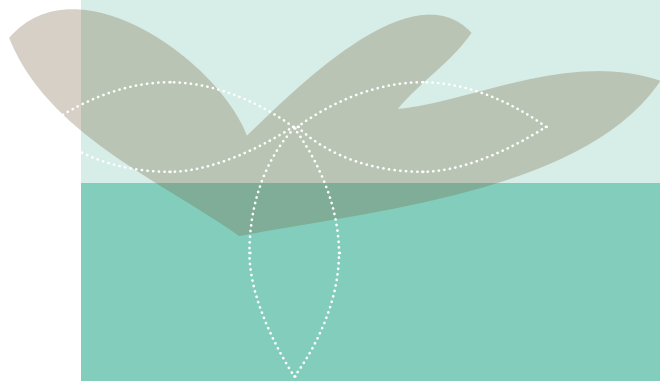


# Telecommunications in the Pacific

Background Paper for *Pacific Economic Survey 2008*



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# 1 Background and Context

The worldwide transformation of telecommunications over the past decade—the proliferation of new and more widely-affordable communication tools, the opening and diversification of markets and services—is beginning to reach the Pacific region. On the streets of Port Moresby and Kokopo today, sellers of prepaid mobile phone cards compete for space with betel nut sellers while the betel nut sellers order fresh supplies on their new, cheap mobile phones. In cafes in central Suva and Apia, students research papers and apply for jobs through broadband wireless Internet; people of all ages call their relatives overseas via the Internet. Most importantly, there is growing awareness among the region's leaders, business community, and the public at large of the potential benefits of more affordable, reliable and accessible telecoms/information and communications technologies (ICT) infrastructure and services and its contribution to economic and social development.

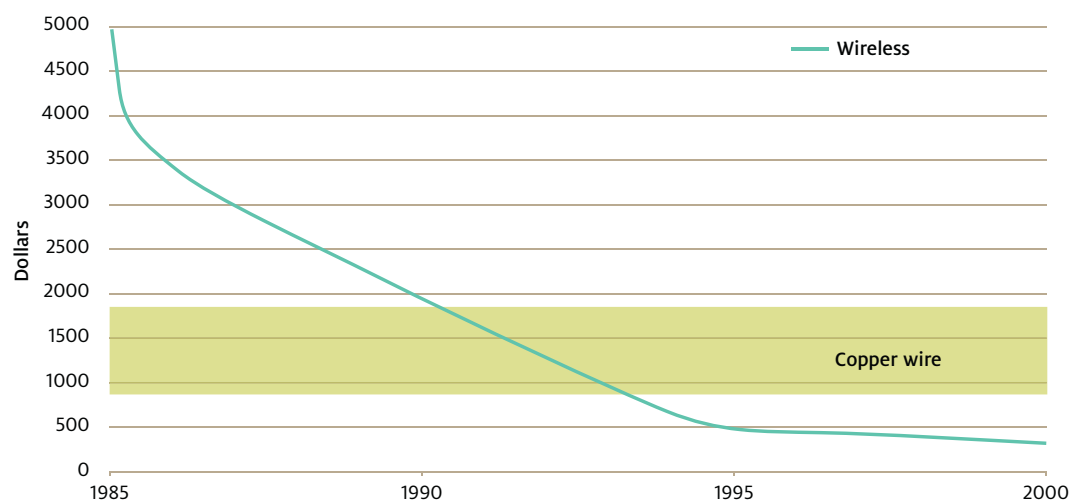
Yet this transformation is far from complete: the supply of telecommunications and the information and communication infrastructure (ICI) in this region remains inadequate, while the latent demand is high. For the majority of Pacific islanders, Papua New Guineans and Timorese, particularly in rural areas and outer islands, the process of communications remain costly, inefficient and uncertain. For many villagers in Vanuatu, Solomon Islands and Timor-Leste for example, contacting relatives may mean sending a handwritten note via a passing vehicle or boat; or visiting a radio station and paying for a broadcast message. For businesses and producers seeking customers or price information, communication entails a long and costly journey to the nearest public phone or wireless signal in another town. For local governments, clinics, schools and other institutions, communication is often a brief, indistinct exchange via two-way (HF) radio. While many rural people lack a more efficient means to communicate, they also lack access to information—on market conditions, government policies, healthcare, education, business opportunities—compounding their isolation.

Constraints to more widespread availability of affordable telecommunications in the Pacific to date include: restrictive market structures and licensing regimes (exclusive licenses, lack of competition, service-specific licenses); relatively high capital and operating costs; relatively small market size and revenues; limited and costly access to international bandwidth; legal, regulatory and institutional frameworks designed around monopolies; and limited resources and skills available to oversight institutions. These factors have hindered the investment in ICI needed in the Pacific to provide more widely available and affordable services to citizens and businesses.

This situation is beginning to change, reflecting the following global developments:

- › *Weakening rationale for monopolies.* The unit costs of mobile telecoms networks fell dramatically in the 1990s, as shown in Figure 1. The proliferation of mobile telephony, coupled with the commercial expansion of Internet, completely transformed business in the telecommunications sector. This revolution in technology also began changing the widely-held view that telecommunications was a natural monopoly; the view that the sector could operate and thrive under competition started to dominate in policy circles. It was now economically feasible for more than one company to operate in telecommunications. Mobile telephone service—the network for which is relatively easy for a new company to roll out—had made smaller economies attractive potential new markets for both foreign and domestic companies.

**Figure 1. Falling Costs of Mobile Telephone Networks**



Source: Herschel Shosteck Associates

- > **Liberalisation of telecoms markets.** Many governments around the world have restructured their telecommunications/ICI sectors to reflect these changes. By the late 1990s telecommunications competition had been introduced in Australia, Chile, Singapore, New Zealand, the UK and elsewhere in W. Europe, and the United States. In the 2000s, market liberalisation extended to: East Asia, Latin America, Sub-Saharan Africa and the Caribbean, prompting rapid growth in access, particularly to mobile telephony.
- > **Consequent changes in legal/regulatory frameworks.** With the new technology and market structures, the role of telecommunications laws and regulations needed to change. Stronger regulators were needed to protect the interests of consumers, and to ensure that business decisions by one company did not affect the capacity of other companies to enter the market or provide services.
- > **Increasing consumer awareness and expectations** of potential telecommunications products and services.

The Caribbean experience<sup>1</sup> of market liberalization in the late 1990s demonstrated the feasibility of competition in very small markets, as well as the importance of an orderly transition to competition and the establishment of a transparent, pro-competitive and harmonized legal and regulatory framework.

In the Pacific region, this change process has come later than elsewhere. Telecommunications liberalization has lagged. Monopolies have prevailed in most countries, preserving low penetration rates for fixed lines, mobile phone subscribers and Internet users, as illustrated in Table 1. However, new opportunities are materialising. From the ICI industry perspective, the Pacific is a relatively untapped, albeit risky, market: worldwide, the mobile telecommunications industry is looking to “connect the next billion”, for example, as traditional markets become saturated. From the broader economic perspective, larger and more diverse telecommunications markets contribute to: direct and indirect job creation and income-earning opportunities; increased and more diversified revenues; and increased investment opportunities, for example, for national provident funds. From the user perspective, potential beneficiaries of improved connectivity include:

- > **Small and medium-sized enterprises:** lower communications costs reduce overall business transaction costs; communications infrastructure facilitates domestic and cross-border transactions, opens up new marketing and distribution channels, improves access to information about markets, prices, consumers;

<sup>1</sup> The Organization of Eastern Caribbean States (OECS): Dominica, St Kitts & Nevis, Grenada, St. Lucia and St Vincent) also established a common regulatory framework and authority, ECTEL.

- > *Primary producers*: communications infrastructure facilitates access to information on market prices, weather, agricultural extension services such as electronic trading platforms;
- > *Service industries*: connectivity offers opportunities for entrepreneurship, tourism, and establishment of new services such as internet cafes, and larger information technology (IT)-enabled services such as call centres, business processing outsourcing, banking and financial services. In this regard, there are significant potential opportunities for women entrepreneurs: Bangladesh's Grameen Village Phone experience is perhaps the best known example;
- > *Government agencies, particularly in decentralizing administrations*: better connectivity enhances their ability to exchange data between national and sub-national offices, for example on disease surveillance, planning and budgeting, land and property registration, disaster recovery; and improves public service delivery to citizens and businesses;
- > *Rural Communities*: travel time and cost savings; potentially easier access to information on health and education services; access to job information; closer contacts with distant family members such as migrant workers, and possibility of transmitting remittances<sup>2</sup>.

Against this background, this paper reviews the current status of telecommunications/ICI and services in the Pacific, including Papua New Guinea and Timor-Leste: considering market structures and enabling/regulatory environments. It highlights opportunities offered by changes in technologies and their implications. It outlines what actions are needed—by the private sector, by governments—to facilitate improved and more affordable access for the majority of the populations in the region. Although it acknowledges the potential contributions of telecoms/ICT to broader economic and social development, it does not discuss these in detail, since these contributions have been widely documented elsewhere (see Annex 1). Rather it focuses on telecommunications/ICI as the key enabler or critical success factor for some of these value-added applications.

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2 The mobile phone industry is increasingly exploring "m-Banking" services that allow users to transfer credit via text messaging (SMS) and, in the case of the Philippines, for example, obtain cash and make deposits.

## 2 Current Situation in the Pacific

### Access to Telecommunications/Information and Communications Infrastructure

Conceptually, “access” or “connectivity” may be considered on two broad levels, analogous to highways and feeder roads. These are: (a) Core Networks or *Backbone Networks*, high-capacity communications infrastructure that carries traffic from different service providers, nationally and internationally different service providers—nationally and internationally—can be microwave, fibre-optic, satellite can be microwave, fibre-optic or satellite; and (b) *Access Networks* or “last mile”, fixed, mobile or satellite (VSAT) links to the end user.

In the Pacific region, “access” is challenging on both levels. Backbone networks—typically a combination of microwave domestically with satellite links internationally and to more remote islands—are costly to install and maintain, and typically owned and operated by monopolies. Access to end-users was traditionally provided through fixed lines, with Very Small Aperture Terminal (VSAT), to more remote sites. Mobile network rollout is increasing, particularly in countries that have liberalized their markets (Samoa, Palau, Papua New Guinea, Tonga), or are planning to do so (Fiji, Vanuatu). Current levels of teledensity are shown in Table 1: overall, these levels are low, compared to similar or even lower-income economies<sup>3</sup>.

**Table 1. Teledensity in the Pacific**

Country	GDP per capita 2006—constant 2000 US\$	Fixed %		Mobile %		Internet Users %	
		2002	end-2007*	2002	end-2007*	2002	end-2007*
Palau	6697	35.0	41.0	10.0	52.0	10.0	25.0
Fiji	2257	12.4	13.0	13.3	24.8	6.6	9.4
Marshall Is	2050	6.0	8.0	1.1	8.5	2.6	14.4
FSM	1967	10.0	12.0	3.4	19.4	4.4	13.0
Tonga	1658	11.3	13.8	3.4	30.0	2.2	3.1
Samoa	1578	6.5	11.0	1.5	46.0	2.2	4.5
Vanuatu	1255	3.2	3.9	3.8	11.5	3.5	7.5
Solomon Is	696	1.5	1.5	0.2	2.2	<0.5	1.5
PNG	639	1.1	1.1	0.3	5.1	1.3	1.8
Kiribati	546	5.1	4.3	0.6	0.5	2.0	2.2
Timor-Leste	678 oil 321 non-oil	0.2	0.3	1.0	5.7	<0.5	<1.0

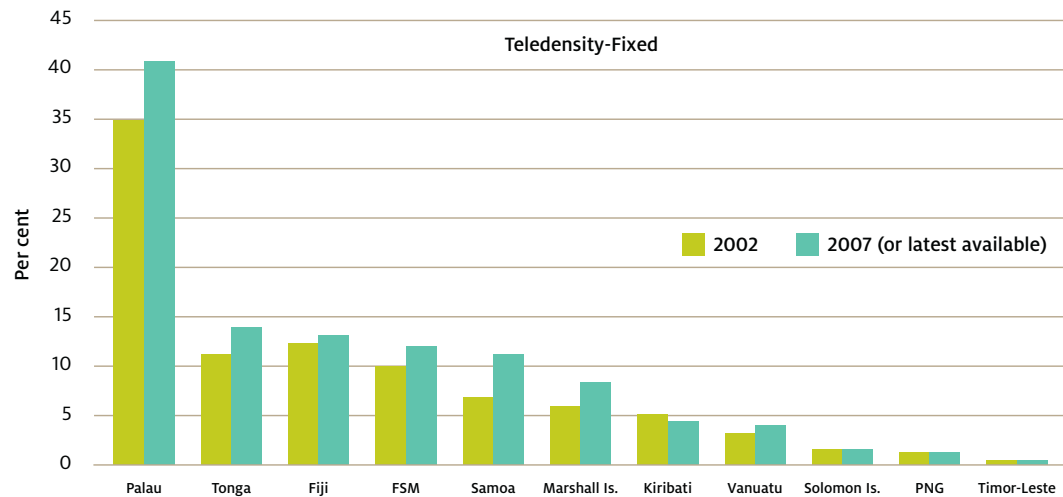
\* Note: 2007 or latest available. Updated subscriber data may be difficult to obtain. Where available, data are sourced directly from operators, otherwise from ITU’s ICT Indicators Database, 2006. Source for income data: World Development Indicators, 2007.

*Fixed lines* (copper wireline) are largely limited to major population centres and, given the high investment and maintenance costs, rollout has been limited in past years, as illustrated in Figure 2, except in the case of Palau and Samoa. Alternative “fixed-line” technologies such as fixed-wireless, also known as wireless local loop or

3 For example, at the end of 2006 the average number of mobile subscribers per 100 inhabitants was 16.8 across 24 countries in sub-Saharan Africa (World Bank Survey, forthcoming, 2007).

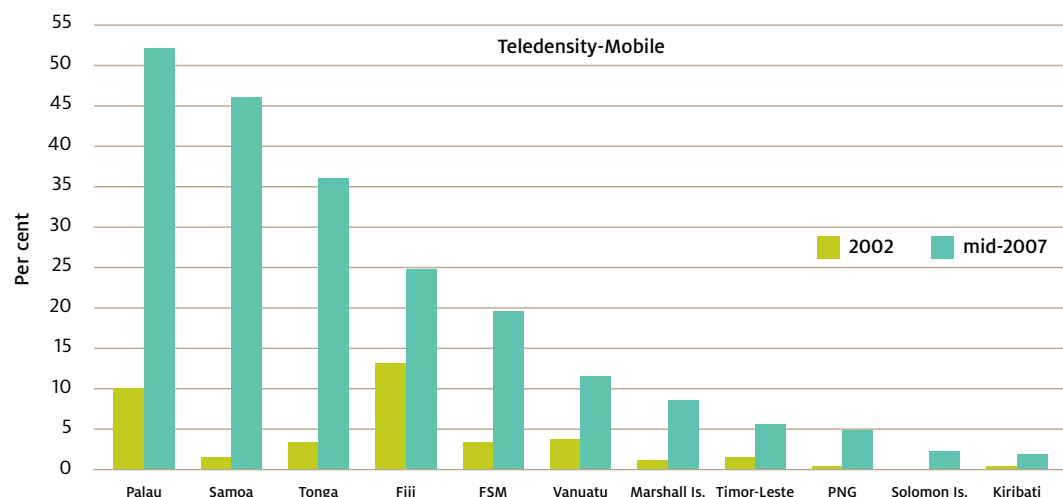
WLL; and WiMAX, (wireless long-distance microwave networks) are still limited in the Pacific but have potential. Fiji Telecom Ltd deployed fixed-wireless in some rural areas, mainly for public telephony, for example. Other operators (e.g. in Fiji and Tonga) are considering WiMAX deployment as alternatives to copper wire.

**Figure 2. Access to Fixed Lines per 100 Inhabitants**



Access to *mobile telecommunications* is increasing more rapidly, particularly in countries that permit competition in this sub-sector, as illustrated in Figure 3. The relatively high mobile penetration in Fiji where there is still a monopoly reflects higher income levels. Except in the case of Fiji where Vodafone offers “2.5 generation” data services (GPRS) which allows basic Internet access and plans to offer higher-speed “3rd Generation (3G) later in 2007, mobile operators typically only offer basic voice and text messaging (short message service or SMS) at present. Most subscribers in the region use prepaid services which can be activated immediately, thus avoiding lengthy (or indefinite) waiting periods for provision of fixed lines.

**Figure 3. Mobile Telecommunications Subscribers per 100 Inhabitants**

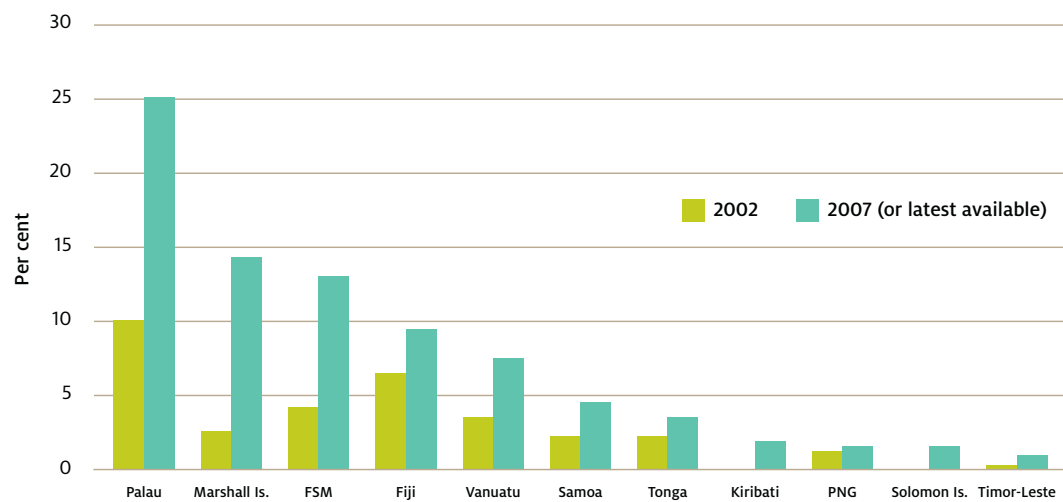


Access to *Internet*, as summarized in Figure 4, is increasing, but remains very limited outside capital cities. The majority of subscribers are institutional. Access is overwhelmingly via dial-up, thus limiting access to availability of fixed lines. Access speeds are typically very slow due to limited bandwidth and network congestion, resulting, for example, in very slow login times to websites and extended waiting periods.

However, broadband Internet services are slowly becoming available, particularly in Fiji, Papua New Guinea, Tonga and Samoa which have liberalised Internet service provision, in Palau and on a more limited scale in Vanuatu. Broadband access technologies include DSL (over fixed lines) and wireless (e.g. WiFi “Hotspots”). In Solomon Islands a non-governmental organization, People First Network (PFNet), has pioneered the use of email via HF radio in remote rural areas, providing basic access at low speeds.

In addition to the various value-added services that it can deliver, broadband Internet also offers an alternative means of long-distance and particularly international telephony, through *Voice over Internet Protocol* (VoIP), bypassing the typically high tariffs of international/long-distance providers. Detailed statistics for VoIP usage are not available for the Pacific. However, anecdotal evidence indicates increasing use of VoIP, both legally and otherwise. With the exception of Fiji which has adopted a VoIP policy (in June 2007), and proposes to license VoIP service providers, and Vanuatu which proposes to liberalise telecommunications value-added services including VoIP (2007 Telecommunications/ICT Policy), other governments in the region have not yet developed formal regulatory approaches to VoIP.

**Figure 4. Internet Users per 100 Inhabitants (estimated)**



With regard to *Backbone Networks*, domestic and inter-island connectivity is gradually improving in some countries, notably Fiji, Samoa, Vanuatu and Tonga, as operators seek to increase their transmission capacity (bandwidth) by upgrading microwave links, and, on a limited basis, rolling out fibre-optic cables. Others are installing VSAT or other satellite connectivity to remote locations. Timor-Leste has a microwave backbone in place. In Papua New Guinea, the incumbent, Telikom, is starting to upgrade its backbone (mostly microwave, some fibre), while its new competitor, Digicel, is planning to build its own backbone. Alternative backbone networks (e.g. on power transmission lines) are also being considered in PNG and Fiji. In general, backbone capacity is considered to be inadequate to meet future demand.

**Figure 5. Fibre-Optic Cables Serving the South Pacific Region**



Source: Hong Kong University Telecommunications Research Project, 2005

The international or *regional backbone* question is challenging and attracting increased attention from telecom operators in the region. The majority of telecom operators in the region now rely on high-cost, limited capacity satellites for international traffic. For example, Timor Telecom routes its international traffic via satellite to Frankfurt and Hong Kong as it has no access to international backbone networks. The number of submarine cables directly serving the Pacific is currently limited. Existing submarine cables, as shown in Figure 5, include Southern Cross (Australia to Hawaii, with a landing station in Fiji); PacRim East (New Zealand-Hawaii), PacRim West (Australia-Guam, with a newly connected spur of “recycled” cable to PNG known as APNG-2), South Pacific Network (PacRim E, W and TASMAN-2), Tasman-2 (Australia-New Zealand), plus cables in the Western/Northern Pacific (Guam, N. Mariana Islands, FSM, Marshall Islands). Other than in Guam and Fiji, there are no Pacific landing stations. Access to the Southern Cross cable in Fiji is via the incumbent operator. In that regard, some new cable projects are now under consideration in the region (see Table 2).

**Table 2. Current and Prospective Cable Projects**

Current	Potential
<ul style="list-style-type: none"> <li>&gt; Southern Cross Network Cable: (i) Ready for Service Date (RSD)—November 2000; (ii) Length—30,500km; (iii) Max capacity—480Gbps; (iv) landing Points—Australia, Fiji, New Zealand, US (including Hawaii), Canada</li> <li>&gt; Aurlia-Japan Cable (AJC): (i) RSD—December 2001; (ii) Length—12,700km; (iii) Max capacity—320Gbps; (iv) landing Points—Australia, Guam, Japan</li> <li>&gt; Japan-US cable (JUS): (i) RSD—September 2001; (ii) Length 22,600km; (iii) Max capacity—640 Gbps; (iv) Landing points—Japan, US (including Hawaii), Canada</li> <li>&gt; VSNL Transpacific: (i) RSD—December 2002; (ii) Length 22,300km; (iii) Max capacity 7,680 Gbps; (iv) Landing Points—Guam, Japan, US, Canada</li> <li>&gt; Gondwana 1: (i) RSD Spring 2008(installed, testing underway); (ii) Landing points—Australia, New Caledonia</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Hontua: (i) support from the French Government; (ii) Landing points—Tahiti, French Polynesia; Hawaii</li> <li>&gt; Pacific Rim Cable: Landing points—Hawaii, American Samoa, Samoa</li> <li>&gt; Pipe-Pacific Cable 1 (PPC-1): (i) Sponsored by pipe networks; (ii) Max Capacity—1.2 tbps (ii) Landing points—Australia, Guam</li> <li>&gt; Telstra Sydney-Hawaii Cable: (i) Sponsored by Telstra; (ii) Max Capacity—1.3 tbps; (iii) Landing points—Australia, Hawaii</li> <li>&gt; East Asia Crossing (EAC) Cable: (i) Sponsored by Asia Netcom; (ii) Landing points—Philippines, US (including Guam and Hawaii)</li> <li>&gt; South Pacific Island Network (SPIN): (i) support from the French Government (to be contacted for the study); (ii) Landing points (original design: Australia, Papua New Guinea, Solomon Islands, Vanuatu, New Caledonia, Fiji, Wallis &amp; Futuna, Samoa, American Samoa, Tonga, Niue, Cook Islands, French Polynesia; revised design without Australia, PNG, Solomon Islands and Niue); (iii) Estimated cost—€300m in its original configuration, €180m in its revised configuration; (iv) Pre-feasibility study conducted.</li> </ul>

Given the distances involved and the telecommunications traffic within the Pacific, the costs and benefits of new regional infrastructure require careful consideration, and, most likely, collaborative solutions. Issues of open access and fair and transparent pricing are essential if such projects are to result ultimately in lower access costs to end-users.

## Access Costs (Prices)

The relatively low teledensity rates in the Pacific region overall indicate lack of access to and high prices of telecommunications services. In addition, in most Pacific island countries, international fixed line calling rates were set well above cost, and the extra revenue cross-subsidized below-cost domestic rates. These high tariffs are attributable in part to higher costs of production—related to geographic isolation, absence of supporting infrastructure and low population density—and in part to absence of competition. It is reasonable to assume that the cost of producing telecommunication services in outer Pacific islands or in the Highland regions of Papua New Guinea, for example, must be more expensive than in densely populated areas such as Delhi or Manila, or in small states, like Cyprus, whose proximity to continental Europe facilitates access to modern infrastructure (for instance submarine cable connections) not available for many countries in the Pacific. It is also reasonable to assume that tariffs in monopolistic markets may be higher unless there is strong price regulation in place. In the Pacific, the extent to which relatively high prices can be attributed to geography and to a less competitive regulatory framework is difficult to measure. Both are hindrances, but the latter can be changed through sector reform.

Due to the complexities of telecoms/ICT service pricing (including bundling or packaging of services, promotions, and the consequent difficulties of cross-comparisons, plus difficulties of obtaining pricing data in some cases), the following data should be used for illustrative purposes only. For fixed services, international calling rates are typically high, in effect cross-subsidising local calls; accordingly they account for a high proportion of operators' revenues. The structure of mobile tariffs is complex, given the variety of

different prices depending on destination (own or other operator's network, local or international) and time of day (peak/off-peak).

With these caveats in mind, the following trends are currently being observed in the Pacific. First, some operators are seeking to rebalance international and local fixed line tariffs (likely to result in increases in the latter). Second, introduction of competition, or even the threat of competition, has prompted many mobile operators to reduce tariffs, in particular the price of entry. For example, the threat of competition in Vanuatu prompted the incumbent to reduce the price of a mobile SIM card from Vt5000 in November 2006 to Vt2000 in February 2007, and then to VT1000. In Papua New Guinea, the entry of a new mobile operator offering a Kina 20 SIM card in July 2007 prompted the incumbent to reduce its own SIM card from Kina 125 to Kina 25. Table 3 summarizes the latest available price data for local calls and text messages from prepaid mobile phones. Third, introduction of competition in Internet service provision—particularly broadband wireless—is affecting residential and business prices. Table 4 indicates variability between advertised price data for broadband Internet in selected countries. Where competition has been introduced, the prices of products and services soon begin to range quite significantly as competitors offer different types of promotions and target services, including “service bundles” to different market segments.

**Table 3. Advertised Prepaid Mobile Tariffs, March 2008 or latest available (\*) (US\$)**

Operator	Mobile-Mobile		Mobile-Fixed		SIM card US\$ (+ credit)	SMS (US\$/min)	
	Peak	Off Peak	Peak	Off Peak		Local	Int'l
FIJI: Vodafone Fiji Ltd.	0.36	0.24	0.34	0.20	10.00 includes credit	0.13	
KIRIBATI: Telecom Services Kiribati Ltd.	0.28	0.14	0.46	0.23	52.00	0.09	
MARSHALL IS: Marshall Islands Telecom	n/a					0.02	
FSM: FSM Telecommunications Corporation	0.10	0.10	0.10–0.50	0.10–0.50		0.04	
PALAU: Palau Mobile Corporation	0.22	0.15			25.00 includes credit 15	0.06	0.20
PALAU: Palau National Communications Corporation	0.22	0.22	0.22		25.00 includes credit 10		0.20
PNG: Pacific Mobile Communications (B-Mobile)	0.53	0.20	0.53	0.20	19.87 no credit 8.84 Includes credit	0.10	n/a
PNG: Digicel PNG	0.33	0.16	n/a	n/a	7.07 includes credit	0.08	0.09
SAMOA: SamoaTel Ltd							
ST to ST	0.14	0.14	0.28	0.28		0.08	
ST to Digicel	0.28	0.28					
SAMOA: Digicel Samoa Ltd.							
	0.29	0.10	0.29	0.10		0.08	
SOLOMON IS: Solomon Telekom Company Ltd.	0.42	0.32	0.45–0.80	...	54.00 (includes 15 credit)	0.14	0.14
TIMOR-LESTE: Timor Telecom	0.25	0.187–0.13	0.29	0.22–0.15	20 credit 10	0.10	0.20
TONGA: Tonga Communications Corporation (TCC)	0.11–0.23	0.09–0.21	0.11–0.23	0.09–0.21	15.40 credit 5.37	0.05	0.16–0.19
TONGA: Shoreline Communications Inc. (Tonfon)	0.10	0.04–0.10	0.10–0.19	0.10–0.19	10.73 credit 2.67	0.03–0.05	0.16–0.21
VANUATU: Telecom Vanuatu Ltd.	0.11–0.42	0.05–0.42	0.43	0.43 (2 mins)	10.53	0.11	0.21

\* Note. All prices subject to change at any time. Exchange rates effective end-March 2008. Prices for SIM cards may be difficult to compare because of included airtime in some cases. Calls are charged per second, per 6 seconds, per 30 seconds or per minute. Countries with two operators shown have introduced competition. In addition, Fiji and Vanuatu have agreed to introduce competition.

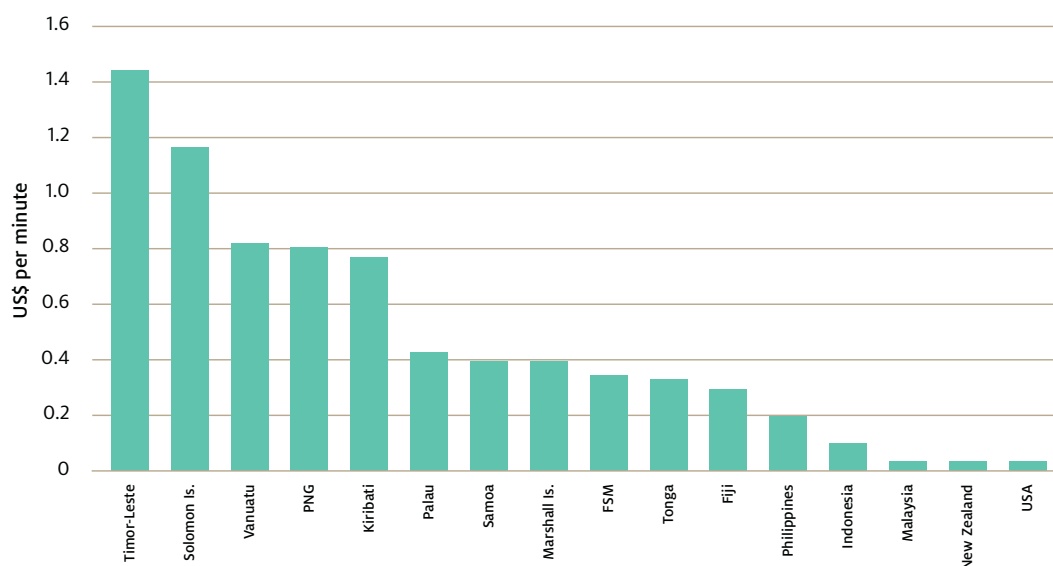
**Table 4. Advertised Broadband Internet Access Rates, March 2008**

ISP	Residential		Business		Fastest offered	
	US\$/month	Speed	US\$/month	Speed	US\$/month	Speed
Fiji-Connect	26	256k	84	512k	334	2Mbps
Fiji-Unwired	33	256k	134	512k	134	512kbps
Timor Telecom	900+319= 1,219	128k	3,450+789= 4,239	512k	3,450+789= 4,239	512kbps
PNG-Daltron	116	256k	414	512k	414	512kbps
Solomon Telekom	118	128k	566	512k	4,351	2Mbps
Vanuatu-TVL	227	128k	669	512k	1,278	1Mbps

Note: Timor Telecom charges for internet access + leased line. Sources: Operator/Internet Service Provider websites. Exchange rates March 31, 2008.

Wholesale pricing data are also complex. However, an interesting “proxy” indicator—reflecting the costs of terminating international calls—is “Skype Out” rates<sup>4</sup>, summarized in Figure 6. “Skype out” rates refer to the charges per minute for calls to the countries listed below. Skype out rates to the Pacific are among the highest in the world, with a one-minute call to Timor-Leste and Solomon Islands costing US\$1.44 and US\$1.15 respectively, compared to, for example US\$0.02 to Malaysia or to the US.

**Figure 6. Skype Out Rates-Pacific Region and Other (US\$ per minute)**



Source: www.skype.com. September 2007. Note: \* skype out rates for more competitive markets may vary according to type of service called, e.g. fixed, mobile, premium or toll-free numbers. The numbers shown for all countries listed here indicate calls to local fixed lines.

4 “Skype out” rates are the cost of calling TO a particular country destination from anywhere in the world, using the skype internet telephony service.

## Market Structures: Status and Implications

Until the middle of the current decade, the predominant market structure was monopolistic, in part due to “legacy” long-term exclusive licenses awarded to operators, as noted in Table 5.

**Table 5. Telecommunications Market: Exclusivities mid-2007**

Country	Sub-Sector	Operators	End of Exclusivity
<b>Fiji</b>	Fixed-Local	Telecom Fiji Ltd (TFL)	Was 2014*
	Fixed-Int'l	Fintel	Was 2014
	Mobile	Vodafone	Was 2014
	Internet	Connect (TFL) Unwired Fiji Kidanet (Fintel) University of South Pacific	2005
<b>Marshall Islands</b>	Fixed, mobile, Internet	Marshall Islands Telecommunications Authority	
<b>Palau</b>	Fixed	Palau National Communications Corporation	
	Mobile	Palau National Communications Corporation Palau Mobile Corporation	2006
<b>PNG</b>	Fixed	Telikom PNG	2007 (uncertain)
	Mobile	Pacific Mobile Communications (Telikom subsidiary) Digicel PNG (op. 07/2007) GreenCom (not yet op.)	2007
	Internet	Tiare (Telikom) Daltron Datec Global Technology Datanets	
<b>Samoa</b>	Fixed	Samoa Tel	
	Mobile	Samoa Tel Digicel Samoa	2006
	Internet	Samoa.ws iPasifika	
<b>Solomon Islands</b>	Fixed, Mobile Internet	Solomon Telikom	2018**
<b>Timor-Leste</b> (BOT concession)	Fixed, Mobile	Timor Telecom	2017**
	Internet	Timor Telecom iNet	
<b>Tonga</b>	Fixed	Tonga Communications Company (TCC)	2002
	Mobile, Internet	TCC TonFon (acquired by Digicel Nov 2007)	2002
<b>Vanuatu</b> (Franchise Agreement)	Fixed, Mobile Internet	Telecom Vanuatu Ltd	Was 2012

\* Renegotiated in 2007.

In the early 2000s, several governments in the region began to review these licensing arrangements, including exclusivity. Several governments have liberalised Internet service provision, and others have or are in the process of liberalising mobile communications. In some cases the incumbent operators have retained their monopolies over the international gateway and backbone infrastructure.

Table 6 summarizes changing market structures; some countries are still in transition.<sup>5</sup> Many governments have followed a similar path of revising their telecommunications policies, legislation, and reviewing licensing arrangements, including exclusivity. Tonga introduced mobile competition in 2003. Samoa and Palau introduced competition in mobile telecommunications in 2006, and Papua New Guinea in mid-2007. Fiji and Vanuatu issued pro-liberalization policies in 2006 and 2007 respectively. In the last quarter of 2007, the governments of Fiji and Vanuatu renegotiated the exclusive licenses of their incumbent operators, culminating in Settlement Agreements to phase in competition for telecommunications services, and issue new licenses to all operators, as well as to establish new, independent regulators.

**Table 6. Current Telecommunications/ICT Market Structures.**

Country	RETAIL					WHOLESALE	
	Telephony		Wireless (Mobile)	Internet Service		Leased Lines	Int'l Gateway
Fixed Lines	Fixed Wire-less	Dial-up Access		Broad-band Access			
FSM	M	n/a	M	M		M	M
Fiji	C*	C*	C*	C*	C	C*	C*
Kiribati	M	n/a	M	M		M	M
Marshall Is	M		M	M		M	M
PNG	M	n/a	C	M	C	M	M*
Palau	M		C	M		M	M?
Samoa	M	M	C	C	C	C	C
Solomon Is	M	n/a	M	M	M	M	M
Timor-Leste	M	n/a	M	M	C**	M	M
Tonga	M	n/a	C	M	C	C	C
Vanuatu	M	n/a	C*	M	C*	C*	C*

M=monopoly, C=competition. C\* =competition formally introduced December 2007 after renegotiation of exclusive licenses; new operators to roll out later in 2008. C\*\*=Liberalized, but must lease lines from incumbent

The remaining monopolies are in Marshall Islands, Solomon Islands and Timor-Leste. The government of Marshall Islands has proposed to introduce competition. The government of the Solomon Islands has drafted a policy proposing the introduction of competition in 2008, and the government of Timor-Leste is currently reviewing its options. With regard to the incumbent operators themselves, the proceedings of the Pacific Islands Telecommunications Association (PITA) as well as their annual reports suggest that they are preparing for the changing market landscape, including emerging competition, as well as opportunities offered by technological change.<sup>6</sup>

## Policy/Regulatory Issues

With the gradual introduction of competition, governments in the Pacific region are in effect implementing “first generation” policy/legal/regulatory reforms. Liberalization of telecommunications/ICT markets under “best practice” conditions worldwide has typically entailed the following, to facilitate an orderly and transparent transition:

- > Development of new telecommunications/ICT sector policies in order to clarify, *inter alia* the government’s position, sector objectives, key milestones, and role of institutions;

5 This table reflects the “traditional” telecoms/ICT market structure. It is important to note that convergence of technology, discussed further in Section 3 below, is disrupting this structure as it is eliminating distinctions between infrastructure and services and between telecoms, Internet and media. Reflecting convergence, many countries (though not yet in the Pacific) are moving away from sector-specific to unified access/service licenses.

6 See for example various proceedings of the Pacific Islands Telecommunications Association, the regional industry body, <http://www.pita.org.fj>

- > Review and revision of legislation to take account of changing technologies, business models, and to provide flexibility to anticipate further changes;
- > Revision of licensing arrangements: review and possible renegotiation of exclusive licenses; offering of new licenses through competitive tenders or other processes;
- > Development of regulations in areas such as: interconnection (to allow different operators to terminate calls on each others' networks), numbering (allocation, pricing, number portability), spectrum management (to allow orderly allocation of radio frequencies and appropriate pricing for spectrum usage), universal service obligations (to ensure equitable access for populations living in high-cost, less commercially attractive areas), competition policy (to prevent anti-competitive practices such as price collusion);
- > Separation of ownership, policy and regulatory functions of government; strengthening the capacity of regulators.
- > Regional collaboration in developing paths to policy, regulatory reform for the Pacific Islands context, as well as on ICI development.

How is this progressing in the Pacific? Fiji, Samoa, Solomon Islands and Vanuatu have issued formal sector policies. Samoa successfully renegotiated the exclusive license with its mobile operator, Telecom Samoa Cellular, in 2006, and its neighbours are actively considering renegotiation of their own exclusive licenses. PNG, Marshall Islands and Timor-Leste are developing new policies. Samoa has updated its sector legislation. Fiji, Solomon Islands, Micronesia and Vanuatu have drafted but not yet enacted new telecommunications laws. Timor-Leste is reviewing existing legislation. Samoa has developed a full set of telecommunications regulations and appointed an independent regulator. Papua New Guinea established an independent multi-sector regulator, the Independent Consumer and Competition Commission (ICCC) to oversee licensing and tariffs in 2002; a technical regulator, PANGTEL, handles spectrum and licensing issues [there are some overlapping responsibilities]. Fiji, Solomon Islands, Vanuatu and Timor-Leste are looking to establish separate regulatory bodies. Thus, the process of regulatory reform is still ongoing.

In tackling these "first generation" reforms, three important areas will need to be addressed in the short term: building adequate regulatory capacity; ensuring equitable access for rural areas; and managing change in the structure and business models for incumbent operators particularly those relinquishing exclusive licenses.

*Regulatory Capacity.* International experience of telecoms liberalisation underscores the importance of strong regulation, particularly in the immediate post-liberalization period. This is particularly important in the Pacific where in many cases the responsible government ministries and nascent regulatory institutions have limited staff and technical skills, particularly compared to the operators whom they are supposed to regulate. In some instances they have, by default, delegated some regulatory responsibilities to the industry itself, contrary to best practice. In Vanuatu and Timor-Leste for example, the incumbent telecom operators have been managing spectrum and numbers—scarce public resources. Development of "regulatory capacity" has started, with the support of different institutions;<sup>7</sup> this will be a long-term process. In this regard, there is also some discussion around the region on the extent to which harmonization of regulations across the region and/or establishment of some kind of regional regulatory body or technical facility—an approach supported for example by the Pacific Forum Secretariat in the context of the Pacific Plan—may be feasible.

In the OECs countries in the Caribbean, governments agreed in 1998 on a common regulatory framework and established a regional regulatory authority known as ECTEL in 2000<sup>8</sup>. While this appears at first glance to offer an attractive model for the Pacific region, since many countries have started a similar reform process and face similar regulatory challenges, important differences include: the larger geographical area between and within

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7 (regional regulatory agencies such as ACCC and ACMA (Australia), bilateral governments (AusAID, DCITA), the International Telecommunications Union (ITU), Asia-Pacific Telecommunity (APT) and the World Bank.

8 This experience has been extensively documented. See [www.ectel.info](http://www.ectel.info) and [www.worldbank.org/ict](http://www.worldbank.org/ict).

Pacific economies, greater distance from international backbone infrastructure/bandwidth and international markets more generally; different legal/regulatory traditions, and lack of unifying political structures. Hence, policymakers and regulators are also considering alternative approaches, including establishment of a regional “pool of expertise,” or “resource centre” institutional twinning, or regulatory “outsourcing” arrangements.

**Equitable Rural Access.** Another very challenging area of telecommunications reform is equitable rural access or Universal Service: developing appropriate regulatory safeguards, as well as incentive structures/financing mechanisms, to ensure that the introduction of competition also benefits the more remote areas in the region. In the Pacific region, the cost of serving some remote and sparsely populated areas is likely to remain high—despite advances in technology. Table 7 summarizes current international industry benchmarks for rural/urban service provision. In the Pacific, the risk is that, even when competition is introduced, telecommunications service providers will be inclined to focus on lower-cost, higher-revenue urban and coastal areas. To offset this risk, mechanisms have been developed elsewhere to create incentives for greater rural access, including public access, particularly in areas where individuals cannot afford their own handsets. Universal Service Funds/Rural Funds have been set up in countries around the world, from Uganda to Nepal: these are typically financed from a combination of industry levies (e.g. taxes on net revenues), government and/or external contributions, and then used to subsidize service provision in commercially marginal areas, often through competitive tenders. In addition, or alternatively, governments can provide other incentives for rollout into more difficult areas, including assistance with land acquisition, tax incentives for equipment and handsets. These issues and options are currently under consideration in the Pacific.

**Table 7. Illustrative Costs of Telecoms Service Provision: Urban vs. Rural**

Service	Rural Areas (US\$)			Urban Areas (US\$)		
	CAPEX per line	ARPU Per month	Annual Revenue/CAPEX	CAPEX per line	ARPU Per month	Annual Revenue/CAPEX
Fixed	>800	3–8	<0.12	<400	5–10	>0.3
Mobile	>200	3–8	<0.48	<50	5–15	>3.6
Broadband	>400	5–15	<0.45	<80	15–40	>6

Note: CAPEX=capital expenditure. ARPU=average revenue per user. Source: Alcatel-Lucent, Sept 2007.

**Incumbent Operators.** With regard to change management for incumbent operators following the end of exclusivity, issues that need to be addressed include: changing and diversifying their business models in order to preserve or increase revenues, identification of new sources of financing, including increased private participation, and possible operational restructuring. Many operators in the region are privatized or partly privatized (Table 8): increasing private participation is under consideration in some countries. Since governments in the region have derived revenues from these incumbent operators, and revenue flows may change in a more competitive market, managing this change has wider implications. Retrenchment of staff is a risk that also needs to be carefully managed.

**Table 8. Ownership Structures—Private Participation**

Country	Company	Govt Ownership	Private Ownership	Shareholders
<b>Fiji</b>	Fintel	51.5% (ATH)	49.0%	Cable & Wireless (UK)
	Vodafone Fiji Ltd	51.5% (TFL)	49.0%	Vodafone
<b>Marshall Islands</b>	Marshall Is. Telecom Ltd	25%	75.0%	Marshall Is. Citizens
<b>Palau</b>	Palau Mobile Corp.		100%	
<b>Samoa</b>	SamoaTel	40%	27.5%	National Bank Provident Fund (Govt-owned)
			22.5%	Bank of Samoa (Govt owned)
			10.0%	Samoa Life Insurance
	Digicel Samoa		100%	Digicel
<b>Solomon Islands</b>	Solomon Telekom		51%	S.I. National Provident Fund
			42%	Cable & Wireless (UK)
			7%	Investment Corporation of Solomon Is.
<b>Timor-Leste</b>	Timor Telecom	20.6%	54%	Portugal Telecom
			16.9%	Vodatel (Macau)
			8.5%	Individuals (2)
<b>Tonga</b>	Tonfon		100%	Digicel (eff. November 2007)
<b>Vanuatu</b>	Telecom Vanuatu Ltd	33%	33%	Cable & Wireless (UK)
			33%	France Telecom

### 3 Looking Ahead: Trends, Opportunities and Challenges

As policymakers in the Pacific region start to address these first-generation challenges, a “second generation” is already approaching very rapidly. Why? First of all, the nature of demand for telecommunications/ICT services is evolving worldwide. Following the strong growth of mobile services, with over 2.5 billion users, and “saturation” of traditional voice telephony markets in most developed economies, demand for mobile data capability (e.g. 3G mobile) is increasing. Second, demand for broadband is accelerating dramatically—as a platform to deliver high-speed Internet, telephony (VoIP) and also media, including radio, TV and video. Third, demand for value-added services, via mobile and broadband, is increasing in both developed and developing economies. Value added services or “applications” include, for example: banking/financial transfer services via mobile phones, producer price information via mobile phone or Internet; distance education and health services, as well as various platforms for e-commerce.

In parallel, information and communications technologies are changing fast. The traditional distinctions between telephony, data services and media/broadcasting (as well as the equipment used to deliver these services) are disappearing, or rather “converging.” The infrastructure to deliver these “converged” services is, essentially, the Internet (Internet Protocol networks, or “Next Generation Networks”)<sup>9</sup>: in other words, delivery of voice, data and video services is increasingly taking the form of data packets. This means that traditional telecommunications market distinctions, for example, between “telephony” and “Internet” services, and “network” and “services” providers are also disappearing.

The main implications of these trends for future development of telecommunications/ICT in the Pacific are the need for

- > more investment in infrastructure, particularly *backbone networks to deliver broadband Internet* and “converged” information and communications services. Such investment would be driven largely by the private sector;
- > continued efforts to increase rural access to promote economic and social inclusion—basic voice services may not be sufficient in the future. In these areas, some public funding may be needed to fill market gaps;
- > continued efforts to bring down prices through competition among operators, and regional collaboration;
- > enhancement of regulations and regulatory capacity to anticipate and manage technological change.

On the infrastructure side, the key challenge will be for countries in the region to secure sufficient data transmission capacity or “bandwidth” at reasonable cost, both at the national and international level. This entails mobilising increased investment (public, private, external) in national “backbone” networks, ensuring access to users at competitive rates (so as not to create new types of monopolies), and also ensuring that prevailing sector policies facilitate the growth of diversified access networks to meet the demand for broadband. As noted above, there are several potential submarine cable projects in the region. Another initiative is a satellite-based Internet access system for rural and remote areas in all Pacific island countries and territories that has been secured by SPC with financial assistance from the Australian Agency for

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<sup>9</sup> Also referred to as “next-generation” networks

International Development (AusAID). This new satellite-based Rural Internet Connectivity System (RICS) is expected to be operational in 2008<sup>10</sup>. As in other multi-country infrastructure projects, including fibre-optic cables, it will be very important to ensure not only that costs are in line with international benchmarks. It will also be important for participating governments to consider putting in place appropriate competitive safeguards—open access, fair pricing, transparent governance structures—to ensure that such infrastructure is not “captured” and that its deployment does indeed result in more competitive end-user prices and equitable access to realize the kinds of broader economic and social benefits described earlier.

Technological change and convergence will have significant implications for regulatory approaches and structures not only in the Pacific but elsewhere. Issues that regulators will need to consider include, for example, the nature of telecommunications/media/Internet licensing (move away from service-specific licensing); management of spectrum; allocation of numbers; as well as competition policy. Pricing structures—for example for “bundled offers” of telephony, Internet access and video on demand—are becoming more complex. The main implication is the need to consolidate and strengthen the relevant regulatory institutions, so they are adequately informed and resourced, and encourage efforts at regional coordination and harmonization of approaches, as discussed earlier.<sup>11</sup>

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<sup>10</sup> Source: Pacific Islands Forum Secretariat, August 2007

<sup>11</sup> This is a worldwide debate among regulators. The International Telecommunications Union (ITU) and infoDev have developed a new Regulatory Toolkit, including coverage of convergence-related issues. In East Asia, regional institutions such as ASEAN, APECTel, APT have established working groups. In the Pacific, the industry association, PITA, has held some seminars related to next generation networks, but awareness among regulators is still limited.

## 4 Conclusions and Messages

As the end of the decade approaches, telecommunications in the Pacific region is in transition. The contribution of telecommunications to economic growth and diversification, as well as its impact on social cohesion, will become increasingly apparent. The demand for new infrastructure, to meet the high latent demand for basic services outside major population centres, as well as anticipated demand for broadband Internet and related value-added services, is growing rapidly. It will need to be met mainly by private investment; public funding would address market failures to ensure equitable access. Competition is gradually being introduced; policies and regulations are being updated step-by step; institutional strengthening remains challenging, as regulators grapple with first-generation and, increasingly, second generation reform agendas.

The challenge to the region's policymakers is to ensure that this transition is managed in an orderly and transparent manner to realise the potential economic and social benefits associated with more affordable and accessible telecommunications/ICT and to protect the interests of end-users. In practice this means that the region's decision-makers are encouraged to:

- > formulate and disseminate clear policies with regard to telecommunications sector development, investment needs and legal/regulatory framework;
- > undertake new infrastructure projects and licensing arrangements in a cautious and transparent manner—preferably through competitive processes to avoid creating a new generation of “exclusivities”;
- > update existing legislations and regulations to reflect the shift to more competitive markets, and anticipate technological change;
- > mobilize the resources required to support the institutions that will oversee an increasingly vibrant and dynamic telecommunications sector;
- > foster collaborative regulatory approaches—possible harmonization of regulations, sharing of technical expertise—to make the best use of scarce resources.

## Annex 1. Selected References on ICT (particularly mobile telecommunications) and Development Impact

### **World Bank: Information and Communication for Development—Global Trends and Policies, 2006**

The main finding of the report is that ICT plays a vital role in advancing economic growth and reducing poverty. Therefore it needs 1) to be a top priority for governments and regulators in developing countries to put in place a sound and transparent policy framework, and 2) to be included as a core indicator in the measurement and monitoring of development. In the report, the World Bank states that “ICT makes a country’s economy more efficient and globally competitive, improves health and education services, and creates new sources of income and employment for poor people. Moreover, ICT enhances social inclusion and promotes more effective, accountable, democratic government, especially when combined with effective freedom of information and expression.”

The full study is available here: [http://www-wds.worldbank.org/external/default/main?pagePK=64193027&piPK=64187937&theSitePK=523679&menuPK=64187510&searchMenuPK=64187283&theSitePK=523679&entityID=00012009\\_20060420105118&searchMenuPK=64187283&theSitePK=523679](http://www-wds.worldbank.org/external/default/main?pagePK=64193027&piPK=64187937&theSitePK=523679&menuPK=64187510&searchMenuPK=64187283&theSitePK=523679&entityID=00012009_20060420105118&searchMenuPK=64187283&theSitePK=523679)

### **Leonard Waverman, Meloria Meschi, Melvyn Fuss: The Impact of Telecoms on Economic Growth in Developing Countries, 2005**

The main finding of the study is that *mobile telephony has a positive and significant impact on economic growth in both developing and developed countries*, but that this impact may be twice as large in the former as opposed to the latter. A developing country which had an average of 10 more mobile phones per 100 inhabitants between 1996 and 2003 would have enjoyed per capita GDP growth that was 0.59 percent higher than an otherwise identical country. The growth dividend is far larger in developing countries than in developed, because here the main communications networks are to a superior extent mobile and supplant the information-gathering role of fixed-line systems.

The full study is available here: [http://www.gsmworld.com/using/public\\_policy/esb/index.html](http://www.gsmworld.com/using/public_policy/esb/index.html)

### **ITU: World Telecommunications Development Report- Measuring ICT for social and economic development, 2006**

Excerpt from study: “The phenomenal growth in information and communications technologies (ICTs) has important implications for economic growth, in both developed and developing countries. The ICT -producing sectors (both services and manufacturing) create direct and indirect benefits in the countries where they are located. Growth of these industries results directly in new jobs and revenue.

The full study is available here: <http://www.itu.int/ITU D/ict/>.

### **GSM Association: Regulation and the Digital Divide, 2006—How best practice regulation can drive investment and penetration in emerging markets**

The study finds that mobile telephony acts as a major catalyst of economic and social development and is already playing a central role in bridging the digital divide. In the period of 2001-2006 approximately 8 times as many mobile connections have been made relative to other technologies (fixed and fixed wireless) in Sub-Saharan Africa.

The full study is available here: <http://www.gsmworld.com/digitaldivide/regulation.shtml>

***The Information for Development Program, the International Finance Corporation (World Bank Group) and the GSM Association: Micro-payment systems and their application to mobile networks, 2006***

The study argues that there are many economies where a wide acceptance of a cashless society is many years away. These are primarily economies where the average income is low with many people having no involvement with a bank at any time in their life. These people survive on cash and they very likely have no trust that a bank would serve their interests very well. At the same time, many banks would regard this segment of the market as being unworthy of any effort and likely to be more trouble than it's worth. In many cases, the cash assets held by any one individual would be too small for any bank to regard as having value when considered alongside the traditional costs to maintain banking records for a customer.

The full study is available here: [http://www.infodev.org/files/3014\\_file\\_infoDev.Report\\_m\\_Commerce\\_January.2006.pdf](http://www.infodev.org/files/3014_file_infoDev.Report_m_Commerce_January.2006.pdf)

***The Digital Divide: Information Technology, Market Performance and Welfare in the Indian Fisheries Sector, Robert Jensen, Quarterly Journal of Economics, Vol CXXII, August 2007 Issue 3.***

Northern Kerala's economy in South India is based on sardine fishing. Catch prices have been traditionally unpredictable, as they depend on supply, local markets, price of fuel and short life span of catch. Fishermen faced daily the problems of over-supply in local markets. Fish were thrown away, even though there might be buyers for them a little farther along the coast. On average, 5–8% of the total catch was wasted. On January 14th 1997, 11 fishermen at Badagara beach ended up throwing away their catches, yet on that day there were 27 buyers at markets within nine miles who would have bought their fish, if only they knew. Mobile phones were introduced in Kerala in 1997. Since coverage spread gradually, this provided an ideal way to gauge the effect of mobile phones on the fishermen's behavior, the price of fish, and the amount of waste. As phone coverage spread between 1997 and 2000, fishermen started to buy phones and use them to call coastal markets while still at sea. Instead of selling their fish at beach auctions, face to face, the fishermen would remain at large and call around to find the best price.

Dividing the coast into three regions, Jensen found that the proportion of fishermen who ventured beyond their home markets to sell their catches jumped from zero to around 35% as soon as coverage became available in each region. At that point, no fish were wasted and the variation in prices fell dramatically. By the end of the study coverage was available in all three regions. Waste had been eliminated and the "law of one price"—the idea that in an efficient market identical goods should cost the same—had come into effect, in the form of a single rate for sardines along the coast. This more efficient market benefited everyone. Fishermen's profits rose by 8% on average and consumer prices fell by 4% on average. Higher profits meant the phones typically paid for themselves within two months. The study shows the importance of the free flow of information to ensure market efficiencies, which in turn improve welfare and in turn results in sustainable development.