughout the economy. As mentioned, the actual value-added of the communication sector is relatively low at 3.6 per cent.

Despite the relatively low contribution of telecommunications to overall

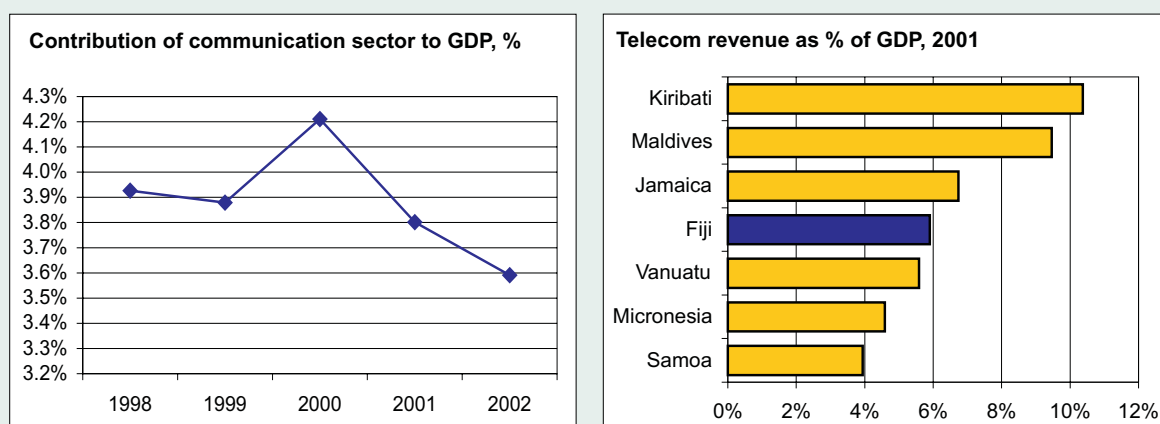
economic output, as a business, telecommunication firms are among the largest in the country. ATH, the holding company for government holdings in the sector, has the biggest market capitalization on the South Pacific Stock Exchange and is Fiji's single largest enterprise in terms of revenues. ATH pays a minimum of 50 per cent of net profit in dividends ensuring its major shareholder, the Fiji National Provident Fund (FNPF) a steady source of income for financing the nation's pension system.<sup>1</sup> ATH is also one of the biggest taxpayers to the government. This situation complicates liberalization of the telecommunication sector.

### 7.2 Social impact

ICT is slowly beginning to impact Fijian society. Access to traditional ICTs such as radio and television is high. Over 90 per cent of households are estimated to have a radio and over half the population have access to

**Figure 7.1: Telecoms and the economy**

Contribution of the communication sector to GDP, Fiji and telecom revenues as a percentage of GDP, selected economies, 2001



*Note:* The left chart measures the value-added of the communications sector (which includes posts).  
*Source:* ITU adapted from Fiji Islands Bureau of Statistics and World Telecommunication Indicator database.

television. Five years ago the Internet was just getting started in Fiji; at the end of 2002 an estimated 6.1 per cent of the population were users. Fiji's inhabitants are also getting exposed to ICTs through their mobile phones with the number of text messages reaching six million in 2002, or almost six per subscriber per month. The population is starting to use electronic transactions. ANZ bank, one of the largest, has 30 Automatic Teller Machines (ATMs) on the two main islands where customers can not only withdraw cash but also pay their phone bill and recharge their pre-pay mobile account. ANZ also offers telephone and online banking.

Most Internet use is to sites abroad. However local content is beginning to develop. One of the radio stations has audio streaming (albeit paid streaming and aimed at Fijians abroad). There are some promising areas for local content: the local newspaper plans to put up classifieds and another company is planning to make a site with vacancies in the hotel industry. Fiji has limitations in developing local content. There are few domestic solutions for web site design and hosting and design skills are lacking. This is unfortunate since it is estimated that F\$1'000'000 a year is lost to hosting abroad with virtually all local hotel and resort web sites located overseas.

A major drawback is that most of the population are still not aware of the potential of the Internet. Also, pricing of Internet service is expensive for many and discourages heavy use. It is too costly to experiment, be creative and come up with new ideas. This also discourages the development of Internet cottage industries that are dependent on inexpensive Internet access.

### 7.3 Knowledge base

#### 7.3.1 Literacy and school enrolment

A significant determinant of a country's ability to transition to an information society is its knowledge base. Indicators such as educational

attainment and school enrolment help determine the potential for ICT use. The 2003 UNDP Human Development Index indicator for education—composed of school enrolment and literacy—suggests that Fiji is doing well compared to other developing countries. Fiji received a score of 0.88 on the education index, which is high compared to the medium human development average of 0.74. Adult literacy has increased from 80 per cent in 1985 to over 93 per cent in 2001. This is 15 per cent above the medium human development average of 78 per cent. Fiji has universal access to primary education, increased access to secondary education and virtual gender parity. In 1996 net secondary school enrolment was 80 per cent and in 2001 compulsory education was extended to lower secondary.

Qualitative differences do exist between rural and urban areas. Rural schools tend to have poorer facilities and fewer teachers are trained. In 2000 the pass rate in rural schools was only 26 per cent compared to 62 per cent in urban schools for Fiji School Leaving Certificates.<sup>2</sup>

Information and Communication Technology (ICT) has not been a top priority among efforts to improve the educational system and the government remains vague on policies towards making new technologies more accessible in schools. In its 2001 Annual Report<sup>3</sup>, the Ministry of Education highlights Fiji's efforts to adapt the educational system to changing needs and global through the *"introduction of proposed programmes in Agriculture Science, Computer Education, Home Economics, Industrial Arts and Office Technology"*. This general statement is the only reference made to ICT. The ministry's focus over the next three years does not include any ICT specific programmes or objectives.

#### 7.3.2 ICT training

The University of the South Pacific offers a range of courses and degrees through its five faculties (Agriculture, Humanities, Law, Pure and Applied Sciences, and Social and Economic

Development). In addition to certificate and diploma ICT programmes, students can also obtain a bachelor's degree with a single or double major in Computer Science and Information Systems. In 2002, 116 students were studying computer science as their sole major (3.4 per cent of all bachelor degree students) and another 1'417 as a double major (44.7 per cent of all bachelor degree students). In addition, nine students were enrolled in masters or doctorate programmes in the Department of Mathematics and Computing Sciences. There are plans to expand the number of ICT courses and to establish a Faculty of Computational, Mathematical and Informational Sciences.

USP is also beginning to offer industry-accredited training programmes in areas such as networking and operating systems. It is planning a survey of companies with ICT employees to compare the private sector's needs with the number of USP graduates and their qualifications. This will help USP plan its ICT curriculum. In regards to CISCO Network Academies, two are being established in Fiji. One will be located at USP and the other at the Fiji Institute of Technology (FIT), a post-secondary institution which in 2000 enrolled over 12'000 students.

It is not clear how many Fijians graduate in ICT from overseas institutions and return home. The existing data are not always up-to-date or clear about the field of study. For example according to statistics for scholarships offered by New Zealand, some 104 students studied there between 1995-2001 of which only one was in the field of Computing and Mathematical Studies.<sup>4</sup> It is possible that the 15 obtaining degrees in Engineering included computer science studies.

### 7.3.3 ICT manpower

Although Fiji has been able to generate an increasing number of graduates, thanks to USP, it suffers from a shortage of *experienced* ICT professionals. Political instability has had an impact with some ICT

professionals undoubtedly emigrating.<sup>5</sup>

Recruiting from abroad is difficult since work permits are not easily obtained. Companies need to justify that they cannot find a Fijian for the post. The Department of Immigration tracks the number of expatriate workers in the workforce, by occupation and country of origin.<sup>6</sup> However ICT is not identified as a category; at the end of 2000, there were 173 expatriate engineers of which some may be in the ICT field.

## 7.4 e-government

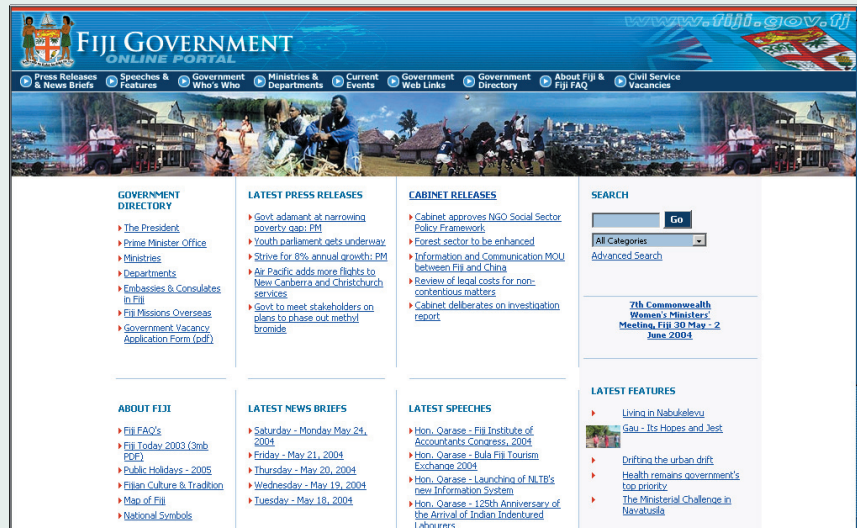
The official Fiji Government web site, at [www.fiji.gov.fj](http://www.fiji.gov.fj), is hosted and maintained by the Ministry of Information (Figure 7.2). The site includes official press releases and links to government agencies with their own web site. In August 2003 four out of 25 ministries as well as some agencies and the Parliament ([www.parliament.gov.fj/main/index.aspx](http://www.parliament.gov.fj/main/index.aspx)) had their own web sites. Notable exceptions include the Ministry of Communications and the Ministry of Education.

The main driver of e-government applications is *Information Technology & Computing Services* (ITC, at [www.itc.gov.fj](http://www.itc.gov.fj)), under the Ministry of Finance and National Planning. One of its most successful projects was the computerization of the 2001 elections, facilitating registration and verification of voters. A web site allowed voters to check their electoral details. While this proved useful during the election process, the website generated a number of privacy issues, and has since been brought offline.

The Fiji government does not provide any interactive applications but is limited to static websites providing text based information and the downloading of documents. Online documents are provided on the ICT web site and include immigration, as well as citizenship and passport applications. According to ITC, the first pilot e-government project will be the development of a dynamic website for

Figure 7.2: Fiji online

Fiji government website

Source: [www.fiji.gov.fj](http://www.fiji.gov.fj).

the Immigration Department. This will allow customers to apply, pay for and receive immigration services online.

Under the "People online" project ITC is working in three different areas to provide citizens with access to the Internet and e-government applications:

- One is to connect all 19 public libraries to the Internet. This is specifically aimed at students that do not have access to the Internet through their educational institution.
- Another is the establishment of rural telecenters. These would eventually be turned into a private business to become sustainable. A pilot project that was carried out in the village of Verata showed that a computer with dial-up access was of great interest to citizens. The public access point was so popular that school children from other villages were prepared to walk for an hour just to be able to use the Internet.

- A third, so-called "Supercentres" is aimed at those in urban areas who cannot afford to use Internet cafés. These one-stop e-government centres would provide access only to government sites, and allow citizens to complete forms online. The idea is to charge a small fee to make the project sustainable. One bottleneck is that this will only become viable once a number of significant government applications are online.

#### 7.4.1 Government strategies and plans

Fiji's goals regarding ICT are outlined in the country's *Strategic Development Plan 2003-2005 (SDP)*.<sup>7</sup> The overall goal, "Universal access to internationally competitive information and communication technology services" highlights the need for market liberalization and sector reform. Other objectives include enhancing rural coverage, aligning ICT training with market needs (including the provision of ICT equipment in schools) and introducing

e-government services. Concrete performance indicators are included to measure these objectives (Table 7.1). While the SDP tackles Fiji's main barriers to the expansion and use of ICT, it does not specify exactly how the objectives will be achieved. Without sufficient commitment, including the necessary funding, it may be difficult to achieve the identified targets.

The *IT Advisory Council* (ITAC) was set up in 2001 to advise the Minister

of Communications on policy. The Council includes representatives of key government ministries, the academic community and the private sector.<sup>8</sup> The ITAC has been drafting an ICT Policy. The draft policy has the vision "*to harness Fiji's ideal geographic location, competent workforce and world-class information technology infrastructure to promote Fiji's international competitiveness and create a dynamic, vibrant and well connected e-society.*"<sup>9</sup> It has three target areas: government, business

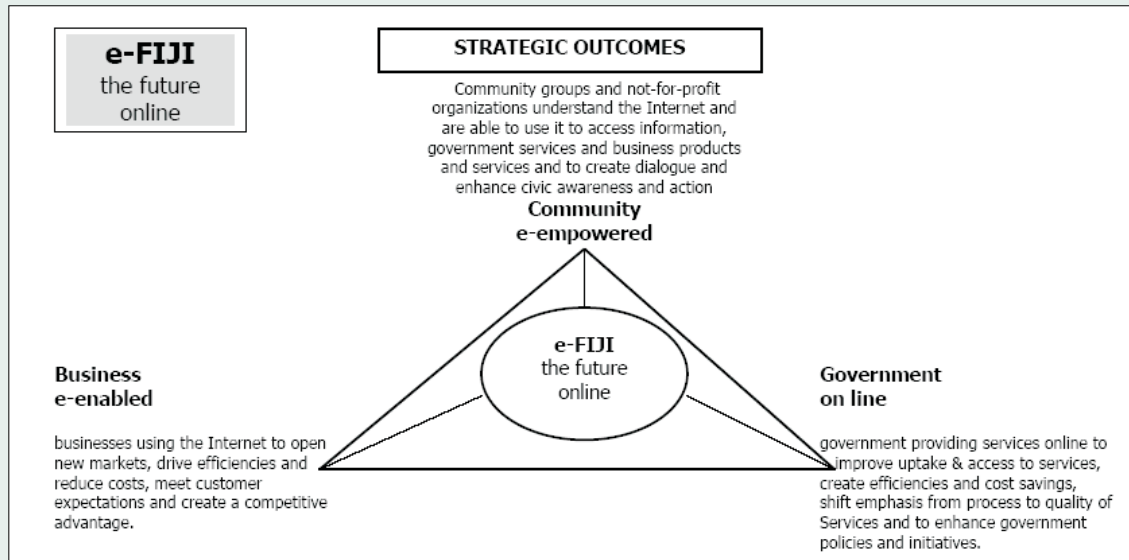
**Table 7.1: Strategic Development Plan 2003-2005**

ICT objectives and indicators

Policy Objectives	Key Performance Indicator
To reduce telecom rates in the short term by promoting more discussions between potential investors in ICT services and FINTEL/Telecom Fiji to negotiate favourable rates under which the investments would be viable.	Reduction in telephone charges by an average of 15 per cent by 2005. At least one international call centre established by 2003.
Increased coverage of telecommunication services especially to rural areas.	Telecommunication access to at least 400 more unconnected villages by 2005.
In the medium term, liberalisation of the telecommunications sector through more competition and the removal of exclusive licences.	Telecommunications legislation and regulatory body established by 2004. Exclusive telecommunications licenses removed by 2005. Increased competition with more Internet Service Providers (ISP). Quality standards comparable to the global market established by 2004.
To ensure the regulatory and legal framework functions to promote ICT development.	All ICT related legislation reviewed and amended by 2003. A fully developed internationally compliant privacy system for the handling of information in the ICT sector in place by 2003.
To align Fiji's ICT training to developments in the employment market.	An additional 10 schools per year with computers and internet access. Corporate sponsorship provided for additional schools. Teachers' computer skills upgraded. ICT employment skills training modules adopted by IT training providers by 2004.
To introduce "e-government" in order to raise efficiency of service delivery.	Integrated e-government development plan adopted by 2003. Suitable government services available through the internet by 2005.

Source: Strategic Development Plan 2003-2005.

Figure 7.3: Three thrusts of Fiji's ICT Policy



Source: ITAC, "Policy Directions and Strategies for the Development and Growth of Information and Communication Technology".

and community (Figure 7.3). For government, the policy calls for the delivery of online services including at least 25 by the year 2006. The draft policy also states that government should make greater use of ICT to improve its own internal processes including online procurement. For business, the policy calls for the establishment of bilateral partnerships with other nations that are well advanced in business ICT applications. Greater liberalization of the telecommunication sector is also identified in the business section. Community identifies policies for getting more citizens online, raising awareness and providing training. The draft policy calls for the creation of the ICT Development Unit (ICTDU) to serve as a focal point for carrying out the policy, identifies the annual amount the government should contribute through 2006 to make the policy a reality and notes that improved indicators will be needed to measure performance.

The Ministry of Communications is presently drafting a new telecommunica-

tions bill in consultation with other stakeholders. The bill would replace the 1989 Post and Telecommunication Decree that currently guides the sector. The draft bill calls for the creation of the Telecommunication Authority of Fiji as sector regulator, established a license regime, makes provision for universal service and covers the facilitation of competition by mandating interconnection and forbidding the abuse of significant market power.

### 7.5 e-business

Fiji's e-commerce capabilities are presently limited but it hopes to expand them significantly in the future. There is presently no domestic e-commerce infrastructure (e.g., capability for processing credit card transactions securely within Fiji) nor are the needed laws in place meaning that currently any electronic transaction does not technically have legal validity in Fiji.

The Ministry of Commerce, Business Development and Investment has recently formulated an e-commerce



policy framework that has been endorsed by the cabinet. The policy examines the various areas impacted by e-commerce and the steps needed to develop e-commerce. This includes issues such as payments systems and privacy. The policy notes which existing laws would need to be modified to cover electronic transactions and also calls for the creation of a new legislation such as an Electronic Transaction Bill. The process to create the needed legislation would likely last around a year and require some international assistance.

Fiji is hoping to attract ICT business by leveraging on its English speaking workforce, time zone (GMT +12 hours so that processing can be carried out overnight for North American or Asian customers), geographical location in the centre of the Pacific, relatively low labour costs and connection to the Southern Cross fibre optic cable. The government offers a number of incentives such as rapid one-stop paperwork processing, low cost office

rental, duty free imports of ICT equipment, accelerated depreciation and other investment benefits and unrestricted repatriation of profits. The Fiji Islands Trade and Investment Bureau (FTIB) is the statutory organization coordinating the effort. One bottleneck has been telecommunication prices. Although promotional material claims that Fiji's telecom operators will match or better regional tariffs for investors, FTIB claims that high prices are the main barrier to attracting IT businesses.

Nonetheless, Fiji is beginning to have some success attracting offshore business processing centres bringing two on board in 2003. ACS, a large US outsourcing company, opened a facility in Suva that will eventually employ 300 and provide back office processing for ACS clients in the Pacific as well as US. One of the main reasons was because of Fiji's English speaking workforce. Australia New Zealand (ANZ) Bank has established a call centre called Quest providing support to ANZ clients in the Pacific region.



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- <sup>1</sup> "The major recipient of the profits is the Fiji National Provident Fund, or in a broader sense, the workers of this country. FNPF has now earned \$44 million for its members in dividend payments since 1999, and still retains its terminal value in ATH of 58.2% as a major shareholder." Telecom Fiji. "ATH Releases 2003 Annual Report." *Press Release*. 1 August 2003.  
[http://www.telecom.com.fj/newsroom/2003\\_press\\_release/01august03.shtml](http://www.telecom.com.fj/newsroom/2003_press_release/01august03.shtml). [Accessed 18 June 2004].
- <sup>2</sup> Strategic Development Plan: 2003-2005. The Fiji School Leaving Certificate is passed at the end of higher secondary school, when students are, on average, 17 years of age.
- <sup>3</sup> Ministry of Education. Annual Report for the Year 2001. Parliament of Fiji. Parliamentary Paper No. 66 of 2002.
- <sup>4</sup> This information is hosted by the Ministry of Finance and National Planning, at:  
<http://www.fijichris.gov.fj/pages/SAC/SAC-LS-000.htm>. [Accessed 18 June 2004].
- <sup>5</sup> According to the Ministry of Finance and National Planning web site, between 1986 and 1996, an estimated 12% of Fiji's 1986 labour force emigrated (33'000 of 274'000). Between 4'000 and 6'000 persons per year left the country between 1997 and 2001. See
- <sup>6</sup> See <http://www.fijichris.gov.fj/pages/SAC/SAC-DI1.htm>. [Accessed 18 June 2004].
- <sup>7</sup> Government of Fiji. *Rebuilding Confidence for Stability and Growth for a Peaceful, Prosperous Fiji. Strategic Development Plan 2003-2005*. November 2002.  
<http://www.itc.gov.fj/docs/Strategic%20Development%20Plan%202003%20-%202005.PDF>. [Accessed 18 June 2004].
- <sup>8</sup> ITAC members are: Mac Works; Ministry of Commerce, Business Development and Investment; University of the South Pacific; Ministry of Education; Connect; Fiji School of Medicine; FINTEL; ITC; Fiji Trade & Investment Board; Ministry of Information and Media Relations; Ministry of Commerce, Business Development and Investment; National Planning Office and the Ministry of Communications.
- <sup>9</sup> Information Technology Advisory Council. *Policy Directions and Strategies for the Development and Growth of Information and Communication Technology*. Draft October 2003.

## 8. Conclusion

### 8.1 A sense of urgency

Fiji has several common and two specific problems inhibiting its evolution into an information society. The common problems—limited infrastructure (specifically in rural areas), shortage of skilled ICT workforce and computer literate population, lack of awareness about the benefits of ICTs to meet development needs, lag in introducing latest technology—are typical of many developing countries. The unique problems – uncertain political environment following the coup of May 2000 and long-term telecommunication monopoly situation are not both widely typical of most developing countries. There is hope that these latter problems can be solved. It has now been three years since the coup and each day marks a passage to normality. There is a feeling among many, that the telecommunication monopoly is untenable and is a barrier to realizing Fiji's potential in ICTs.

While ICT policy makers cannot do much about the political environment, they can have an impact on the ICT sector. As long as the monopoly situation persists, it will be a brake on Fiji's ICT potential. There is significant evidence that Fiji is missing out on benefits that a more liberalized telecom environment would provide in the form of lower prices for ICT services, better quality and more innovation. Fiji's telecom market structure is also an artificial constraint on the existing private operators by preventing them from entering new segments.

Fiji has a number of advantages that would be more fully exploited in a liberalized telecommunication environment. The decision to connect to the Southern Cross fibre optic undersea cable was forward looking and ensures the country an ample supply of bandwidth. It now needs the

applications, services and growing market to exploit the Southern Cross connection. Fiji's strategic location in the Pacific and headquarters of a number of regional organizations is an advantage as is its English-speaking, literate population. Another big plus is the presence of the University of the South Pacific, the largest in the region. These factors can be more fully optimised by offering competitively priced and advanced telecommunication services that would attract more organizations and support the development of an offshore ICT sector in areas such as call centres, back office data processing and film. FINTEL, the international operator notes the following about the potential for the Southern Cross cable:

*"This will enable activities such as call-centers, data processing zones, tele-medicine and other tele-services to be available in Fiji via this cable. ...It opens up a huge range of opportunities such as multimedia and cable TV and offers secure, high-speed service."*

### 8.2 The small market argument

It is often argued that small island developing states face difficulties in adopting ICTs due to isolation and small market size. Fiji's connection to the Southern Cross cable effectively ends cyber-isolation by providing the country a fast connection to the digital economy. Though Fiji may be geographically far away from major markets, in the Internet world it is now as close as any country.

Small market size is often used as an argument for the maintenance of a monopoly for the provision of telecommunication services. The logic is that the market is too small to attract investors. The difficulty with this

**Table 8.1: Competition in small countries**

Countries with competitive telecom markets, population less than one million, developing nations, August 2003

Country	Population 2002	GNI per capita 2002 (US\$)	Competition from	Note
St. Kitts & Nevis	47'000	6'370	Sep. 2001	OECS agreement with Cable & Wireless introducing full competition. Two new licenses issued.
Dominica	78'000	3'180	Sep. 2001	OECS agreement with Cable & Wireless introducing full competition. Marpin Telecoms subsequently awarded mobile, ISP and fixed licenses.
Seychelles	83'000	6'530	Dec. 1998	Second mobile operator launched in December 1998.
Tonga	99'000	1'410	Aug. 2002	Shoreline Communications launched as second mobile operator.
Grenada	106'000	3'500	Sep. 2001	OECS agreement with Cable & Wireless introducing full competition. Two new mobile licenses awarded.
St. Vincent	117'000	2'740	Sep. 2001	OECS agreement with Cable & Wireless introducing full competition. Two new mobile licenses awarded.
St. Lucia	160'000	3'840	Sep. 2001	OECS agreement with Cable & Wireless introducing full competition. Two new mobile operators launched in 2003.
Suriname	446'000	1'960	1998	ICMS granted an overall concession to provide public services as second operator.
Guyana	879'000	840	Feb. 2001	Cel*Star awarded mobile license.
<b>Fiji</b>	<b>834'000</b>	<b>2'160</b>	<b>2014?</b>	<b>Presently monopoly until 2014.</b>

Note: OECS = Organization of East Caribbean States.

Source: ITU adapted from ECTEL, World Bank, GSM World and country reports.

argument is that it is untested with a monopoly established before there has been the experience that would validate it (Box 8.1). In any case, this argument is becoming less tenable and today there are a growing number of small developing nations—with populations smaller than Fiji—that have competitive telecommunication markets (Table 8.1).

Exclusivity for the provision of telecom services is a blessing for monopolists. There are few if any examples of monopoly telecom operators losing money. In fact, operators in monopoly

markets tend to make higher profits than those in competitive ones. Fiji is no exception. While the ratio of ATH's profits to its revenues is 20 per cent, close to the average of other small islands states, those of Vodafone Fiji and FINTEL are far higher at 42 and 35 per cent respectively. Furthermore, the level of reinvestment of profits into telecom infrastructure is low in Fiji compared to other nations. The ATH group's capital expenditure ratio to revenues is 24 per cent compared to a recommended ratio of 40 per cent and the small islands states average of

### Box 8.1: How small is too small?

One of the most noticeable aspects of many of Asia-Pacific's small island states is how few have competitive mobile markets. Out of the region's 21 island economies with a population of less than one million, only two—Guam and Macao, China—had more than one mobile operator in 2002. The lack of multiple operators is surprising considering the dramatic impact that competitive mobile markets have had on increasing telecommunication access in other countries in the region.

The gut reaction is that the small islands are too small to attract multiple players. Yet, as the case of Guam and Macao, China illustrates that is not entirely true. With 454'000 inhabitants, Macao, China has half the population of Fiji (844'000 population), which has only one operator. With a population of 158'000, Guam has fewer inhabitants than eight other Pacific island nations. And if population size was an issue how do you explain the tiny Principality of Liechtenstein where there are no less than four mobile operators serving a population of just over 30'000?

It appears that income rather than size has more of a bearing on whether a mobile market has competition or not. Fairly wealthy small economies such as Liechtenstein, Luxembourg and Iceland with per capita incomes close US\$ 30'000 all have multiple mobile operators. However wealth provides less of an explanation for the Indian Ocean island of the Seychelles, which is considerably poorer at per capita income of US\$ 6'500 and a population of 80'000 but with two mobile operators. Contrast that with Brunei, whose per capita income is twice that of the Seychelles and whose population is four times larger. Yet Brunei has only one mobile operator and mobile penetration 15 points less than the Seychelles. Another exception to the wealth argument is Cambodia, one of the

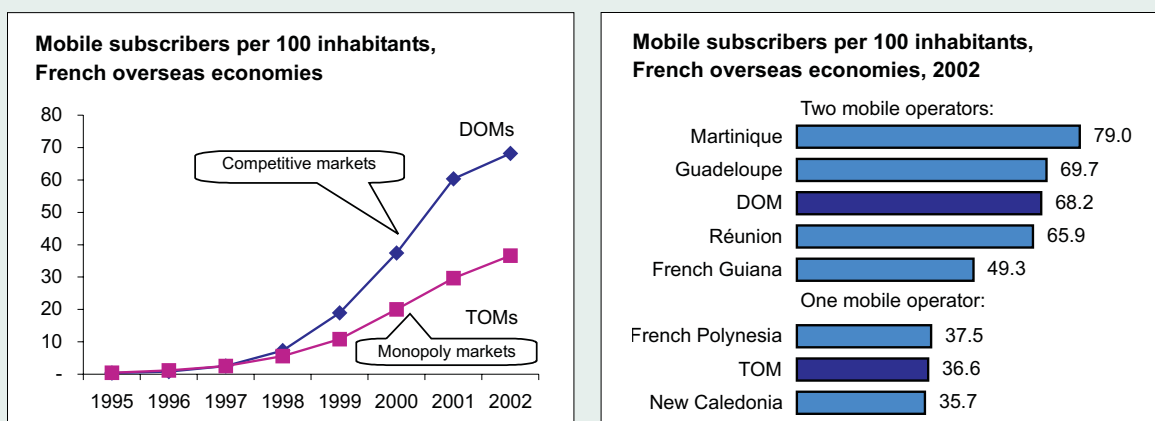
poorest nations in the Asia-Pacific region whose per capita income of some US\$ 250 is around one quarter the average Pacific island. Yet Cambodia manages to sustain no less than four mobile operators.

The argument that wealth dictates the competitiveness of a mobile market also does not seem to hold true when comparing French *Départements d'Outre-Mer* (DOMs) and *Territoires d'Outre-Mer* (TOMs). Income-wise the DOMs and the TOMs fall within a range of around US\$ 15'000 per capita and all have a population of less than one million each. The former consists of Guadeloupe, Martinique and French Guyana in the Western Hemisphere as well as Réunion in the Indian Ocean. The TOMs are French Polynesia and New Caledonia in the Pacific. The DOMs all have more than one mobile operator whereas the TOMs have only one. This seems to make a noticeable difference with the DOMs having close to twice the mobile penetration of the TOMs (Box Figure 8.1).

Why should the size of a country matter? In other words why not throw open the mobile market and see if there are any takers? Let investors decide the issue. The problem is that many Pacific small islands will not allow mobile competition, partly a legacy of exclusive licenses granted to incumbent operators. The results have been less than impressive with mobile densities hovering at 1.4 compared to 5.8 in other developing countries in the region. One good reason for acting now and opening mobile markets is that smaller countries are ideal test beds for new wireless technologies. Take the Isle of Man in the United Kingdom with 73'000 inhabitants. It became the first place in Europe to have third generation mobile service when it was launched on 4 December 2001.

Adapted from ITU, *Asia-Pacific Telecommunication Indicators 2002*.

**Box Figure 8.1: It's better to be a DOM than a TOM**



Source: World Telecommunication Indicator Database.

28 per cent. Fiji's ratio of telecom investment is far less than Cape Verde and Mauritius, which have a higher level of profitability than Fiji, but reinvest more of their earnings back into the telecommunication sector.

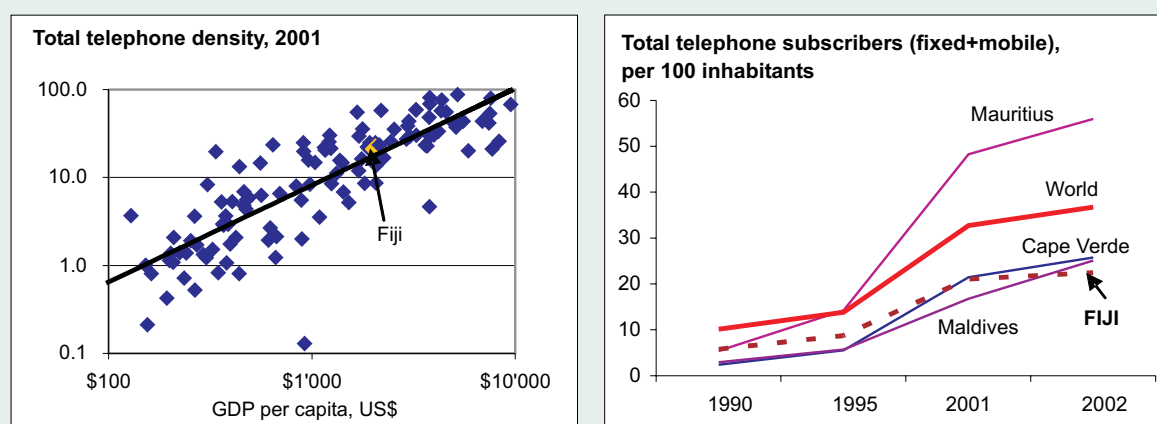
The consequences of Fiji's relatively low level of investment are evident in the national transmission network and mobile coverage. A major barrier towards greater telephone penetration in rural areas is the backbone network does not cover them. Contrast that with the Maldives, a far more stretched out but smaller populated country than Fiji and economically, at the same level of development. The Maldives has succeeded in providing telephone service to all of its 100 inhabited islands. In terms of mobile coverage, Fiji's figure of 50 per cent is the second lowest among countries at similar levels of economic development. The mobile network covered almost three quarters of the population in the Maldives at the end of 2003 even though the Maldives has a smaller market, has more inhabited islands, is more spread out and has a higher rural population than Fiji. Therefore it cannot be argued that the reasons for Fiji's low level of mobile coverage is due to its level of economic development, small market size, level of rural population or number of islands.

### 8.3 Falling behind

Fiji's relative position in telecommunication penetration rankings has been declining over the last 30 years. It has gone from the 82<sup>nd</sup> ranked country in telephone density in 1975 to the 99<sup>th</sup> in 2002. Its overall telephone density was just 3.2 points less than the world average in 1975; by 2002 the gap had risen to 14.3 points. There seems to be a degree of complacency about this possibly because Fiji is performing about where it should be in terms of its level of economic development (Figure 8.1, left). However Fiji is falling behind other countries that it had been ahead of just over a decade ago such as Mauritius, Cape Verde and the Maldives (Figure 8.1, right). The latter two countries are noteworthy in that they are Least Developed Countries, a lower development status than Fiji.

The ITU has been using the Mosaic framework to assess e-readiness in nations. Advantages of this framework include its application to many countries, detailed analysis and comprehensive assessment by looking at a number of different factors. The framework was applied to Fiji (Box 8.2). Fiji ranks twelfth out of 20 economies that have been thus far analysed. One of the features of the

Figure 8.1: Where Fiji stands



Source: ITU World Telecommunication Indicator database.

Mosaic framework is that the values can be applied to a radar chart that allows a visual assessment of where a country is relatively strong and where it is weak. In the case of Fiji, it is relatively weak in the areas of market structure and dispersion.

In November 2003, the ITU launched the Digital Access Index (DAI), a new measure for gauging how countries are performing relative to each other in providing access to ICT. The DAI is based on five categories that impact a country's ability to provide access: infrastructure (fixed and mobile telephones), affordability (20 hour per month Internet tariff), knowledge (literacy and school enrolment), quality (broadband subscriptions and international Internet bandwidth) and usage (Internet penetration). Countries are categorized into one of four groups: high, upper, medium and low access. With a value of 0.43 (out of possible 1.0), Fiji falls into the middle of the medium access group and ranks 85<sup>th</sup> out of 178 economies. Within the Pacific, Fiji ranked 3<sup>rd</sup> after Australia and New Zealand (however only five developing Pacific island nations were included in the DAI). Among Small Island Developing States, Fiji placed 17<sup>th</sup> out of the 26 SIDS considered (Box Figure 8.2, left). Fiji's category values are compared to the SIDS average to gauge its relative strengths and weaknesses. Fiji compares well in terms of knowledge and affordability due to its relatively high literacy and school enrolment and flat rate local call pricing for dial-up Internet access. It does less well in infrastructure, usage and quality.

### 8.4 Recommendations

- **Market liberalisation.** Fiji is missing the benefits that a more competitive telecom market would provide such as lower prices, better quality, enhanced innovation and greater customer focus.

The existing operators would benefit from additional liberalization since they could

enter closed markets. Indeed the two holders of exclusivities in the national and international telecommunication market have both suggested they are not opposed to competition. FINTEL stated:

"We will welcome competition as long as it is managed properly and it is in accordance with certain processes and with the regulatory framework in the country."<sup>3</sup>

ATH, holding company for the government's shares in Telecom Fiji and Vodafone Fiji notes:

"...the Company is not against competition per se, provided there is a level playing field for all players in the market."<sup>4</sup>

The two foreign investors in the international and mobile operators are no strangers to competition. Many of Cable and Wireless' exclusive licenses in the Caribbean have been terminated earlier in order to introduce competition.<sup>5</sup> Out of 28 countries where Vodafone operates mobile services, only Fiji is a monopoly.<sup>6</sup>

The prevailing sentiment is that competition is inevitable and steps are being taken to open the telecommunication market. This includes preparation of a new telecommunication act, the regularization and issuance of licenses and solving interconnection issues for ISPs that have already been licensed. This process should not be allowed to stall and if anything should be accelerated. Fiji cannot afford to fall back and miss out on the opportunities. The earliest possible introduction of competition should be the goal. If this is phased in and the period extends more than a year, then the current operators should be obliged to meet specific network targets in terms of access.

- **Market structure.** Fiji not only has a monopolized telecom sector,

### Box 8.2: State of the Internet in Fiji

The ITU has been using a framework to analyze the development of the Internet in different nations. Developed by the Mosaic group, the framework consists of values for six different elements that have an impact on Internet take-up. Values range from 0 to 4; the higher the value, the better.

**Pervasiveness** measures the overall access rate to the Internet. Fiji is rated *common*, 3, as the estimated number of users is 50'000 for a penetration rate of 6.1 per cent of the population (above the 1 in 100 to reach the pervasive level).<sup>2</sup>

**Dispersion** measures the geographical spread of Internet access. Here Fiji is rated 2, *moderately dispersed*. While dial-up Internet is available for the price of a local call in most urban areas, this is not always the situation in rural areas. Either the area is without telephone service or there is no local point of presence meaning that Internet access would incur long distance charges.

**Absorption** measures the extent to which different sectors of the economy are using the Internet. Fiji is rated 2, *moderate*. Most ministries in the capital are connected to the Internet however only around ten per cent of civil servants have access. While the University of the South Pacific has good connectivity, less than five per cent out of a total 900 primary and secondary schools have access to the Internet. The extent of computerization in business is not known. Larger companies would have Internet access and "commercial" (.com.fj) has by far the largest number of domain registrations. However it is estimated that computerization among smaller and medium

enterprises is low. The Ministry of Health has an Internet connection as do some hospitals.

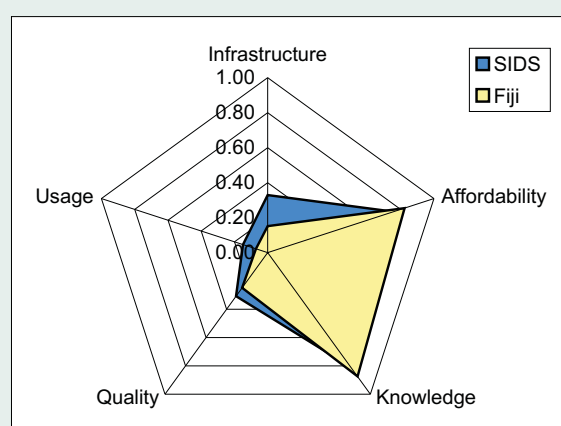
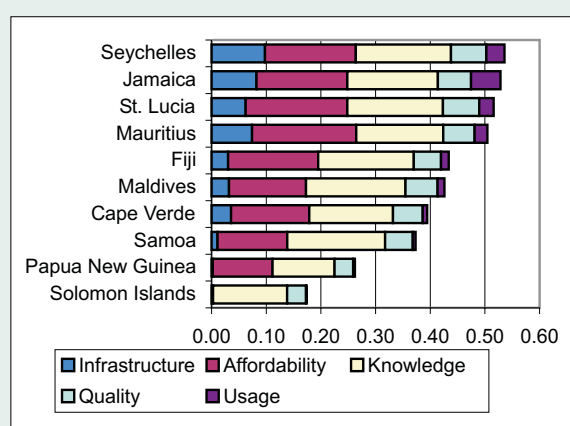
**Infrastructure** measures the extent and speeds of backbone and local access networks. Fiji is rated 2, *expanded*. Fiji recently connected to the Southern Cross fibre-optic cable for international connectivity. However, the predominant method of access to the Internet is still via low-speed, dial-up. Broadband consumer access technologies are not available.

**Organization** measures market conditions. Fiji is rated 1.5, between *single* and *controlled*. Although several ISP licenses have been issued, there is only one ISP in operation. International connectivity is under monopoly provision.

**Sophistication** measures how usage ranges from conventional to highly sophisticated. Fiji is rated 2, *conventional*. The usage of more advanced applications such as media streaming, e-commerce transactions and government interaction are still developing.

The ITU has carried out evaluations for 20 economies since January 2000. One way of comparing economies is to sum the individual scores. The highest ranked economy thus far is Hong Kong, China with an overall score of 22.5 (out of a possible maximum of 24). Fiji ranks thirteenth with a score of 12.5. One benefit of the Mosaic framework is that it highlights which areas a country need to improve to enhance its Internet diffusion. In the case of Fiji, this would be dispersion and organizational, the areas where it is below the average of the 20 countries evaluated.

Box Figure 8.2: State of Internet in Fiji



Note: The higher the value, the better (0=lowest, 4=highest).

Source: ITU.



but also has different operators in each segment: local, mobile, international and Internet. This adds to higher pricing since mobile or international customers typically have to go through two different operators (whether directly or indirectly). Existing networks such as that of the FEA are also under utilised since they cannot currently provide telecommunication services. Fiji cannot afford to pay high prices and have infrastructure under utilised.

Operators in Fiji are making an exceptionally high level of profits compared to other economies. While their shareholders may be benefiting, the economy as a whole is suffering through higher costs. For example FTIB has a hard time attracting investors in the IT industry because of high communications costs.

- **Tariff rebalancing.** Fiji's telecommunication tariffs are unsustainable. International, data and mobile prices are high and local services low, compared to underlying costs. A realignment of prices would foster greater investment in basic network infrastructure. One only has to point to mobile pricing to show that fixed prices could be raised. Mobile is much more expensive yet has just as many users. However it is important to retain a pricing structure that will not adversely affect Internet access. The current flat rate local call charge is a benefit for dial-up Internet access. Changing to per minute telephone usage charges for dial-up Internet access would have an adverse impact on Internet usage.
- **Universal access**—Clear and measurable targets need to be established for universal service and universal access. Specifically, instead of focusing on the telephone density indicator, which is too vague, more insightful measurements

should be used. These include the number of villages with telephone service, the percentage of the population covered by a cellular mobile network signal, distance of population from a telephone and the percentage of households with a telephone (disaggregated by fixed only, mobile only, and both fixed and mobile). Thought also needs to be given to the idea of including ICT such as Internet access in universal access and service policies.

The specific way that universal service and access is to be achieved also needs to be addressed. There is no mention of this in the draft telecommunication act. For example, will operators contribute to a fund and how would the fund be administered? Or would special tariffs be available for disadvantaged segments of the population? Also, while rural communications are important and the rural community underserved, this should not be the sole focus of universal service and access policy. Fiji's population is becoming more urban and there are many citizens in towns and cities who lack easy and affordable access. A policy providing preferential access for public facilities such as schools and libraries also needs to be established.

There is also a need to coordinate different ideas for community access. For example there appear to be conflicting sentiments about how rural telecentres should be implemented. It may also be practical to leverage on the network of post offices or other such facilities spread throughout the country to provide locations for public Internet access.

The issue of land as it relates to the installation of communication (and electric) infrastructure also



needs to be resolved in order to enhance public access.

- **ICT policy and regulation—** There is a need to strengthen ICT policy and regulatory capacity, particularly since the market is headed in the direction of additional liberalization. While there is not much need to regulate in a monopoly situation, this becomes critical with the introduction of competition.

One area of attention would be a reorganization of sector oversight. Currently, the Ministry of Communications carries out most telecom policy activities, with a unit in the Ministry of Finance responsible for government computerization, the Ministry of Commerce, Business Development & Investment responsible for e-commerce and the FTIB handling the development of ICT industry. The idea of creating a super ICT ministry that would combine elements of the previous three should be studied. There are plans to create a telecommunication regulator and this should be carried out as soon as possible. The IT Advisory Council should meet on a more formal and regular basis and possibly be chaired by the Prime Minister to demonstrate the importance of this sector and raise its visibility.

- **Statistics.** The operators generally collect the only data on the telecommunication sector. The Bureau of Statistics, the national statistics office, collected the number of households with a telephone and television in the 1996 Census. The 2003 *Household Income and Expenditure Survey* will additionally for the first time, have data on the number of households with a mobile phone and Internet access, including expenditure. These statistics are crucial for the analysis of the level of universal service and should be used by policy makers.

Data is lacking at individual level particularly for PC and Internet access and use. There is no reliable figure for the number of Internet users in the nation let alone a breakdown by gender, location, income, ethnicity, etc. Thus it is impossible to make an accurate assessment of the level of ICT usage or the extent of Fiji's digital divide. The Bureau of Statistics with the support of the Ministry of Communications should collect this data in an annual survey. There are model surveys available from Eurostat and the OECD upon which the questionnaire should be based.

One area for which there is scarce data is the impact of ICT on the economy and ICT usage at the enterprise level. Hopefully the former can be resolved to some extent with the adoption of the new UN guidelines on macroeconomic statistics, which for the first time, will support analysis of the ICT sector. The latter, ICT business usage, should be collected in a special questionnaire. There are guidelines available for this type of survey.

- **E-government.** ICT strategies need to be backed by the necessary funding. ITC Services, which has a large range of ideas and the expertise, needs to be provided with the appropriate resources to develop e-government applications. Existing expertise should be used to advance ICT. A solution has to be found to improve the quality of GOVNET. Unless the speed of the network and the quality of services do not improve, the e-government project will not be successful. The group in charge of e-government must be given the authority to standardize e-government services and applications.

All government ministries and departments should be online and provide basic information on

their sector. Even very basic sites would provide an important starting point and guarantee Fiji's representation on the web. ITC Services should be given the mandate to coordinate this effort and standardize sites.

- **Leverage USP.** In many nations, the tertiary sector has played a key role in the development and sustainability of the Internet and as an important source of ICT research and development. The government should use the University of the South Pacific (USP) as a centre of excellence for new applications and as a testing ground. Investment in USP would have potentially high pay-off for the government. This includes more ICT courses and the formation of ICT experts, as well as the testing of new technologies and applications. Students could help the government develop applications as part of their studies. The current situation, especially the high cost for bandwidth, is inhibiting USP from developing its potential. As an educational institution USP should either be allowed to provide its own Internet connection or get very low cost Internet access. This is in keeping with the situation in many other nations where the academic system has preferential access and pricing.
- **ICT workforce.** While there is a general agreement that there is a shortage of experienced ICT professionals, the government has not undertaken measures to analyse the gap. Such a study

would be a first step to understanding the current situation.<sup>7</sup> Fiji needs to know exactly how many ICT professionals it has and how many it needs. Since the USP is planning to carry out an ICT survey among businesses and the public sector, the government should use this opportunity to participate in the study. The data that is currently collected on Fiji's human resources (mainly by the Public Service Commission) need to be modified to include more specific information on ICT (as opposed to general categories, such as 'engineering' or 'technology'). In order to alleviate current ICT labour shortages, the government should make work permits for ICT specialists easier to obtain. Take the example of developed countries that facilitate work procedures for foreign professionals because of the highly competitive international market for ICT skills. ICT brainpower is essential for the overall development of the country.

- **E-schools.** One of the top priorities of the government should be to develop a program for the provision of computers to all primary and secondary schools and connection to the Internet. This could include obligating ISPs to offer a preferential tariff for academic institutions. The Ministry of Education needs to define and implement an ICT curriculum for secondary schools and offer relevant course material.

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- <sup>1</sup> <http://www.pacificislands.cc/pm12001/pmdefault.php?urlarticleid=0010>. [Accessed 18 June 2004].
- <sup>2</sup> There is no formal Internet user survey conducted in Fiji. The ISP estimates that there are 50'000 users. They multiplied the 8'000 subscriber base by three (24'000) and added to that estimated leased line and LAN users in government bodies and the university.
- <sup>3</sup> "Interview with Mr. John Richards, Chief Executive of Fintel." 7 February 2003. *World Investment News* (WINNIE). <http://www.winne.com/topinterviews/richards.htm>. [Accessed 18 June 2004].
- <sup>4</sup> "Draft Proposed Telecommunications Bill." 4 June 2003. *South Pacific Stock Exchange Company Announcement*. [http://www.spse.com.fj/publish/page\\_270.shtml](http://www.spse.com.fj/publish/page_270.shtml). [Accessed 18 June 2004].
- <sup>5</sup> For example, both Barbados and Jamaica ended Cable and Wireless owned telecommunication companies monopoly and introduced competition in October 2001 and March 2000 respectively. The Organization of East Caribbean States took a regional approach, terminating the Cable and Wireless monopoly simultaneously on 7 April 2001. See the agreement on the Eastern Caribbean Telecommunications Authority web site at: <http://www.ectel.info/about/Agreement.pdf>. [Accessed 18 June 2004].
- <sup>6</sup> See Vodafone's list of equity interests and partner networks available at: [http://www.vodafone.com/popup\\_opco\\_table\\_summary/0,3037,CATEGORY\\_ID%253D302%2526LANGUAGE\\_ID%253D0%2526CONTENT\\_ID%253D20194,00.html?#](http://www.vodafone.com/popup_opco_table_summary/0,3037,CATEGORY_ID%253D302%2526LANGUAGE_ID%253D0%2526CONTENT_ID%253D20194,00.html?#). [Accessed 18 June 2004].
- <sup>7</sup> For an example, see the "Report of the Sub-Committee on Demand for Information Technology Manpower (2001-2006)" carried out in Mauritius by the Ministry of Education and Scientific Research available at <http://ministry-education.gov.mu/irrept01.htm>. [Accessed 18 June 2004].



## Annex 1: Acronyms

<b>ADSL</b>	Asynchronous Digital Subscriber Line
<b>ATH</b>	Amalgamated Telecommunication Holding Limited
<b>ATM</b>	Automatic Teller Machine
<b>CDMA</b>	Code Division Multiple Access
<b>DAI</b>	Digital Access Index
<b>DOM</b>	Départements d'Outre-Mer
<b>F\$</b>	Fiji Dollar. The national currency. The 2002 annual average rate of F\$2.19 per one United States dollar is used to make conversions in the report.
<b>FEA</b>	Fiji Electricity Authority
<b>FCC</b>	Federal Communications Commission
<b>FINTEL</b>	Fiji International Telecommunications Limited
<b>FIT</b>	Fiji Institute of Technology
<b>FJ</b>	Fiji's Internet domain name
<b>FNPF</b>	Fiji National Provident Fund
<b>FTIB</b>	Fiji Islands Trade and Investment Bureau
<b>FMIS</b>	Financial Management Information System
<b>FPTL</b>	Fiji Post and Telecommunications Limited
<b>FSM</b>	Fiji School of Medicine
<b>GDP</b>	Gross Domestic Product
<b>GOVNET</b>	Government Network
<b>GPRS</b>	General Packet Radio Services
<b>HDI</b>	Human Development Index
<b>HIES</b>	Household Income and Expenditure Survey
<b>ICT</b>	Information and Communication Technology
<b>ICTDU</b>	ICT Development Unit
<b>IANA</b>	Internet Assigned Number Authority
<b>ISDN</b>	Integrated Services Digital Network
<b>ISP</b>	Internet Service Provider
<b>ITAC</b>	Information Technology Advisory Council
<b>ITC</b>	Information and Technology and Computing Services
<b>ITU</b>	International Telecommunication Union
<b>LAN</b>	Local Area Network
<b>MMS</b>	Multimedia Messaging Services
<b>MoH</b>	The Ministry of Health
<b>PC</b>	Personal Computer
<b>PSTN</b>	Public Switched Telephone Network
<b>SIDS</b>	Small Island Developing States

<b>SIM</b>	Subscriber Identity Module
<b>SMS</b>	Short Message Service
<b>SPSE</b>	South Pacific Stock Exchange
<b>TOM</b>	Territoires d’Outre-Mer
<b>UNDP</b>	United Nations Development Programme
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>USP</b>	University of the South Pacific
<b>VSAT</b>	Very Small Aperture - Satellite - Terminal
<b>WAP</b>	Wireless Access Protocol
<b>WSIS</b>	World Summit on the Information Society

## Annex 2: Meetings

Entity	26 <sup>th</sup> June	27 <sup>th</sup> June	30 <sup>th</sup> June	1 <sup>st</sup> July	2 <sup>nd</sup> July
<i>Ministry of Information, Communications, and Media Relations</i>	11am-12pm				1:30-2:30pm
University of the South Pacific	12-1pm				
National IT Advisory Council.	1-2pm				
Ministry of Commerce, Business Development, and Investment	2.30-4.00pm				
Vodafone		9-10am			
UNDP Fiji		11-12pm			
Ministry of Finance and National Planning		2.30-4:30pm			
CONNECT			10am-12pm		
Bureau of Statistics			12-1pm	9-10am	
Fiji Electricity Authority			2:30-3:30pm		
Minister of Communication			4:30-5:00pm		
SOPAC				10-11am	
Pacific Island Forum (Forum Secretariat)				11-12am	
PITA				12-1pm	
FINTEL				2.30-4.00pm	
The Fiji Islands Trade and Investment Bureau					9-10am
Telecom Fiji					10-12am
Ministry of Education					9-10am
Ministry of Health					12-1pm
Fiji Post					12-1pm

## Annex 3: ICT statistics

Year Ending 31.12

National Currency: Dollar

	Unit	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>DEMOGRAPHY, ECONOMY</b>											
Population	10x3	759	768	774	788	797	806	810	813	820	826
Households	10x3	127	128	129	130	132	133	134	136	137	138
Gross domestic product	10x6	2'673	2'800	2'962	3'060	3'283	3'588	3'505	3'836	2'089	...
Average annual exchange rate per US\$		1.46	1.41	1.40	1.44	1.99	1.97	2.13	2.28	2.19	1.90
Consumer price index		98	100	103	107	113	115	116	121	122	...
<b>TELEPHONE NETWORK</b>											
Main telephone lines		59'471	64'772	70'018	71'793	76'933	81'518	86'400	92'222	97'515	102'023
Main tele. lines p. 100 inhab.		7.84	8.43	9.05	9.12	9.66	10.11	10.66	11.34	11.90	12.35
% digital main	%	85.6	85.6	84.0	99.3	99.7	99.8	100.0	98.0	99.8	...
% residential main	%	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	60.0	...
% main lines in urban		44	44	44	44	80	...	...	44	44	...
Public payphones		392	577	687	822	887	1'018	1'259	1'500	1'000	...
Line capacity of local exchange		70'086	77'610	84'512	90'778	91'582	94'700	98'000	105'980	110'726	...
Waiting list for main lines		9'360	8'927	8'103	6'445	3'125	5'166	5'139	4'032	4'969	...
<b>MOBILE SERVICES</b>											
Cellular mobile telephone subscribers		1'100	2'200	3'700	5'200	8'000	23'380	55'057	80'933	89'900	109'882
- Digital cellular		1'100	2'200	3'700	5'200	8'000	23'380	55'057	80'933	89'900	109'882
- Cellular prepaid		...	...	...	...	-	-	...	...	81'812	100'806
Coverage of population	%	...	...	...	...	...	...	40.0	49.5	55.0	55.0
Cellular sub. per 100 inhab.		0.14	0.29	0.48	0.66	1.00	2.90	6.79	9.95	10.97	13.31
<b>OTHER SERVICES</b>											
ISDN		-	-	-	-	-	-	-	20	...	...
ISDN B channel		-	-	-	-	-	-	-	40	...	...
Private leased		...	...	...	...	1'322	...	...	84	500	...
<b>TRAFFIC (minutes)</b>											
- Local telephone	10x3	...	...	...	...	...	...	258'118	89'300	89'300	...
- National trunk telephone	10x3	...	...	...	...	...	...	42'470	39'500	39'500	...
Int'l outgoing telephone	10x3	14'289	15'148	16'000	17'155	17'985	18'800	15'025	19'700	23'165	...
Int'l incoming telephone	10x3	24'000	27'112	30'000	34'231	34'998	...	40'385	57'000	67'959	...
Total mobile	10x3	...	...	...	...	...	...	17'347	21'684	39'782	...
Mobile SMS sent	10x3	...	...	...	...	...	...	...	...	2'992	...
<b>STAFF</b>											
Full-time telecommunication staff		1'106	1'068	1'061	1'096	1'183	1'197	1'354	1'585	2'000	...
- of which: female		...	...	...	...	920	...	...	...	600	...
<b>QUALITY OF SERVICE</b>											
% teleph. faults cleared by next day	%	...	...	...	...	...	...	60	90	75	...
Faults per 100 main lines per year	%	190.0	180.0	167.0	194.0	153.0	128.0	135.0	117.0	9.3	...
<b>TARIFFS</b>											
Residential teleph. connection		114.00	114.32	84.52	84.52	84.52	84.52	84.52	84.52	84.52	86.45
Business teleph. connection		286.00	285.98	285.95	285.95	285.95	285.95	285.95	285.95	285.95	...
Residential telephone monthly subscription		5.32	5.32	5.32	5.32	5.32	5.32	3.12	2.84	2.84	2.84
Business telephone monthly subscription		6.78	6.78	6.78	6.78	6.78	6.78	4.58	4.16	4.16	...
3-minute local call (peak)		0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	...
3-minute local call (off-peak)		0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	...
Cellular connection charge		110	110	110	110	110	110	110	-	-	...
Cellular monthly subscription		44	44	44	44	44	44	44	33	33	...
Cellular - 3-min. local call (peak)		0.60	1.80	1.80	1.80	1.80	1.80	1.80	0.66	0.66	...
Cellular - 3-min. local call (off-peak)		0.60	1.80	1.80	1.80	1.80	1.80	1.80	0.66	0.66	...
<b>REVENUE AND EXPENSE</b>											
Total telecom services revenue	10x6	93.00	97.40	106.70	111.90	123.00	138.00	186.50	201.00	155.00	...
- Telephone service revenue	10x6	72.00	79.00	92.80	90.50	100.30	100.50	149.50	148.00	88.00	...
- Mobile communication revenue	10x6	0.80	1.30	2.20	3.40	4.70	26.00	26.37	37.66	53.01	...
<b>CAPITAL EXPENDITURE</b>											
Annual telecom. invest.	10x6	10.30	23.30	34.00	39.00	21.50	32.00	32.65	42.00	83.00	...
- Mobile communication invest.	10x6	...	...	...	...	...	...	5.96	8.21	4.90	...
<b>BROADCASTING</b>											
Television receivers		50'000	70'000	75'000	78'000	80'000	88'908	92'000	95'100	96'000	...
Television equipped households		45'000	63'000	67'500	70'200	72'000	80'017	82'800	85'590	87'000	...
Home satellite antennas		70	190	...	...	...	139	105	111	113	...
<b>INFORMATION TECHNOLOGY</b>											
Personal computer		...	...	...	...	32'000	34'000	36'000	38'000	40'000	...
Internet subscribers		60	60	407	1'080	2'061	2'500	3'500	5'500	7'600	9'000
Estimated Internet users		60	70	500	1'750	5'000	7'500	12'000	15'000	50'000	55'000
International Internet Bandwidth (Mbps)		-	...	...	...	...	1	4	...	8	12
Internet users per 100inhab.		0.01	0.01	0.06	0.22	0.63	0.93	1.48	1.84	6.10	6.66
Public Internet access facilities		...	...	...	...	...	...	...	11	15	...