

**Public Inquiry
into the need for declaration
of certain wholesale services
in international connectivity markets**

DISCUSSION PAPER

Issued on 4th September 2012

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1 Executive Summary

Part VI of the *National Information and Communications Technology Act 2009* (the Act) provides for NICTA to conduct a public inquiry into whether or not particular wholesale services should be declared by the Minister and thus subject to the non-discrimination obligations and General Pricing Principles specified in the Act.

In May 2012 NICTA decided to hold a public inquiry to examine whether certain wholesale services relating to access in PNG to international connectivity should be declared by the Minister. The focus was on three services mentioned in subsection 132(1) of the Act, namely:

- access to capacity on international communications cables;
- access to international gateway facilities; and
- access to capacity on international communications satellite links.

These terms of reference for the inquiry are provided at Annex A.

As explained in this discussion paper, NICTA staff have considered issues relating to the potential declaration of these services. NICTA staff have found that there is a national market for wholesale capacity on, and access to, international fibre-optic submarine cables, that that market is susceptible to ex ante regulation by NICTA, and that Telikom has a position of significant market power in that market. NICTA staff have considered the potential declaration of two services within that market, namely:

- wholesale capacity on, and access to, international fibre-optic submarine cables landed in PNG; and
- wholesale access to international gateway facilities at submarine cable landing stations in PNG.

NICTA staff are satisfied that the declaration of both services would satisfy the declaration criteria set out in section 128 of the Act.

NICTA staff also found that there is a separate national market for wholesale access to, and capacity on, international communications satellites, but that that market is not susceptible to ex ante regulation by NICTA. Accordingly no wholesale services in that market have been considered for potential declaration.

On the related issues of international call costs, NICTA is concerned about the relatively high costs of calling *into* PNG compared to other countries in the region and the potential that such costs have to suppress the volume of international call traffic into PNG and consequently the associated welfare benefits of high service level adoption. Given that retail prices for calls into PNG are set by telecommunications operators in other countries, NICTA recognises that there is very limited scope for it to intervene on this matter. NICTA recognises that the retail costs in other countries would need to include the accounting rate applied by operator licensees in PNG, which need not be cost-based but which would need to cover the costs associated with international gateway operations and the termination service from the gateway to the called party. In the context of Part VI of the Act, the domestic component of the termination of an international inbound call is already covered by the declaration of the Domestic (Mobile or Fixed) Terminating Access Service (DTAS). NICTA does not propose to attempt to regulate, through declaration, the price of any other component of the total service because this would not address the problem or affect the outcome of negotiations with foreign or international correspondent operators. However, as the DTAS covers the domestic component of the termination of an international inbound call, NICTA staff would expect that any reductions in mobile termination rates generally in PNG should have the effect of reducing overall termination prices for international calls into PNG and, hopefully, the associated retail prices.

NICTA invites interested parties to submit written comments in response to the specific questions and general issues raised in this discussion paper. Submissions should be supported with evidence and data where possible. Submissions should be submitted **via email to inquiry.submission@nicta.gov.pg** and must be received **by 12 noon Tuesday 2nd October 2012**. Copies of all submissions received will be published on NICTA's Public Register consistent with the requirements on NICTA under subsection 229(3) of the Act (subject to NICTA's consideration of any claims for confidentiality over specific elements of those submissions pursuant to section 44 of the Act).

2 Background

2.1 The wholesale access regime

Part VI of the *National Information and Communications Technology Act 2009* (the Act) sets out the wholesale access regime for the ICT industry. Under that regime:

- NICTA may recommend to the Minister that certain wholesale services should be made **declared services**;
- Access providers (i.e. operator licensees) that supply declared services are required to comply with certain **non-discrimination obligations** in relation to those declared services (unless exempted);
- The terms and conditions on which access providers are required to comply with the non-discrimination obligations are subject to agreement between the access provider and the access seeker, which must be consistent with the **General Pricing Principles** and any relevant Service Specific Pricing Principles;
- In the event that such an agreement cannot be reached, the terms and conditions of access will be as set out in any reference interconnection offer (RIO) that the access provider has submitted to NICTA and which NICTA has accepted. A RIO must also be consistent with the General Pricing Principles and any relevant Service Specific Pricing Principles. In the absence of both an agreement and a RIO that has been accepted by NICTA, the terms and conditions of access are those determined by NICTA through arbitration.

2.1.1 Declared services

There are currently three declared services:¹

- (i) the domestic mobile terminating access service;
- (ii) the domestic fixed terminating access service; and
- (iii) all facilities access services that may be supplied by means of any facility constructed under a universal access Project Agreement for the life of that facility (of which there is currently none).

Section 131 of the Act envisages that NICTA will examine whether or not the following wholesale services or any similar wholesale services should be declared:

- Domestic inter-exchange transmission services;
- Domestic transmission tail services;
- Domestic digital data and/or voice resale services (whether access tails or end-to-end services), such as xDSL services and/or Ethernet services;
- unbundling of specified facilities located between a local exchange and the network boundary, whether unconditioned and/or conditioned (including spectrum sharing);
- domestic inter-network mobile roaming services;
- facilities access services associated with fixed network facilities (including exchanges); and
- facilities access services associated with mobile network facilities (including telecommunications transmission towers).

¹Under section 131 of the Act these services were deemed to have been declared from the commencement of the Act.

In addition, section 132 of the Act envisages the possible declaration of the following wholesale services any time after 1 July 2012:

- access to international gateway facilities;
- access to capacity on international communications cables; and
- access to capacity on international communications satellite links.

NICTA may initiate an inquiry to the possible declaration of these or any other wholesale service on its own initiative, in response to a request from any person, or upon the direction of the Minister.

2.1.2 The non-discrimination obligations

The non-discrimination obligations that must be fulfilled by any operator licensee that supplies a declared service are set out in section 136 of the Act (and reproduced below):

- (1) This Section sets out the “non-discrimination obligations”.
- (2) For the purposes of this Section, if an operator licensee supplies declared services, whether to itself or to other persons –
 - (a) the operator licensee is an “access provider”; and
 - (b) the declared services are “active declared services”.
- (3) An access provider shall, if requested to do so by an access seeker –
 - (a) supply an active declared service to the access seeker in order that the access seeker can provide retail services; and
 - (b) take all reasonable steps to ensure that the technical and operational quality of the active declared service supplied to the access seeker is equivalent to that which the access provider provides to itself; and
 - (c) take all reasonable steps to ensure that the access seeker receives, in relation to the active declared service supplied to the access seeker –
 - (i) fault detection, handling and rectification; and
 - (ii) ordering and provisioning,
 of a technical and operational quality and timing that is equivalent to that which the access provider provides to itself.
- (4) Subsection 3(a) does not impose an obligation to the extent (if any) to which the imposition of the obligation would have any of the following effects –
 - (a) preventing an operator licensee who already has a contractual right of access to the declared service from obtaining a sufficient amount of the declared service to be able to meet the operator licensee’s reasonably anticipated requirements, measured at the time when the request was made; or
 - (b) preventing the access provider from obtaining a sufficient amount of the declared service to be able to meet the access provider’s reasonably anticipated requirements, measured at the time when the request was made.
- (5) If an access provider owns or controls any facilities then the access provider shall, if requested to do so by an access seeker –
 - (a) permit interconnection of those facilities with the facilities of the access seeker for the purpose of enabling the access seeker to be supplied with active declared services in order that the access seeker can provide retail services; and
 - (b) take all reasonable steps to ensure that –

- (i) the technical and operational quality and timing of that interconnection is equivalent to that which the access provider provides to itself; and
 - (ii) the interconnection complies with any applicable industry code or industry standard; and
 - (iii) that access seeker receives, in relation to that interconnection, fault detection, handling and rectification of a technical and operational quality and timing that is equivalent to that which the access provider provides to itself.
- (6) If an access seeker uses active declared services supplied by an access provider in accordance with Subsection (3), the access provider shall (in connection with matters associated with, or incidental to, the supply of those active declared services), if requested to do so by the access seeker, give the access seeker such billing information (at such times or intervals, containing such particulars, and in such a manner and form as is specified in the regulations) as is reasonably required to enable the access seeker to supply retail services.
- (7) If an access provider supplies an active declared service by means of conditional access customer equipment, the access provider shall, if requested to do so by an access seeker who has made a request referred to in Subsection (3), supply to the access seeker any service that is necessary to enable the access seeker to supply retail services by means of the active declared service using that conditional access customer equipment.
- (8) This Section does not impose an obligation on an access provider if there are reasonable grounds to believe that –
- (a) the access seeker would fail, to a material extent, to comply with the terms and conditions on which the access provider complies, or on which the access provider is reasonably likely to comply, with that obligation; or
 - (b) the access seeker would fail, in connection with that obligation, to prevent dangerous conduct.
- (9) Examples of grounds for the belief in Subsection 8(a) include –
- (a) evidence that the access seeker is not creditworthy; or
 - (b) repeated failures by the access seeker to comply with the terms and conditions on which the same or similar access has been provided (whether or not by the access provider).

For the purposes of subsection 136(6) of the Act (as reproduced above), the billing information that an access providers must supply to an access seeker as part of the supply of a declared service is specified in section 21 of the *National Information and Communication technology (Operator Licensing) Regulation 2010* (and reproduced below):

- (1) An access provider shall, if requested to do so by an access seeker and the access provider knows, give the access seeker the following billing information–
- (a) customer names, billing addresses and account numbers;
 - (b) numbers dialled; and
 - (c) time and duration of call;
 - (d) geographic region call originates and terminates;
 - (e) any other information reasonably required by the access seeker to bill the customer.
- (2) The information specified in Subsection (1) shall be provided –
- (a) at times agreed by the access seeker and the access provider; and
 - (b) in a manner and form agreed by the access seeker and the access provider, including whether the information is to be given in electronic or paper form.

2.1.3 The General Pricing Principles

Under section 138 of the Act, access providers must comply with the non-discrimination obligations:

- (a) on such terms as are agreed between the access provider and the access seeker; or
- (b) failing agreement:
 - (i) on such terms as are specified in a relevant RIO that has been accepted by NICTA or;
 - (ii) if the RIO does not specify terms and conditions relevant to the matter under dispute or there is no RIO, on such terms and conditions as determined by NICTA through arbitration.

Access seekers must also comply with the any-to-any connectivity obligation set out in section 137 of the Act in the same manner.

The General Pricing Principles are set out in section 134 of the Act and provide guidance to access providers and access seekers in the relation to the pricing of declared services. The agreed terms and conditions of supply of a declared service must, among other things, be consistent with the General Pricing Principles (§126(d)).

Section 134 of the Act reads as follows:

(1) The “general pricing principles” are that the price of access to a declared service should promote the achievement of the objective of this Part as set out in Section 124² and, in particular, that the price of access to –

- (a) that declared service should –
 - (i) be set so as to generate expected revenue from that declared service that is sufficient to meet the efficient costs³ of providing access to that declared service; and
 - (ii) include a reasonable return on investment, over the economic life of the assets employed, commensurate with the regulatory and commercial risks involved,

this principle is known as the “cost recovery principle”; and

- (b) a declared service that is a resale service should be set by –
 - (i) RMAC⁴, where this results in pricing that is consistent with the cost recovery principle; or
 - (ii) cost-based pricing⁵, if RMAC would result in pricing that is insufficient to meet the cost recovery principle; and

²Subsection 124(1) of the Act states that ‘The objective of this Part and Part VII of this Act is to (a) promote effective competition in markets for ICT services in Papua New Guinea, to be known as the “competition objective”, subject to (b) promoting the economically efficient use of, and the economically efficient investment in, the facilities by which ICT services may be supplied, to be known as the “efficiency objective”.

³Efficient costs are defined for this purpose in subsection 134(2) of the Act to ‘include the direct and indirectly attributable capital, operating and maintenance costs actually incurred by the access provider in providing the declared service to itself and access seekers (including a reasonable contribution to any common costs), unless NICTA determines that such costs are inefficient having regard to the efficiency objective and any evidence before it’.

⁴RMAC means a “retail minus avoidable cost” pricing methodology (§134(2)).

⁵ Cost-based pricing is defined in subsection 134(2) of the Act to mean ‘pricing based on the cost recovery principle in which NICTA has regard to the following factors –

- (a) the application of the cost recovery principle; and
- (b) the need for the pricing to make a fair and reasonable contribution to the access provider’s common costs; and

- (c) a declared service that is not a resale service should be subject to cost-based pricing; and
- (d) a declared service, where the access provider is required to extend or enhance to [sic] the capability of a facility in order to supply the declared service, should –
 - (i) be set so as to generate expected revenue in respect of that extension or enhancement that is sufficient to meet the reasonably anticipated costs of that extension or enhancement in the circumstances; and
 - (ii) include a reasonable return on investment, commensurate with the regulatory and commercial risks involved; and
 to avoid doubt, this may require the access seeker to bear up to 100% of the actual cost of any such extension or enhancement.

...

Copies of agreements relating to the supply of a declared service must be provided to NICTA (§143(5)). Subsection 143(6) of the Act provides that:

In circumstances where NICTA considers that operator licensees have entered into a commercial agreement for the supply of a declared service that contains a term or condition (whether or not including a price) that is –

- (a) materially inconsistent with the general pricing principles or any service specific pricing principles; or
- (b) directly or indirectly harmful to retail customers in Papua New Guinea,

then NICTA may, by notice in writing to the access provider and the access seeker, deem the access seeker to have notified an access dispute to NICTA in accordance with Subsection [143](1) in relation to that term or condition.

In such an event NICTA may arbitrate the resolution of the deemed dispute pursuant to Division 6 of Part VI of the Act.

2.2 The inquiry and declaration process

NICTA may only recommend that the Minister declare a particular wholesale service if NICTA is satisfied that such a declaration would satisfy all of the declaration criteria set out in section 128 of the Act as follows:

The “declaration criteria” are as follows –

- (a) that declaration of the wholesale service will further the achievement of the objective of this Part as set out in Section 124; and
- (b) specifically, in relation to the competition objective, that –
 - (i) access or increased access to the wholesale service (as a consequence of declaration) is necessary for the promotion of effective competition in at least one market other than the market for the wholesale service; and

(c) the need for the recovery of the reasonable costs, incurred in the provision of access and interconnection by the access provider, that would not have been otherwise incurred but for the requirement to provide such access or interconnection; and

(d) the availability and capacity of the facilities operated by the access provider and the timeframe reasonably required to provide access to additional capacity; and

(e) any other factors that NICTA considers relevant, to the extent that such factors are consistent with the cost-recovery principle and Subsections (a) to (d) of this definition.’

(ii) the wholesale service is supplied in whole or in part via a facility that cannot feasibly be substituted, as a matter of commercial reality, via another facility in order to supply that wholesale service; and

(c) specifically, in relation to the efficiency objective, that –

(i) declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied; and

(ii) access or increased access to the wholesale service (as a consequence of declaration) is technically feasible having regard to the specific factors identified in Section 124(2)(a); and

(iii) in the case of wholesale services that are facilities access services, increased access to the wholesale service would avoid inefficient replication of underlying facilities that may be efficiently shared.

Before NICTA can consider whether or not the declaration of a particular service would satisfy the declaration criteria it must first identify suitable candidate services for consideration. Although some potential wholesale services are specified in the Act, NICTA staff have identified suitable candidate wholesale services through market analyses processes consistent with international best practice in ex ante competition regulation. That process is explained below together with the factors that NICTA staff took into account during each of the key stages.

2.2.1 Approach to market definition

The theory of market definition is well-understood. Markets are formed at the intersection of the three dimensions listed below:

- Consumer: A group of consumers has a common set of objectives that are satisfied by services/products.
- Product: A supplier offers services/products to a market to satisfy consumer objectives.
- Geography: Consumer objectives, and the services/products that meet those objectives, have to be available in a common location, for a transaction to take place, and a market to exist.

The consumer dimension is particularly relevant because the existence of distinct sub-sets of consumers with different service requirements may well indicate that there are really two distinct markets. Most obviously there is a clear distinction between retail markets (serving end users) and wholesale markets (providing services to intermediary agencies which on-sell to end users). As the present inquiry is for the purposes of section 127 of the Act, the customer dimension must be defined as ‘wholesale customers’. A wholesale customer is defined in the Act as ‘an operator licensee, but excluding circumstances where that operator licensee acquires an ICT service for that operator licensee’s own personal use rather than to facilitate the supply of an ICT service by that operator licensee’.

The boundaries that separate different markets are understood in terms of the services/products that comprise each market, and specifically in terms of the ability of one product to be substituted for another. The degree of demand-side and supply-side substitutability will depend on factors such as the characteristics of the underlying technology, the utility of the product, costs and prices, and trends in each of these areas (e.g. convergence of technologies, costs or service features).

Markets may also be defined in terms of geography. Within telecommunications regulation there is a general pre-disposition to define markets as national unless there are demonstrable regional variations in supply or demand. For example, the European Commission, which is generally regarded as setting best

practice in market definition, makes the rebuttable presumption that all telecommunications markets are national in scope.⁶

2.2.1.1 The hypothetical monopolist test

The concept of the hypothetical monopolist test is often a useful tool to identify close demand-side and supply-side substitutes. A product is considered to constitute a separate market if a hypothetical monopolist supplier could impose a small but significant (taken to mean a 5–10% increase), non-transitory (at least 1-year's duration) increase in price without losing sales to such a degree as to make the exercise unprofitable. Whether or not the small but significant non-transient increase in price (SSNIP) is profitable will depend on the number of customers that move to a substitute service or/and the extent to which alternative suppliers are enticed into the market.

The hypothetical monopolist test starts by identifying a focal product, i.e. the most narrowly-defined product that is obviously in the named market. Other candidate products will then be included in the same market depending on the extent to which any of the following forms of substitution applies between the candidate product and the focal product:

- Supply-side substitution
- Wholesale demand-side substitution
- Retail demand-side substitution.

If the SSNIP would be unprofitable because consumers would switch to other products or because suppliers of other products would begin to compete with the monopolist, then the market definition should be expanded to include the substitute products in the same market. If the SSNIP would be profitable then this will be evidence of the absence of appropriate substitutes and therefore that a discrete market exists.

2.2.2 Approach to determining whether a market is susceptible to ex ante regulation

The European Commission has adopted a set of three threshold criteria to be applied to markets under consideration for regulation before a full-scale market analysis is undertaken.⁷ The application of this threshold test has been documented by the Body of European Regulators for Electronic Communications (BEREC)⁸ and has since been adopted in many countries outside of Europe, such as Moldova, Oman, Saudi Arabia and the United Arab Emirates. NICTA staff regard the test as an important filter for determining whether or not a particular market warrants is susceptible to ex ante regulation.

Under this approach a particular market will be considered susceptible to ex ante regulation if:

- (1) it has high and continuing barriers to entry;
- (2) it is not tending towards being effectively competitive; and

⁶SEC(2007) 1483, Explanatory Note accompanying [European] Commission Recommendation on Relevant Product and Service Markets, p12

⁷European Commission (2007), *Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications and service*, OJ L344/25 of 28 December 2007. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:344:0065:01:EN:HTML> See also the *Explanatory Note - Accompanying document to the Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications and services*, SEC (2007) 1483 final.

⁸European Regulators Group (2008), *Report on guidance on the application of the three criteria test*, Available at www.erg.eu.int/doc/publications/erg_08_21_erg_rep_3crit_test_final_080604.pdf

- (3) ex post regulatory controls are unlikely to be sufficient to address concerns associated with market dominance.

A market that satisfies all three criteria is susceptible to ex ante regulation. That is, the application of ex ante regulation may be warranted. In such a case, a further more detailed analysis of the market is in order. However, even if a particular market fulfils all three criteria it does not automatically mean that ex ante regulation is necessary in that market. NICTA may still forbear from regulation to monitor the way the market develops, particularly if there are other constraints that might discourage or prevent the exercise of any significant market power (SMP) or dominance.

2.2.3 Approach to market analysis

Substantial degree of power in the defined market (hereafter “SMP”) is not defined in the Act. NICTA staff are therefore obliged to consider the usual meaning of the term in relevant literature, including the literature on market dominance, and equivalent term or near equivalent term in other jurisdictions such as in Europe.

Dominance is the ability of a participant in a market to act substantially independently of its competitors and consumers, and not be unduly constrained in decision-making on price or service by the possible reactions of competitors and customers. In an effectively competitive market competitors are constrained by each other and by customers. They know that if they increase prices or reduce output they will lose customers to competitors and will sustain commercial damage as a result. However, if they are dominant they know that these constraints either do not apply or will apply only if the decisions involve very large changes in price or production.

A number of considerations typically impact on whether there is dominance in a market. None of these considerations is determinative of the issue when taken alone. In particular, market share is not in itself determinative of market dominance because it is usually the result of a range of competitive circumstances rather than a cause. The various factors that NICTA staff believe are relevant to consider when determining if there is dominance in a relevant market are identified and explained in Annex B.

2.2.4 Period of analysis

NICTA staff considered the abovementioned factors that are relevant to SMP in a forward looking analysis of each relevant market over the two year period ending 31st December 2014. Applying economic definitions in a clear and easily administered way is a major challenge in any sector of the economy. However, in the telecommunications sector there are further difficulties that result from the dynamic nature of the sector, such as:

- Rapid pace of underlying technological development. Services are defined in market and in technical terms. As the technologies change or merge the service characteristics change as well. In telecommunications the fundamental shift to common IP platforms for the provision of services, rather than discrete technology and discrete service platforms has significant impact at the service and supplier levels.
- Fast changing cost structures and cost relationships. The ‘distance’ between services and markets, in terms of substitutability, may be measured in many ways, including cost. As unit costs fall, or cost relationships change through convergent technologies, the market boundaries, established when earlier technologies held sway, come under question.
- Fast changing patterns of demand and of substitution between services and applications: This follows from changes in the underlying technological and cost realities.
- Convergence of services and technologies, underpinned by the extension of ubiquitous digital technologies and particularly packet technologies;
- Convergence of suppliers resulting from changes in the value chains associated with the sector, and the changing value relationships of functions and those who undertake them, and from the commoditisation of many services in the sector.

These factors make it difficult to segment and define specific service markets in the first place, and to ensure that they remain relevant in future as a basis for regulation. For that reason NICTA staff consider it desirable to adopt a time horizon for market definition and analysis of 18 months to 2 years at most.

2.3 The structure of this discussion paper

This discussion paper is organised around the three key markets that NICTA staff identified through their analysis as being the key relevant markets, namely:

- The wholesale market for access to international capacity of submarine cables;
- The wholesale market for access to international capacity via satellite; and
- The wholesale market for termination on individual networks of international inbound calls.

A separate chapter in this discussion paper is dedicated to the consideration of each of these markets and the candidate wholesale services that exist therein.

2.4 Submissions in response to this discussion paper

NICTA invites written submissions in response to the specific questions and issues raised in this discussion paper from any interested party. Arguments and assertions (as distinct from statements of opinion) should be supported with evidence and data, particularly if they are contrary to the current understanding or proposed conclusions of NICTA staff as set out in this discussion paper.

Submissions should be submitted via email to inquiry.submission@nicta.gov.pg and must be received by 12 noon Tuesday 2nd October 2012.

Copies of all submissions received will be published on NICTA's Public Register consistent with the requirements on NICTA under subsection 229(3) of the Act.

2.5 Claims for confidentiality over information submitted to NICTA

Claims for confidentiality over any written information submitted to NICTA in response to this public consultation process are governed by section 44 of the Act. Under section 44 of the Act, NICTA ultimately determines whether or not it will accept a claim for confidentiality and exclude from publication the information that is subject to that claim. The process for claiming confidentiality is set out in the *Guidelines on the submission of written comments to public consultations and public inquiries*, which are available from NICTA's Public Register. Any respondent that wishes to claim confidentiality over information that it submits in response to this discussion paper should follow the procedures described therein.

3 OVERVIEW OF INTERNATIONAL CONNECTIVITY OPTIONS IN PNG

International connectivity into and out of PNG is currently supplied by way of submarine cable and satellite-based services. An overview of the two submarine cables landed in PNG is provided in Figure 1. Capacity on international communications satellites is currently supplied by a number of satellite operators, including APT Satellite, AsiaSat, Intelsat, JSAT, and SES World Skies. In addition, there are a number of other satellite operators that have the potential to supply capacity in PNG.

With the exception of Telikom in relation to the APNG2 submarine cable, the owners of the submarine cables and satellite systems that supply international capacity into and out of PNG are not licensees under the Act.

Figure 1: Overview of international submarine cables landed in PNG

Cable system	APNG2	Pipe Pacific Cable 1 (PPC-1)
Owners	<ul style="list-style-type: none"> • Telikom PNG • Telecom New Zealand • Reach (Telstra) 	Pipe Networks
Dimensioning (fibre pair x wavelength x capacity per wave length)	2 x 1 x 0,565 Gbps between Sydney and Port Moresby	128 x 2 x 10 Gbps between Sydney and Guam with spur to Madang
Design capacity	1.136 Gbps	2.56 Tbps
Lit capacity	1.136 Gbps (of which only 600 Mbps is useable due to a faulty repeater)	<ul style="list-style-type: none"> • 140 Gbps on the Sydney-Guam Trunk • 40 Gbps on the PNG-Guam route • 40 Gbps on the PNG-Australia route.
Purchased capacity	1.136 Gbps	10 Gbps
Used capacity	600 Mbps	438 Mbps
Landing Stations	<ul style="list-style-type: none"> • Ela Beach, PNG • Sydney Australia 	<ul style="list-style-type: none"> • Cromer, Sydney, Australia • Madang, PNG • Piti, Guam

4 INTERNATIONAL CONNECTIVITY VIA SUBMARINE CABLE

4.1 Summary

NICTA staff propose to conclude that there is a national market for wholesale capacity on, and access to, international fibre-optic submarine cables, that it is susceptible to ex ante regulation by NICTA, and that Telikom has a position of significant market power in that market. NICTA staff have considered the potential declaration (by the Minister) of two services within that market: (1) wholesale capacity on, and access to, international fibre-optic submarine cables landed in PNG and (2) wholesale access to international gateway facilities at submarine cable landing stations in PNG. NICTA staff are satisfied that the declaration of both services would satisfy the declaration criteria.

4.2 The relevant market

4.2.1 The focal product

The focal product is the most narrowly-defined product set that is obviously in the defined market. It is used as the key input to the HMT so as to determine the scope of the market. NICTA staff initially identified the relevant focal product as wholesale capacity on, and access to, international fibre-optic submarine cables. Telikom supplies such capacity on two separate cables—PPC-1 and APNG-2. Other licensees use access to such capacity in the supply of various retail services, including voice, data and internet services.

4.2.2 Possible substitute products

NICTA staff considered the following candidate substitute products:

- Wholesale access to other international submarine cables (i.e. besides PPC-1 and APNG-2);
- Wholesale international access via terrestrial links (e.g. fibre-optic cable or microwave); and
- Wholesale international access provided via satellite.

4.2.2.1 Wholesale supply-side substitution

Wholesale supply-side substitution arises when an alternative supplier is attracted into the market in response to a SSNIP being implemented by a hypothetical monopolist. It may be assumed that this would only happen if the substitute supplier were able to transfer its existing resources to supplying the focal product within a period of no more than a year and without significant new investment. The question is whether this would occur to such an extent that the SSNIP would be unprofitable.

This type of substitution is currently inconceivable. Although other international submarine cables exist in the Pacific and additional deployments in the region, NICTA staff are not aware of any plans for a third submarine cable to be landed in PNG (at either an existing landing station or at a newly constructed landing station). In any case substantial investment would be required to land a third submarine cable in PNG and the lead time for such an endeavour would be well over one year. There is therefore no realistic opportunity for wholesale supply-side substitution in response to a SSNIP by a hypothetical monopolist.

4.2.2.2 Wholesale demand-side substitution

Wholesale demand-side substitution is where the *purchaser* of wholesale capacity on international submarine cables is persuaded to use alternative products in response to a SSNIP by a hypothetical monopolist. The question is whether this would occur to such an extent that the SSNIP would be unprofitable.

As there is no realistic prospect of a third cable being landed in PNG(during the period under analysis) there is consequently no opportunity for wholesale customers to access an alternative submarine cable in response to a SSNIP by a hypothetical monopolist.

Wholesale customers may of course access international connectivity via satellite-based services. However, it is widely recognised that quality differences and capacity constraints make satellite-based connectivity an inferior substitute for international connectivity for fibre-optic cables for many types of communications services. For example, the high latency of satellite transmissions can affect the quality of voice and data transmissions. Accordingly, NICTA staff do not consider that international access via satellite can realistically be considered an effective supply-side substitute. To the extent that it may be – for limited applications – the substitution possibility would not be a material constraint on the operator concerned.

The possibility of wholesale demand-side substitution in favour of terrestrial links was also considered, such as fibre-optic cable and long-haul microwave. However, there are currently no such options available in PNG. Although there are occasional trials and plans proposed for the establishment of such links, the lead time for such an endeavour would be likely to be well over a year, making such systems an unrealistic substitute for international connectivity via submarine cables during the period under consideration. Further, in the case of microwave, the over limitations of the capacity of such systems compared to the capacity on submarine cables makes them inferior and not fit for most of the purposes associated with submarine cable usage.

4.2.2.3 Retail demand-side substitution

In this context, the retail purchaser of international capacity is persuaded to use an alternative product in response to the SSNIP by a hypothetical monopolist supplying wholesale access to capacity on international submarine cables. The question is whether this could occur to such an extent that the SSNIP would be unprofitable. However, if retail customers were to switch to an alternative service provider for international calls and/or internet access they would either have to accept the service degradation and likely price increase associated with satellite communications. Their only other alternative would be switching to another service provider that was dependent on the same hypothetical monopolist for its wholesale international access. Neither choice is likely to be preferable to accepting the SSNIP so NICTA staff do not consider that retail demand-side substitution presents any credible substitutes for wholesale access to international fibre-optic submarine cables.

4.2.3 Proposed conclusion on product market definition

Under the conditions presented in the HMT, NICTA staff consider that there is no credible substitute for the focal product of wholesale access to capacity on international submarine cables. The focal product therefore defines the market: *the market for wholesale capacity on, and access to, international fibre-optic submarine cables.*

4.2.4 Geographical scope

NICTA staff believe that the market for wholesale capacity on, and access to, international fibre-optic submarine cables is national in its scope. Although physical access to the PPC-1 cable has to occur at the cable landing station in Madang, and physical access to the APNG-2 cable has to occur at the landing station at Ela Beach, the same supply conditions apply for both services regardless where the end-user is located throughout the country.

Question 1: Do you agree with NICTA staff's proposed conclusion that the relevant market is the national market for wholesale capacity on, and access to, international fibre-optic submarine cables? Please explain the reasons for your answer and support it with evidence where possible.

4.3 The three criteria test

The three criteria test is designed to confirm that the identified market is an appropriate candidate for ex-ante regulation. In the case of the market for wholesale capacity on, and access to, international fibre-optic submarine cables, NICTA staff consider that:

- There are high and non-transitory barriers to entry. The difficulty and high costs involved in landing an international submarine cable in PNG are considerable. It is also unrealistic to expect that a third cable will be landed in PNG unless or until there is substantial growth in demand for international bandwidth into and out of PNG.
- There is no trend towards effective competition behind the barriers to entry. Given technological differences, satellite access is not a credible substitute for international fibre-optic cables, except possibly in the remotest locations not abutting or connected to the national terrestrial wireless and cable networks.
- Ex post competition law is insufficient to resolve any likely market failure in a suitable timeframe—that is, within a timeframe that ensures minimum lasting damage to competition and consumer welfare. Further the time and effort involved in confirming ex post that there has been an abuse of a position of significant market power, and then finding the means to rectify it, would likely cause substantial and lasting damage to the downstream retail markets that depend upon international connectivity and subsequently to the economic development of PNG.

NICTA staff therefore believe that the market for wholesale capacity on, and access to, international fibre-optic submarine cables is an appropriate market for ex-ante regulation.

Question 2: Do you agree with NICTA staff's proposed conclusion that the market for wholesale capacity on, and access to, international fibre-optic submarine cables is susceptible to ex ante competition regulation?

4.4 Analysis of the market for dominance

Telikom is the only licensee that is authorised (by the relevant owners of the submarine cables) to operate a landing station in PNG in relation to either the PPC-1 cable or the APNG-2 cable and to supply within PNG wholesale access to the capacity on those cable systems. Telikom has as a result a market share of 100% in the market for wholesale capacity on, and access to, international fibre-optic submarine cables. This is an important factor but not determinative of the issue of dominance.

NICTA staff have also considered other factors (identified in Annex A) that typically indicate whether or not there is dominance in a market. Of those, NICTA staff found the following to be relevant and compelling:

- Control of infrastructure not easily duplicated—clearly Telikom controls infrastructure that is essential to supply services in the market for wholesale capacity on, and access to, international fibre-optic submarine cables;
- Technological advantages and superiority—Telikom is the only licensee with direct access to international fibre-optic submarine cables, which is a superior alternative to satellite-based international connectivity for most purposes;

- Absence of or low countervailing buying power— given the absence of suitable alternatives, customers have little leverage on which to establish effective countervailing power. Access to their networks on a wholesale basis is subject to regulation which also prevents the formation of countervailing buying power in that area. It is the case that some licensee demand could be transferred to satellite on a self-supply basis. However the relative inadequacies of satellite as a substitute have been discussed earlier. Wholesale self-supply would be self-defeating and not a basis for effectively leveraging buying power.
- Economies of scale—Telikom is likely to benefit from economies of scale relative to any new entrants of potential competition (e.g. capacity upgrades on the existing cables could be achieved at a much lower price than equivalent capacity provided by landing a third cable in PNG);
- Vertical integration—Telikom is vertically integrated, giving rise to the possibility of it leveraging its position in the market for wholesale capacity on, and access to, international fibre-optic submarine cables into downstream wholesale and retail markets;
- Absence of potential competition—There is no possibility of a rival landing station being established in PNG in the foreseeable future;
- Ease of market entry—The substantial costs and difficulty involved in persuading an international cable consortium to land its cable in PNG (given that two cables are already landed), and then constructing and operating a landing station, establish very high barriers to market entry. This market is not easy to enter.

NICTA staff did not have sufficient information on Telikom's pricing and profitability in the relevant market to form a view on the relevance or significance of this particular aspect.

4.4.1 Proposed conclusion

NICTA staff's consideration of the factors discussed above indicate that Telikom has SMP in the market for wholesale capacity on, and access to, international fibre-optic submarine cables. NICTA staff consider this conclusion to be clear and compelling. The factors that NICTA staff most compelling were:

- Telikom's control of essential infrastructure that is not easily duplicated;
- Telikom's technological advantages and superiority arising from its control of that infrastructure;
- The absence of potential competition;
- The absence of or low countervailing buying power; and
- Telikom's vertical integration.

Question 3: Do you agree with NICTA staff's proposed conclusion that Telikom has a position of significant market power in the market for wholesale capacity on, and access to, international fibre-optic submarine cables? Please explain the reasons for your answer and support it with evidence where possible.

4.5 Consideration of Telikom's SMP

To have SMP in a market is neither illegal nor necessarily problematic. However, SMP is problematic if it poses a material risk of harm to the development of effective competition in the market or otherwise to consumer's long term interests. After considering the sources of Telikom's SMP in the market for wholesale capacity on, and access to, international fibre-optic submarine cables, NICTA staff believe that Telikom has both the commercial incentive and ability to abuse its SMP in a manner that would be very damaging to competition in that market. These concerns are summarised in Figure 2 and are based on accepted economic theory and international regulatory best practice.

Figure 2: Overview of the potential problems arising from Telikom's SMP

Source of dominance	Potential abuse of dominance
Control of infrastructure not easily duplicated	<i>Refusal to supply / denial of access</i> Given its SMP and its control of essential infrastructure and the technological advantages that it affords, Telikom has the incentive and ability to strengthen unfairly its position in downstream retail markets by denying access to international submarine cables, or refusing to supply capacity on international submarine cables, to other licensees that compete against Telikom in downstream retail markets (such as the retail mobile services market or the market for internet access). As wholesale capacity on, and access to, international fibre-optic submarine cables is a key wholesale input for many downstream retail communications services (and likely to become more so over time), any such action by Telikom would unfairly raise its rivals' costs (e.g. By forcing them to rely wholly on satellite capacity) and could significantly impede the development of competition in the downstream markets.
Technological advantages and superiority	
Absence of potential competition	<i>Excessive pricing</i> Prices can be considered excessive if they allow the licensee concerned to sustain profits that are higher than it could expect to earn in a competitive market. Given its SMP and the absence of potential competition and any significant countervailing buying power, Telikom has the incentive and ability to set its prices for wholesale capacity on, and access to, international fibre-optic submarine cables at levels that maximize Telikom's profits at a given level of demand. A consequence of such pricing behaviour would be that the quantity of capacity/access demanded, consumer surplus, and total welfare would all be less than their potential values under competitive conditions.
Absence of or low countervailing buying power	
Vertical integration	<i>Anti-competitive price discrimination</i> Telikom's SMP and its vertical integration gives it the incentive and ability to attempt to raise unfairly the costs incurred by its rivals in the downstream retail markets. This can be achieved by Telikom charging a higher price (that is above costs) to downstream competitors than the price that Telikom implicitly charges to its retail arm (i.e. price discrimination between internal and external supply).

4.5.1 Proposed conclusion

Having considered the nature of Telikom's SMP in the market for wholesale capacity on, and access to, international fibre-optic submarine cables, NICTA staff have concluded that Telikom's SMP is potentially harmful to the development of effective competition in that market.

Question 4: Do you agree with NICTA staff's proposed conclusion that Telikom's SMP in the market for wholesale capacity on, and access to, international fibre-optic submarine cables is potentially harmful to the development of effective competition in that market? Please explain the reasons for your answer and support it with evidence where possible.

4.6 Consideration of wholesale services for declaration

Having found Telikom to have SMP in the market for wholesale capacity on, and access to, international fibre-optic submarine cables, and that position to SMP to be potentially harmful to effective competition in that market, NICTA staff determined that it would be appropriate and reasonable to consider the following wholesale services as candidate services for declaration under Part VI of the Act:

- wholesale capacity on, and access to, international fibre-optic submarine cables; and
- wholesale access to international gateway facilities at submarine cable landing stations.

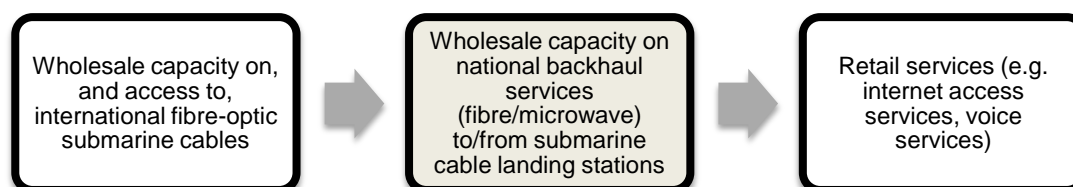
The proposed definitions of these services are shown in Figure 3. For the purposes of subsection 129(1)(b)(iv) of the Act, NICTA staff considered declarations that lasted for a period of five years.

Figure 3: NICTA staff's proposed definitions of the candidate services for declaration

Name of service	Proposed definition of the service
Wholesale capacity on, and access to, international fibre-optic submarine cables landed in PNG	A network service for the carriage of any combination of voice communications and/or data between two distinct geographic points, one of which is located outside of PNG, via an international fibre-optic submarine cable.
Wholesale access to international gateway ⁹ facilities at submarine cable landing stations in PNG	A facilities access service that enable an access seeker to interconnect its facilities to the international gateway facilities of an access provider that are located in the access provider's submarine cable landing station.

NICTA staff are mindful that the supply of wholesale transit capacity to and from Telikom's submarine cable landing stations might also be an appropriate candidate service for declaration. The relationship of that market to the market for wholesale capacity on, and access to, international fibre-optic submarine cables is shown in Figure 4. NICTA staff note that Telikom currently supply wholesale backhaul services from its landing stations in Ela Beach and Madang and some licensees also self-supply their own microwave links. NICTA staff are not at this stage proposing that backhaul services be considered for potential declaration but would be interested in receiving comments from licensees on this particular aspect before finalising a view.

Figure 4: The value chain of markets relevant to the wholesale market for submarine cable access



⁹International gateway is defined in the *National Information and Communications Technology (Operator Licensing) Regulations 2010* as 'any equipment, whether hardware or software, in a network which interfaces that network with an international network'.

Question 5: Do you agree with NICTA staff's proposed definitions of the two candidate services identified for potential declaration? If not, please set out and explain your amendments to alternative definition.

Question 6: Is there a need for NICTA to consider the potential declaration of wholesale capacity on national backhaul services? Please explain the reasons for your answer and support it with evidence where possible.

4.6.1 Consideration against the declaration criteria

NICTA staff have considered whether or not the declaration of either or both of the candidate services would satisfy the declaration criteria. Their conclusions are summarised in Figure 5.

Figure 5: Overview of NICTA staff's consideration of the declaration criteria

	Declaration criterion	Wholesale capacity on, and access to, international fibre-optic submarine cables	Wholesale access to international gateway facilities at submarine cable landing stations
A	That declaration will further the achievement of the objective set out in Section 124	NICTA staff believe that this criterion is met. For the reasons discussed above, declaration of these services would promote effective competition in many downstream retail markets while also promoting efficient use of the facilities necessary to supply these services.	
B(i)	In relation to the competition objective, access or increased access to the wholesale service is necessary for the promotion of effective competition in at least one market other than the market for the wholesale service.	<p>NICTA staff believe that this criterion is met. International connectivity via fibre-optic submarine cable is a key input in the supply of many communications services and likely to become more so over the period under analysis. Access to these services on terms consistent with the non-discrimination obligations (see s.125(1)(b))) would foster effective competition in all downstream retail markets (including, specifically, the retail market(s) for internet access) by:</p> <ul style="list-style-type: none"> removing the potential for Telikom to deny access to, or refuse to supply capacity on, international submarine cables; and/or price discriminating between its internal and external supply of access to, and capacity on, international submarine cables. 	
B(ii)	In relation to the competition objective, the wholesale service is supplied in whole or in part via a facility that cannot feasibly be substituted, as a matter of commercial reality, via another facility in order to supply that wholesale service.	NICTA staff believe that this criterion is met. The services are supplied via a combination of facilities that include, most significantly, a submarine cable landing station. There is no way to supply these services without a submarine cable landing station or access to such a facility.	
C(i)	In relation to the efficiency objective, declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied.	NICTA staff believe that this criterion is met. The pricing of these services, if declared, would be in accordance with the general Pricing Principles and thus set so as to generate expected revenue that is sufficient to meet the efficient costs of providing access to the service and include a reasonable return on investment, over the economic life of the assets employed, commensurate with the regulatory and commercial risks involved. Further, studies by the International Telecommunication Union of the experiences of other countries that have taken similar regulatory actions in relation to access show that such action can actually encourage increased investment by	

		the landing station operators as a result of increased demand and regulatory and pricing certainty. ¹⁰	
C(ii)	In relation to the efficiency objective, access or increased access to the wholesale service is technically feasible having regard to the specific factors identified in section 124(2)(a) of the Act	NICTA staff believe that this criterion is met. Access to these services has already been demonstrated (in PNG and in other countries) to be technically feasible. Although physical space inside the landing stations may impose a limit on the potential for increased (i.e. additional) access to international gateway facilities at submarine landing stations, such limits are unlikely to be reached or exceeded in the foreseeable future. In many countries, such as Samoa, access is arranged at a site that is remote from the landing point such as the first network node of the access provider, thereby providing additional space and an electrically sound environment for access equipment.	
C(iii)	In relation to the efficiency objective, in the case of wholesale services that are facilities access services, increased access to the wholesale service would avoid inefficient replication of underlying facilities that may be efficiently shared.	This service is a network service, not a facilities access service.	NICTA staff believe that this criterion is met. This service is a facilities access service and increased access to it would avoid inefficient replication of the association facilities, in particular the submarine cable landing stations themselves.

4.6.2 Proposed conclusion

NICTA staff believe that the declaration by the Minister of the following two services (as defined above) would satisfy the declaration criteria in section 128 of the Act:

- wholesale capacity on, and access to, international fibre-optic submarine cables; and
- wholesale access to international gateway facilities at submarine cable landing stations.

Question 7: Do you agree with NICTA staff's proposed conclusion that the declaration of the following two services would satisfy all of the declaration criteria in section 128 of the Act:

- wholesale capacity on, and access to, international fibre-optic submarine cables; and
- wholesale access to international gateway facilities at submarine cable landing stations?

4.7 Service specific pricing principles

Section 135 of the Act requires NICTA to make service specific pricing principles in related to a particular declared service within six months of the Minister declaring that service. Service specific pricing principles may contain price related terms and conditions (whether relating to a price or the method of ascertaining a price) and non-price terms and conditions relating to access to the declared service.

¹⁰ See for example, International Telecommunications Union (2008), *Trends in Telecommunications Reform 2008: Six Degrees of Sharing*, available for purchase at www.itu.int/publ/D-REG-TTR.10-2008/en. The Infocomm Development Authority in Singapore has also noted that as a consequence of its imposition of access and non-discrimination obligations, the revenues of the submarine cable landing station operators actually increased significantly (despite the decrease in wholesale prices) as retail usage and hence demand increased exponentially. See IDA presentation, *International gateway international liberalization: Singapore's experiences*; ITU global symposium of regulators, 2008, available at www.itu.int/ITU-D/reg/Events/Seminars/GSR/GSR08/documents_presentations/Session_2_IDA.pdf

NICTA staff have not yet given any particular consideration to what would be appropriate content for service specific pricing principles in relation to either of the candidate services being considered for potential declaration. NICTA staff would welcome receiving comments and suggestions on this aspect from interested stakeholders. Pursuant to subsection 135(4) of the Act, NICTA staff will release a draft of the service specific principle principles for public comment before there are finalised.

Question 8: In the event that either or both of the candidate services are declared by the Minister, what price and/or non-price related terms and conditions do you believe that NICTA should set out in the associated service specific pricing principles? Please support your answer with reasons and evidence where possible.

4.8 Technical and operational quality of declared services

The non-discrimination obligations in section 136 of the Act require that an access provider, in its supply of a declared service to an access seeker, take 'all reasonable steps' to ensure that the access seeker receives:

- (in relation to the supply of an active declared service) fault detection, handling and rectification and ordering and provision of a technical and operational quality and timing that is equivalent to that which the access provider supplies to itself; and
- (in relation to interconnection with relevant facilities) interconnection that is of a technical and operational quality and timing that is equivalent to that which the access provider supplies to itself.

NICTA staff have not yet given any particular consideration to what 'all reasonable steps' might involve in the context of the supply of either or both of the candidate services but do consider that, as a minimum, it would require an access provider to supply access and services of a quality equivalent quality to that which it supplies itself (unless the parties agree otherwise). NICTA staff would welcome receiving comments from stakeholders on topic of technical and operational quality. In particular, NICTA staff are interested to know whether stakeholders believe it is necessary for NICTA to add additional detail to the requirements of section 136 of the Act (e.g. by way of a guideline) and, if so, what that additional detail could usefully address.

Question 9: In the event that either or both of the candidate services are declared by the Minister, what are the factors relating to the 'technical and operational quality and timing' of the supply of the candidate services that access seekers would expect to be covered and protected by section 136 of the Act?

Question 10: In the event that either or both of the candidate services are declared by the Minister, is there a need for NICTA to add detail to the requirements of section 136 of the Act (e.g. by way of a guideline)? If so, what should that additional detail address and why?

5 INTERNATIONAL CONNECTIVITY VIA SATELLITE

5.1 Summary

NICTA staff propose to conclude that there is a national market for wholesale access to, and capacity on, international communications satellites, but that that market is not susceptible to ex ante regulation by NICTA.

5.2 The relevant market

5.2.1 The focal product

NICTA staff considered that the most narrowly-defined product set that is obviously in the relevant market is wholesale access to capacity on international communications satellites. Operator Licensees in PNG acquire this service directly from satellite operators such as APT Satellite, AsiaSat, Intelsat, JSAT, and SES World Skies.

5.2.2 Possible substitute products

NICTA staff considered the following candidate substitute products:

- Wholesale access to international submarine cables (i.e. PPC-1 and APNG-2); and
- Wholesale international access via terrestrial links (e.g. fibre-optic cable or microwave).

5.2.2.1 Wholesale supply-side substitution

Given the global nature of satellite systems and the huge costs, complexities, and long lead times associated with launching and maintaining a satellite-based service, it is inconceivable that a SSNIP in the supply of the focal product *in PNG* would lead to the entry of an alternative supplier, let alone entry within a year or which would render the SSNIP unprofitable. In addition, the characteristics of the satellite-based international service for at least some users means that at wholesale and retail level there would be no substitution by submarine cable based services. Satellite offers the possibility of nomadic services and avoidance of any need to be connected to the terrestrial network. These characteristics may be important to some satellite users and would preclude switching.

5.2.2.2 Wholesale demand-side substitution

It is feasible that the purchasers of wholesale capacity on satellites could be persuaded to use alternative products, such as wholesale capacity on either the PPC-1 or APNG2 international submarine cables. As previously discussed, the submarine cables would actually provide a technology superior service for many purposes. Based on the limited information that has been supplied to NICTA staff about the current prices being charged in PNG for capacity on satellite systems and submarine cables, it appears that wholesale prices for satellite capacity tend to be lower than those currently charged by Telikom for equivalent capacity on either the PPC-1 or APNG2. However, NICTA staff do not currently have sufficient pricing data to quantify that difference. Nevertheless, given the global nature of satellite services it seems unlikely that any substitution in favour of submarine cable capacity would be sufficient to render a SSNIP in the supply of the focal product unprofitable.

The possibility of wholesale demand-side substitution in favour of terrestrial links such as fibre-optic cable and long-haul microwave was also considered but ultimately dismissed for the same reasons it was not considered to be an effective substitute to submarine cable access within the period under consideration.

5.2.2.3 Retail demand-side substitution

Some satellite based retail services are at risk of being substituted for submarine cable-based services, if a submarine-cable based service can be made available with a better price/service characteristics mix. Permanent installations would be especially vulnerable to this kind of substitution. However there are specific lower capacity satellite services that may have nomadicty and fast set-up features that make them particularly valuable for certain purposes – such as the support of mineral prospecting, to name a specific case – and which are not at risk of substitution by submarine cable based services. On balance NICTA staff are inclined to believe that a SSNIP would be profitable, at least in the short term horizon of this assessment. Ideally, an assessment would be required of all existing satellite services in PNG (or a representative sample) to determine if they are at risk of substitution in the event of a SSNIP. NICTA does not have this information at present.

5.2.3 Proposed conclusion on product market definition

Despite the absence of detailed information on prices and installation purposes, based on its consideration of the HMT, NICTA staff consider that there is no credible general substitute for the focal product and that it alone defines the market as: *wholesale access to capacity on international communications satellites*.

5.2.4 Geographical scope

NICTA staff consider that the market for wholesale access to, and capacity on, international communications satellites is a national market, in the sense that the typical satellite coverage and service capability from satellite systems in PNG is national rather than sub-national or regional.

Question 11: Do you agree with NICTA staff's proposed conclusion that there is a national market for wholesale access to capacity on international communications satellites? Please explain the reasons for your answer and support it with evidence where possible.

5.3 The three criteria test

NICTA staff applied the three criteria test to the market for wholesale access to, and capacity on, international communications satellites and concluded that, although there are indeed high and non-transitory barriers to entry, behind those barriers there is a clear trend towards effective competition in that market. This is evident in the number of actual and potential suppliers of satellite capacity into and out of PNG. The market structure therefore strongly suggests that the market offers substantial real choice and that it is already effectively competitive.

The three criteria are to be applied in cumulative fashion and for the market to be susceptible to ex ante regulation of dominance it must pass all three tests. As the market did not satisfy this second criterion, the third criterion (that of the sufficiency of ex post competition law) was not considered and NICTA staff concluded that the market was not appropriate for ex-ante regulation.

Question 12: Do you agree with NICTA staff's proposed conclusion that the market for wholesale access to, and capacity on, international communications satellites is *not* susceptible to en ante competition regulation?

6 TERMINATION OF INTERNATIONAL INBOUND CALLS

NICTA is concerned about the relatively high costs of calling *into* PNG compared to other countries in the region and the potential that such costs have to suppress the volume of international call traffic into PNG and consequently the associated welfare benefits of high service level adoption.

The high costs of calling into PNG relative to other countries in the region was recently identified in a major study by the Asian Development Bank as one of a handful of 'critical development constraints' within PNG's telecommunications sector.¹¹

Figure 6 shows some examples of how international calling rates into PNG compare to the prices for calls into some other countries in the region. In all cases the calling rates into PNG are either towards the high end of the sample or are in a grouping of countries that does not reflect the cost advantages that PNG should be enjoying as result of having two submarine cables landed on its shores.

NICTA is also aware of anecdotal evidence that those calling costs are distorting international business telecommunications traffic into and out of PNG and are constraining some international business. Higher inbound call charges would be expected to distort traffic patterns and lead to more outbound calls, with additional costs being borne by PNG residents and business, as a result.

NICTA staff would like to better understand why it is relatively expensive to make an international call into PNG and what could be done (either by licensees or NICTA) to encourage reductions in those calling prices. NICTA staff appreciate that there is limited scope to address this matter from the PNG end given that the settlement rates for inbound international calls are negotiated between international correspondents. However, NICTA staff also note that a key wholesale cost that influences the price of termination of international calls into PNG is the price charged by Operator Licensees such as bemoile, Digicel and Telikom for call termination on their respective networks.

In the view of NICTA staff, the domestic component of the termination of an international inbound call is part of the Domestic (Mobile or Fixed) Terminating Access Service (DTAS), which is already a declared service pursuant to section 131 of the Act. This is because the nature of a terminating access service is not affected by the source of the call being terminated. As shown in Figure 7, given the definitions of the DTAS in Schedule 1 to the Act, it does not matter whether a call originates on a fixed or mobile network in PNG or originates in another country and comes into PNG via an international gateway, the DTAS portion of the call is the same. Further, the traffic routing and therefore the costs of the DTAS should be the same regardless of where the call originates.

As a consequence the price charged for the termination in PNG of an international inbound call after it passes through an international gateway facility of some kind should be consistent with the General Pricing Principles and cost-based. This applies regardless of whether the DTAS is being supplied:

- a) by an Operator Licensee to another Operator Licensee, as is the case in the termination of a national call or the termination of an international inbound call that enters PNG via another licensee's gateway; or
- b) by an Operator Licensee to itself, as is the case in the termination of an international inbound call that enters PNG via that licensee's own gateway.

Accordingly any reductions in the mobile termination rate generally should have the effect of reducing overall termination prices for international calls, unless for some reason the reduction is not passed through for such calls.

¹¹ Asian Development Bank (2012), *Papua New Guinea: Critical Development Constraints*, pp.28-29.

Figure 6: Comparison of some international calling rates into PNG and neighbouring countries

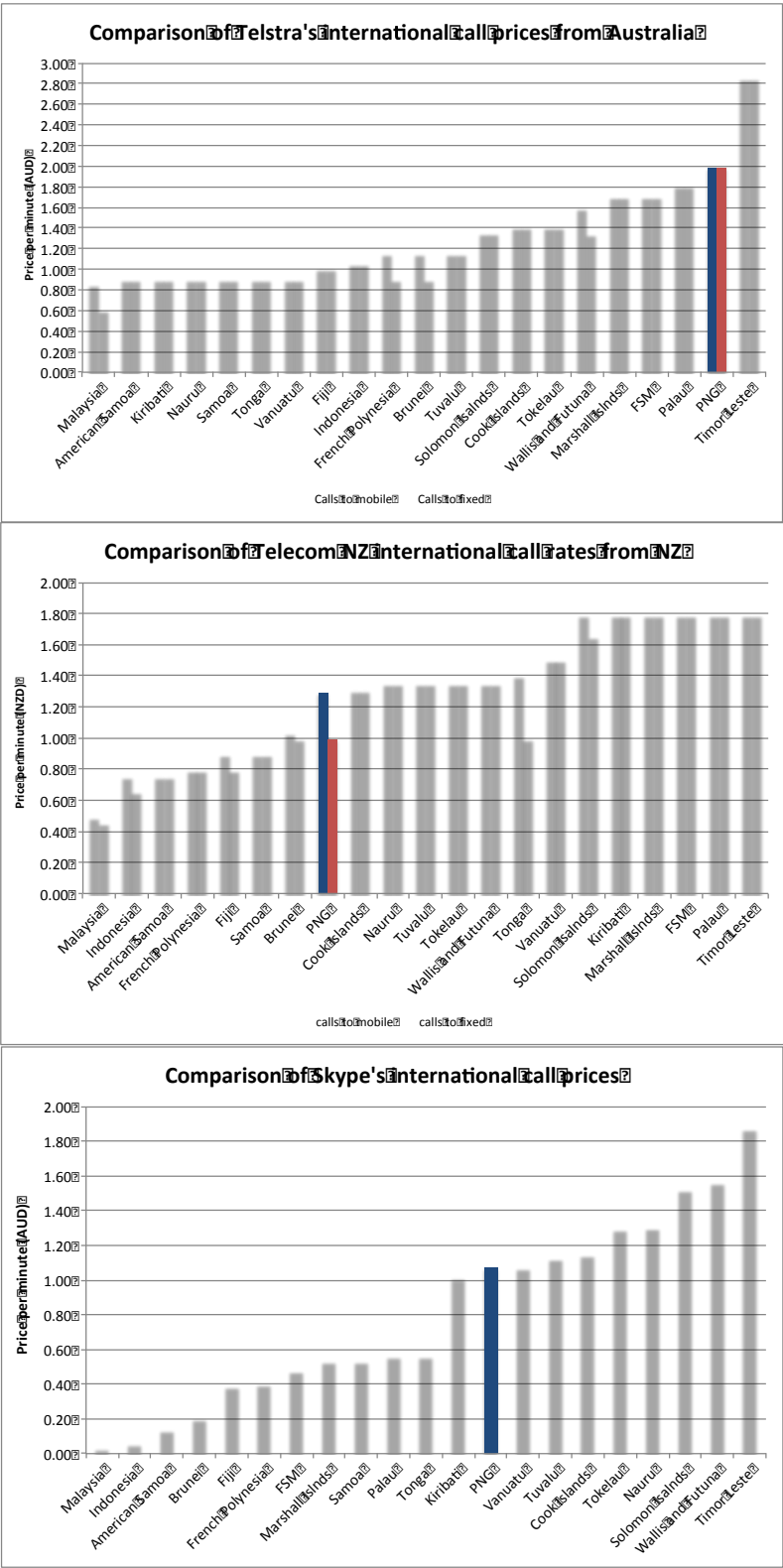
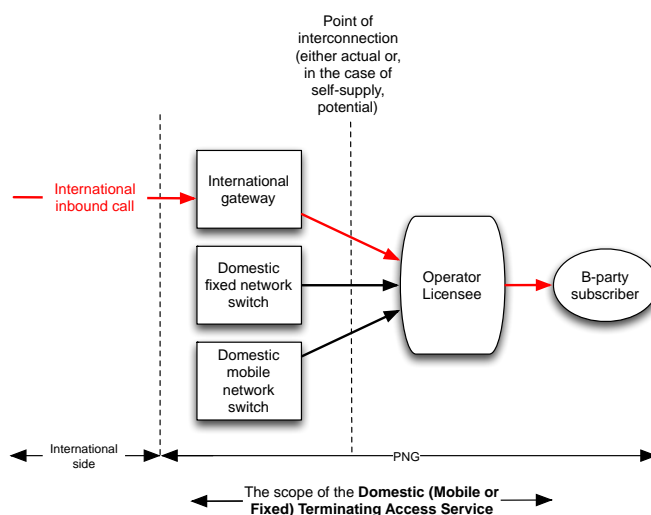


Figure 7: The scope of the Domestic (Mobile or Fixed) Terminating Access Service



Question 13: What are the factors that contribute to the relatively high price of international calls into PNG? What can NICTA do to encourage reduction in those call prices?

Question 14: Do you agree with the view of NICTA staff that the domestic termination in PNG of an international inbound call is covered by the existing declarations of the Domestic Mobile Terminating Access Service and the Domestic Fixed Termination Access Service? Please explain the reasons for your answer.

7 Next steps in the inquiry process

This discussion paper sets out NICTA staff's findings and proposed conclusions on the matters under inquiry and reflects the course of action that, as of the date of publication of this discussion paper, NICTA staff intend to recommend to the NICTA Board (NICTA).

Interested parties are now invited to submit written comments in response to the specific questions and issues raised in this discussion paper, as well as on any other relevant matters. Once NICTA staff have completed their consideration of those submissions and any new evidence that they may contain, NICTA staff intend to finalise a recommendation to NICTA.

In the event that the submissions received in response to this discussion paper substantially alter the views and conclusions of NICTA staff, then NICTA staff may conduct a further round of public consultation on those specific issues. However, interested parties should not rely on there being a further round of public consultation and therefore should respond as if this is the final opportunity.

8 Summary list of discussion questions

Question 1: Do you agree with NICTA staff's proposed conclusion that the relevant market is the national market for wholesale capacity on, and access to, international fibre-optic submarine cables? Please explain the reasons for your answer and support it with evidence where possible.

Question 2: Do you agree with NICTA staff's proposed conclusion that the market for wholesale capacity on, and access to, international fibre-optic submarine cables is susceptible to en ante competition regulation?

Question 3: Do you agree with NICTA staff's proposed conclusion that Telikom has a position of significant market power in the market for wholesale capacity on, and access to, international fibre-optic submarine cables? Please explain the reasons for your answer and support it with evidence where possible.

Question 4: Do you agree with NICTA staff's proposed conclusion that Telikom's SMP in the market for wholesale capacity on, and access to, international fibre-optic submarine cables is potentially harmful to the development of effective competition in that market? Please explain the reasons for your answer and support it with evidence where possible.

Question 5: Do you agree with NICTA staff's proposed definitions of the two candidate services identified for potential declaration? If not, please set out and explain your amendments to alternative definition.

Question 6: Is there a need for NICTA to consider the potential declaration of wholesale capacity on national backhaul services? Please explain the reasons for your answer and support it with evidence where possible.

Question 7: Do you agree with NICTA staff's proposed conclusion that the declaration of the following two services would satisfy all of the declaration criteria in section 128 of the Act:

- wholesale capacity on, and access to, international fibre-optic submarine cables; and
- wholesale access to international gateway facilities at submarine cable landing stations?

Question 8: In the event that either or both of the candidate services are declared by the Minister, what price and/or non-price related terms and conditions do you believe that NICTA should set out in the associated service specific pricing principles? Please support your answer with reasons and evidence where possible.

Question 9: In the event that either or both of the candidate services are declared by the Minister, what are the factors relating to the 'technical and operational quality and timing' of the supply of the candidate services that access seekers would expect to be covered and protected by section 136 of the Act?

Question 10: In the event that either or both of the candidate services are declared by the Minister, is there a need for NICTA to add detail to the requirements of section 136 of the Act (e.g. by way of a guideline)? If so, what should that additional detail address and why?

Question 11: Do you agree with NICTA staff's proposed conclusion that there is a national market for wholesale access to capacity on international communications satellites? Please explain the reasons for your answer and support it with evidence where possible.

Question 12: Do you agree with NICTA staff's proposed conclusion that the market for wholesale access to, and capacity on, international communications satellites is *not* susceptible to en ante competition regulation?

Question 13: What are the factors that contribute to the relatively high price of international calls into PNG? What can NICTA do to encourage reduction in those call prices?

Question 14: Do you agree with the view of NICTA staff that the domestic termination in PNG of an international inbound call is covered by the existing declarations of the Domestic Mobile Terminating Access Service and the Domestic Fixed Termination Access Service? Please explain the reasons for your answer.

Annex A: Inquiry terms of reference

Under the authority of section 127 of the *National Information and Communications Technology Act 2009* (the Act), NICTA has decided to inquire into and report on whether certain wholesale services relating to access to international connectivity should be declared under section 130 of the Act. In doing so, NICTA will:

- (a) analyse the extent of competition in the relevant international connectivity access markets;
- (b) consult with the Independent Consumer and Competition Commission, operator licensees, and any other relevant parties or government agencies;
- (c) form a view as to whether or not those markets are effectively competitive; and, if any is not effectively competitive,
- (d) consider whether the declaration by the Minister of any particular wholesale service or services in that market—in particular access to international gateway facilities, access to capacity on international communications cables, and/or access to capacity on international communications satellite links—would satisfy the declaration criteria specified in section 128 of the Act;
- (e) determine whether or not NICTA should recommend to the Minister that one or more wholesale services in those markets be declared under section 130 of the Act; and, if such a recommendation should be made,
- (f) specify the recommended terms of the declaration(s) and the recommended expiry date(s) for the declaration(s);
- (g) prepare for the purposes of section 135 of the Act draft service-specific pricing principles in relation to the wholesale service(s) recommended to be declared; and
- (h) identify and consider relevant matters relating to the technical and operational quality of the supply of the wholesale service(s) recommended to be declared for the purposes of section 136 of the Act.

The inquiry is expected to be conducted over a period of four months, commencing with the publication of a public discussion paper in September or shortly thereafter. The inquiry will be paper-based (i.e. rely entirely on written submissions and evidence) and is not expected to involve any public hearings.

Annex B: Factors considered by NICTA staff in market analyses

This annex identifies and explains the various factors that NICTA staff believe are relevant to consider when determining if there is significant market power in a relevant market.

Market shares

Market shares are not conclusive of SMP on their own. In the application of competition law in the European Union, operators with a market share of less than 25% are unlikely to have SMP, while a market share greater than 50% tends to lead to a rebuttable presumption of SMP. In the European Commission's decision-making practice, SMP concerns normally arise where an operator has at least 40% market share. However, there may even be concerns about dominance where an operator has less than 40%, depending on the size of that operator's market share relative to its competitors.¹²

Market shares may be assessed either on the basis of subscribers, sales volume or value of sales. Usually share of revenue (value of sales) is preferred because subscribers are not of equal value or equal potential and most markets are multi-product with value being the only common measure that can be applied. Comparison of market shares measured by subscribers, sales volume and sales value often provides useful analytical insights. In the case of a fairly homogenous product or service, an operator that has a higher market share by value than by volume might be an indication that that operator can price above rivals and make super normal profits, which might be a sign of SMP.¹³

Control of infrastructure not easily duplicated

This "control of infrastructure" indicator refers to a situation in which the availability of a certain infrastructure is necessary to produce a particular product or service; the required infrastructure is exclusively or overwhelmingly under control of a particular operator; and there are high and non-transitory barriers to duplicating or substituting for the infrastructure in question. In such a situation, the control of infrastructure not easily duplicated can make it feasible for the operator in question to behave independently from other suppliers (i.e. MNOs) and to exercise market power (in absence of significant countervailing power), as there is almost no actual or potential competition. One example is control/ownership of a large network that a competitor would find costly and time-consuming to build in order to provide the service in question. Such control may hence represent a significant barrier to entry. In addition it might be possible for the supplier to lever its market power horizontally (to adjacent markets) or vertically (to downstream markets).¹⁴

Overall size of the licensee

This refers to the potential advantages, and the sustainability of those advantages, that may arise from the large size of one operator relative to its competitors. Areas where such advantages may exist include economies of scale, finance, purchasing, production capacities, and distribution and marketing. Such advantages may accrue in part due to other activities of the licensee beyond the relevant market.¹⁵

¹²Body of European Regulators for Electronic Communications (BEREC) (2005) *Revised ERG Working Paper on the SMP concept for the new regulatory framework*, ERG (03) 09rev3, September 2005, p. 4, available at www.erg.eu.int/doc/publications/public_hearing_concept_smp/erg_03_09rev3_smp_common_concept.pdf. It is important to note that in the EU, and also in other quite diverse jurisdictions such as Samoa, Malaysia and Saudi Arabia, the 40% rule is only a rebuttable assumption that encourages the circumstances of market share and concentration to be further analysed. In those jurisdictions, a burden is placed on operators with above-threshold level market shares to argue why they should not be regarded as having SMP.

¹³BEREC (2005), op.cit. p.4–5

¹⁴BEREC (2005), op.cit. p.5

¹⁵Ibid

Network effects

Network effects describe the dependence of consumer willingness to pay for a given good on the number of users of that good (i.e. on the size of the network). A good or service exhibits network effects when the utility of a user increases with the number of other users consuming that good.¹⁶ The presence of network effects can therefore confer market power on firms with high market shares.¹⁷

Technological advantages and superiority

Technological advantages may represent a barrier to entry as well as an advantage over existing competitors due to lower production costs or product differentiation. However, some technological advantages might only be temporary and may therefore not be a permanent source of SMP.¹⁸

Absence of or low countervailing buying power

The existence of customers with a strong negotiating position, which is exercised to produce a significant impact on competition, will tend to restrict the ability of providers to act independently of their customers. Such power is more likely where a customer accounts for a large proportion of the producer's total output, is well informed about alternative sources of supply, is able to switch to other suppliers readily at little cost to itself, and where it may even be able to begin producing the relevant product itself. This criterion is generally more meaningful in wholesale markets because suppliers that are purchases of wholesale services are typically more visible and powerful than retail customers.¹⁹

Easy or privileged access to capital markets / financial resources

Easy or privileged access to capital markets may represent a barrier to entry as well as an advantage over existing competitors. Aside from internal sources (e.g. as indicated by cash flow or revenue) the ability to procure outside capital, a firm's capital structure, and its ability to increase equity capital (e.g. structure of shareholders) or debt might be considered. Further, access to capital might be influenced if a firm has links with other companies (e.g. affiliated companies belonging to the same group) that are favourable for its activities in the market in question.²⁰

Product / services diversification

Diversification is where an operator produces a range of products and/or services (which may or may not be in separate markets). When those products/services are bundled, it may make competitive entry into the supply of one or more of the products/services potentially more difficult.²¹

Economies of scale

Economies of scale arise when increasing production causes average costs (per unit of output) to fall. Economies of scale are common where the production process involves high fixed costs. One other way in which increasing scale can lower unit costs is by allowing greater specialisation, and in turn higher productivity. Economies of scale on their own do not create entry barriers—given a certain level of demand, technology and cost function, competitors can exhaust the same economies if they are able to produce the same volumes. However, economies of scale can de-facto amount to an entry barrier if

¹⁶Farrell, J. And Klemperer, P. (2007) 'Coordination and lock-in: competition with switching costs and network effects', in Armstrong, M. And Porter, R. (eds), *Handbook of Industrial Organization*, vol.3, Elsevier

¹⁷Klemperer, P. (1987) 'Markets with consumer switching costs', *The Quarterly Journal of Economics*, no.102(2), pp.375–394; Klemperer, P. (1995) 'Competition when consumers have switching costs: an overview with applications to industrial organisation, macroeconomics and international trade', *Review of Economic Studies*, no.29(1), pp.38–56;

Farrell, J. and Klemperer, P. (2007) op.cit.

¹⁸BEREC (2005), op.cit. p.5

¹⁹BEREC (2005), op.cit. p.5–6

²⁰BEREC (2005), op.cit. p.6

²¹Ibid

further factors—such as sunk costs and switching costs—exist so that economies of scale create an asymmetry between one operator and its competitors. If this is the case, economies of scale can act as a barrier to entry as well as an advantage over existing competitors.²²

Economies of scope

Economies of scope exist where average costs for one product are lower as a result of it being produced jointly with other products by the same operator. Cost savings may be made where common processes are used in production. Economies of scope are common where networks exist, as the capacity of the network can be shared across multiple products. Similar to economies of scale, economies of scope can be a barrier to entry as well as an advantage over existing competitors. For example, if the existence of economies of scope requires entrants to enter in more than one market simultaneously, this may require additional expertise and more capital, which may in turn mean the costs are higher to enter the market.²³

Vertical integration

Vertical integration may give an advantage to the integrated firm over its competitors because control of the upstream or downstream markets may make new market entry more difficult. Vertical integration potentially creates conditions for leverage of market power from an upstream market to a downstream market due to both the incentive and ability for vertically integrated firms to limit entry into downstream markets. Further, vertically integrated multi-product operators may also have a competitive advantage over their competitors if they are in a position to bundle products in way that may either not be able to be replicated by competitors due to a lack of corresponding wholesale products, which in turn might increase the cost of entry.²⁴

A highly developed distribution and sales network

Well-developed distribution systems are costly to replicate and maintain, and may even be incapable of duplication. They may represent a barrier to entry as well as an advantage over existing competitors.²⁵

Absence of potential competition

This refers to the prospect of new competitors that are in the position to switch or extend their line of production entering the market (e.g. due to a hypothetical price increase) within the timeframe considered by the market review. The record of past entry is one factor that can be looked at, as well as potential barriers to entry.

Barriers to expansion

There may be more active competition where there are lower barriers to growth and expansion. While growth and expansion is easier to achieve (particularly for new entrants) in growing markets, it might be inhibited in mature, saturated markets, where customers are already locked in with a certain supplier and have to be induced to switch.²⁶

Ease of market entry

The threat of potential entry may prevent firms from raising prices above competitive levels, leading thereby to a situation in which no market power is exercised. However, if there are significant barriers to entry, this threat may be weak or absent. Operators may then be able to raise prices and make persistent

²²BEREC (2005), op.cit. P.6

²³Ibid

²⁴BEREC (2005), op.cit. p.6–7

²⁵BEREC (2005), op.cit. p.7

²⁶Ibid

excess profits without attracting additional competition that would reduce them again. The impact of entry barriers is likely to be greater where the market is growing slowly and is initially dominated by one large supplier, as entrants will be able to grow only by attracting customers from the dominant firm. However, barriers to entry may become less relevant where markets are associated with ongoing technological change and innovation.²⁷

Excess pricing and profitability

The ability to price at a level that keeps profits persistently and significantly above the competitive level is an important factor for SMP. In a competitive market, individual firms are typically not able to maintain prices above economic costs and sustain excess profits for any appreciable time. As costs fall, prices may be expected to fall too, if competition is effective. Although the existence of prices at a level that keeps profits persistently and significantly above the competitive level is an important indicator for the existence of SMP it is not a necessary condition for finding SMP.²⁸

Excessive prices can be detected by an analysis of Price Cost Margins (PCM) which measure directly the deviation of prices from costs. However, although valuable from a theoretic perspective, in many cases necessary data to calculate PCM are not available at a disaggregated product or market level. In addition, the fact that in communication markets usually there are multi-product undertakings with high joint and common costs that have to be attributed to certain services may make the calculation of PCM even more difficult.²⁹

Lack of active competition on non-price factors

There are other strategic competition parameters besides pricing. For example, such non-price factors may include marketing, service quality, service range, innovation, or geographic coverage.

Switching barriers

When considering a switch to new services in place of existing services, there are three possible cases. First, consumers will remain with current services if satisfied. Second, if not satisfied after a comparison of information, they will substitute the services in question for new services unless significant barriers exist (such as uncertainty about the quality of service and reputation of alternative suppliers). If consumers already have a considerable investment in equipment necessary for the services, are locked into long-term contracts or are concerned about disruptions and inconveniences in so doing, they will stick to current services and show inertia in the choice of services and operators. Consumers' reluctance to switch suppliers can subsequently work as a potential barrier to entry and/or expansion.³⁰

Customers' ability to access and use information

Limited customer access to and use of reliable information on prices and other aspects of the services can dampen competition by reducing the degree to which customers act upon differences between competitors. As a result, operators are better able to act independently of customers.³¹

²⁷BERC (2005), op.cit. p.8

²⁸Ibid

²⁹Ibid

³⁰Ibid

³¹BEREC (2005), op.cit. p.13