Establishment of Harmonized Policies for the ICT Market in the ACP Countries

Interconnection and Cost Modeling:
Knowledge-based Report

ICB4PAC

Capacity Building and ICT Policy, Regulatory and Legislative Frameworks for Pacific Island Countries

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Foreword

Information and communication technologies (ICTs) are serving as the most important driving force behind the Pacific Islands' economic and social integration into the wider global community.

In light of the huge changes that are taking place and mindful of the need to shape them in ways that best reflect the aspirations of the individual islands societies -- each with their unique heritage -- 15 Pacific countries in the Group of African, Caribbean and Pacific States (ACP) have come together to develop and promote the use of harmonised ICT policies, legislation and regulatory frameworks.

This cooperation has taken the form of a project entitled "Capacity Building and ICT Policy, Regulatory and Legislative Frameworks Support for Pacific Island countries" (ICB4PAC). Executed by the International Telecommunication Union (ITU), the project has been undertaken in close collaboration with the Pacific Islands Forum Secretariat (PIFS), Secretariat of the Pacific Community (SPC), Pacific Islands Telecommunication Authority (PITA), and the Pacific ICT Regional Regulatory Centre (PIRRC), with the support of the University of the South Pacific (USP). A global steering committee composed of the representatives of the ACP Secretariat and the Development and Cooperation - EuropeAid (DEVCO, European Commission) oversees the overall implementation of the project.

This project is taking place within the framework of the ACP Information and Telecommunication Technologies (@CP-ICT) programme and is funded under the 9th European Development Fund (EDF), which is the main instrument for providing European aid for development cooperation in the ACP States, and co-financed by the ITU. The @CP-ICT aims to support ACP governments and institutions in the harmonization of their ICT policies in the sector by providing high-quality, globally-benchmarked but locally-relevant policy advice, training and related capacity building.

All projects that bring together multiple stakeholders face the dual challenge of creating a sense of shared ownership and ensuring optimum outcomes for all parties. ICB4PAC has given special consideration to this issue from the very beginning of this project in November 2009. Having agreed upon shared priorities, stakeholders reviewed the methodology and governance for implementing the project. The specific needs of the region were then identified and likewise potentially successful regional practices; these were then benchmarked against practices and standards established elsewhere.

These detailed assessments (knowledge-based reports), which reflect country-specific particularities, served as the basis for the model policies and legislative texts that offer the prospect of a legislative landscape for which the whole region can be proud. The project is certain to become an example for other regions to follow as they too seek to harness the catalytic force of ICTs to accelerate economic integration and social and economic development.

I take this opportunity to thank the European Commission and ACP Secretariat for their financial contribution. I also thank the Pacific Islands Forum Secretariat (PIFS) and the Secretariat of the Pacific Community (SPC) for their contribution to this work. Without political will on the part of beneficiary countries, not much would have been achieved. For that, I express my profound thanks to all the ACP governments for their political will which has made this project a resounding success.

Brahima Sanou
BDT, Director

Acknowledgements

The present document the achievements of the regional activities carried out under the ICB4PAC project 'Capacity Building and ICT Policy, Regulation and Legislative Frameworks for Pacific Islands', officially launched in Fiji in November 2009.

In response to both the challenges and the opportunities from information and communication technologies' (ICTs) contribution to political, social, economic and environmental development, the International Telecommunication Union (ITU) and the European Commission (EC) joined forces and signed an agreement aimed at providing "*Support for the Establishment of Harmonized Policies for the ICT market in the ACP*", as a component of the programme "ACP-Information and Communication Technologies (@CP-ICT)" within the framework of the 9th European Development Fund (EDF), i.e., ITU-EC-ACP project.

This global ITU-EC-ACP project is being implemented through three separate sub-projects customized to the specific needs of each region: Pacific island countries (ICB4PAC), the Caribbean (HIPCAR) and sub-Saharan Africa (HIPSSA).

The ICB4PAC Project Coordinator and support team at ITU Head Office in Geneva provided guidance and support to the expert, Mr Jim Holmes, who conducted the assessment of the present situation of interconnection in the Pacific Island countries. The draft document was then reviewed, discussed and adopted by broad consensus by participants at the first workshop for this topic (Sydney, Australia, 3-5 December 2010).

ITU would like to especially thank the workshop delegates from the Pacific Island ICT and telecommunication ministries, regulators, academia, civil society, operators, and regional organizations including the Pacific Island Forum Secretariat (PIFS), University of the South Pacific (USP), Secretariat of the Pacific Communities (SPC), Pacific Island Telecommunications Association (PITA) among others for their hard work and commitment in producing the contents of this report. This broad base of public sector participation representing different sectors allowed the project to benefit from a cross-section of views and interests.

Without the active involvement of all of these stakeholders, it would have been impossible to produce a report such as this, reflecting the overall requirements and conditions of the Pacific island region while also representing international best practice.

The activities have been implemented by Ms Gisa Fuatai Purcell, responsible for the coordination of the activities in the Pacific (ICB4PAC Project Coordinator), and Mr Sandro Bazzanella, responsible for the management of the whole project covering sub-Saharan Africa, Caribbean and the Pacific (ITU-EC-ACP Project Manager) with the overall support of Ms Reshmi Prasad, ICB4PAC Project Assistant, and of Ms Silvia Villar, ITU-EC-ACP Project Assistant. The work was carried out under the overall direction of Mr Cosmas Zavazava, Chief, Project Support and Knowledge Management (PKM) Department.The document has further benefited from comments of the ITU Telecommunication Development Bureau's (BDT) ICT Applications and Regulatory Monitoring and Evaluation Division (RME). Support was provided by Mrs Eun-Ju Kim, Regional Director for Asia and the Pacific. The team at ITU's Publication Composition Service was responsible for its publication.

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Executive Summary

This assessment of the current situation regarding interconnection and cost modelling is an action of the 'Capacity Building and ICT Policies, Regulations and Legislative Frameworks for Pacific Island Countries' (ICB4PAC) project. The project is jointly funded by the European Commission (EC) and the International Telecommunication Union (ITU) for the ACP member countries in the Pacific. These countries are: the Cook Islands, Fiji, Kiribati, the Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, the Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

The ICB4PAC project aims to develop and promote capacity building in areas relating to ICT policies, regulations and legislative frameworks for the Pacific Island countries. It is doing this through a range of targeted training, education and knowledge-sharing measures.

Interconnection and cost modelling is one of the priority topics that were agreed by the recipient countries during the project-planning meeting (Fiji, November 2009).

The study was conducted using a data collection form that was sent to the focal points for ICB4PAC in each of the recipient countries. A desk study was also carried out. Email was the main means of communication with the focal points and the project coordinator responsible for this action. Once the first draft was completed, it was sent to each of the focal points for their comments and feedback. A workshop was held to discuss in depth the assessment's findings (Australia, December 2010). There was much discussion about the issues raised by the countries on the varying degrees of telecommunication development in the Pacific Island countries. As a result, the recommendations were revised and are in chapter 6. A list of participants is in Annex I.

Study findings and recommendations

The study found that the Pacific Island countries included in this study have varying potential for developing their telecommunication sectors through competition. The populations of the countries range from over six million in Papua New Guinea to approximately 1,400 in Niue. The potential for competition in the provision of telecommunication network services is not tied directly to population, as such, but to the ability of service providers to become commercially sustainable given the overall level of demand.

It would be inappropriate to seek the lowest common denominator of the Pacific Island countries and pitch recommendations on that basis. Such recommendations would have no value for the countries that do have competition (Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu). It is unclear if the arrangements established in Nauru might be called competitive.

Equally, to exhort that some of the smaller Pacific Island countries, such as the Cook Islands, Niue, Tuvalu and Palau, should develop detailed interconnection arrangements and cost models in advance of any likelihood of use in the short to medium term, would also lack credibility.

There is a group of countries, including Kiribati, who may be in an intermediate situation. They want to have a competitive marketplace but, for various reasons, may not be able to attract suitable new entrants to invest.

Therefore, three strands of recommendations have been developed, each addressed to one of the following groups of Pacific Island countries:

- those with competition now;
- those that have some probability of introducing competition in the near to medium future;
- others, including the smallest ones, without immediate prospects for competition.

Recommendations for countries that already have competitive telecommunication markets

The following actions are recommended.

1. Legislation is amended to ensure that the legal and regulatory frameworks meet best practice, and specifically requires the following points.
   (a) Interconnection agreements, if negotiated between the parties, are explicitly reviewed and approved by the regulatory agency after being determined to be consistent with the public interest and the interests of those using telecommunication services.
   (b) Interconnection agreements are made transparent by normally being publicly published. Regulatory agencies should have the responsibility for determining any claims from operators or other parties that publication would destroy commercial value in confidential information. In determining such claims, regulators should apply rules specifically developed by them in advance. These should set out the criteria and procedures that will be applied to allow disclosure to be weighed against private commercial interests.
   (c) Notwithstanding (b), the price components of all agreements are published.
   (d) Where interconnection rates are to be determined by the regulatory agency, they are cost based and the formulae are included either in the legislation itself or in regulations pursuant to such legislation.
   (e) Regulatory agencies are empowered to require interconnection reference offers to be prepared for regulatory approval by service providers.
   (f) Interconnection and access are on a fair, reasonable and non-discriminatory basis and the party providing interconnection and access is doing so on terms and conditions no less favourable than those applying to its own retail operations.
2. Where decisions are made on the basis of benchmarking studies, the regulatory agency is required to publish the benchmarking study and conduct a public consultation on the adequacy and appropriateness of the study and of the comparator countries used before making a final order on the matter.
3. Where decisions are made on the basis of cost models, the regulatory agency is required to publish as much of the cost model as does not disclose the commercially confidential information of any service providers. It is also required to conduct a public consultation on the adequacy and appropriateness of the cost model before making a final order on the matter. The rules make it clear how the cost of developing cost models should be borne within the industry. However, even if borne by one or more operators, this does not affect the model access arrangements set out earlier in this recommendation.
4. All countries should make arrangements for the development of interconnection and access regulatory and administration skills in their regulatory agencies. In particular, this should include cost modelling and arbitration, so that the agencies have staff with the expertise to specify and critique benchmarking studies and cost models that are developed for the agency or proposed to the agency by service providers and their consultants.

Recommendations for countries that might have competitive telecommunication markets in the medium term

The following recommendations are made.

5. Legislative arrangements based on the best practices outlined in recommendation 1 should be put in place well before competition commences and in sufficient time for the regulatory agency to be established and developed with the expertise and confidence ready to take on the interconnection and access administration required of a competitive telecommunication service market.
6. Regulatory agencies (including relevant ministries) should establish – through benchmarking, other analysis and public consultation – a comprehensive set of performance indicators that the telecommunication service provider(s) should meet in terms of:
    a. the services that should be provided
    b. the technical parameters and performance requirements of the services
    c. the pricing policy and aspirations associated with the services
    d. other dimensions that will affect the service's outcomes that might be achieved in similar competitive market environments.

Recommendations for countries that are unlikely to have a competitive telecommunication market in the medium term

The following recommendations are made.

7. Recommendation 6 also applies to this category of countries.
8. Regulatory agencies should design, in consultation with the affected service providers, schemes that will encourage the delivery of services to the quality standards set out in recommendation 6. This includes schemes that enable services to be contracted out if that would provide the appropriate guarantees of delivery, incentives and penalties.[1]
9. Telecommunication service policies should be reviewed and redeveloped and, in the light of this, legislation should be amended, if required, to authorize regulatory agencies and relevant ministries to establish schemes of the kind contemplated in recommendations 6, 7 and 8.
10. In the absence of long-term plans for market liberalization and the introduction of competition, the role of the ministry or separate regulator must include facilitating the creation of conditions to achieve the benefits of competition, such as licensing of additional service providers and ensuring that they have reasonable wholesale access and usage terms and conditions.

[1] Ministries and regulators need to develop clear views of the services that are needed, and the qualities and characteristics that are acceptable for these services. Quality issues include availability, provisioning and fault response delay as well as the standards that should apply bearing in mind international practice. A monopoly provider needs to be given incentives to meet these standards over time. Incentives can be both positive and negative. The option of having work sub-contracted out may serve to encourage better outcomes.

Overall recommendations

The following overall recommendations are made.

11. The countries that are covered in this study shared their experiences and ideas on how to improve their competitive environments. They also shared their approaches to interconnection, access, cost modelling and other related methodologies. They should continue to jointly assess the progress made and provide mutual assistance on any difficulties encountered.
12. Policy and legislation should be reviewed now and, where appropriate, amended to ensure that regulatory functions are separated from service providers' operating functions. Consideration should be given to organizationally separating regulatory functions from the broader policy activities of departments and ministries.

Section 1: Introduction

The assessment of the present situation of Interconnection and Cost Modelling is an action of the 'Capacity Building and ICT Policy, Regulatory and Legislative Frameworks support for Pacific Island Countries' (ICB4PAC) project. The ICB4PAC is jointly funded by the European Commission (EC) and the International Telecommunication Union (ITU) for the ACP member countries in the Pacific. These countries are: the Cook Islands, Fiji, Kiribati, the Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu.

The ICB4PAC project aims at developing and promoting capacity buildings in ICT policies, regulatory and legislative frameworks for the Pacific Islands, through a range of targeted training, education and knowledge sharing measures.

Interconnection and Cost Modelling is one of the priority topics that was agreed to by the recipient countries during the project planning meeting that was held in Nadi, Fiji in November 2009. This assessment was sent to all the focal points of the ICB4PAC project for their comments and feedback. It was further reviewed and discussed at a workshop that was held in Sydney Australia on 3-5 December 2010 where participants provided further information especially on the recommendations section of the report. The workshop included a capacity building session in addition to the discussion of the assessment report, which was enjoyed by all. A list of participants is attached as Annex I.

1.1 Project methodology

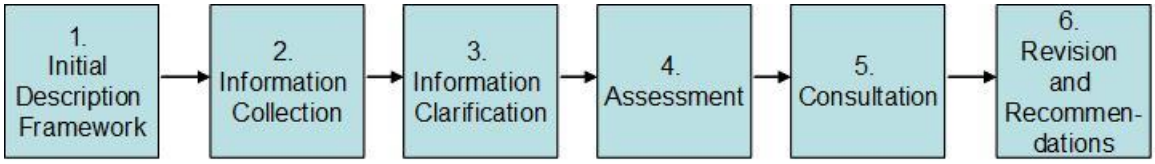
The project was undertaken as desk-based research and analysis. In principle, this method should have been adequate for collecting, assessing and reporting on data.

However, such an approach relies on the timely and complete responses of the nominated coordinators (or focal points) in the 15 Pacific Island countries. Late and incomplete responses created problems.

The project was initiated by sending a standard pro-forma for the collection of data to all 15 Pacific Island countries. This is included in Annex 2.

The stages in the overall process are shown in Figure 1.

Figure 1: Project stages



Stage 1 determined the ways in which interconnection and related cost modeling frameworks might be described.

Stage 2 developed the data request pro-forma which, if completed fully, would allow the situation in each of the study countries to be described in a systematic manner and aid assessment and analysis.

Stage 3 involved clarifying with the focal points in each country the information provided in the data request. This included seeking additional information about situations not anticipated when the request was formulated.

Stage 4 was the assessment in three parts:

- documenting the arrangements that apply for interconnection and cost modelling in each country;
- establishing a best practice framework from the expert's experience in various country markets around the world, but with appropriate concessions to the typical constraints that apply in the Pacific region;
- assessment of the practices of each country against the best international practice standards, together with a SWOT analysis as required by the ToR (Terms of Reference).

Stage 5 shared the draft assessment report with each participating country so that they could make comments. These could confirm or correct facts; comment on the best practice standards adopted for assessment; and comment on the assessment of a country's arrangements against the best practice standard.

Stage 6 revised the assessment based on the comments and formulated recommendations at a regional and country level.

1.2 Report structure

This report covers stages 1–6 of the project, and includes a draft assessment for consultation and comment by the 15 countries in the study.

- Chapter 2 describes interconnection and access, and the issues and best practices associated with the regulatory administration of interconnection and access.
- Chapter 3 describes cost modelling and the cost standards that are or might be employed in the Pacific region. The use of supplementary costing tools, such as benchmarks, for the determination of interconnection charges are also discussed, together with a description of current best practice in modelling for interconnection costs.
- Chapter 4 describes the interconnection and related cost modelling practices in each of the 15 beneficiary countries.
- Chapter 5 is a draft assessment of each country's practices and a SWOT analysis.
- Chapter 6 sets out a series of recommendations. These recommendations have been amended to take account of the discussion at a workshop (Australia, December 2010) where the report and its recommendations were major agenda items for discussion.

Section 2: Interconnection and access

2.1 Definitions

2.1.1 Access

Access refers to making available facilities and/or services for another undertaking, under defined conditions, on either an exclusive or non-exclusive basis, for the purpose of providing electronic communications services.

Access to services can take a number of forms.

- *Access to services* refers to access to customers directly connected to other networks. These services may include interconnection links and collocation.
- *Access to facilities* refers to facilities that for various reasons may be considered as essential but it is either not possible or uneconomic to duplicate. This could be access to ducts, towers, some easements and rights of way.
- *Access to wholesale services* refers to those services in markets that are not competitive but the services are required by retail service providers, such as leased lines, bitstream access, backhaul and subscriber lines on a shared basis.

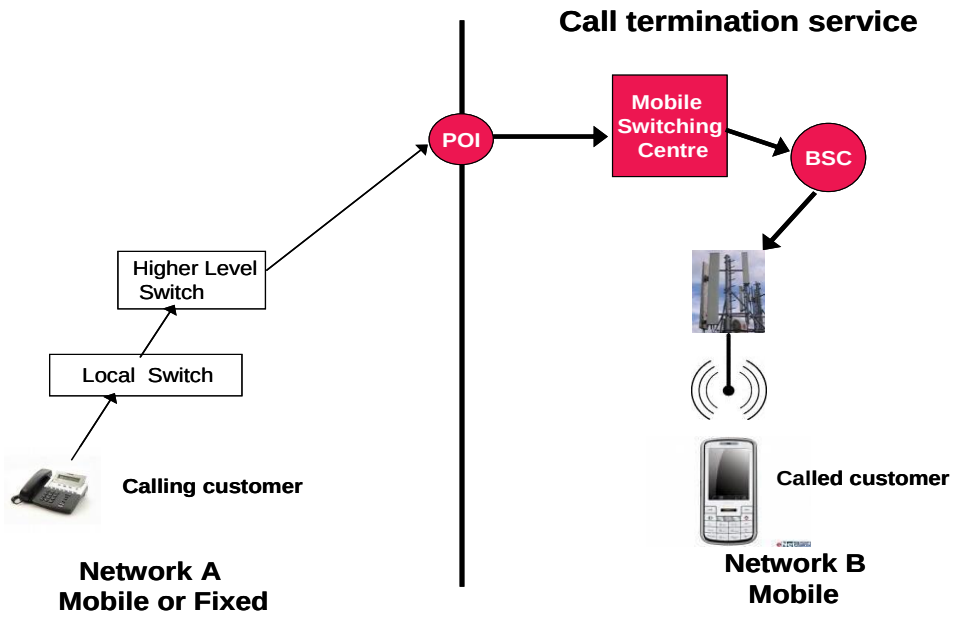
2.1.2 Interconnection

Interconnection means the physical and logical linking of public communication networks used by the same or a different undertaking in order to allow the users of one undertaking to communicate with users of the same or another undertaking, or to access services provided by another undertaking.

Interconnection services can take a number of forms.

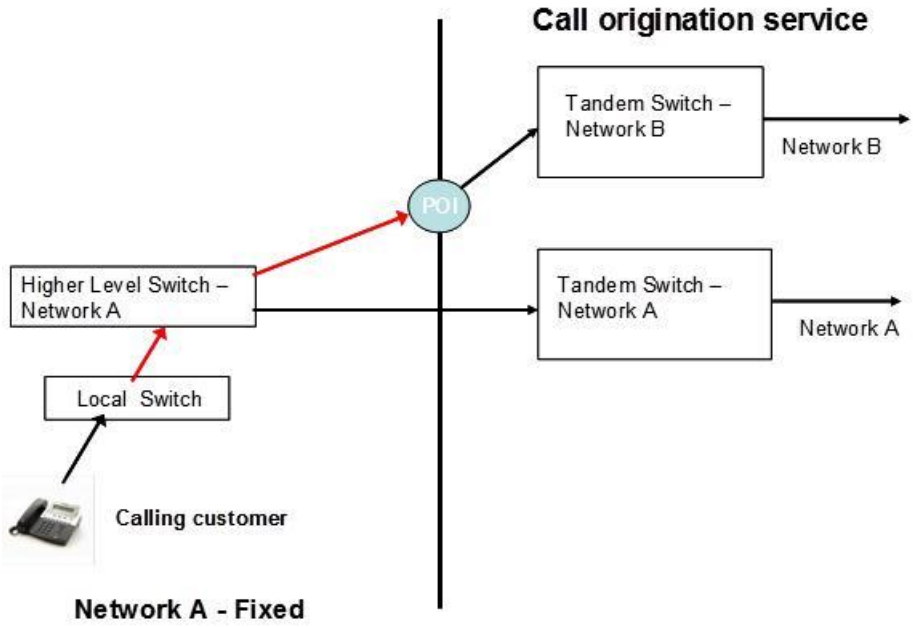
1. *Call termination services* involve the termination of a call originating on another network to a service connected to the network in question. The specific service involves the conveyance of a call from a point of interconnection (POI) at which the call is handed over by the other network operator to the service of the subscriber being called. Figure 2 illustrates call termination.
2. *Call origination services* involve the origination of a call on a network to access an information or transmission service provided by another network operator. The first case involves access to telephone information or similar content services that are directly connected to other networks. The second case involves carrier pre-selection or call-by-call selection in which the subscriber, either generally or in relation to each call, selects for its long-distance services a service provider other than the one to which its service is directly connected. The specific service involves the conveyance of a call from the calling subscriber's service to POI for handover to another network operator. Figure 3 illustrates call origination.

Figure 2: Illustration of termination interconnection service



Note: (1) This illustration shows termination on a mobile service as an example of termination generally. (2) The termination service involves conveyance of the call in the direction of the arrows from the POI to the called customer.

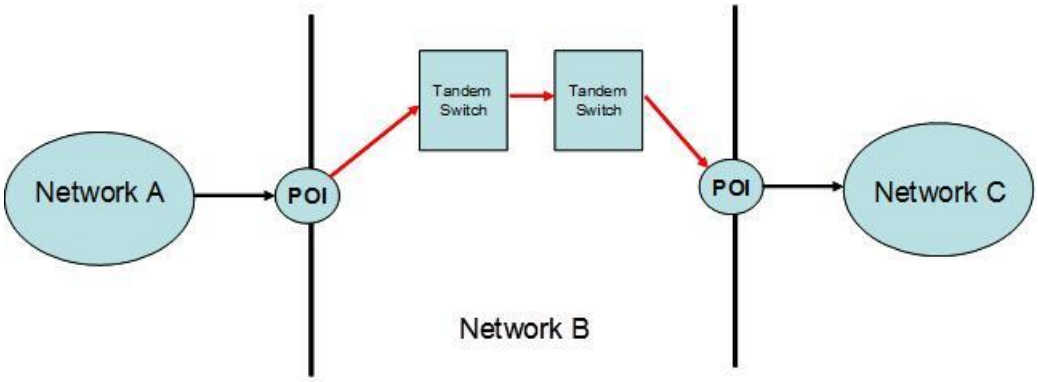
Figure 3: Illustration of call origination service



Note: (1) This illustration shows origination on a fixed service as an example of origination generally. (2) The origination service involves conveyance of the call in the direction of the arrows from the POI to the called customer. Only the red arrows are associated with the service.

3. *Transit services* involve the conveyancing of calls between POIs. It should be noted that in some definitions the POIs must be associated with network operators other than the networks operated by the provider of the transit service. In this definition, if a carrier provides both a transit service and a call termination service in respect of a single call, then the resulting total service may be called a near-end handover interconnection arrangement ('near-end' because the handover is near to the location of the calling subscriber). However, for the purposes of this report it is preferable to regard such services as two separate services – transit and call termination. It follows that one of the POIs may be associated with a customer network that is also operated by the provider of the transit service. A transit service is illustrated in Figure 4.

Figure 4: Illustration of transit service



Note: The transit service is provided by Network B from one POI to the other POI. Network B and Network C might be controlled by a single network operator. Alternatively Network B may be operated by a different operator to Network C. The elements of the conveyance path that are part of the transit service are shown by red arrows.

2.2 The fundamental issue with interconnection

Most countries (and all 15 of those included in this study) adopt a 'calling party's network pays' (CPNP) approach to interconnection. The fundamental idea is that a network operator should be paid or compensated for terminating calls that originate outside its network and which it delivers (terminates) to the called party whose service is directly connected to its network. In turn, this is based on the idea that the calling party is responsible for making the call and has most control over whether the call is made or not. The calling party's network operator has the means through normal billing to recover the price of the call from its customer, and also the practical means to add to the price otherwise payable for the additional costs incurred to terminate the call on another network.

However, the CPNP approach to interconnection pricing and payments is not the only option. Other options include the following approaches.

- 'Receiving party's network pays' (RPNP): an approach that was adopted in various countries in the past, including Singapore
- 'Mobile party's network pays' (MPNP): an approach that operated in relation to fixed-to-mobile and mobile-to-fixed interconnection in Hong Kong until April 2009;
- 'Bill and keep' (BAK): an approach adopted between peers for internet interconnection, between mobile operators in many countries including the US, and increasingly favoured as a long-term solution by the EC.

The CPNP approach creates a terminating interconnection monopoly in the hands of the service provider offering the termination service. This would not occur in the case of RPNP (although other competition issues would arise) or BAK.

For as long as the provider of the call termination service may charge for the interconnection service, there is an incentive to maximize the charge for a number of reasons.

- The charge cannot be avoided by either party
- There is a win-lose situation – whatever one party pays the other collects
- The charge will be paid by a competitor and it is in the interests of all operators to increase the costs borne by their competitors
- If call termination revenues exceed the amount needed for cost recovery, the excess can be used to cross-subsidize retail service prices, thereby improving the competitiveness of the interconnection service provider in downstream retail markets.

This potential means that interconnection needs to be regulated to avoid anti-competitive outcomes that would otherwise occur to the detriment of competition and consumer welfare.

2.3 Reference paper for the General Agreement on Trade in Services (GATS)

The initial source of best practice for the provision, regulation and administration of interconnection services is in the reference paper attached to the GATS Agreement on Basic Telecommunications Services (1998). The coverage in the agreement on interconnection is in Section 2 of the reference paper. Around 120 of the 208 countries in the world are WTO members and signatories to the GATS, although most of the countries in the Pacific are not. Nevertheless the reference paper's principles are, generally, very influential in this field.

A number of key concepts for best practice can be drawn from the reference paper.

2.3.1 Major suppliers

The reference paper is concerned with interconnection to the networks of major suppliers, typically entrenched incumbent operators. There is not a definition of major supplier in the reference paper. When applied to domestic regulation, the 'major supplier' concept has been transformed into the concept of service providers with market power, which has been variously described as significant market power (SMP) or market dominance.

2.3.2 Any technically feasible point

The reference paper requires that interconnection should occur at any technically feasible point. This does not mean any technically possible point in a network, but at any point where it can be technically organized and where it is sensible from an economic perspective. The cost of network conditioning and upgrade will usually be borne by the party seeking interconnection at a particular point (although not always). Consequently, this overall view of technical feasibility will involve some constraints in asking for interconnection at points that require substantial upgrade.

2.3.3 Non-discriminatory terms and conditions

This includes a quality of service that is no less favourable than the service provider (the major supplier) provides to itself and its affiliates. The principle of non-discrimination also extends to non-discrimination between interconnecting service providers.

2.3.4 Timely

A service provider cannot be permitted to delay competition by delaying interconnection.

2.3.5 Rates

The charges for interconnection services must be cost-oriented (a term that is further discussed in Chapter 3), transparent (although not necessarily published publicly), reasonable with regard to economic feasibility, and sufficiently unbundled. It is clear that the rates and how they are to be applied must be made known to the seeker of interconnection services. Charge and service unbundling is a principle that protects the interconnecting network operator from having to take services that it does not need, it might self-provide or have provided by a third party.

2.3.6 Public availability of procedures for interconnection negotiation:

The reference paper envisages that there should be an opportunity for the operators to negotiate arrangements for the provision of interconnection services, and that the procedures for doing so should be documented, and made clear through some level of publication. This is part of the overall emphasis on transparency promoted by the WTO generally. Processes should have documented procedures and they should be available and understandable.

2.3.7 Transparency of interconnection agreements or reference interconnection offers

Again, there is a commitment to transparency and to addressing the information asymmetry that favours incumbent operators who are fully aware of the terms of earlier agreements with other operators. An uninformed service provider may settle for less than others, and suffer competitive disadvantage as a result.

2.3.8 Dispute settlement by an independent domestic body

There is an anticipation that interconnection is so important to the parties that disputes will inevitably arise. If these remain unresolved there will be delayed competition at the expense of not only weaker (typically new entrant) service providers but also consumers. Dispute settlement by an independent body is the minimum requirement under these conditions. The body must be independent of the parties to the dispute to ensure a fair outcome.

2.4 Legislative frameworks: current international best practices

The issues associated with interconnection in CPNP situations are essentially universal. Even though the precise solutions adopted vary, they too have become more uniform in the pursuit of best practice as it has emerged over the past 15 years.

With the exceptions of best practices in relation to costs and cost modelling (which are discussed in chapter 3), statements of best practice, against which the practice of Pacific Island countries might be reported and assessed, could be organized under the headings outlined here.

There should be a clear legislative framework in the form of either an act or regulations pursuant to an act, or both, which sets out each of the matters listed below. The act should be accessible to all who might wish to know the law on interconnection and access.

2.4.1 Objectives and principles

The objectives and principles relating to interconnection and access, including the context in which issues associated with interconnection and access might be addressed and resolved, need to be made explicit. Typically these objectives are also those for regulating the sector as a whole.

Principles will refer to standards that dictate how matters will be addressed, rather than the objectives themselves. For example, the act might place reliance for the development of the telecommunication sector primarily on the forces of a competitive market, with regulatory intervention regarded as a second best means of achieving consumer, societal and other goals in the absence of adequate competition. The principle here is primacy of competition as a tool for sector development.

In the specific case of interconnection, one would expect to see some reference to the following points.

- The any-to-any connectivity principle (whether under this name or otherwise) which preserves the right of a subscriber to a service on one network to call and be called by subscribers with services connected to other networks
- The rights of licensed service providers to mandated interconnection services from other licensed service providers once a formal request is made
- The obligation of a licensed service provider to provide mandated interconnection services to other licensed service providers on receipt of a formal request.

It is typical practice for legislation in this area to set out a range of objectives that need to be pursued, but with a balance to be achieved in the optimization of each objective being left to the judgement of the regulator. This means that, taken to extremes, some objectives that bear on interconnection and access may be incompatible with others. For example, the objectives relating to interconnection might require the regulator to establish cost-based charges but also to ensure that the outcome promotes the adoption and accessibility of services to retail customers, and that the issues of social, economic and geographic disadvantage are fully considered. This is a mix of commercial, social and national inclusion goals that need to be balanced when the legislation is implemented.

2.4.2 Independent authority

Interconnection regulatory arrangements need to be administered by an independent agency. Under the GATS requirements, independent refers to independence from the parties in the market place. Therefore, the regulatory arrangements for interconnection cannot be administered by the incumbent. Even so, it is not necessary for a separate telecommunications regulatory agency to be established apart from the department or ministry. However, regulatory separation from governmental policy departments is clearly to be preferred. In the Pacific region, many countries do not have the resources or skilled personnel to warrant the establishment of an independent agency separate from departments and ministries.

2.4.3 Relevant considerations

The legislative or regulation framework should, ideally, set out factors that constitute relevant considerations that need to be taken into account when regulating interconnection and access. If there are factors that explicitly should not be considered, they might be listed as irrelevant considerations.

In particular, matters affecting the setting of interconnection charges might be listed to ensure that they are assessed and weighed by the regulator in the course of determining charges. Such factors might include:

- the costs of providing the interconnection service (including the standard to apply in the calculation of those costs);

- previous charges that have applied and whether some period for adjustment and accommodation to new charges is required (often called a *glidepath*);
- the impact of certain levels of charge on retail prices and retail take-up of services and service accessibility for end users generally;
- the overall reasonableness of costs, with efficiency and best practices in other comparable countries for interconnection charging taken into account;
- the impact on investment and competition of interconnection charges under consideration.

2.4.4 Procedure

The legislative framework or other authoritative source should set out the procedure to be followed for interconnection activities such as the preparation and approval of a reference interconnection offer (if there is provision for such offers in the jurisdiction), and the process for negotiating and amending interconnection agreements.

Clear and transparent processes add to improved understanding, realistic expectations and certainty for all parties, and are likely to support decisions to invest in the sector.

Best practices for the process for establishing interconnection agreements include a number of points.

- The parties are required to negotiate in good faith.
- The parties are expected to act expeditiously and to take no more than a reasonable amount of time to respond to each other's requests for service or information.
- Either or both of the parties may ask the regulator to intervene and arbitrate on issues that the parties cannot agree on, after a reasonable period of negotiation. Legislation in some countries sets out the timescales that are considered reasonable, while other countries leave it to the judgment of the parties and the regulator. Both approaches have their virtues and there is no best practice on this particular issue.
- It is at the regulator's discretion whether or not to act as an arbitrator, and the regulator also has some discretion on the procedure to adopt if arbitration goes ahead.
- Arbitration is confined to the issues that the parties raise for arbitration and does not extend to the whole of the interconnection agreement.
- Arbitration is held in camera with only the parties to the dispute participating.
- When an interconnection agreement is concluded, the regulator must approve and register it. The regulator must ensure that its terms are in accordance with any pre-existing reference interconnection offer (RIO) (and, if not, either the agreement or the RIO will need to be amended), and that the agreement is not otherwise contrary to the public interest.
- The agreement should be published. The onus is on any party claiming confidentiality or that publication could adversely harm its commercial interests to prove that assertion. In determining claims of confidentiality, the regulator will assess and balance the public's (and other industry participants') interest in transparent and open regulation of interconnection (the default outcome) against the potential harm to the claimant.

2.4.5 Interconnection agreements' RIOs

The idea of a RIO is to provide a standing offer that can be converted into a contract by the acceptance of a suitably licensed service provider entitled to receive interconnection services. Further, any agreement that is based on a RIO which is not approved by the regulator will, if the agreement is approved, lead to the RIO being amended. This means that the administration of a RIO is a means of ensuring the principle of non-discrimination.

RIOs (and the interconnection agreements that they are based on) typically cover a range of technical, operational and contractual details that may be important to the parties in managing their relationship but are not appropriate for including in legislation. In addition, RIOs typically include substantial additional details to make operational the arrangements that are included as principles in the legislation, such as billing and payment arrangements, the resolution of detailed accounting and measurement disputes, needs forecasting, order creation and processing, and so on.

Although the RIO approach is clearly best practice, not all jurisdictions have incorporated it as a basic part of their interconnection regime. In Australia, there is not a requirement for RIOs to be prepared. Instead, there is provision for voluntary access undertakings that require approval and registration by the regulator, the ACCC. Over the years, many voluntary undertakings have been put forward by the incumbent, Telstra, and other major service providers such as Optus and Vodafone. In all cases relating to interconnection, the ACCC has not accepted the undertaking in its proposed form. The result is that there are not any undertakings that are registered and operational. Consequently, the potential path for low-cost creation of interconnection agreements offered elsewhere through RIOs has not been realized.

2.4.6 Approval and registration

It is a common misconception that, if the service providers who are parties to an interconnection agreement agree between themselves, there is no further role for the regulator. This is contrary to best practice. Best practice requires that the regulator should examine agreements to ensure that they are consistent with the wider public interest, including the interest of consumers in the growth and development of a sustainable, competitive telecommunication sector. If the regulator has determined minimal requirements for agreements (including alignment with pre-existing RIOs, if any), then the regulator needs to ensure that these requirements have been complied with. Lastly, the agreement, if accepted, must be approved and registered by the regulator.

2.4.7 Transparency and publication

Best practice requires RIOs and interconnection agreements to be published. This requirement helps ensure both transparency and non-discrimination. It also addresses the information asymmetry that can develop in favour of the incumbent, who has knowledge of multiple agreements.

In some jurisdictions, service providers have successfully claimed that all or part of the interconnection agreements contain commercially valuable information that could harm their commercial interests if published. These claims need to be assessed against the importance of sector regulation being credible and properly administered, and the public interest.

It can be concluded that confidentiality claims are extremely unlikely to ever be sufficient to justify non-publication of either the whole agreement or a RIO, but publication of a version with redacted sections is a possibility.

Interconnection charges should always be published. If they are included in an order or determination by the regulator, then they should be published on that basis. However, even if they have been the result of private negotiations between the interconnected network operators, they will have been approved by the regulator before registration. The regulator's approval and the rates approved should always be published. These are never matters that can be said to be private to the parties.

2.4.8 Public consultation

Many regulators are either required or have an option to hold public consultations in relation to various parts of the interconnection and access processes, such as:

- in the course of determining interconnection rates;
- when establishing procedural frameworks;
- when establishing access codes; and
- before approving RIOs.

Irrespective of whether public consultation is mandated or a decision by the regulator on a case-by-case basis, the use of public consultation is emerging as best practice. Public consultations enable all stakeholders to participate in processes they are affected by. They add to the transparency and credibility of the overall result. In addition, responses may provide useful new ideas and improve the outcomes. Public consultation can also act as a pressure release and allow stakeholders to put across views and evidence that they might otherwise be encouraged to use in judicial proceedings.

2.4.9 Enforcement

The regulator needs clear powers in the act to enforce decisions made in relation to access and interconnection. Without such powers, the regulator's role is weakened and authority severely reduced.

2.4.10 Dispute resolution

Most interconnection regimes prefer the parties to resolve disputes between themselves rather than using up the regulator's limited resources. In summary, best practice suggests the following arrangements relating to dispute resolution.

- If after a reasonable time, good faith negotiations to conclude an interconnection agreement have failed, one or both of the parties may take the issues in dispute to the regulator for arbitration.
- The legislation may establish procedures for resolution of disputes that involve the interpretation of an interconnection agreement that has been concluded and is being implemented. Typically, the regulator has no role in resolving legal disputes of this kind, other than to ensure that interconnection services continue to be provided and the interests of customers and end-users are not being adversely affected. In such cases, best practice is for the legislation or the interconnection agreement to require the parties to exhaust all non-judicial dispute resolution processes, such as commercial arbitration or whatever is provided for in the agreement, before going to court.
- Regulators should avoid being involved in the resolution of billing disputes because billing is an issue between the operator and the consumers, but it can intervene where a consumer complains to the Regulator. Also, it may take a lengthy period and cumbersome procedures .

2.4.11 Appeals

Some provision needs to be made for allowing appeals to made in court on matters of law. On issues of fact, other than facts going to jurisdiction or powers, either the regulator's decision is final or there may be an appeal to a superior administrative tribunal. It is most certainly not best practice to permit appeals to be made to policy-making bodies such as ministries or government departments.

The points set out in this section provide a best-practice framework for assessing the arrangements for interconnection and access in the Pacific region.

Section 3: Costs and cost modelling

3.1 Prices in a competitive market

If markets for goods or services are effectively competitive then the price mechanism will be the means of matching supply and demand. Over time, prices will tend towards the long-run incremental costs of supply, allowing for a risk-adjusted return on the capital employed.

3.2 Interconnection markets

There are three interconnection service markets that need to be considered:

- call termination;
- call origination;
- transit.

These services were discussed in detail in chapter 2.

3.2.1 Call termination

It is clear that the markets for call termination are never competitive. Each network is a separate and distinct call termination service market. In order to call a particular subscriber on a particular service then it is necessary to terminate the call on the network to which that subscriber's service is directly connected. There is only one route to the subscriber and this is only supplied by one service provider. There is no possibility of competitive entry into this particular market. The terminating network operator has 100 per cent market share and that will continue.

It therefore follows that the forces at work in competitive markets will not constrain the service provider of the termination service from setting termination prices in accordance with cost. The service provider knows that pricing above cost will not affect the retail preference of its subscriber to continue being connected to its network. Subscribers' purchasing decisions are affected by the price of the services they pay, not the prices that are borne by callers. The call termination service provider has a further incentive to price over cost: it knows that the burden will fall on its competitor in retail markets. Shifting costs to competitors is a good strategy, if it can be implemented.

It is therefore possible to conclude that call termination markets are always characterized by a single service provider that is dominant. In the EC's terminology that service provider has SMP. A service provider is dominant if it can act in a market independently of its customers and competitors. This is usually taken to mean that it can increase prices or reduce outputs without needing to take account of the responses of its competitors or customers.

3.2.2 Call origination

The situation can be different for call origination. Call origination services include call selection and carrier pre-selection services (CS/CPS), as well as calls to information services connected to other networks. Call origination services almost always only apply in the case of calls originating on fixed networks. For example, the current Malaysian access code nominates call origination services from mobile networks as subject to regulation. However that is an exceptional case. In most cases, regulators will only designate call origination from networks that do not have significant or effective competition at the retail level.

For both CS/CPS and access to information services, the costs associated with the origination service are paid by either the selected/pre-selected service provider or the network operator to which the information service is connected. However, the cost is passed back to the calling customer through the amounts paid for the services the customer was seeking to access in the first place. These situations differ from call termination because the called party received the benefit.

With call origination, if the calling party does not want to bear the costs of interconnected access, the service provider can be changed– but only if there are other service providers to choose from. So if the relevant retail market is competitive, there is no need to designate the call origination market. That is usually the case with retail mobile service markets.

3.2.3 Transit services

In the case of transit services, it is an empirical matter to assess whether there are licensed service providers with the capacity and presence to compete for providing these conveyance services. Sometimes only the incumbent fixed operator is licensed to provide third-party services, or the incumbent fixed operator may have the only network with the capacity and the ubiquity to provide these services nationally. In this case, there will be a strong argument for the market to be designated and transit service provision by the incumbent to be mandated.

The conclusion is that call termination should be considered the primary interconnection service market for applying costing best practices, and this is the case used in the rest of this report. However, similar costing principles and cost modelling techniques will apply to all three services.

3.3 Access service markets

Access services cover a range of facilities and infrastructure to which a carrier might be granted regulated access. Sometimes the access is conditional upon availability of capacity, and sometimes the access is unconditional.

Conditional access to facilities would include access to the operating sites and buildings of another service provider. These are forms of co-location. Co-location is only possible if there is room (or capacity) for the interconnecting service provider to set up equipment and otherwise establish its presence at a particular site. Access to the towers established by a service provider would be conditional. If the antenna-bearing capacity of the tower is full, then access by the first service provider may not be possible. Of course, it is easy for the service provider that owns a site, tower or building to say that it has no room, or that it has usage plans for any capacity that it is not currently using. This is why regulators must establish criteria and various methods to test such claims.

Access to local loops (the physical connection between a service provider's exchange and the premises of the customer) is unconditional. It does not depend on current use but on the services that the customer wishes to receive over that connection from another service provider. There may, of course, be technical features of the copper connection that make the current service unsuited to being used as an unbundled local loop (ULL), and this needs to be determined through prior testing.

3.4 Regulator pricing practice

When determining or approving prices for interconnection and access services, regulators seek to emulate the way in which prices would be set in an effectively competitive market.

As already noted, this means that, in the case of interconnection, regulators adopt a long-run cost approach. This is because, if the call termination market was effectively competitive, that is the way in which prices would tend.

In the case of access, pricing the variety of circumstances in which access services are supplied and the social policies that surround many of them complicate the regulatory pricing issue. For example, subscriber line rentals have been subject to social pricing policies in most countries for a very long time. These policies include uniform pricing in the interests of national inclusion, so that rentals in high density, low-cost urban areas are kept the same as for services in low density, high-cost rural and provincial areas. It is possible that the rentals in both cases are below costs, and subsidized from revenues from retail calls and other services. If, at a wholesale level (ULL, and wholesale line rental), these services were to be priced on the basis of costs, then it is possible that the wholesale price would exceed the retail price in some or all areas. The result would be no demand at all and no downstream competition in the relevant retail markets.

In this case, regulators have adopted a different approach to wholesale pricing based on retail price minus avoidable retail costs. In this way, the obligations associated with social pricing policies can be made compatible with competition.

In the case of facilities that have scarcity value, such as towers in areas where town planning prevents new structures or ducts in areas where it is more economic to use available unused capacity than to invest in completely duplicated systems, the regulated approach to pricing might be more cost-based. For example, it can be assumed that a new entrant would be prepared to pay a lower amount for a long-term lease of tower capacity than for a new tower. If all high land is taken, the cost to build might be substantial because a new tower might need to be taller than existing ones to reach the same height from lower ground. However, if a service provider builds a new tower and does not have a use for all of the antenna-carrying capacity, it would seek to sub-let the excess to other organizations. A regulator might, therefore, base tower space rentals on the proportion of the total capacity used multiplied by the cost of building and maintaining a tower of this kind.

3.5 Cost standards and methodologies

Using access and interconnection costs to assist in determining prices for these services is an economic activity, rather than a matter of accounting based on the historical costs recorded in an operator's accounts. Where there is a choice of building or leasing a facility, as there may be in the provision of transmission capacity for transit purposes or in building a tower for sitting antennae, the decision is based on current and anticipated future costs. The choices are not assessed on past costs and, therefore, current economic costs (not historical accounting costs) are needed.

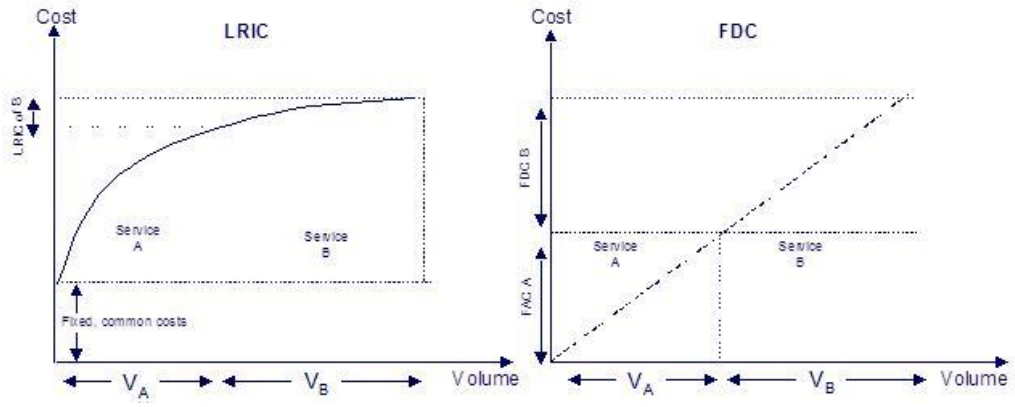
There are two cost standards that compete for regulatory favour, and ITU does not prefer one over the other. Therefore, the following assessment is the personal view of Mr Jim Holmes, the author of this report, and should not be cast as an ITU view.

There are two costing approaches most commonly used.

- **Fully allocated costs (FAC)**, also known as fully distributed costs (FDC). This methodology is called 'fully allocated' because all costs, including common costs, are allocated to services.
- **Long run incremental costs (LRIC)** is used to determine the additional costs associated with the production of a service. In other words, this approach seeks to find the difference in costs between the situation where a service is and where it is not produced (that is the incremental cost associated with the provision of a service).

The difference between FAC/FDC and LRIC is illustrated in Figure 5.

Figure 5: LRIC versus FDC

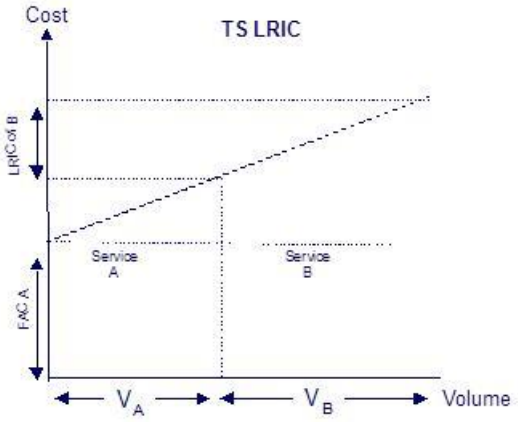


Total service (TS) refers to the size of the increment that is being considered. In the case of the SBR model, the approach is called 'total service LRIC' (TS LRIC) because it estimates the avoided costs associated with not producing any services, leaving only the costs common for all services. The increment is the cost difference between not providing any service and providing the full quantum of the services that are produced by the network. This is illustrated in Figure 6.

In the overwhelming majority of countries that employ an LRIC approach, provision is made for a contribution by call termination traffic to the shared network and common and overhead costs. The standard is then expressed as '*LRIC +'* with the plus referring to this additional element. The rationale for including a contribution of this kind is that, without it, common and overhead costs would be entirely borne by other services, particularly the retail services offered by the service provider. There would then be a subsidy from the service provider's retail customers to its competitor's retail customers. That would distort competition in the market.

A TS LRIC standard with mark-ups as contributions for common and overhead costs starts to look like a fully distributed cost model. However, it is not the same. Not all costs are necessarily accepted or distributed in such a model, and the way in which fixed and common costs are allocated may differ between the two approaches, even if the same total costs are involved.

Figure 6: TS LRIC (Total Service LRIC)



However, some organizations and commentators have advocated a different approach, which could be called a *pure incremental cost* approach. They argue that the appropriate cost standard is the increment of costs associated with the service in question (the termination service for interconnecting calls), and that this increment can be determined as the difference between the aggregate of costs with the service in question included and the aggregate of costs without.

There are many arguments against this approach.

- It is not actually best practice or even practice at all. It is not thought that this approach is used anywhere in the world where a 'calling party pays' scheme for termination charging is in place.
- The pure incremental cost approach assumes that the final increment is call termination. In fact, the network platform sustains a large range of services that the operator must provide to be commercially viable. Users are not going to subscribe to a service that does not have call termination services. They expect a full service, not the equivalent of a public telephone call-box service. It is therefore an arbitrary decision to decide that the incremental service is call termination.
- The pure incremental cost approach leaves recovery of common and overhead costs to other services, and particularly retail services. There is no compelling reason for this arbitrary exclusion of one service from that burden, and for the subsidy that results.

However, there is a very specific argument in this approach's favour. The *pure incremental cost* approach was adopted by the EC in its recommendation of 7 May 2009.[2] However, this recommendation has been the source of considerable contention in the EU, and may be further modified. In response to the unfavourable reception that the draft received, the final recommendation has been modified to permit NRAs in EU Member States to implement it over a longer period, to the end of 2012, and in exceptional circumstances to 2014.

There does not appear to be a reason why Pacific Island countries should not adopt an EC-recommended approach in advance of the EU Member States themselves. Rather, it would be useful for monitoring the approach's development and practical application. In any case, the EU situation is different from that in the Pacific region because service penetration and usage in Europe is closer to saturation and the emphasis there is on efficiency rather than further investment.

Therefore, it is recommended that a TS LRIC + approach represents current best practice, and is an appropriate approach to interconnection costing in the Pacific region. Failing that, an FDC approach could be used, but this would need to be implemented with care to avoid including costs that stem from any inefficient practices of the service provider offering the call termination service. Efficiency issues are discussed in section 3.7.1.

3.6 Cost models and benchmarks

3.6.1 Cost models and benchmarks compared

Cost models are tools that seek to create a reflection of reality so that service costs can be calculated. They require time, resources and expertise to prepare and refine. Cost models are a tool for assisting regulators and service providers when making judgments about costs. When making a judgment about whether to rely on them and to what extent, regulators and operators must remember that the results calculated by cost models always reflect the assumptions incorporated in the model and the data used.

[2] EU (2009).

Benchmarks of interconnection charges in other countries differ from cost models in an important respect. Cost models seek to calculate the costs of service (call termination in this case) in the country in question. Benchmark studies seek to determine costs in other countries that are considered relevant in important ways to the country in question. Benchmark studies have the advantages of being relatively quick and cheap to complete, especially compared to cost modelling, and from the regulator's perspective they have an additional advantage in that they do not require cooperation from service providers in the jurisdiction.

3.6.2 Benchmark studies

An international benchmarking of interconnection rates is not an appropriate way to determine cost-based termination rates but can be an excellent way of quickly and inexpensively establishing an interim rate or providing a means of assessing the pricing outcomes of a commercial negotiation or a cost model.

The principal weakness of an international benchmarking exercise is that complex differences in the circumstances of various countries must either be normalized or disregarded, which can introduce a degree of subjectivity into the process. The greater the difference in the circumstances of the benchmark countries, the more adjustments will need to be made to the underlying data to make them comparable. This is an important consideration when selecting the countries that will form the benchmark set. As few countries are so similar that they are immediately and directly comparable to one another, the selection of countries to include in the benchmark must be on the basis that their circumstances are reasonably comparable to the country being benchmarked. In practice, decisions on which countries to include in a benchmark will also be influenced by the availability of the necessary data.

Most importantly, the benchmark countries should also be at similar stages in their socio-economic and industrial development; that is, developing countries should typically be benchmarked against other developing countries.

Identifying countries that are 'reasonably comparable' sounds easier than it often proves to be in practice as the list of potential national differences is considerable. For example:

- countries differ in terms their geographic size, population and economic development;
- telecommunication markets differ in terms of their size, stage of liberalization, number of participants, labour costs, demand, and level of affordability;
- telecommunication networks differ in terms of their size, topology, utilization, technology and age;
- network operators differ in terms of their relative size, scale, operating practices and level of integration; and
- regulatory environments differ in terms of the level of regulatory refinement, taxes and duties, radiofrequency spectrum management and cost, and the method used to set interconnection prices.

It is neither practicable nor necessary to adjust the benchmarking data to normalize all of these differences. Some differences are more significant than others. Figure 7 shows some of the factors for which adjustments are often made. However, such adjustments can also risk overcomplicating the exercise, particularly if the benchmark is intended to be used simply as a common sense check on the outcome of a cost model rather than the principal or only basis for determining the rates.\

Once the benchmark countries have been selected, identifying and adjusting interconnection pricing data presents a second challenge. As different countries may use different methods for calculating or setting interconnection prices, and often adopt different pricing structures, it will rarely be possible to rely on a simple comparison of interconnection prices between countries. As a minimum, a common currency is needed.

It is important to know, in broad terms, how the interconnection prices were set in each of the countries to be included in the benchmark. This is a key indicator of how closely the interconnection price is likely to reflect cost. When trying to estimate interconnection rates that are reasonably reflective of cost, it is important to include in the benchmark only those countries that have set rates based on a detailed cost study or cost modelling, and which have been formally approved on that basis by an independent regulatory agency.

Figure 7: Common adjustments to normalize national differences in benchmarking exercises [3]

Factor	Reason for adjustment
Population density	The number of inhabitants per square kilometre in each country can affect network development costs. Countries with high population densities tend to have lower network costs than countries with lower population densities.
Local area size	This may affect the proportion of short and long distance calls and therefore the costs of interconnection.
Extent of urbanization	Network development costs are lower for urban areas than rural ones. Countries with a high degree of urbanization tend to have lower network costs than countries with less urbanization.
Call duration	This may vary widely across countries for several reasons. For example, if customers pay a flat rate for unlimited local calling, average call duration is likely to be longer than in countries where customers pay a per-minute rate. Networks with higher call durations need more network capacity, and so will have higher costs.
Input prices	The costs of key inputs will vary across countries, and this will affect interconnection costs. For example, the cost of capital will be significantly higher for most developing countries than for developed countries due to a higher risk in developing markets.
Scale economies	If a firm faces significant fixed costs, average cost is likely to decline as output increases. Markets with greater scale generally have lower average costs. When attempting to extrapolate prices or costs from countries with scale advantages to a country with a smaller market, it may be necessary to adjust the benchmarked data.
Taxes	Price data included in the exercise should either include or exclude all retail taxes.

It is reasonable to assume that interconnection prices will closely reflect costs in a country that has set these prices based on cost modelling, and received formal approval from the regulatory body to confirm or 'certify' that that was the case.

In contrast, interconnection prices that have been set unilaterally by an operator or are the outcome of commercial negotiations are unlikely to be based on costs.

[3] ITU (2008).

Similarly, benchmarking against countries that have themselves used benchmarking to set interconnection rates potentially introduces a series of inappropriate comparator countries into the benchmark. Benchmarks based on benchmarking involve further removal from actual costs.

The different pricing structures adopted in different countries make comparisons particularly difficult and must be normalized. Some countries, such as Mauritius, have a very simple interconnection pricing structure, with one single price for fixed termination and another single price for mobile termination. Other countries, such as India, Tanzania and the Republic of the Congo, have simplified this structure even further by adopting a single price for both fixed and mobile termination.[4] However, most countries have set a number of different prices for both fixed and mobile termination that differ according to time of day, distance, network utilization and/or which network operator is terminating the call. For example, some countries set fixed termination rates based on whether the call is terminated from a local, single tandem or double tandem exchange; while other countries, such as Guernsey and Jersey, set different fixed termination rates for peak and off-peak times. Some countries, for example, Hungary and Morocco, combine both these approaches and set different fixed termination rates for local, single and double tandem services that also differ between peak and off-peak times.

Comparing fixed termination rates is often further complicated by some countries applying a separate call-set up charge in addition to the call duration element in the termination rate. All of these factors can make it very complicated to compare the interconnection prices of the different countries in a benchmark.

The comparison of mobile termination rates is more typically complicated by rates differing by operator (that is asymmetric rates) and/or time of day. This is shown in Figure 8 by comparing the structures for mobile call termination rates in Australia and Ireland.

In cases such as that presented by Ireland, it is common to use either the rate applicable to the largest operator on the assumption that this represents the operation with the most efficient scale of operation, or an average of the various rates. As traffic profiles differ by country (as does the definition of peak and off-peak times) it is necessary to make assumptions about the appropriate weighting of these factors. These weights should ideally accurately reflect the traffic profiles of the particular operators in question. However, such information is rarely available in the public domain, and is not available for all countries. Consequently, it is usually necessary to generalize assumptions about traffic profiles. However, in doing so, it is important that a consistent approach is adopted for all countries in the benchmark.

Figure 8: Comparison of two different pricing structures for mobile termination

AUSTRIA	
Operator	Price per minute (€)
Hutchison	0.04
Mobilkom	
Orange	
T-mobile	

IRELAND			
Operator	Price per minute (€)		
	Peak (Mon-Frid)	Off-peak (Mon-Fri)	Weekends
Meteor	0.15600	0.09790	0.05210
Vodafone	0.12750	0.04827	0.04827
3	0.17780	0.11430	0.08890

The use of glide paths in the benchmark countries can often lead to uncertainty or dispute over which particular rate among those specified in the glide path should be used in the benchmark. In such circumstances it is necessary to distinguish between two common types of glide paths.

[4] In the case of Tanzania, this is on the basis that the single interconnection service is 'voice termination'.

The first type is typically found when a regulatory agency has modelled the cost of termination in successive years to account for forecast changes in market shares or traffic volumes. Each interconnection price in the glide path thus reflects the costs of termination at that point in time or in that year. Examples of countries that have adopted such a glide path are Malaysia and Tanzania. In such cases, it is appropriate to include in the benchmark the rate that represents the current prevailing interconnection price.

The second type of glide path is that which has been adopted to graduate the implementation of a cost-based interconnection price. In such cases, the cost-based price is the end point where the glide path and the interim rates tend to reflect arbitrary points between the prices that applied prior to the cost modelling exercise and the destination figure. In this instance, it is appropriate to use the end-point of the glide path as that is the rate that has been determined to reflect the cost of termination. The other rates in the glide path are simply steps towards that end. The exception would be the scenario where a regulator wishes to use a benchmark to compare the current prevailing rates across a number of countries. In such a scenario, it might be more relevant to include the current prevailing interconnection price rather than the end point. This raises the issue of whether the benchmark study is of costs or rates. It can be contended that the purpose of benchmarking interconnection rates should be to understand the costs that have been calculated in similar overseas countries rather than simply compare current prices.

It is necessary to convert the rates into a common currency or monetary unit to enable a comparison. That conversion will typically be based on either foreign currency exchange rates or purchasing power parity (PPP), or a combination of both. Generally speaking, it is appropriate to use a foreign exchange rate to convert foreign currencies into the local currency when the majority of the local telecommunication operators' costs are incurred in a foreign currency. This situation can arise when operators must purchase capital equipment in international markets or repay loans denominated in a foreign currency. The average exchange rate over a sufficiently long period will smooth out the exchange rate fluctuations that occur over time. This is more accurate than using a spot price, which at any particular moment could happen to be abnormally high or low. It will also be necessary to consider the stability of any foreign currencies at the analysis stage, particularly if the relevant exchange rate has fluctuated considerably since the interconnection prices were set in a country.

If most of the costs incurred by local telecommunication operators are local and denominated in the local currency, then it is more appropriate to base the conversion on PPP. A good example of such costs is employment costs. The reality for most operators is that their costs are incurred in both local and international markets, and in both local and foreign currencies. To reflect this situation, a prudent approach is to convert prices into the local currency using a weighted average of both foreign exchange rates and PPP. It is recommended that this approach is used for currency conversions.

Finally, a further important matter must be determined once all of the data have been collected, sorted, and re-processed and before any comparisons can be made. The data will show a range of call termination rates and these might be usefully set out from lowest to highest. The important point is where to pitch the rate for the country in question. Before a decision is made, it should be determined whether there are outlying values that ought to be discarded. Having assessed the data for any rates that should be discarded, should the rate be the median, the mean or something else, say best practice, or better practice (perhaps represented by the top of the third quartile)? There is no correct answer to this question. It is a judgment in each case. Many benchmarking studies wrongly assume without discussion that a median or mean figure should be taken as the outcome.

This extended discussion on benchmarking has been included to signal that there are many judgements to be made in the course of such studies. It may be that stakeholders, particularly those with direct interests in the outcome, will strongly pursue approaches that best serve their interests.

Benchmarking is made more difficult in the Pacific region because very few regulators have developed cost models for interconnection or access rate setting. This means that Pacific region regulators using benchmarks will need to look beyond their region for almost all of the comparator countries to include in their study.

3.6.3 Cost models – types

There are three general types of cost model: top-down, bottom-up and hybrid. All three can be LRIC or FAC, as required.

Top-down cost models are based on accounting sources: the fixed assets register for capital expenditure, and the general ledger for operational and other on-going expenditure. Top-down models operate on the basis that the costs of the fixed or mobile network are contained in the service provider's accounts and that the role of the model is to convert accounting costs that reflect capital and operational purchases into costs on a per service basis. The historical accounting costs are converted into current costs where necessary. The costs for purchasing some goods may typically rise over time, as in the case of land and labour, and the costs for others may fall, such as the cost per unit of capacity for technical and operating equipment and systems.

All costs are annualized and the total annualized costs are converted into service costs using routing tables, that is, matrices showing the relative frequency with which a unit of service (say a minute of call traffic) will use each of the elements that make up the network.

Bottom-up cost models do not use the accounts as their source for network costs. Rather, a theoretical model is designed to efficiently process the assumed service demand, and then cost that theoretical network. The conversion from network to service costs is on the same basis as in top-down models, that is, by using routing tables.

Hybrid cost models, as the name implies, incorporate features from both the top-down and bottom-up cost models. For example, in a top-down model the allocation of operational costs to network elements will require information on cost drivers that are not in the accounts. If the service provider has a comprehensive activity-base costing (ABC) system then that will be a very useful source of information for cost allocation purposes. Otherwise, assumptions have to be developed from other sources, including activity sampling and benchmarking.

Bottom-up models are good for modelling the costs of capital costs. However they typically rely on benchmarks for determining mark-ups for common and overhead costs, including indirect maintenance. These assumptions are inputs and not part of the bottom-up modelling process. To this extent, the model will become a hybrid one.

3.6.4 Cost models: strengths and weaknesses

The strengths and weaknesses of the top-down and bottom-up approaches are shown in Figures 9 and 10.

Figure 9: Strengths and weaknesses of top-down cost models

Strengths	Weaknesses
The main strengths of adapting the operator's accounts to match the interconnection pricing standard. • This is the only approach that is totally based on the actual costs of operating in the national market. Each of the other approaches requires simulation of national operating conditions. • The model has the ability to take account of the minutiae of real costs. No matter how good the assumptions used in other approaches, they cannot match the detail obtained from the original accounts. • There is a strong audit trail. Top-down approaches can always be traced back to the audited accounts of the operator.	The main weaknesses of adapting the operator's accounts to match the interconnection pricing standard. • The model cannot take full account of potential efficiency improvements. The top-down approach is to some extent constrained by the historic network design and operating practices of the operator. • There are problems maintaining the confidentiality of an operator's cost data. If the top-down approach is to be transparent, then data must be made publicly available.

Figure 10: Strengths and weaknesses of bottom-up cost models

Strengths	Weaknesses
The main strengths of building an economic/engineering model of an efficient operator. • This takes full account of all theoretically available efficiencies, both technical and operational. The bottom-up model can adopt a scorched earth approach, which simulates the operator's entire network and facilities being rebuilt in the most efficient manner to support estimated demand for access lines and call traffic. • Problems of confidentiality of data are avoided. As the model will not be based on the operator's actual network, the cost and volume inputs can be generically obtained.	The main weaknesses of the bottom-up approach to matching the interconnection pricing standard. • The model has little resemblance with the operator's actual costs.[5] • The model deals with operational costs, which comprise maybe 60 per cent of the total network costs of a real-world operator. To address operating costs, the bottom-up model has to rely on mark-ups and rules-of-thumb derived from best practice comparisons.

These strengths and weaknesses apply generally. In the specific case of determining the costs of call termination services, the balance swings in favour of bottom-up models.

- The models are usually produced by regulators to help them determine call termination rates, and it is an advantage that there is limited reliance on service provider cooperation for data inputs.
- The models are not network specific and therefore may be made public and discussed during public consultations.

[5] For example, after two years of work on bottom-up models in the UK, the Office of Telecommunications (Oftel) was forced to admit that they could not be reconciled with the top-down approach.

- There may be no (say, mobile) operator providing services either at all or in some regions and, therefore, no recorded account costs will be available.
- The models are more amenable to adjustment to ensure efficiencies of operation, and these can be built into the network design parameters and the assumptions about utilization and operational cost mark-ups.

3.7 Which costs?

3.7.1 Efficiency

An effectively competitive market will encourage productive, allocative and dynamic efficiency on the part of competitors. If the regulated prices for call termination services are to emulate those that would otherwise result from competitive market forces, they must be costs of an efficient operator. An efficient operator is one that deploys forward-looking technologies and efficient practices in the operation of its business. Forward-looking technologies are those that would be used by a network operator building a network today. At the least, obsolescent equipment would not be used.

Efficiency as used here is an economic concept, and relates to achieving economies of scale in network operation. If, for example, a market is capable of sustaining two mobile operators, then over time they would tend towards 50 per cent market share each. That would represent the practical optimal scale efficiency available to them. Under these conditions the bottom-up model would be based on 50 per cent of the total traffic rather than on the actual traffic of any individual service provider. In this way, the concept of scale efficiency would be covered off in the modelling process.

In principle, it is appropriate that the costs that are taken into account when cost modelling are the costs that would be incurred by an efficient operator. These costs are being passed onto another competitor in the market. It is inappropriate for an operator's inefficiencies to be borne by its competitors. Charges for call termination, which are based on efficient costs, are an incentive to achieve the levels of efficiency involved.

3.7.2 Scorched node or scorched earth

There are two main approaches to modelling the network topology in a bottom-up model.

- **Scorched earth:** this is an approach where the location and number of network nodes are determined based on an optimal network design, taking account of current and future traffic and subscriber profiles.
- **Scorched node:** this approach takes the current location and number of network nodes as the basis for the modelled network topology. Future nodes are optimized based on forecasted traffic and subscriber requirements.

Scorched earth approaches require considerable care to ensure that the theoretical location of nodes in the model is both optimized and has some regard for the topography of the country to which the model relates.

If the network is being optimized for scale efficiencies and uses a 50 per cent share of traffic (for a two-supplier market) or a 33 per cent share of traffic (for a three-supplier market) then the model will not reflect, except by chance, the size of any of the actual operators in the market. This means that reconciliation between modelled nodes and actual nodes (of actual networks) will either be inappropriate or approximate.

This means that different issues and requirements for care arise depending on whether the model is scorched node or scorched earth. Best practice here would seem to be not one form of scorching or another, but whether the implementation is adequate and careful.

3.8 Symmetry

The approach based on optimizing to achieve potential scale efficiencies suggests that the result will be symmetrical, especially between call termination rates for different mobile networks. However, there are many examples of countries that have introduced asymmetrical call termination rates depending on the actual or expected unit costs of each particular network.

Best practice is no longer to establish call termination rates based on the costs of each network in any automatic way. As already discussed, interconnection charges are based on costs, but the costs are those of an efficient network operator, with scale efficiencies, rather than the costs of individual operators. The default position, in the absence of a compelling reason to the contrary, is symmetry.

The EC and European Regulators Group (ERG) has signalled that one compelling reason might be that spectrum has been exhausted and that a new entrant into a mobile market may be forced to use bands or capacity that puts it at a cost disadvantage. This is one example where individual costs might be taken into account.

A further note relating to best practice is that, where they exist, asymmetries should be progressively reduced over the shortest reasonable time, such as within three years. Asymmetries, if justified at all, should be temporary and not a permanent feature of the regulatory landscape.

3.9 Implementation

Once a regulator has determined the interconnection rates that should apply, consideration needs to be given to the implementation arrangements. If the new rates are similar to the existing rates then the changeover is unlikely to cause any disruption. However, if the new rates are substantially different, the possibility of progressive implementation on a glide path basis arises.

It is important to make clear at this point that, while some commentators do not favour glide paths, there are exceptional circumstances when they are justified. Glide paths are often included in implementation arrangements, but, unless justified in the specific circumstances of their application, they are not considered as best practice.

To take a practical and common example, imagine that a mobile call termination rate has been set at 20 cents per minute, based on benchmarking. As already noted, benchmarking is an inexact method, and requires many judgments about the comparator countries and their relevance to a home country. Imagine also that a well-constructed bottom-up cost model has suggested that the termination rate should be 14 cents per minute, and that this is the rate that the regulator is going to determine. The first consideration is whether a reduction of 6 cents per minute (30 per cent) is significantly different. Most regulators would say that it was significant, and that progressive or stage implementation on a glide path basis should be considered.

Figure 11 presents the arguments for and against a glide path approach to implementation.

Arguments for a glide path	Arguments against a glide path
• The service providers involved have planned their businesses and their investments for some period ahead, and a sudden change in an important variable such as the call termination charge will have a major impact. Time is needed to adjust the parameters in the business and investment plans accordingly. • Step function changes are to be avoided and smoothed, where possible, for the benefit of service providers and, through them, of customers and end users. • The service providers could not have reasonably anticipated and planned on such a significant change in termination rates.	• A glide path might allow one service provider to acclimatise and adjust to a new interconnection rate, but this accommodation is paid for by the other service provider and its customers. • Glide paths are likely to be justified in a policy sense where the rates being introduced are retail rates affecting residential customers across the social spectrum, rather than wholesale rates or rates affecting business customers. • Business plans should be robust with hedging for contingencies, especially when a major review (of interconnection rates) has been foreshadowed and is then conducted over a long period (typically in excess of six months).

The arguments set out in Figure 11 are general. In the specific example, it might reasonably be assumed that:

- call termination rates based on the modelled costs are a more accurate reflection of the costs in the country in question than the benchmarked rates; and
- in all likelihood, the call termination rates based on benchmarks delivered a windfall to the provider of termination services for some or all of the period in which they operated.

This means that the windfall would be extended to the extent of the glide path. This is an outcome that is hard to justify on public policy grounds.

If on balance it is decided to implement a glide path, then the rationale for the glide path should dictate its length. If the rationale is to allow adjustment to business plans, and to investment and purchasing arrangements, then the length of the glide path might be limited to the planning and forward purchasing horizon. These would not normally extend beyond a year or two years at most.

In summary, practice is variable with glide paths. Best practice requires that any claim for a glide path be seriously examined and that the length of the path, if one is permitted, should be limited by the rationale that justifies it in the first place. Continuation through a glide path of an existing windfall arrangement at a competitor's expense is to be avoided.

3.10 Conclusions on best practice standards for the Pacific region

The standards for best practice developed elsewhere, and particularly in Europe, for regulating and cost modelling of interconnection and access rates are generally applicable for assessing these matters in the Pacific region.

However, in all of the ICB4PAC beneficiary countries, there are substantial limitations in terms of the resources and capacity available to regulators. Consequently, this will influence the choice of methodologies that they choose to apply to address the issues. In many countries, for example, there is monopoly provision of fixed and mobile services, and therefore the need and opportunity to commit to best practice may not have fully arisen.

Some practices emerging elsewhere reflect the level sector development in those countries and regions, and therefore may be inappropriate for adoption in the Pacific region. One example is the 2009 policy of the European Commission in relation to call termination rates and the cost standard that should underpin them. The EC approach is tending towards a pure incremental cost approach, without contribution to shared and common costs. This approach is consistent with high service penetration levels and less emphasis on new investment to achieve increased take-up rates.

The circumstances in the Pacific region are different. In all Pacific Island countries, the total regulatory package needs to support and encourage new investment from new entrants as well as current service providers. Ensuring that the cost standard for regulated services is capable of providing the recovery of efficient costs is part of that encouragement.

Section 4: Interconnection and cost modelling in the Pacific region by country

4.1 Cook Islands

4.1.1 Country and market background

The Cook Islands comprise 15 islands with a total land area of 240 square kilometres within an exclusive economic zone covering 1.8 million square kilometres of ocean.

The total population at the 2006 census was 19,569, of whom 14,153 lived on the island of Rarotonga.

For telecommunication purposes, it is important to note that there is a much larger population of Cook Islanders in New Zealand. In the 2006 census, 58,008 self-identified as being of ethnic Cook Island Maori descent. Tourism is a major and growing industry and this also drives the need for telecommunication services that meet tourist expectations and needs.

Telecom Cook Islands Limited is government-owned and is the only service provider in the country. Telecom Cook Islands provides fixed, mobile, internet and international gateway services.

4.1.2 Legislative framework

The provision of telecommunication services is governed by the Telecommunications Act 1989, which is administered by Telecom Cook Islands.

The legislation is of the pre-competition style and created rights and obligations for the service provider and established the power of the minister.

The Cook Islands Government has determined to introduce competition and terminate the telecommunication monopoly. The government has reviewed the existing act and prepared new legislation in the form of the Telecommunications Bill 2009. This bill may be deferred or delayed and may, in the course of parliamentary debate, be amended. Therefore, the assessment in this report is based on current practices but with a note about policy intentions.

The bill provides for the creation of the office of Telecommunications Commissioner as an independent regulatory authority, one of whose duties will be to support and promote sustainable and efficient competition in the market for the benefit of end-users. Part 7 of the bill makes explicit provision for interconnection, and, in particular:

- the commissioner will be required to 'promote adequate, efficient and cost-oriented interconnection of telecommunications networks and access by service providers to telecommunications facilities of other service providers';
- the commissioner has the task of promoting interconnection agreements and of resolving disputes in the course of negotiations through arbitration;
- the bill sets out the process to be followed if a request for interconnection is made by one licensed operator on another;
- 'Interconnection charges of dominant service providers or network providers […] shall be cost-based, or if this is not possible, use benchmarking techniques. The Commissioner may approve a plan to phase in this requirement over time, taking into account the financial impact on the affected dominant services providers.'

The bill does not explicitly confer on network operators a clear and absolute obligation, or a clear and indefeasible right, to interconnect. The rights and obligations are hedged around with other considerations, such as the right not to enter into an agreement that might result in physical harm to a network. Sub-clause 36(4) empowers the commissioner to clarify interconnection rights and obligations at the request of any service provider or other interested party. This is clearly a useful provision, but might be better if made complementary to a clearer statutory statement.

4.1.3 Regulatory arrangements

There is no separate regulatory agency, and no need for a competition regulator since there are not any competitors. The ministerial oversight of Telecom Cook Islands is with the prime minister's department.

4.1.4 Interconnection and access

As noted in section 4.1.3, there is no interconnection and access requirement at this stage of the development of telecommunications in the Cook Islands. However, the government will need to give consideration to the substantive arrangements and development of relevant regulatory capacity and structures if the proposed opening up of network services markets to competition is to be successful.

4.1.5 Cost modelling capability

Telecom Cook Islands has developed, with assistance from Telecom New Zealand, an FDC model which has been used as an input into the setting of subscriber line rental charges. There is, therefore, some capability to examine other costs in the future, including for call services and call termination.

4.2 Fiji

4.2.1 Country and market background

The Republic of the Fiji Islands comprises an archipelago of about 322 islands, of which 106 are permanently inhabited, and 522 islets. The two major islands, Viti Levu and Vanua Levu, account for 87 per cent of the population of 849,000.

The telecommunication sector has been opened to controlled competition for some time, and has been opened further in the past years with the licensing of Digicel to provide mobile services.

Licensing is undergoing significant change and the new licensing arrangements are still in draft form. Consequently, licences date from different periods in the liberalization history of the sector in Fiji. There has been industry agreement, however, that licences should be open, entitling the licensee to participate and provide services in any telecommunication market. Notwithstanding this, in practice, licensees have tended to remain in the service markets that represent their strengths, as shown in Figure 12.

Figure 12: Service markets and licensed providers in Fiji

Service market	Licensed service providers
Fixed	Telecom Fiji Limited (TFL)
Mobile	Vodafone, Digicel, INKK (an MVNO associated with Vodafone)
Internet	Many licensed internet service providers (ISPs) including those associated with carriers. For example, Connect (associated with TFL)
International services	Fiji International Telecommunications Limited (FINTEL) controls the only landing station in operation, connected to Southern Cross Cable

4.2.2 Legislative framework

The Commerce Act 1998 established the Fiji Commerce Commission as a multi-sector regulatory agency for the regulation of any industry designated by a minister.

In particular, the commission has the powers in relation to regulated industries of:

> *'(b)* the maintenance of a register of access agreements;
>
> *(c)* the facilitation of negotiations about access to infrastructure facilities or services under access regimes;
>
> *(d)* the arbitration of disputes about access to infrastructure facilities or services under access regimes.'[6]

The act establishes the commission as independent of both government's policy-making arms (ministries) and participants in the telecommunication market.

4.2.3 Regulatory arrangements

Telecommunications is an industry that has been designated for the purposes of the Commerce Act (1998).

The act requires anybody proposing to enter into an access agreement for facilities or services access to advise the commission at least 30 days beforehand.[7] This enables the commission to give advice on the proposed agreement to the person involved and to the minister.[8] The commission has no ability to prevent the agreement from being signed or implemented. In addition, anybody entering into such an agreement must notify the commission and provide a copy to enable the agreement to be registered. Again, there is no provision for the commission to intervene and require changes to the agreement if it is considered not to be in the public interest.

6 Government of Fiji (1998), Section 10(1).
7 Section 19.
8 Part 3.

The commission may act as an arbitrator if one or both parties to a dispute over access refer the matter for arbitration. The act sets out the matters that must be considered in the course of resolving the matter:

'(4) in the arbitration of a dispute referred under this Part, or in the variation of an existing determination, the arbitrator must take into account –

(a) the access provider's legitimate business interests and investment in the infrastructure facilities or services;

(b) the costs to the access provider of providing access, including any costs of extending the facilities but not costs associated with losses arising from increased competition in upstream or downstream markets;

(c) the terms of access for the third party;

(d) the economic value to the access provider of any additional investment that the third party or the access provider has agreed to undertake;

(e) the interests of all persons holding contracts for use of the facilities;

(f) firm and binding contractual obligations of the access provider and other persons already using the facilities or services;

(g) the operational and technical requirements necessary for the safe and reliable operation of the facilities or services;

(h) the economically efficient operation of the facilities or services;

(i) the benefit to the public from having competitive markets;

(j) whether, if the access provider were required or permitted to extend the infrastructure facilities, the extension should be technically and economically feasible and consistent with the safe and reliable operation of the facilities;

(k) the compensation (if any) which should be paid to the access provider;

(l) in a case to which subsection (3) applies any submissions made concerning the dispute by the public;

(m) any other matters that the arbitrator considers relevant.'[9]

This is a comprehensive list of considerations and includes the issues that one would want the regulator to consider in determining interconnection rates.

Determinations resulting from arbitration are binding on the parties to the dispute.10

In 2008 a new Part 5A was added to the act dealing explicitly with telecommunication services, with specific provisions for interconnection.

4.2.4 Interconnection

Section 36(E) gives the commission the power to examine telecommunication markets to determine if there is *SMP*, and to impose regulatory obligations to reduce the risk of harm that might result from such power. Clearly, call termination markets are in contemplation here as well as a range of other service markets.

The amendments to the act clarify that licensed operators have an obligation to provide interconnection and the right to seek it with other licensed operators.

[9] Sub-section 26(4).
[10] Sections 28 and 29.

The amendments also add to the overall principles the basis on which licensed service providers may charge for interconnection services:

> '(5) The price that may be charged by the licensee for interconnection is a price that reflects the following factors –
>
> *(a)* the direct costs incurred in providing the interconnection service;
>
> *(b)* a reasonable contribution to fixed and common costs; and
>
> *(c)* a reasonable return on the capital employed in providing the service.'[11]

This equates to the best practice already outlined in this report, and adds to the principles that the commission may consider when arbitrating these matters.

The act now gives the commission the power to require the preparation of reference interconnection offers.[12]

4.2.5 Access

Section 36H of the act provides:

> '36H.–(1) Subject to section 36C, the Minister may, on the recommendation of the Commission, make regulations under this section requiring a licensee having a substantial degree of power in a market to offer a particular form of indirect access or access to facilities to other licensees if –
>
> *(a)* there is a reasonable likelihood of consumer demand for alternative telecommunications licensees;
>
> *(b)* the regulations are necessary to introduce such competition; and
>
> *(c)* the costs for providing such service are fairly distributed among the licensees providing it and those receiving the service.
>
> *(2)* Before making any recommendations to the Minister under subsection (1), the Commission shall consult –
>
> *(a)* any licensee that would, under regulations made in terms of the recommendation, be required to offer access to other licensees; and
>
> *(b)* the owner of any telecommunications network or facilities that would be used in connection with the provision of such access.'

This is an unusual provision and does not represent best or indeed any form of practice for access arrangements. The criteria in Sub-section 36H(1) seem not to be the most relevant criteria for considering whether and in what circumstances facilities access might be desirable. There is no reference, for example, to whether the facilities might be bottleneck facilities, subject to scarcity for one reason or another, or not economically replicable. Condition (a) would almost always be fulfilled. Condition (b) is a matter entirely within the control of the commission and the minister and, in any case, should follow from a policy decision, not be a pre-condition of it. Condition (c) is a standard condition relating to appropriate compensation for facility sharing.

[11] Sub-section 36F(5) – Interconnection Principles.
[12] Section 36G.

4.2.6 Cost models and benchmarking

Although the act now makes clear the costs that should be taken into account in determining interconnection charges, these have yet to be employed by the commission. The commission has not developed its own cost model and has not adopted any model prepared by or for the service providers. In fact, the commission has made it clear that certain models prepared by service providers' experts have not been accepted, although the reasons for this non-acceptance have not been stated or published.

The new pricing guidelines in Sub-section 36F(5), which relate entirely to the costs to be considered in cost modeling or other forms of cost calculation, have yet to be implemented by the commission.

In the past, the commission has arbitrated call termination charges based on the materials and arguments that have been put by the parties. Some have offered benchmark studies in the course of their arguments. The commission has indicated that it has undertaken some form of benchmark analysis, but has not published the study, the study specification or the comparator countries that were included.

4.3 Kiribati

4.3.1 Country and market background

The Republic of Kiribati is composed of 32 atolls and one raised coral island dispersed over 3,500,000 square kilometers. The estimated population in 2009 was 98,000, of whom around 50 per cent live on South Tarawa.

The telecommunication sector has an incumbent operator, Telecom Services Kiribati Limited (TSKL) providing fixed, mobile and international gateway services, and TSKL and Television Kiribati Limited (TKL) providing internet services.

The government has indicated that it is seeking to introduce competition into the sector and has had lengthy negotiations with one potential entrant before they were broken off in 2009.

4.3.2 Legislative framework

The provision of telecommunications service in Kiribati is governed by the Telecommunications Act 2004. The act in Part II established the Telecommunications Authority of Kiribati (TAK) and makes provision for licensing of systems and services and the interconnection of facilities (Part III). The legislative framework, therefore, contemplates competition in the provision of network services. In particular, the objects of the act includes 'promoting efficiency and competition among persons engaged in the operation of telecommunications systems and services'.[13]

4.3.3 Regulatory arrangements

Part II of the act established the authority as an independent regulatory agency,14 with a range of functions and powers:

> '(b) grant licences for telecommunication systems and services and supervise and enforce compliance with the condition of licences;

[13] Government of Kiribati (2004), Paragraph 3.(1)(d).

[14] Section 7 permits the Minister to give directions of a general nature to TAK in relation to the performance of its functions and the exercise of its powers.

(e) promote competition including: (i) protecting persons who provide telecommunication systems and services from practices of other persons that are damaging to competition; and (ii) facilitating the entry into the market of telecommunication systems and services by persons who wish to supply those systems and services;

(f) regulate the interconnection between and access systems of operators of telecommunication systems (sic);

(i) regulate rates and charges levied by operators of telecommunication systems and services.'[15]

Section 46 of the act deals with appeals against the authority's decision. The decisions of the authority in exercising its powers and performing its functions under the act are final and conclusive on questions of fact. Any person aggrieved by the decision of the authority on any question of law may appeal to the High Court with the leave of that court.

4.3.4 Interconnection

Section 18 of the act permits operators to enter into interconnection agreements on terms and conditions on which they agree, and which have been approved by the authority. If the parties fail to agree, the authority shall at the request of any of them determine the terms and conditions.

The authority may order the interconnection of one operator if another operator requests.

The authority may issue guidelines on the negotiation of interconnection agreements between operators, but, so far, has not done so.

Section 19 of the act requires the provision of all telecommunication services to be in accordance with tariffs approved by the minister in consultation with the authority. The criteria for the approval of tariffs and charges (including interconnection charges it would seem) are that they are 'just and reasonable', non-discriminatory, and calculated in accordance with any methods or techniques specified in guidelines issued by the authority. So far, the authority has not issued any such guidelines. However TAK advises that proposed telecommunication competition regulations for the provision of telecommunication services, which also contain provisions relating to interconnection and other wholesale services, have been developed.

The legislation does not clarify the meaning of 'just and reasonable' or provide any further guidance for the minister or authority. The standards of justice and reasonableness in this field are therefore left to the discretion of the minister and the authority.

4.3.5 Access

Access would seem to be included in the legislative coverage of interconnection. The act defines 'telecommunications system' as meaning 'equipment for telecommunication'. This could conceivably refer to facilities such as towers and ducts. However, it might not be capable of being extended to include rights of way.

[15] Sub-section 5.(1).

4.3.6 Cost models and benchmarking

The authority has the benefit of cost models that were developed for it through ITU support in 2008-09 when it seemed that the entry of a second mobile operator was imminent. These models were based on a combination of cost proxies and some data from the incumbent, and would need reviewing and current data re-loading if they were to be used for call termination costing in the future. Nevertheless, the authority has some tools available to calculate interconnection costs should that be required for confirming the rates offered or negotiated by the parties.

The authority has not conducted a systematic benchmarking study for determining call termination rates.

4.4 Marshall Islands

4.4.1 Country and market background

The Republic of the Marshall Islands has a population of approximately 62,000 and a land area of 181 square kilometres.

The Marshall Islands National Telecommunications Authority is the sole provider of all services, and was established pursuant to the Communications Act 1987 and the Marshall Islands National Telecommunications Authority Act 1990. It is a private corporation with significant government ownership (approximately 76 per cent).

4.4.2 Legislative framework

The legislative framework authorizes the authority to provide services. Spectrum licensing and management is retained by the government, but these powers have not been used to modify the NTA's effective monopoly on all services including even the provision of internet services at hotspots.

4.4.3 Regulatory arrangements

Spectrum management and regulation is retained by the government, which oversees the operations of the NTA.

4.4.4 Interconnection and access

There is no current requirement for interconnection or access, and no network service competition in prospect that might change this.

4.5 Micronesia

4.5.1 Country and market background

The Federated States of Micronesia is spread across the 607 islands of the Caroline Islands within the wider region of Micronesia. It has a population of approximately 111,000 and a land area of about 700 square kilometers.

4.5.2 Legislative framework

The FSM Telecom Corporation is established by law as a public corporation with authority to provide services and is a monopoly service provider.

4.5.3 Regulatory arrangements

There is no separate regulator. Policy control and supervision generally in the sector, as well as spectrum management, is with the Department of Transportation, Communication, and Infrastructure.

4.5.4 Interconnection and access

There is no current requirement for interconnection or access, and no network service competition in prospect that might change this.

4.6 Nauru

4.6.1 Country and market background

Nauru has a territory of 21 square kilometers and a population of approximately 14,000.

The traditional incumbent is the Republic of Nauru Telecommunications Corporation (RONTEL), which in the past had a monopoly in the provision of all services, including international services. In 2009, however, a licence was granted to Digicel Nauru to provide mobile services. It is understood that the licence allows Digicel to provide all other services, including fixed and international gateway services. A mobile service was launched in August 2009.

4.6.2 Legislative framework

The current act in Nauru is the Telecommunications Act 2002, which established RONTEL as a statutory corporation and sets out its obligations as the national service provider. There is no provision in the act for the licensing of competitive operators or for interconnection and access arrangements between operators.

In practice, RONTEL has found it difficult to provide service on Nauru and has struggled to maintain fixed networks deployed in earlier times. Consequently, the introduction of a second operator might not be competitive, but a means of providing an initial service.

4.6.3 Regulatory arrangements

The 2002 act did not establish an independent agency for regulating the provision of service. By implication, the power is reserved with the government.

Digicel entered the Nauru market on the basis of a licence granted by the government. The terms of the licence, and the rights and obligations acquired by Digicel are not known. The licence is said to be confidential and not available to third parties. It is not possible, therefore, to examine the post-licence relationship between Digicel and RONTEL, and to determine whether it is competitive.

4.6.4 Interconnection and access

There are no arrangements for interconnection in the act, and the arrangements, if any, in the Digicel licence are considered confidential and not available to third parties.

4.7 Niue

4.7.1 Country and market background

Niue has a population of around 1,400 and a land area of 260 square kilometres.

Telecom Niue (Niue P&T) provides fixed, mobile and international gateway services as per the communications act. Internet services are provided by a private company, the Internet Users Society of Niue (IUS-N), under an agreement with the government. Internet services have been provided using WiFi technology free of charge since 2003.

4.7.2 Legislative framework

The current legislation comprises the Communications Act 1989 and the Telephone Regulations 1972 and Radiocommunications Regulations 1972. These laws and regulations are of an earlier era and the government has expressed an intention to update them. The arrangements permitting IUS-N to provide a nationwide free internet service were developed with the government. A major incentive for this initiative was to provide connectivity to support tourism in Niue.

4.7.3 Regulatory arrangements

In effect, Niue P&T is both a service provider and a regulator.

4.7.4 Interconnection and access

The government has given permission for a private operator to test its GSM mobile facilities in Niue. The conditions that apply to the operator receiving approval are considered confidential and it is not known if any interconnection arrangements or charges are being contemplated, or, if so, what they might be.

The free internet access service is not accessible via dial-up telephone services, and no interconnection or access arrangements with Telecom Niue are in place, or required for the current mode of operation.

4.8 Palau

4.8.1 Country and market background

The Republic of Palau occupies islands that have an aggregate land area of 460 square kilometres with a population of around 20,000. About two-thirds of the population lives on the island of Koror.

Fixed, mobile, internet and international services are provided by the incumbent, the Palau National Communications Corporation (PNCC), a private company incorporated in 1982. Palau Mobile Corporation (PMC) also provides mobile services.

4.8.2 Legislative framework

Legislation is in place that governs the operations of the PNCC and its powers and duties in the course of providing services. However, this legislation does not provide a framework for the competitive provision of telecommunications in Palau.

4.8.3 Regulatory arrangements

Because the telecommunications sector is not regulated at all, except in relation to spectrum, neither PNCC nor Palau Mobile Corporation (PMC) are required to have telecommunication operating licences. PMC has been separately authorized to provide mobile services by the government. As a foreign corporation, PMC was required to obtain a Foreign Investment Board (FIB) business licence as a preliminary matter before being issued service provider, frequency spectrum and earth station licences by the government.

Sector oversight is by the Communications Division of the Ministry of Infrastructure, Industries and Commerce.

4.8.4 Interconnection and access

There are no access or interconnection arrangements between PNCC and PMC, and it would seem that none are contemplated in the near future. The ministry explains that a subscriber to PMC's cellular service is not authorized to call a PNCC cellular service unless the call is made as a long distance call. This is due to restrictions on PMC's foreign investment permit, under which PMC is only authorized to provide international direct dial services. PMC is not permitted to provide national call services.

4.9 Papua New Guinea

4.9.1 Country and market background

Papua New Guinea, with an estimated population of 6,732,000 in 2009, and a land area of 463,000 square kilometres, is the largest of the Pacific island countries in this study. The capital, Port Moresby, has over 250,000 people, and the extent of urbanization is less than elsewhere in the Pacific region.

The telecommunication market is served by Telikom PNG Limited (Telikom), the incumbent general carrier, licensed to provide national fixed and international services. There is competition in the public mobile services market between B Mobile (the Telikom-affiliated service provider) and Digicel PNG Limited (Digicel). There are approximately ten licensees in the value-added services market.

4.9.2 Legislative framework

Papua New Guinea is moving from an existing legislative arrangement in the Telecommunications Act that has been in place since 1996 to a new scheme, which is expected to be implemented during the second quarter of 2010, based on the National Information and Communications Technology (NICT) Act of 2009.

The Telecommunications Act 1996 makes substantial and detailed provision for interconnection and for the resolution of disputes if potentially interconnecting service providers cannot negotiate terms on a commercial basis. The policy for interconnection, as embodied in the act, is to give primacy to the commercial negotiations of the carriers if that can be achieved. A licensed carrier has the right to interconnect its facilities to the network of any other carrier under sub-section 82(1) of the act on such terms and conditions as the carriers agree on.[16]

[16] Government of Papua New Guinea (1996), Paragraph 82(1)(b).

In this regard, the policy was based on the approach taken in Australia and elsewhere. Since the mid-1990s, the Australian experience has shown how difficult and protracted interconnection negotiations and disputes can become, particularly if the timetable is left in the hands of the parties. There are invariably ample opportunities for gaming by the parties, and substantial commercial incentives for one or both of them to do so.

In the absence of agreement between them, one or both of the parties may apply to the regulator, the Independent Competition and Consumer Commission (ICCC)[17] for a dispute to be arbitrated. Regulator arbitration was adapted from the regulatory framework in Australia and some other countries. At the time of Papua New Guinea's legislation there was little experience in Australia of regulator arbitration on interconnection and access disputes. The history since then confirms that arbitration is a resource-intensive and protracted process. In Australia, the back-log of arbitrated disputes grew substantially after 1997.

As noted, the primary and preferred mechanism for interconnection is by commercial negotiation and agreement between the parties. However, there are two additional arrangements under the act. The first involves arbitration by the ICCC, and the second, if the parties and the ICCC fail to deliver a timely outcome, is determination by the minister.

4.9.3 The ICCC's powers

The ICCC has power under section 84 of the act to determine by arbitration those interconnection matters in dispute that one or both of the parties has submitted to it.[18]

A determination by the ICCC is required to specify the facilities and the networks concerned, and set out the terms and conditions of the interconnection. This must be consistent with the act, the charging principles determined under section 86 of the act, and with government policy.[19]

The terms and conditions must relate only to technical standards for interconnection, points of interconnection, supply of facilities for the purposes of interconnection and carriage, supply of traffic information and other information necessary for the purpose, charges payable for interconnection and carriage, and any matter incidental to the foregoing.

Section 86, referred to above, provides that 'the regulatory contract or the licence of a carrier may set out principles that are to be applied in agreeing on or in determining terms and conditions about charges payable by a carrier to another carrier from whom access is being sought' for, among other things, interconnection and carriage of communications across networks.[20]

Telikom's regulatory contract requires the ICCC to take regard of the following considerations when determining access and interconnection charges:

> *'(a)* the directly and indirectly attributable incremental capital costs incurred by Telikom in connection with the provision of the access and interconnection, and including economic depreciation costs associated with the asset base, for those assets used directly and indirectly to provide the access and interconnection;
>
> *(b)* the directly and indirectly attributable operating costs incurred by Telikom in connection with the provision of the access and interconnection;

17 Established in 2002 under its own legislation, the ICCC Act.
18 Sub-section 84(1).
19 Sub-section 84(3).
20 Sub-section 86(1).

(c) full recovery of one-off incremental operational and capital costs incurred in the provision of the access and interconnection which Telikom would not have otherwise incurred but for the requirement to provide the access and interconnection;

(d) the requirement for a fair and reasonable contribution to the common costs incurred by Telikom;

(e) the availability and capacity of the telecommunications network operated by Telikom to provide the access and interconnection and the timeframe reasonably required to provide access to additional capacity; and

(f) any other factors the Commission considers relevant.'[21]

Clearly it is intended that, in relation to determining interconnection charges, the ICCC should take regard of cost factors, although it may take into account other factors under item (f).

Amendments to the act in 2008 empowered the ICCC to make an interim determination effective for a period of 12 months.[22] This measure was clearly designed to facilitate quicker outcomes.

4.9.4 The minister's powers

Amendments were made to the act in early 2008. One amendment, in section 84A, gives the minister power to determine matters affecting interconnection and the carriage of communications between networks.

The ICCC can only arbitrate if the parties have a dispute in the course of negotiating an access agreement, and one or both of them refers the matter to the ICCC. If the parties fail to refer a matter, the ICCC cannot intervene.

This situation was considered to be unsatisfactory because overall public interest requires that interconnection should be put in place and effective from the earliest possible time. Normally, interconnection of networks is an expression of the any-to-any connectivity principle which in turn expresses the entitlement and expectation of any user to call and be called by any other user no matter which network the user is connected to. The any-to-any connectivity principle may, therefore, be seen as a kind of consumer right. In addition, however, consumers have an interest in the establishment of effective competition. This is not normally possible without interconnection because smaller carriers, usually new entrants, will have difficulty in acquiring customers and selling their services. In this respect, size and reach matters.

The act was amended in April 2008 by the inclusion of section 84A to empower the minister to determine terms and conditions for interconnection of networks and carriage between them. Interconnection by the carriers concerned must occur within 28 days of the determination.23 The minister's power is confined by a requirement that before making his determination, he must consult with the ICCC, PANGTEL (the technical and administrative regulator of the industry) and the carriers concerned. The minister is not required to take into account costs or any other matter when exercising the power. In fact, this is spelled out clearly in sub-section 84A (4):

'(4) Nothing in Sub-section (1) limits the generality of the Ministerial Determination.'

[21] Telikom Regulatory Contract, clause 2.6. Similar clauses are found in Telikom's General Carrier Licence (Clause 19.3); Telikom's Public Mobile Licence (Clause 14.3); and Digicel's Public Mobile Licence (Clause 15.4).

[22] Sub-sections 84 (6) to (12).

[23] Sub-section 84A (2).

However, the minister's power must be read subject to section 82, in which it is clear that if the parties fail to agree, terms and conditions of interconnection shall be as in an ICCC determination or 'as are determined in a Ministerial Determination but are not the subject of a Commission Determination.'24 In other words, the priority is parties' agreement, ICCC determination and ministerial determination, in this order. If there is an ICCC determination then this, in effect, overrides a ministerial determination to the extent that they cover the same topics. This might be better described as suspending the operation of a ministerial determination to the extent that they cover the same topics. If there is a prior ICCC determination, then a subsequent ministerial determination on the same matters will be to no effect. So far as is known, the minister has not exercised these powers to date.

4.9.5 Regulatory arrangements

Two regulatory frameworks have been developed and published governing interconnection:

- Telecommunications Interconnection Code of Practice – by ICCC
- Technical Interconnection Code of Practice – by PANGTEL

PANGTEL's code of practice sets out standard technical terms that govern the interconnection and inter-operation of networks. The code reflects best practice and incorporates international technical standards as appropriate.

The ICCC code, published in November 2006, is more relevant to the themes of the current study. The code was prepared after a process of industry consultation as prescribed in the act. The code seeks to elaborate on the principles and processes set out in the act.

Of particular interest is the following paragraph from section 2.2.:

> 'The Commission's final determination of the charges for access and interconnection must be made available to PANGTEL and the public but must not disclose confidential data provided to the Commission by the Access Provider and Access Seeker for the purposes of its determination.'

Unfortunately, in the only interconnection agreement that has been entered into, this provision has not been applied.

The code also sets out and elaborates the contents that should be in an access agreement. In addition, the code sets out the pricing principle that the ICCC will apply if it is called upon to determine disputes about access and interconnection pricing. The principle, as stated, builds on the provisions of the act in a way that reflects prevailing best practice:

> 'Where the Access Provider and the Access Seeker fail to reach agreement on a commercial basis as to the charges payable for access and interconnection, and the Commission is required to determine the matter pursuant to section 84 of the Telecommunications Act, in determining the charges for access and interconnection the Commission shall have regard to the following factors:
>
> *(a)* the directly and indirectly attributable incremental capital costs incurred by the Access Provider in connection with the provision of the access and interconnection services to the Access Seeker(s), being a reasonable return on the written down asset base, and including economic depreciation costs associated with the asset base, for those assets used directly or indirectly to provide the access and interconnection;

[24] Paragraph 82(1) (b) (ii).

(b) the directly and indirectly attributable incremental operating costs incurred by the Access Provider in connection with the provision of the access and interconnection;

(c) full recovery of once off incremental operational and capital costs incurred in the provision of the access and interconnection which the Access Provider would not have otherwise incurred but for the requirement to provide the access and interconnection;

(d) the requirement for a fair and reasonable contribution to the common costs incurred by the Access Provider;

(e) the availability and capacity of the telecommunications network operated by the Access Provider to provide the access and interconnection and the timeframe reasonably required to provide access to additional capacity; and

(f) any other factors the Commission considers relevant.'[25]

The code goes on to reassert the principle that the charges should be published.[26]

Finally, the code sets out a detailed procedure for arbitration and the timescales that the ICCC will follow for each stage.

There has been one arbitration that this study is aware of, but it is not known to what extent the ICCC followed its own procedure and timing.

4.9.6 Interconnection

As already noted, there has been one interconnection agreement entered into between Telikom and Digicel. The carriers could not agree on various aspects of the agreement relating to charging and these issues were settled, after a protracted process, via ICCC arbitration.

4.9.7 Access

According to the ICCC, there have not been any access agreements registered.

4.9.8 Cost modelling and benchmarking

The ICCC reports that it has employed cost modelling in the course of settling interconnection charging disputes. It has also benchmarked rates in countries considered to be similar to Papua New Guinea. The cost model(s) and benchmark studies have not been made public and no details have been released. It is, therefore, not possible to say whether or not they have been prepared on best practice principles.

4.10 Samoa

4.10.1 Country and market background

The Independent State of Samoa has a population of around 179,000 and a land area of 2,831 square kilometres. Approximately two-thirds of the population lives on Upolu, and the balance on Savaii and smaller islands.

[25] Clause 5.2.1.
[26] Clause 5.2.2.

The telecommunication market has been progressively liberalized since 2005 and there is competition in the provision of mobile, international gateway and internet services, as indicated by Figure 13. As of July 2009, the policy in place is that all services shall be liberalized and the exclusive provision of services by SamoaTel effectively ended in all telecommunication markets.

Figure 13: Service providers in Samoa

Telecommunication service markets	Service providers
Fixed	SamoaTel
Mobile	SamoaTel; Digicel Samoa Limited
Internet	CSL and a number of smaller ISPs
International gateway	SamoaTel; Digicel Samoa Limited

4.10.2 Legislative framework

To provide the required legislative framework for the then-pending liberalization of the telecommunication sector in Samoa, the legislative assembly passed the Telecommunications Act in 2005. This established the Office of the Regulator and also set up the framework for introducing competition in many parts of the market. Experience soon showed the need for improvements, and the act went through a series of improvements/amendments, the most recent being in 2008.

The act was amended in 2008 as a response to the Digicel legal appeal to the Supreme Court regarding long-term interconnection rates, which the regulator tried to implement after a cost study was completed.

As a result of the Digicel court case, it was considered that the act needed to address the issues surrounding establishment of interim interconnection rates. It was also decided that a specialized body was needed which appellants could appeal directly to rather than have appeals heard in the Supreme Court, which did not have the background knowledge needed to hear telecommunication matters. As a result, the Telecommunications Tribunal was established as an administrative appellate body.

Further amendments to the act are being considered, based on proposals from the regulator. These possible amendments include:

- further clarifications of the provisions on appeals and judicial process, and the operation of barriers to appeal;
- mediation processes;
- the nature of the regulator's independence whilst being subject to the Public Service Commission;
- whether rates can be set retrospectively; and
- the regulator's role in policy-making and the relationship of this with the regulator's implementation role.

The act sets out a range of objectives.[27] These include:

> *'(c)* promote the efficient and reliable provision of telecommunications services, relying as much as possible on market forces, such as competition and private sector investment, to achieve this objective;
>
> *(e)* encourage sustainable foreign and domestic investment in the telecommunications sector;
>
> *(f)* establish a framework for the control of anti-competitive conduct in the telecommunications sector;
>
> *(g)* promote efficient interconnection arrangements between service providers.'

4.10.3 Regulatory arrangements

The regulator has the functions and power to implement the act and regulations as well as other elements of the legal and regulatory framework,[28] including specific power to regulate interconnection.[29]

Like many nations of the Pacific, Samoa does not have separate and general competition legislation governing all sectors of the economy. Part VI of the act provides for competition policy in relation to the telecommunication sector, including detailed provisions for the designation of dominant service providers, abuse of dominance, other anti-competitive practices (other than the abuse of dominance in a market), and remedies for abuse of dominance and anti-competitive practices.[30] There is nothing exceptional about these provisions.

Part VII deals with interconnection. Section 32 requires that the regulator, amongst other things, will 'promote adequate, efficient and cost-oriented interconnection of telecommunications networks and access by service providers to telecommunications facilities of other service provides' to permit interoperability and promote the development of competitive telecommunications service markets.[31] The act provides processes and established rights in relation to interconnection.

Section 36 deals with interconnection charges and requires that the 'interconnection charges of dominant services providers […] shall be cost-based', but empowers the regulator to phase in such rates over time 'taking into account the financial impact on the affected dominant service provider'.[32] That the charges should be cost-based is unexceptional, but that glide paths might be considered on the basis of the impact on the dominant service provider is curious. The provision is likely to be read more broadly and to enable the regulator to take account of other factors as well, because it does not say that only the impact on the dominant service provider is a factor. Other stakeholders, such as the other service provider(s) involved, together with retail customers have legitimate interests that might be affected by staged implementation of cost-based interconnection rates.

An amendment to the act inserted section 39A which empowered the regulator, subject to compliance with an expeditious consulting procedure, to impose interim interconnection charges. These need not be cost-based, under section 36.[33] However the Telecommunications Tribunal in May 2009 confirmed that the requirements of section 32 still apply to interim interconnection rates, and therefore they should be cost-oriented. Section 39B enables the regulator to impose such charges in the absent of agreement between service providers.

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27 Section 3.
28 Paragraph 8(1)(b).
29 Paragraph 8(1)(i).
30 Sections 26 to 30 inclusive.
31 Section 32(a).
32 Sub-section 36(1).
33 ub-section 39A(9).

Section 37 requires that every dominant service provider shall prepare for regulatory approval and publish a reference interconnection offer, and update it periodically. The offer must comply with the regulator's orders and guidelines. Although specific regulator approval is not required for the offer, the process considered as a whole enables the regulator to effectively do that using other processes of control.

Section 38 requires the publication of interconnection agreements save for information claimed to be confidential and adjudged to be confidential by the regulator. Interconnection agreements must comply with the act and other regulations and orders, and the regulator may order amendments found not to be complying.[34]

4.10.4 Interconnection and access

The legislative and regulatory arrangements for interconnection and access have been described above.

In practice, the development of implementation and access orders, and the implementation of them, has been far more difficult in Samoa than might be suggested by the current legislation. As noted, the legislation has been modified to reduce the involvement of the courts in the interpretation of interconnection requirements and regulatory powers.

The history of interconnection rate setting in Samoa involves several changes of direction as a result of appeals to the Supreme Court and the Telecommunications Tribunal.

- Competition commenced in 2006 with the licensing of Digicel and its acquisition of the incumbent mobile service. The regulator set fixed and mobile call termination rates on an interim basis based on a benchmark study.
- At the same time, the regulator retained consultants to develop cost models to calculate the costs of call termination. Digicel appealed to the Supreme Court which granted orders to prevent implementation of the consultant's results on the basis of procedural flaws. The benchmarked rates continued to apply.
- The regulator sought to extend the benchmarked rates through two orders in the second half of 2009 and the first half of 2010, pending the completion of new cost models by consultants retained by the regulator.
- SamoaTel challenged the orders before the tribunal, which struck them out on the basis that they were not cost-oriented as required by the act. The tribunal directed the regulator to prepare new orders.
- The tribunal's decision was challenged, unsuccessfully, by Digicel before the Supreme Court.
- The regulator has issued replacement orders for the interim orders that were overturned by the tribunal, and is now in the process of preparing orders with longer-term effect.

There are no regulations for interconnection or for infrastructure sharing at this stage. Also, there are no published guidelines but the process for setting rates has now been established through several court cases and the tribunal's ruling. The Office of the Regulator is in the process of documenting the lessons learnt and recommended procedures based on the process.

[34] Section 39.

4.10.5 Cost modelling and benchmarking

The arrangements in the act provide that all interconnection charges must be *cost-oriented* (including rates provided for interim interconnection orders) and that the interconnection charges of service providers designated as dominant in a market shall be *cost-based*.

In Samoan practice, *cost-oriented* has come to be associated with such methodologies as benchmarking. In other words, there is a sufficient relationship with costs if the charges in Samoa are based on a comparison with charges in other countries that have been based on cost studies, and where those other countries are considered likely to have costs similar to those in Samoa.

Cost-based, on the other hand, relates to the costs in Samoa. The appropriate methodology to determine those costs is through the preparation of a suitable cost model.

The regulator has used benchmark studies to determine call termination costs in 2006, and again in 2010 in the determination of the rates to include in the replacement orders for the orders overturned by the tribunal. On the latter occasion, there was a consultation on both the orders and the benchmark study used in the process.

The regulator has retained a consultant to develop cost models for fixed and mobile call termination. These models are scorched earth, bottom up, LRIC models that include mark-ups for indirect, common and overhead costs. Stakeholders have had the opportunity to examine and make submissions on the models and on the assumptions used in them.

4.11 Solomon Islands

4.11.1 Country and market background

The Solomon Islands covers a land area of 28,400 square kilometres and has a population estimated at 552,400 in 2006. Approximately 10 per cent live in the capital and largest city, Honiara.

The Solomon Islands is one of the least connected countries in the world according to the World Bank. Total population covered by telecommunication networks (fixed and mobile) is about 60,000 (around 11 percent). This compares to over 90 percent population coverage in Samoa, and over 80 percent in Vanuatu. As of March 2009, there were 12,000 fixed lines in service and 35,000 mobile subscribers.

Fixed and mobile services are provided by the monopoly operator, Solomons Telecommunications Limited (STL, also known as Our Telekom). Internet access is primarily via dial-up, though a small high-frequency radio email service is available in some locations through a non-governmental organization, People First Network. There are fewer than 1,000 broadband (DSL) subscribers. Prepaid Wireless LAN access is available in Honiara in selected WiFi hotspots.

4.11.2 Legal and regulatory framework

The government's policy is to improve telecommunications services and to liberalize markets and harness competition to do so. In accordance with this policy, the government initiated the process of developing new telecommunication legislation, and invited the shareholders of STL to renegotiate the terms of their exclusive license in late 2008. The negotiations concluded in June 2009 with the signing of a settlement agreement to terminate STL's monopoly, phase in competition, and transfer regulatory functions such as spectrum and numbering management to a new, independent regulator. The new Telecommunications Act was enacted by Parliament on 27 August 2009, and gazetted. The new mobile operator is expected to commence commercial operations. Other segments of the telecommunication market (international gateway and Internet service provision) will also be liberalized.

While some aspects of regulation (interconnection, spectrum and numbering) have been incorporated into the settlement agreement, a complete set of sector regulations will need to be prepared and implemented over the next year.

4.11.3 Regulatory arrangements

Regulator

The Telecommunications Act established the Telecommunications Commission as the regulatory agency. The government completed an internationally competitive recruitment process and appointed a commissioner in December 2009. The establishment of the regulatory agency and details of the regulatory framework are ongoing. The regulator is required by the act to be independent and impartial when making decisions:

> '(1) The Telecommunications Commission must —
>
> *(a)* act in a manner that is independent of, separate from, and not accountable to any person or service provider, including any service provider in which the State of Solomon Islands or Solomon Islands National Provident Fund holds an interest; and
>
> *(b)* make determinations, orders and regulations, and follow procedures, that are impartial with respect to all service providers.'[35]

Mobile competition

The government also launched a tender for a second mobile licence to be awarded before the end of 2009. On 17 December 2009, the government announced that this second 15-year licence had been awarded to *Bemobile*, over other bidders including Digicel. *Bemobile* currently provides mobile telecommunication services in Papua New Guinea.

4.11.4 Interconnection and access

The principal objects are set out in sub-section 3(2) of the act. The first two paragraphs in particular establish the competition principles to be applied:

> 'The objectives in subsection (1) shall be implemented by means of, and all determinations, orders and regulations made under this Act must be made with a view to –
>
> *(a)* establishing and maintaining an open, non-discriminatory, competitively and technologically neutral, objective, transparent and proportionate regulatory regime applicable to service providers;
>
> *(b)* providing conditions for fair and effective competition among service providers in Solomon Islands;'[36]

Part IX of the act deals specifically with interconnection and access. Section 64 establishes the right of service providers to negotiate interconnection agreements among themselves. Section 65 establishes the rights and obligations of service providers to require and provide interconnection services of and to each other, including access to related facilities, systems and services. Section 66 deals with access to essential facilities, a term that is very usefully defined in section 2:

[35] Sub-section 14(1).
[36] Sub-section 3(2)(a) and (b).

> *'Essential facility* means a facility satisfying all of the following criteria: (i) the facility is owned or controlled by a service provider; (ii) the facility is essential for the provision of telecommunications services by another service provider; (iii) for economic, technical or legal reasons the service provider requesting access cannot reasonably duplicate the facility; (iv) the lack of access to the facility presents a barrier to entry into the market of a new service provider or to expansion of an existing service provider; (v) there is likely to be significant demand from users or potential users for the telecommunications services for which access to the facility is required; and (vi) it is technically, economically and legally feasible for the service provider that owns or controls the essential facility to provide access to it.'

This meaning enables the service providers to make their own assessment of whether a facility is essential in the requisite sense and to demand such facilities of each other. However, the commission may, if required, determine that a facility is essential.[37] The right to apply for, and the obligation to provide, access to essential facilities do not come into force until the fourth anniversary of the launch of a new entrant service provider,[38] and thereafter only apply subject to the decision of the commissioner that access is necessary to further the objects of the act in section 3.

Section 67 empowers the commission to require service providers to prepare, update and revise reference offers for approval by the commission. Reference offers must cover such matters as determined by the commission[39], and to be in the form of a model agreement.[40]

Access and interconnection agreements must be filed with the commission, which in turn is required to publish them on its website.[41] Section 30 deals generally with confidential information and related claims. The section provides that 'details of prices for interconnection and access in interconnection and access agreements shall not be considered confidential'.[42]

Price regulation

Section 72 deals with price regulation. The act defines price to include wholesale prices, and therefore prices relating to access and interconnection:

> 'Price means financial consideration charged to a user for the provision of a telecommunications service or access, whether on a wholesale or retail basis.'[43]

Section 72 spells out in detail how the commission may regulate the prices of dominant service providers, and the methodology to be employed for price-setting. The act authorizes the commission to set prices based on benchmarks that meet statutory specifications, and also to accede requests for cost modelling and other methods provided the costs are borne by the service provider requesting such methods:

> '(1) The Telecommunications Commission may, on application or on its own motion, regulate the prices of services provided by a dominant service provider in a telecommunications market with reference to relevant benchmarks in accordance with subsection (2).

37 Sub-section 66(3).
38 Sub-section 66(4).
39 Paragraph 67(1)(a).
40 Sub-section 67(2).
41 Section 70.
42 Sub-section 30(4).
43 Section 2.

(2) "Relevant benchmarks" shall be determined by —

(a) reviewing prices of services substantially similar to those services being assessed, derived from jurisdictions in which —

(i) a reasonable level of competition exists in the provision of the services in question; or

(ii) prices of the services in question are set on the basis of economically efficient costs, including a reasonable return on investment; and

(b) taking into account adjustments to reflect the relative economic and social development, demographics, geography, state of development of the telecommunications sector and differences in the cost of providing telecommunications services in Solomon Islands and such other factors as the Telecommunications Commission considers appropriate.

(3) On application of an interested service provider, the Telecommunications Commission —

(a) may regulate the prices of services provided by a dominant service provider in a telecommunications market with reference to detailed information about service providers' costs including based on cost models in addition to or instead of having regard to relevant benchmarks in regulating the prices of telecommunications services in accordance with subsection (1);

(b) must revise any method of price regulation then in force under this section if necessary to ensure that a service provider whose economically efficiently incurred costs have increased for reasons beyond its reasonable control can recover such increased costs,

Provided that the applicant shall bear in advance the reasonable costs of the Telecommunications Commission, including any independent experts the Telecommunications Commission may in its sole discretion engage [such experts as may be] required to conduct a process to review and evaluate information provided in connection with paragraphs (a) and (b)

(4) The initiation of a process referred to in subsection (3) shall not prevent the Telecommunications Commission from regulating prices with reference to relevant benchmarks in accordance with subsection (1).

(5) Any price regulation introduced upon completion of a process referred to in subsection (3) shall not apply retroactively.

(6) Price regulation under this section may include without limitation applying a price cap method of regulation, the glide path method of regulation, both of the foregoing or such other method of regulation as the Telecommunications Commission considers appropriate.'[44]

The relevant sections of the act, even though only recently passed and not yet applied by the commission, have been repeated here because they set out very clearly not only the methods to be employed but also the conditions under which they may be used.

[44] Section 72.

4.12 Timor-Leste

4.12.1 Country and market background

Timor-Leste has an estimated population of 923,000 (based on the 2007 census) and a land area of 15,400 square kilometres. Around 20 per cent of the population lives in Dili.

At independence in May 2002 the telecommunications infrastructure of Timor-Leste was effectively destroyed. As the Communications Regulatory Authority (ARCOM) notes on its website:

> East Timor is one of the very few countries in the world where there is no existing (monopoly) operator, where there is no fully functioning infrastructure and a very underdeveloped market.
>
> It is therefore not possible to compare the situation in East Timor with that in other countries let alone apply the same solutions. Therefore solutions and a process of development will need to be introduced which are unique to East Timor.'[45]

Fixed, mobile, internet and international gateway services are provided by Timor Telecom. Timor Telecom is operating on an exclusive basis in relation to fixed, mobile and international services. iNet also provides internet services.

The government is committed to liberalization and privatization of the sector. However, in the case of the most likely service prospect for early liberalization, mobile, ARCOM notes on its website:

> 'Although the Government at this stage does not consider that the market can support a second mobile operator, as stated above there is not a prior decision to restrict the market and the government may consider issuing a license for a second mobile operator at some time in the future.'[45]

4.12.2 Legislative framework

Telecommunications legislation has been drafted but not yet enacted. It includes provision for interconnection and related access arrangements. In the meantime, ARCOM continues to operate under the immediate post-independence decree arrangements. It was established under Decree Law 12/2003.

4.12.3 Regulatory arrangements

As noted above, regulation of the sector (effectively a monopoly arrangement) is with the authority established following independence, ARCOM. However, in practice, there is no established legal framework for competition, access and interconnection, and no network services competition to which it might be applied, at this stage.

[45] www.arcom.tl/Telecomm/Policy/Tele_Policy.htm

4.12.4 Interconnection and access

An ITU expert drafted an interconnection policy for Timor-Leste in February 2008. This policy reflects overall best practice, consistent with the view of best practice in this report. The draft policy and related draft regulations reflect the 'negotiate/arbitrate' model and provide for reference interconnection offers to be developed and published. In the case of access to designated facilities, a similar approach, including the use of reference access offers, was also proposed.

The ITU mission also reported in February 2008 on the pricing methodologies that might best be adopted by ARCOM when called upon to establish retail and wholesale prices. The recommendation was for a TS LRIC approach in the longer term, but retail-minus and retail-benchmarking in the shorter term.

4.13 Tonga

4.13.1 Country and market background

The kingdom has an estimated population of 104,000 in 36 inhabited islands. The total land mass of the archipelago is 748 square kilometres. Around 35 per cent of the population lives in the capital, Nuku'alofa.

Local and international telecommunication services are provided by Tonga Communications Corp (TCC), which also operates the ISP Kalianet, and a GSM 900 mobile network. In addition, an emerging second carrier, Shoreline Communications (TonFon), has been building a hybrid GSM-VSAT-IP-based system to deliver low-cost voice, video, data, Internet, entertainment and wireless services throughout the kingdom. Digicel acquired TonFon in Tonga in late December 2007 and re-launched as Digicel in 2008. Liberalization has resulted in a significant increase in teledensity,[46] and a substantial reduction in prices.

The licensed service providers in Tonga are:

- fixed services: TCC;
- mobile services: TCC and Digicel;
- Internet services: TCC, Digicel, and Pacific Rural Internet Connectivity System (RICS);
- international gateway services: TCC, Digicel, RICS (for some schools), USPNet (only on University of the South Pacific campus).

4.13.2 Legislative framework

The telecommunication sector in Tonga is governed by the Communications Act 2000. The objectives of the act are set out in Section 4, and include:

> *'(a)* to establish a communications licensing and regulation frame work in support of the national development policy objectives;
>
> *(b)* to establish the powers and functions of the Department of Communications;
>
> *(c)* to consolidate the regulation and policy control of the communications sector in a single Government department;
>
> *(e)* to establish and to promote competition in the supply, installation, maintenance and operation of customer equipment and related services;

[46] The fixed teledensity in 2008 was 25% and the mobile teledensity in 2008 was 50%, according to CIA (2012)

(f) to promote fair and sustainable competition in the supply and provision of network facilities, network services and applications services.'

The minister and Department of Communications have both policy and regulatory functions for telecommunications. The minister has the power 'to exercise general supervision and control over all matters relating to the communications sector in the Kingdom',[47]and to 'make determinations on any matter specified as being subject to the Minister's determination under this Act, the Radiocommunication Act (Cap 98), the Telegraph Act (Cap 99), and other applicable laws.'[48]

The act provides that 'a licensee must provide all its services in accordance with the written tariffs which are filed and approved by the Department pursuant to section 45(2)'.[49] It is not clear what criteria apply for the approval of tariffs, other than they must be 'in the public interest', a term that is not defined.[50] Nor is it at all clear why tariffs need prior approval if they relate to service markets that either are or might be competitive, such as the mobile services market.

Part IX of the act deals with economic regulation and contains provisions on the promotion of competition and the suppression of anti-competitive behaviour that might otherwise be found in general economy-wide competition law. Tonga has no such general law.

Division 2 of Part IX deals with access to network facilities and services. This covers interconnection services, and the term is used occasionally as if it is part of 'access'. Neither term is defined in the definition section of the act. The specific rights and obligations are:

'(1) Subject to sub-sections (2) and (3), and such exemptions as may be determined by the Minister, a licensee ("providing licensee") shall, if requested in writing to do so by another licensee ("requesting licensee"), give the requesting licensee access to its: —

(a) network facilities;

(b) network services; or

(c) such other facilities or services which facilitate the provision of network services or applications services, including content applications services.

(2) The providing licensee is not required to comply with sub-section (1) unless:

(a) where the request is for access to: —

(i) network facilities, the access is for the sole purpose of enabling the requesting licensee to: —

(aa) provide competitive network facilities and network services; or

(bb) establish its own network facilities; or

(ii) network services, the access is for the sole purpose of enabling the requesting licensee to supply network services or applications services; and

(b) the requesting licensee gives the providing licensee reasonable notice that the requesting licensee requires the access.'[51]

The fundamental principles of non-discrimination and fairness are also covered:

'(4) The access provided by the providing licensee to the requesting licensee under sub-section (1), shall be; —

47 Section 5(a).
48 Section 11.
49 Section 44.
50 Paragraph 45(1)(b).
51 Sub-sections 93(1) and (2).

(a) of at least the same or more favourable technical standard and quality as the technical standard and quality provided in the providing licensee's network facilities or network services; and

(b) on an equitable and non-discriminatory basis.'[52]

The department is empowered to publish guidelines relating to access and interconnection, including on technical standards, points of interconnection and charges payable.[53] To date it has not done so.

Section 97 empowers the department to arbitrate on terms of access where the parties have failed to agree, and at the request of one or both of the parties.

4.13.3 Regulatory arrangements

The regulatory administration of interconnection and access, and of the sector generally, is with the minister and the department. There is no separate regulatory agency outside of the department.

4.13.4 Interconnection and access

The act is based on a strong preference that service providers should arrive at a commercial agreement through negotiation on the terms and conditions for interconnection of their networks.

There is an interconnection agreement in place between TCC and Digicel. It was arrived at through negotiation between the parties and is commercially confidential, and has not been published because it is considered to be commercially confidential in its entirety.

There was no need for the department to perform any arbitration role on matters associated with the original agreement. Subsequent to the agreement, the department has been party to a further clarification of the agreement under which both TCC and Digicel terminate incoming international calls addressed to subscribers of their respective networks. In other words, the service providers will not accept calls from each other's international gateways.[54]

4.13.5 Cost modelling and benchmarking

The department is working on cost models, but they were not available for use to assist in the processes leading to the current TCC – Digicel interconnection agreement.

4.14 Tuvalu

4.14.1 Country and market background

Tuvalu comprises four reef islands and five atolls for a total land area of 26 square kilometres. It has a population of about 12,400.

Telecommunications services are provided by the Tuvalu Telecommunications Corporation (TTC), which operates as a monopoly service provider.

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52 Sub-section 93(4).

53 Section 95.

54 Because of the profit involved in the settlements for international calls relative to the returns elsewhere in the market, this is a recurring issue in the Pacific, and in many other developing countries besides.

4.14.2 Legislative framework

Service provision is governed by the Tuvalu Telecommunications Corporation Act of 1993, which established the operator in corporate form and set out powers and duties in relation to service provision.

Section 6 of the act specifically reserves exclusive service provision rights to TTC:

> '(1) Subject to subsection (2) of section 3 of this Act55 and subsection (2) of this section the Corporation shall have the sole and exclusive right to supply telecommunication services and to establish and develop telecommunication systems in Tuvalu in accordance with its functions and powers under this Act.
>
> (2) Where the Corporation is for any reasons unable to supply or provide a telecommunication service to any person in any part of Tuvalu or to establish and develop an appropriate telecommunication system for that person, it may in accordance with the regulations made by the Minister under this Act, licence a person as it may consider fit and suitable to supply or provide the service at a cost to be paid for by the person requiring the service and upon such other conditions as may be prescribed by regulations and contained in the licence.'

These statutory provisions are exceptional. They do not only reserve a monopoly with the incumbent operator, but make it clear that the only way in which a new entrant will be considered is in the situation where the incumbent is unable to provide a service. On this basis, competition is not contemplated at all, even if more than one operator is licensed.

4.14.3 Regulatory arrangements

Policy oversight and management is retained by the minister and the department.

4.14.4 Interconnection and access

There is no provision for interconnection or access arrangements, and the need is not contemplated under the act.

4.15 Vanuatu

Country and market background

Vanuatu has an aggregate land area of 12,200 square kilometres, and a population at the 2009 census of 243,304.

There are 10 licensed operators. It is intended that they be technology- and service-neutral. However, the provision of mobile services is restricted to two service providers, Digicel Vanuatu and Telecom Vanuatu Limited (TVL).The licensees are set out Figure 14.

[55] These relate to military communications.

Figure 14: Licensees in Vanuatu

Company	Licence constraints	Current services	Comment
Telecom Vanuatu	No constraints – can provide all types of telecommunication service.	Fixed Mobile Internet International gateway	Internet role to be reviewed
Digicel	No constraints – can provide all types of telecommunication service.	Mobile Internet (via mobile phone and Blackberry only) International gateway	Planning broadband internet services
Interchange	Can provide all types of telecommunication service except mobile before March 2011	None	Investigating provision of a submarine cable linking Vanuatu to New Caledonia
Can'l	Restricted to IP-based services No submarine cables No mobile telecommunication services before March 2011	None	Planning Internet services (ISP) Restriction to IP-based services and prohibition on international cables to be removed
CNS	Restricted to IP-based services No submarine cables No mobile telecommunication services before March 2011	None	Planning Internet services (ISP) Restriction to IP-based services and prohibition on international cables to be removed
Hotspotzz	Restricted to IP-based services No submarine cables No mobile telecommunication services before March 2011	Reseller of Internet services via hot spots	Restriction to IP-based services and prohibition on international cables to be removed
Micoms	Restricted to IP-based services No submarine cables No mobile telecommunication services before March 2011	None	Planning Internet services (ISP) Restriction to IP-based services and prohibition on international cables to be removed

Company	Licence constraints	Current services	Comment
Telsat	Restricted to IP-based services No submarine cables No mobile telecommunication services before March 2011	Broadband wireless Internet services in Port Vila only (at this stage)	Restriction to IP-based services and prohibition on international cables to be removed
Wavcom	Restricted to IP-based services No submarine cables No mobile telecommunication services before March 2011	None	Plans unclear Restriction to IP-based services and prohibition on international cables to be removed
Yumi Konek	Restricted to IP-based services No submarine cables No mobile telecommunication services before March 2011	Providing Internet services to two remote sites using HF radio (UNDP- United Nations Development Program-project)	Restriction to IP-based services and prohibition on international cables to be removed

4.15.1 Legislative framework

The Telecommunications and Radiocommunications Regulation Act was passed into law in 2009.

Section 4 provides for the appointment of a regulator. The regulator is intended to be an independent authority with substantial powers and functions as generally set out in section 7 of the act, and as specifically identified elsewhere in the act. Two of the general powers under section 7 are noteworthy, because of their implications for interconnection and access regulation, namely –

3) The Regulator may, with the approval of the Minister,make such regulations as maybe necessary or convinient to give effects to the provisions of this act.

4) Without limiting the generalibility of subsection 3,the Regulator may make regulations:

a) prescribing standard terms in various licences in exemptions;

b) prescribing procedures,forms and fees in respect of any licenses or exception or anything which might be done by any person under this act, except the provision of reason for any decision by the Regulator or;

c) providing for the methodology by which any calculation required to be made under this act is to be made.

The regulator is responsible for issuing licences, including the determination of circumstances where licensing may not be required, and for overseeing compliance with and operation of the licence requirements and system.[56]

[56] Part 3.

The act makes general provisions for competition,[57] interconnection,[58] and tariffs.[59] The way that they relate to interconnection and access are dealt with below.

4.15.2 Regulatory arrangements

The regulation-making power in relation to processes and calculation-methodologies is important for the specification of the arrangements to apply to interconnection. Generally regulation-making powers under the act have yet to be employed. As a result, the regulator is administering arrangements based on the broader requirements set out in the act itself, in the licences which predate the act and in the existing Interim Interconnection Agreement between TVL and Digicel.

There is no general economy-wide competition law in Vanuatu, and the competition law arrangements applying in the telecommunication sector are set out in the act. The powers in the act permit the regulator to determine telecommunication markets for any purpose in the act, having regard to a well-established set of criteria that enable boundaries of substitutability to be tested.[60] The act then empowers the regulator to designate dominant service providers in a market, using either of two criteria:[61]

Subject to the terms of any prior licence, the Regulator may designate a service provider dominant within a telecommunications market if:

a) the service providers gross revenues from that telecommunications market constitutes 40 percent or more of the total gross revenues of all service providers from that telecommunications market; or

b) the Regulator reasonably considers that, either individually or acting in concert with others, the service provider:

(i) enjoys a position of economic strength or controls a bottleneck facility in relevant telecommunications market; and

(ii) such strength or control affords the service provider the power to behave to an appreciable extent independently of competitors, customers, end users or potential competitors in that telecommunications market.

Behaviour that might constitute anti-competitive behaviour or abuse of dominance is set out in specifically non-exhaustive listings in sections 22 and 23 respectively.

Part 6 of the act sets out the procedural and other requirements for interconnection in considerable detail. The act requires:

- that defined access seekers have a right to interconnect;[62]
- that good faith negotiations will occur after a formal request for interconnection;[63] and
- that, absent an order to the contrary by the regulator, a service provider will not be required to enter into an interconnection agreement that might result in damage to its network, interference with network operations or prevent the provision of services to its end users.[64]

57 Part 5.
58 Part 6.
59 Part 7.
60 Section 20.
61 Sub-section 20(1).
62 Sub-section 26(1).
63 Sub-sections 21(2) and (3).
64 Sub-section 21(4).

The act empowers the regulator to notify a service provider to prepare and submit a reference interconnection offer within 90 days.[65] The regulator may require amended provisions compared to those suggested by the service provider to be included.[66] Prices in RIOs are to be in accordance with the interconnection charge standards in section 30. RIOs must also be published, including in the website of the relevant service provider.

Section 28 provides for interconnection agreements to be published within 10 days of being entered into. The act contains provisions enabling service providers to claim confidentiality in relation to matters in an agreement. The decision on confidentiality claims lies with the regulator.

Section 29 sets out the basic requirements for interconnection, including that it should be non-discriminatory, at technically feasible points, and on reasonable terms and conditions.

Section 30 sets the standard upon which interconnection charges will be based:

Interconnection Changes

(1) If there is any dispute over prices for interconnections provided by access providers or where the Regulator is to determine these prices under section 27, the Regulator must determine these prices under section27, the Regulator must determine the prices by benchmarking against cost oriented prices for interconnection in other jurisdiction selected by the Regulator.

(2) The Regulator may use any other method of calculation or determination of the prices, but only where the Regulator determines that it is unable to identify an appropriate selection of cost-oriented prices in other jurisdiction.

The regulator may arbitrate interconnection disputes.67

Non-compliant interconnection agreements are void.68 This is a curious provision as well and being untested as yet. It leaves open that a party might rely on its own non-compliance to avoid an agreement that it finds inconvenient or problematic.

4.15.3 Interconnection and access

The provisions for all future arrangements governing interconnection are set out in some detail in the act. For the present, the only applicable interconnection agreement is the one that was entered into before the act became law, between TVL and Digicel. The current agreement commenced on 25 June 2008 and has a term of four years, with only the price arrangements to be reviewed within that period. The price terms can be reviewed after 20 months (after 25 February 2010) with amendments taking effect at the two-year point (25 June 2010). The interconnect agreement was set up as part of the settlement negotiations between the government and TVL's shareholders when TVL's monopoly was terminated. The interconnection agreement is regarded as a private agreement and not published. It is however shared with the regulator.

In addition, one of the new entrants (Telsat) has asked that the roles, responsibilities and processes of TVL be spelt out in the agreement.

65 Section 27.
66 Sub-section 27(4).
67 Section 31.
68 Section 32.

In addition, at the end of 2009, two of the new entrants (Telsat and Can'l) asked TVL, Digicel or both for Internet interconnection (IP traffic) and facilities sharing (access). However, the processes attending this request are still at an early stage.

4.15.4 Cost modelling and benchmarking

The status of cost modelling and benchmarking under the act are covered in section 30, which is cited in section 4.15.3.

The act is unusual in that it nominates the benchmarking of cost-oriented prices in other selected jurisdictions as the primary method of determining interconnection charges. However, there is a clear duty on the regulator to make a selection and be satisfied that the comparator set or cost-oriented prices for interconnection. Sub-section 30(2) permits the regulator to use other methods for determining interconnection charges, including, it can be assumed, cost modelling. However, these alternative methods are only to be adopted if the regulator is unable to identify an appropriate selection of cost-oriented prices in other jurisdictions. This pre-condition has yet to be tested. However, the challenges that attend benchmarking studies for interconnection charges would effectively leave it to the discretion of the regulator whether to examine alternatives.

The interconnection charges in the current TVL-Digicel interconnection agreement are based on a benchmarking study undertaken by a New Zealand consulting firm. A benchmarking study was used because TVL and the government both agreed that a costing exercise was unduly arduous and costly. In addition, Digicel's network did not exist at that stage so any costing would have been theoretical and based on proxy data.

Section 5: Initial country and regional assessment

5.1 Assessment method

All of the countries in this study are compared along various dimensions that are important in the implementation of interconnection and access arrangements in accordance with best practice. The dimensions that are grouped together for analysis are:

- legislation
- interconnection framework
- access to facilities and other wholesale services
- interconnection agreements
- institutional capability for interconnection
- similarities and differences in relation to interconnection

However, many of the countries have not yet moved to a competitive telecommunication sector. The reasons for this vary, but it would seem that the most common reason is that the population to be served, and current and future demand for services, are insufficient to sustain two or more operators in the market. In these situations there is no point in establishing interconnection frameworks and processes, because there is no prospect of interconnection to begin with. Therefore, in the case of many of the countries, interconnection and the procedures applied for setting related charges are simply not applicable. Nevertheless, later in this chapter, a SWOT analysis has been conducted for each country or group of countries,[69] based on the implicit question: How effective are the means that this country has adopted to ensure that its people and businesses are and will continue to be provided with modern telecommunication services?

5.2 Legislative framework

Figure 15 sets out the legislative arrangements of the countries in the study. Many have sector legislation that has been adapted from Australian, New Zealand and Canadian originals from various eras. In all cases it is clear that those drafting the legislation have considered the arrangements in other countries to ensure that useful ideas have been considered and, if apparently useful, incorporated. This is standard and sensible practice. However, only eight of the countries in the study have sector acts less than a decade old, and in some cases, such as Nauru, the legislation harks back to much earlier templates from elsewhere.

In two of the countries, the Marshall Islands and Niue, management of the sector (effectively any regulation) has been left with the monopoly operator for all practical purposes. In a further six, the regulatory function has been left to a minister or a ministry (or department). In these countries, there is no separate regulatory agency. In only six countries, has a regulatory agency been established separate from both the operators in the industry and from the policy-making levels of government.

Only seven countries have specific provision in their sector legislation requiring or promoting competition in the sector. Another country plans to introduce competition into legislated policy, and another (Kiribati) has a requirement in its act, but no actual fixed and mobile network services competition in the sector at

[69] Individual SWOT analyses have been prepared for Fiji, Papua New Guinea, Samoa, the Solomon Islands and Vanuatu, being countries with substantial arrangements either working or in place. Other countries have monopoly service provision are else no interconnection arrangements and have been considered in categories based on population levels for the purposes of SWOT analysis.

this stage.[70] Of the seven countries with legislated provision for competition, all have legislated provision for interconnection.

Only Fiji and Papua New Guinea have general economy-wide competition laws that seek to identify and proscribe anti-competitive behaviour. Many of the sector-specific acts have made up for this legislative gap by including general provisions on competition. Samoa, Tonga and Vanuatu are cases in point.

5.3 Interconnection framework

As would be expected, those countries with legislation that makes no provision at all for competition, and does not contemplate competitive service delivery, do not make any provision in their legislation for interconnection. As shown in Figure 16, it is only the sub-set comprising Fiji, Kiribati, Papua New Guinea, Samoa, the Solomon Islands, Tonga and Vanuatu that have such arrangements. They make up only half of the study countries that responded to requests for information.

Of the countries referred to, all have provision for negotiations by the parties and for arbitration by the regulator if the parties fail to agree and seek arbitration.

[70] In Kiribati's case the government has negotiated with potential new entrants but has not come to any agreement with any new entrants at this stage.

Figure 15: Legislative framework: general

Country	Current sector legislation (last 10 years)	Regulatory agency separate from operators	Regulatory agency separate from ministries	Name of regulatory or supervisory agency	Legislative provision for competition	Legislative provision for interconnection	Competition law
Cook Islands	No	No (planned)	No	Prime Minister's Department	No (planned)	No (planned)	None
Fiji	Yes	Yes	Yes	Commerce Commission	Yes	Yes	Yes
Kiribati	Yes	Yes	Yes	TAK	Yes	Yes	No
Marshall Islands	No	No	-	National Telecommunications Authority	No	No	No
Micronesia	No	Yes	No	Department of Transportation	No	No	No
Nauru	Yes	No	No	Minister	No	No	No
Niue	No	No	-	Niue P&T	No	No	No
Palau	No	Yes	No	Ministry of Infrastructure, Industries and Commerce	No	No	No
Papua New Guinea	Yes	Yes	Yes	ICCC	Yes	Yes	Yes
Samoa	Yes	Yes	Yes	Office of the Regulator	Yes	Yes	No
Solomon Islands	Yes	Yes	Yes	Telecom Commission	Yes	Yes	No
Timor-Leste	No	Yes	Yes	ARCOM	No	No	No
Tonga	Yes	Yes	No	Minister and Department of Communications	Yes	Yes	No
Tuvalu	No	Yes	No	Minister	No	No	No
Vanuatu	Yes	Yes	Yes	Reguleta blong Telekomunikesen	Yes	Yes	No

Figure 16: Legislative framework for interconnection

Country	Negotiation processes	Arbitration by regulator, if required	Reference interconnection offers	Publication of agreements (in legislation)	Cost-oriented and benchmarks	Cost-based and cost modelling	Comments
Cook Islands	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fiji	Yes	Yes	Yes	Not required	No	Cost-based	Cost formula in legislation
Kiribati	Yes	Yes	Yes	Not required	No (1)	No (1)	(1) Must be just and reasonable
Marshall Islands	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Micronesia	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Nauru	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Niue	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Palau	None	n/a	n/a	n/a	n/a	n/a	n/a
Papua New Guinea	Yes	Yes	No	Yes	No	Yes	Act specifies the costs to be considered
Samoa	Yes	Yes	No	Yes	Yes	Yes	Cost-oriented if interim order, cost-based otherwise
Solomon Islands	Yes	Yes	No	Yes	Yes	Yes	Benchmarks to be specified by Regulator, but parties may fund cost modelling studies
Timor-Leste	No	No.	No	No	No	No	Drafts exist which would meet best practice if implemented
Tonga	Yes	Yes	No	Not stated	No (2)	No (2)	(2) Must be on an equitable and non-discriminatory basis
Tuvalu	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vanuatu	Yes	Yes	Yes	Yes	Preferred method	Available method	Benchmarking and cost-based methods only applicable if determined by regulator

Figure 17: Cost modelling methodologies and capability: actual practice

Country	Requirement for cost-based access and interconnection	Use of cost models for price setting	Use of cost modelling for interconnection	Type of model (for interconnect)	Cost standard	Comments
Cook Islands	No	Yes	No	n/a	n/a	FDC model used for retail access pricing
Fiji	Yes	No	No	n/a	n/a	
Kiribati	No	See comment	See comment	BU (Hybrid) Scorched node	LRIC +	Models have been developed but not used for actual price-setting
Marshall Islands	No	No	No	n/a	n/a	
Micronesia	No	No	No	n/a	n/a	
Nauru	No	No	No	n/a	n/a	
Niue	No	No	No	n/a	n/a	
Palau	No	No	No	n/a	n/a	
Papua New Guinea	No	No	No	n/a	FDC / LRIC +	Regulator may use cost-based methodologies, which would be either FDC or LRIC+
Samoa	Yes (1)	Yes	Yes	BU Scorched earth	LRIC +	(1) Unless for interim orders when cost-oriented approaches may be used
Solomon Islands	No (2)	No	No	n/a	n/a	(2) Benchmarking preferred, for dispute settlement (unless model proposed and paid for by parties)
Timor-Leste	No	No	No	n/a	n/a	Draft policies propose use of TSLRIC methodologies in the longer term
Tonga	No	Not avail.	Not avail.	n/a	n/a	Tonga is working on cost models but they are not ready for use at this time
Tuvalu	No	No	No	n/a	n/a	
Vanuatu	Indirect requirement via benchmarking	Optional	No	n/a	n/a	Benchmarking preferred, for dispute settlement (unless model proposed and paid for by parties)

Figure 18: Current interconnection agreements

Country	In place	Negotiated between the parties	Arbitrated/ determined by regulator	Approved by regulator	Published	Cost-based	Comments
Cook Islands	No	n/a	n/a	n/a	n/a	n/a	
Fiji	Yes	No	Yes	Yes, implicit	No	No	
Kiribati	No	n/a	n/a	n/a	n/a	n/a	
Marshall Islands	No	n/a	n/a	n/a	n/a	n/a	
Micronesia	No	n/a	n/a	n/a	n/a	n/a	
Nauru	Yes	Yes	Not known	Implicitly	No	Probably not	
Niue	No	n/a	n/a	n/a	n/a	n/a	
Palau	No	n/a	n/a	n/a	n/a	n/a	
Papua New Guinea	Yes	No	Yes	Yes, implicit	No	No	
Samoa	Yes	No	Yes	Yes, implicit	In part	Yes	Rates order published
Solomon Islands	No	n/a	n/a	n/a	n/a	n/a	
Timor-Leste	No	n/a	n/a	n/a	n/a	n/a.	
Tonga	Yes	Yes	Not known	Not known	No	Not known	Regulator (department) registered agreement
Tuvalu	No	n/a	n/a	n/a	n/a	n/a	
Vanuatu	Yes	Yes	No	No	No	No	Supported by benchmarking study

Only three countries, Fiji, Kiribati and Vanuatu, have provision for reference interconnection offers to be prepared by service providers (usually limited to dominant service providers) and approved by the regulator.

In only four countries, Papua New Guinea, Samoa, the Solomon Islands and Vanuatu, does the legislation provide for the publication of interconnection agreements.

The legislation in five countries specifically refers to the costs in relation to interconnection charges. The variation in treatment of costs is very interesting.

- **Fiji**: The legislation specifies a cost-based approach and specifies the cost formula to be applied.
- **Papua New Guinea**: If there is arbitration by the regulator, the charges must be cost-based, and the legislation sets out the costs to be considered.
- **Samoa**: Charges may be cost-oriented if they relate to charges in interim orders, but must be cost-based otherwise. *Cost-oriented* is taken to include benchmarking of charges in other similar countries where the rates are based on cost studies. *Cost-based* means based on a study or assessment of costs in Samoa.
- **Solomon Islands**: There is an assumption that benchmarking will be acceptable, but the legislation empowers the regulator to determine the benchmarks to apply. However cost-studies may be undertaken if the parties proposing them also agree to fund them. The legislation recognizes that cost studies and cost modelling may be costly to undertake.
- **Vanuatu**: The legislation nominates benchmarking as a preferred method for determining comparable costs in Vanuatu, but empowers the regulator to use cost-based approaches and to develop cost models if the regulator decides this is desirable.

The first three countries are clearly focused on cost-based outcomes, whereas the last two nominate benchmarking (cost-oriented approaches) as preferable, but allow for cost-based approaches and cost modelling under defined circumstances.

5.4 Access to facilities and other wholesale services

Access to facilities and other wholesale services is provided for in some legislation in association with provisions for interconnection. Clearly, mandatory access to facilities and wholesale services other than interconnection is not a priority in the Pacific region. This is not to prevent the voluntary agreement on such access if the parties find it in their mutual interest. Experience elsewhere suggests that they will seldom find agreement. The priority in the region is to encourage investment and the roll out of networks and infrastructure. Mandated access to facilities and whole services other than interconnection is all about efficiency of utilization and permitting new entrants to enjoy the scale-efficient costs enjoyed by established service providers. In the policies adopted across the region, efficiency of this kind is secondary to investment and rollout.

5.5 Frameworks for interconnection agreements

There is generally less known about the interconnection agreements operating in the Pacific region than those in other regions across the globe. There are a number of reasons for this.

- Reference interconnection offers (RIOs) are only provided for in the legislation of three countries. In the cases of Kiribati and Vanuatu, there has not yet been an opportunity to implement the requirement. In the case of Fiji, the requirement has not been enforced. RIOs need to be made public or at least available to intending interconnectees, and, given their nature as standing offers in contract form, they serve as a reliable guide to the agreements based upon them.
- In Papua New Guinea there is a legislative requirement to publish agreements, but that has not been implemented.
- In some countries, the ministry or regulator has accepted that the whole of interconnection agreements that have been negotiated are commercially confidential in their entirety and need not or should not be published. Nauru and Tonga are in this category.

Only one country, Samoa, claims to have used cost models to assist in decisions related to interconnection. The clear implication of legislation in Samoa and elsewhere is that if the parties agree and negotiate commercially then the charges need not be either cost based or checked for cost consistency by the regulator. Cost standards only come into play when the regulator is required to arbitrate. However, the possibility of cost-oriented or cost-based arbitration serves as a constraint on the parties moving too far from cost because any dissatisfaction resulting in arbitration will impose some view of costs.

In the three countries in which the cost models applied to interconnection charges have been produced:

- Samoa and Kiribati are bottom-up models, and the nature of the model in Papua New Guinea is not known. The Papua New Guinea model is specified in legislation but may not yet exist.
- Kiribati and Papua New Guinea use FDC or close-to-FDC models cost standard and Samoa uses the LRIC+ standard.

5.6 Institutional capability for interconnection

Based on the information in the replies to the data request form, the number of staff employed on interconnection issues in regulatory agencies across the region, including ministries, is small, and their expertise is limited. Taking into account the interconnection agreements that appear to have been concluded without assistance or involvement by the regulator, regulatory agencies have relatively little capacity and experience in dealing with interconnection and related access issues.

Few countries have involved agency staff in the building or revision of models, or the revision or development of rigorous benchmarking studies.

The information provided suggests that much of the capacity has been hired in on an as-required basis using international assistance from APT, ITU and private consultants. The capacity for specifying in detail the work required of consultants and in engaging with them in the production of models and other outputs is limited. The risk is always that the results from consultancies of this kind might not be well adapted to the circumstances of the country concerned, or, whether they are adapted well or not, the regulator has no capacity to find out.

5.7 Interconnection in practice

The discussion in section 5.5 concerns the arrangements that are set out in legislation or other sources that constitute the regulatory framework for interconnection. By contrast, Figure 19 sets out the arrangements that are in place and, therefore, reflect actual practice rather than prescription or policy.

Six of the 15 countries that provided information have some form of interconnection agreement in place. In the case of three of these (Nauru, Tonga and Vanuatu), the agreement was negotiated entirely between the parties without, so far as is known, any intervention or arbitration by the regulator. In the other three cases (Fiji, Papua New Guinea and Samoa), the opportunity for complete agreement between the parties was available but could not be achieved, and the intervention of the regulator in the role of arbitrator was necessary for completing the agreements. The main conditions requiring regulator intervention related to termination rates.

The information on the role of the regulator in registering and approving interconnection agreements once they are made is not clear in most countries. Implicitly, if the regulator has arbitrated and determined some of the key terms, there is an examination and approval of at least those parts of the agreement that were in dispute. However, in relation to either whole agreements that were negotiated by the parties or those parts not determined on arbitration, it is not clear that the regulators reviewed and approved them. It could be argued that when two telecommunication service providers (or competitors in any sector of the economy where they are in effect the only competitors) arrive at a commercial agreement in a confidential environment, there must be a concern that the interests of the parties may have overwhelmed or excluded the interests of consumers. Consumers were not represented and have not had a say. The consumers' interests are protected by public agencies, such as the regulators. Therefore, it is quite reasonable to expect some assessment of consistency with public interest and consumers' interests, before registration is completed.

It is simply not clear that the regulators undertook an approval process of any kind when registering or receiving interconnection agreements negotiated by the parties. In the cases in Papua New Guinea and Samoa, this may well be implicit, especially on clauses that were arbitrated. Elsewhere (Nauru and Fiji), it is perhaps implicit, but that is asserted here with less confidence. In the case of Nauru, for example, so little is able to be made public of the agreement that it is uncertain that it really is an interconnection agreement of any known type, even though it is called that in the information provided.

Transparency is a major problem for interconnection regulation in the Pacific region. Transparency is important to show those whose interests are at stake (beyond the parties to an interconnection or access agreement) the way in which important matters affecting the quality, availability and price of important public telecommunication services have been treated. This is important for regulators as well, since it enables them to canvas the arrangements and seek stakeholder comment through public consultation. Without transparency, public consultation and participation in regulatory development lacks meaning, and this impacts on credibility and legitimacy. Undoubtedly, there may be aspects of agreements for which the quantum of harm to the commercial interests of the service providers is greater than the harm to the public interest caused by non-disclosure. Best practice is a balancing of interests and there should not be a very heavy onus on the parties who want suppression of information. Originating and terminating interconnection service rates need to be published. International best practice is overwhelming on this point.

Of the 15 countries in the study, only Samoa has published interconnection rates beyond the industry. In Fiji, the rates are made known to the licensed operators who will apply them, but not more generally. Apart from rates, no country publishes the agreements in full (subject to proven claims of commercial confidentiality) at this stage, notwithstanding requirements to do so in the legislation in some countries.

Another outcome of non-transparency on agreements, and especially on rates, is that the ability of countries to learn from each other's experience is reduced. This is a secondary outcome, but one that is real nevertheless.

Allowing for the non-transparency of outcomes and processes that have been referred to, for the purposes of this study it can be emphatically stated that only Samoa has a process in place that will definitely lead to cost-based interconnection charges.

5.8 SWOT analyses

An analysis of strengths, weaknesses, opportunities and threats in relation to interconnection and access arrangements suggests that there is an ideal based on a single notion of best practice that should be the standard of measurement and assessment. It is not possible to have a single and rigid concept of best practice for all of the countries of the Pacific region since they are not in the same or similar circumstances, The potential market will often determine whether a competitive model based on licensing of separate network operators is feasible. Some countries have significant competition, particularly in mobile services, and some have limited or no competition. In the near term, the aspirations of each of these categories will be different and to talk about a single standard of best practice to which they should now aspire is not credible.

Firstly, each country with competition that is significant by Pacific levels is analysed, and secondly, the remaining countries are analysed as a group. Nauru would have been a very useful subject of study to show how a country with a small population (around 14,000) can introduce competition and good interconnection practice, but the process and outcome surrounding the Nauruan arrangements have not been made available. Therefore, other smaller countries of the Pacific region are not in a position to decide if the Nauruan approach is a useful model for them. Nauru has not been SWOT-analysed separately, because the information available does not permit it.

Figure 19: Fiji SWOT analysis of interconnection and access arrangements

Strengths • Negotiation/arbitration arrangements appear to be working • Requirement for cost-based access and interconnection • Clear cost-based formula for interconnection • Provision for RIOs • Regulatory agency separated from operators and ministry	**Weaknesses** • Publication of agreements not required in legislation • Lack of capacity in regulator office relating to arbitration and modelling • Current interconnection agreements are not cost based nor planned to be
Opportunities (need to be taken) • No use of cost models to date to give meaning to the requirement of the legislation	**Threats (need to be addressed)** • Lack of regulatory capacity – including cost modelling • Lack of process transparency • Disconnect between legislation and practice

Figure 20: Papua New Guinea SWOT analysis of interconnection and access arrangements

Strengths • Good recent legislation (but about to be amended) • Negotiation/arbitration arrangements appear to be working – albeit have taken longer than expected • Requirement for cost-based access and interconnection • Clear cost-based formula for interconnection • Provision for RIOs • Regulatory agency separated from operators and ministry • Publication of agreements required in act legislation	**Weaknesses** • No provision for RIOs • Cost models not used in practice
Opportunities (to be taken) • The opportunity to use cost models in future • Use of RIOs to improve transparency	**Threats** (to be addressed) • Lack of process transparency, especially in relation to approval of interconnection agreements

Figure 21: Samoa SWOT analysis of interconnection and access arrangements

Strengths • Good recent legislation • Regulatory agency separate and independent of operators and ministry • Strong and improving regulatory capacity • Commitment to public consultation • Arbitration processes are well based and working • Requirement for cost-based and cost-oriented access and interconnection • Clear cost-based formula for interconnection (spelled out in regulatory practice and orders) • Commitment to written reasons to support regulatory orders and decisions	**Weaknesses** • No provision for RIOs • No provision for publication of interconnection agreements
Opportunities (to be taken) • Use of RIOs to improve transparency • Developing local expertise	**Threats** (to be addressed – or managed) • Propensity of parties to litigate – now dampened by changes to act

Figure 22: Solomon Islands SWOT analysis of interconnection and access arrangements

Strengths • Good recent legislation • Regulatory agency separate and independent of operators and ministry • New regulator brings additional regulatory capacity • Provision in act for publication of interconnection agreements • Provision for cost-oriented and cost-based approaches	**Weaknesses** • No provision for RIOs • Cost models not used in practice – yet • The legislation and regulator are new and not tested fully yet on interconnection • Cost standard not specified
Opportunities (to be taken) • Use of RIOs to improve transparency • Developing local expertise	**Threats** (to be addressed)

Figure 23: Tonga SWOT analysis of interconnection and access arrangements

Strengths • Negotiation has worked	**Weaknesses** • Regulatory agency still part of ministry • No provision for RIOs • Legislation silent on publication of interconnection agreements – and not published in practice • No clear provision that interconnection charges must be cost-oriented or cost-based • No cost models available for use yet • Cost standard not specified
Opportunities (to be taken) • There are substantial improvement opportunities to address the weaknesses noted	**Threats** (to be addressed) • Lack of transparency of process

Figure 24: Vanuatu SWOT analysis of interconnection and access arrangements

Strengths • Good recent legislation • Separate regulatory agency from operators and ministry • Provision for RIOs • Provision for benchmarking and cost-based methodologies	**Weaknesses** • Regulator and legislation are fairly recent and have yet to be tested in a full interconnection case • Cost-standard not specified • Act does not require agreements to be approved by regulator
Opportunities (to be taken) • Developing local expertise	**Threats** (to be addressed)

A number of conclusions can be made relating to this group of countries.

- There are some good examples of substantial regulatory capacity but, in all cases, the regulators are expatriates and development of local expertise and confidence will be needed.
- RIOs are a means of addressing transparency without compromising commercial confidentiality.
- Lack of transparency is the greatest threat to good, fair and consistent interconnection outcomes. Samoa is a beacon of transparency that offers a good template for other Pacific Island countries.

Figure 25: Countries without significant competition (Kiribati excepted)

Strengths	**Weaknesses** • Old legislation • Regulators either not separated from ministry or controls left with operator • Limited and inadequate regulatory capacity • No provision for seeking opportunities to introduce any form of competition • No controls on incumbents through performance measures or other means that reflect the outcome in a competitive market • No use of cost-based methodologies or benchmarking to test efficiency of service delivery • There is no process transparency – and possibly no oversight processes
Opportunities (to be taken) • Substantial opportunities to improve regulatory environment and service outcomes exist	**Threats** (to be addressed) • The real threat is that nothing will change except that the range, price and quality of services will fall further and further behind international norms with consequences for the economies of these countries at all levels

Section 6: Recommandations

6.1 Introduction

The countries of the Pacific region included in this study have varying potential for developing their telecommunication sectors through competition. The populations of the countries range from over six million in the case of Papua New Guinea to around 1,400 in the case of Niue. Potential for competition in the provision of telecommunication network services is not tied directly to population as such but to the ability of service providers to become commercially sustainable given the overall level of demand.

It would be inappropriate to seek the lowest common denominator of the Pacific region and pitch recommendations on that basis. There would be no value to such recommendations for the countries that have competition at present: Fiji, Papua New Guinea, Samoa, the Solomon Islands, Tonga and Vanuatu. The nature of the arrangements established in Nauru and whether they might be called competitive is not fully understood.

Equally, to exhort that some of the smaller countries of the Pacific region such as the Cook Islands, Niue, Tuvalu and Palau, should develop detailed interconnection arrangements and cost models in advance of any likelihood of use in the short to medium term, would lack credibility.

There is a group of countries, including Kiribati, who may be in an intermediate situation. They want to have a competitive market place but, for various reasons, may not be able to attract suitable new entrants to invest.

Therefore three strands of recommendations have been developed. Each addresses one of the following groups of Pacific island countries:

(a) those with competition now;

(b) those that have some probability of introducing competition in the near to medium future; and

(c) other countries, including the smallest ones, without immediate prospects for competition.

There are some overall recommendations that can also be made.

In all cases, the recommendations take account of the SWOT analyses in chapter 5, and especially seek to address weaknesses and exploit opportunities that have been identified.

6.2 Recommendations for countries that already have competitive telecommunications markets

1. Legislation should be amended to ensure that the legal and regulatory framework meets best practice, and specifically meets the following requirements.

   (a) Interconnection agreements negotiated between the parties should be explicitly reviewed and approved by the regulatory agency after being determined to be consistent with the public interest and the interests of users of telecommunications services.

(b) Interconnection agreements should normally be published to meet the public interest in transparency. Regulatory agencies should have the responsibility of determining any claims from operators or other parties that publication will destroy commercial value in confidential information. In determining such claims, regulators should apply rules specifically developed by them in advance setting out criteria and procedures that will be applied to allow disclosure to be weighed against private commercial interests.

(c) Notwithstanding (b), the price components of all agreements shall be published.

(d) Where interconnection rates are to be determined by the regulatory agency, they shall be cost-based and the formula shall be included either in the legislation itself or in regulations pursuant to such legislation.

(e) Regulatory agencies should be empowered to require interconnection reference offers be prepared for regulatory approval by service providers.

(f) Interconnection and access shall be on a fair, reasonable and non-discriminatory basis and the party providing interconnection and access shall do so on terms and conditions no less favourable than those applying to its own retail operations.

2. Where decisions are made on the basis of benchmarking studies, the regulatory agency should be required to publish the benchmarking study and conduct a public consultation on the adequacy and appropriateness of the study and of the comparator countries used before making a final order on the matter.

3. Where decisions are made on the basis of cost models the regulatory agency should be required to publish so much of the cost model as does not disclose the commercially confidential information of any service providers and to conduct a public consultation on the adequacy and appropriateness of the cost model before making a final order on the matter. The rules should make it clear how the cost of developing cost models should be borne within the industry. However, even if borne by one or more operators this does not affect the model access arrangements set out earlier in this recommendation.

4. All countries should make arrangements for the development of interconnection and access regulatory and administration skills in their regulatory agencies, particularly in relation to cost modelling and arbitration, so that the agencies have staff with expertise to specify and critique benchmarking studies and cost models that are developed for the agency or proposed to the agency by service providers and their consultants.

6.3 Recommendations with countries that might have competitive telecommunication markets in the medium term

5. Legislative arrangements based on the best practices outlined in recommendation 1 should be put in place well before the commencement of competition and in sufficient time for the regulatory agency to be established and developed with the expertise and confidence ready to take on the interconnection and access administration required of a competitive telecommunication service market.

6. Regulatory agencies (including relevant ministries) should establish through benchmarking and other analysis, and public consultation a comprehensive set of performance indicators that the telecommunication service provider(s) should meet in terms of:

a. Interconnection and access shall be on a fair, reasonable and non-discriminatory basis and the party providing interconnection and access shall do so on terms and conditions no less favourable than those applying to its own retail operations.

b. the technical parameters and performance requirements of the services;

c. the pricing policy and aspirations associated with the services; and

d. other dimensions of service.

These performance indicators should take account of service outcomes that might be achieved in similar competitive market environments.

6.4 Recommendations for countries that are unlikely to have competitive telecommunications markets in the medium term

7. Recommendation 6 also applies to this category of countries.

8. Regulatory agencies should design, in consultation with the affected service providers, schemes that will encourage the delivery of services at quality standards set out in recommendation 6. This includes schemes enabling the provision of services to be contracted out if that provides the appropriate guarantees of delivery, incentives and penalties. [71]

9. Telecommunication service policies should be reviewed and redeveloped and, in the light of any findings, legislation amended, if required, to authorize regulatory agencies and relevant ministries to establish schemes of the kind contemplated in recommendations 6, 7 and 8.

10. In the absence of long-term plans for market liberalization and the introduction of competition, the role of the ministry or separate regulator must include facilitating the creation of conditions to achieve the benefits of competition, such as licensing of additional service providers and ensuring that they have reasonable wholesale access and usage terms and conditions.

6.5 Overall recommendations

11. The countries that are covered in this study shared their experience and ideas on how to improve their competitive environments, and their approach to interconnection, access, cost modelling and other related methodologies in a number of workshops. They should do this again in 2010 and again in 2012 to jointly assess progress made and provide mutual assistance on any difficulties encountered.

12. Policy and legislation should now be reviewed and, where appropriate, amended to ensure that regulatory functions are separated from service providers' operating functions. Consideration should be given to organizationally separating regulatory functions from the broader policy activities of departments and ministries.

[71] Ministries and regulators need to develop clear views of the services that are needed and the quality and characteristics that are acceptable for these services. Quality issues include availability, provisioning and fault response delay as well as the standards that should apply bearing in mind international practice. A monopoly provider needs to be given incentives to meet these standards over time. Incentives can be both positive and negative. The option of having work sub-contracted out may serve to encourage better outcomes.

Annex 1
Workshop Participants

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Annex 2
LIST OF PARTICIPANTS

ITU Study of Interconnection and Access Arrangements in the Pacific

1. **Country:_____**
2. **Website:**

If there is a Government or Regulatory Authority website(s) which contains any of the information being sought please identify it (or them): _____ (Please check that any website referred to is working and up to date before including the details in this reply.)

3. **Legislation:**

What legislation sets out the requirements for interconnection and for access to regulated wholesale services (such as access to network infrastructure, unbundled local loops, etc.)? Please identify the legislation and where it may be accessed electronically. If it is not accessible electronically please send a fax or scanned copy of all relevant legislation to the Project Coordinator.

4. **Regulations:**

What regulations have been put into effect pursuant to relevant legislation that set out the requirements for interconnection and for access to regulated wholesale services (such as access to network infrastructure, unbundled local loops, etc.)? Please identify the regulations and where they may be accessed electronically. If they are not accessible electronically please send a fax or scanned copy of all relevant regulations to the Project Coordinator.

5. **Regulatory Framework and Guidelines:**

What Regulatory Framework and Guidelines have been published by the Regulatory Authority or other responsible government body setting out the requirements and procedures for interconnection and for access to regulated wholesale services (such as access to network infrastructure, unbundled local loops, etc.)? Please identify the Regulatory Framework or Guidelines and where they may be accessed electronically. If they are not accessible electronically please send a fax or scanned copy of all relevant documents to the Project Coordinator.

6. **Order in relation to Interconnection:**

What Orders of the Regulatory Authority are currently in force relating to interconnection? Please identify where they may be obtained in electronic form or else send a copy (or copies) by fax or scanned copy to the Project Coordinator.

{Note that by *Regulatory Authority* both here and later in this document means either the Independent Regulatory Authority if one exists or else that part of a Department or Ministry which is responsible for telecommunications regulation.}

7. **Order in relation to other regulated access:**

What Orders of the Regulatory Authority are currently in force relating to access to regulated wholesale services such as leased lines, unbundled local loops, sharing of physical infrastructure (such as towers and ducts), etc? Please identify where they may be obtained in electronic form or else send a copy (or copies) by fax or scanned copy to the Project Coordinator.

8. **Licensed services providers:**

List the service providers licensed or authorized to provide:

a. Fixed services

b. Mobile services

c. Internet services

d. International gateway services

9. Process in relation to the making of Orders:

What process was put in place before the making of the Orders referred to in Q7 and Q8 above? For example, was there an arbitration proceeding, or was there any form of industry or public consultation?

10. Reference Offers:

Are all or any of the providers of fixed, mobile or Internet services required to prepare and publish reference offers? If so:

(a) What services do the offers cover?

(b) Which service providers are required to make them?

(c) Are the reference offers approved by the Regulatory Authority?

(d) Where must the offers be published?

(e) Where can the ITU Expert access the offers electronically? (If not electronically, please fax of send scanned copies to the Project Coordinator.)

11. Current interconnection agreements:

What interconnection agreements are currently in force? Please send copies to the Project Coordinator or advise how they may be accessed electronically.

12. Current access arrangements:

Apart from the interconnection agreements referred to in Q10, what access agreements are currently in force?

13. Administration of interconnection issues

What Government agency or authority administers interconnection issues and access issues in your country?

What procedure is followed to establish interconnection agreements?

If the service providers are required to negotiate with each other in good faith, under what conditions will the Regulatory Authority get involved?

14. Appeals

Is there provision for or rights of appeal against decisions or orders of the body referred to in Q12? If so to which body may an appeal be made?

15. Staff resources

How many staff does the Regulatory Authority referred to in Q12 have? How many of these are available to assist in the resolution of interconnection issues and disputes? What qualifications do they have?

{Note that by *Regulatory Authority* both here and later in this document is meant either the Independent Regulatory Authority if one exists or else that part of a Department or Ministry which is responsible for telecommunications regulation.}

Annex 2

16. External experts

Has the Regulatory Authority referred to in Q12 used external experts for assistance on interconnection in the last 5 years? If so please provide details.

17. Methodologies used

What methodologies are used to establish the terms and conditions for interconnection, including charges (tariffs) and for wholesale access to facilities and services?

18. Cost Models

Does your country use cost models to determine regulated interconnection and access charges and tariffs?

If so, what sort of model is it? (Bottom up or top down)

What costing standard is incorporated into the model? (LRIC, FAC, Current Cost, Historic Cost):

19. Benchmarking

Does your country establish interconnection and access charges and tariffs through benchmarking?

If so, what benchmarking exercises have been completed?

If not used for determining interconnection and access charges and tariffs, what are benchmarks used for?

20. Other methodologies

What other methodologies are employed in your country to determine interconnection and access charges and tariffs?

21. Interconnection process transaction times

How long did it take from the commencement of the process until the determination of the interconnection charges currently in operation?

What were the actions or things that took up most of the time referred to above?

22. Current charges

What are the current interconnection charges for all interconnection services in your country?

23. Contact:

Please nominate the person who should be contacted to clarify the answers above or for further information.

Name:

Position:

Organization:

Phone:

Email:

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