

DISCUSSION PAPER

Public Inquiry into the Potential Declaration of Certain Wholesale Services

Issued on 14 May 2025

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1. BACKGROUND

1. Section 129 of the National Information and Communications Technology Act 2009 (the “Act”) gives power to the National Information and Communications Technology Authority (“NICTA”) to issue a recommendation to the Minister that certain wholesale services should be declared services.
2. At NICTA’s advice, on 18 February 2019 the Minister declared certain wholesale services (“Wholesale Service Declaration No. [1] Of 2019”). These declared services include: (i) international submarine cable transmission capacity service, (ii) international submarine cable gateway access services, and (iii) international submarine cable duct access service.
3. On 18 February 2019 the Minister also declared the wholesale broadband capacity service (“Wholesale Service Declaration No. [2] Of 2019”). At the time of these two declarations, the sole provider of these declared services was PNG DataCo Limited (“DataCo”).
4. Subsequently, NICTA adopted the Service-Specific Pricing Principles (Submarine Cable Services) Determination 2019¹ and the Service-Specific Pricing Principles (Broadband Capacity Service) Determination 2019. These determinations came into effect on 1 January 2020, and established pricing principles and non-price terms and conditions for the supply of the above mentioned declared services.
5. Both declarations expired on 27 March 2024, on the fifth anniversary of their commencement dates. In addition, the associated Service-Specific Pricing Principles ceased to be in force on the same date in accordance with Section 135 (5). Moreover, pursuant to Section 141(2) (b), DataCo’s Reference Interconnection Offer (“RIO”) associated with these services, expired on the same date. This has led to a situation where the supply of the abovementioned declared services, are unconstrained by the expired service-specific pricing principles, and in consequence, will likely be detrimental for the advancement of the competition and efficiency objectives of Part VI of the Act.
6. Pursuant to Section 127(2)(a) NICTA is initiating a Public Inquiry under Section 230 of the Act into whether certain wholesale services should be declared. To that end, NICTA is issuing this Discussion Paper: Public Inquiry into the Potential Declaration of Certain Wholesale Services (the “Discussion Paper”), and soliciting comments from interested parties.
7. In addition, NICTA is also issuing for comment draft declarations for various wholesale services (see Annex A). In particular, NICTA seeks comments from interested parties as to whether the following wholesale services shall be declared:
 - (a) Wholesale International dedicated submarine cable capacity service;
 - (b) International submarine cable facilities access service;
 - (c) Wholesale long-haul dedicated capacity service;

¹ This would later be amended by the Service-Specific Pricing Principles (Submarine Cable Services) Amended Determination 2020.

- (d) Wholesale local dedicated capacity service; and
 - (e) Wholesale Internet access service.
8. NICTA also seeks comments as to whether additional wholesale service should be considered for declaration.
9. NICTA invites interested parties to provide comments and answers to the set of questions posed in this Discussion Paper. Written submissions should be sent by email to consultation.submission@nicta.gov.pg and must be received by 5 p.m. on 11th June 2025. For further inquiries contact Mr. Polume Lume, Director, Economic, Consumer and International Affairs on telephone 3033272 during business hours or by email to plume@nicta.gov.pg.

2. OBJECTIVE

10. The purpose of this Public Inquiry is to:
- (a) share this Discussion Paper and the enclosed draft declarations to inform interested parties about NICTA's intention to declare certain wholesale services; and
 - (b) elicit comments from interested parties on the questions posed in this Discussion Paper and the draft declarations. In doing so, we seek to ensure that the views of interested parties are considered before NICTA makes a declaration recommendation to the Minister; and
 - (c) further the achievement of the competition and efficiency objectives of Part VI of the Act as set out in Section 124.

3. LEGAL AND REGULATORY FRAMEWORK

11. Section 124 specifies the dual objectives of Part VI of the Act – Interconnection and Wholesale Access, to promote competition and efficiency in the supply of ICT services.
12. Pursuant to Section 124 (1) (a) of the Act, the competition objective is to *“promote effective competition in markets for ICT services in Papua New Guinea.”*
13. Section 124 (1) (b) of the Act defines the efficiency objective as *“promoting the economically efficient use of, and the economically efficient investment in, the facilities by which ICT services may be supplied.”*
14. Section 124 (2) of the Act provides some of the factors that should be considered to determine whether a proposed declaration would likely further the achievement of the efficiency objective:
- “(2) In determining the extent to which a particular thing is likely to further the achievement of the efficiency objective, regard shall be had (without limitation) to all of the following matters -*

- (a) whether it is technically feasible for the relevant ICT services to be supplied, having regard to –*

(i) *the technology available or likely to become available; and*

(ii) *the reasonableness of the costs involved; and*

(iii) *the effect of supplying the ICT services on the integrity, operation or performance of other ICT services or facilities; and*

(b) *the legitimate commercial interests of the access provider in supplying the ICT services, including the ability of the access provider to exploit economies of scale and scope; and*

(c) *the incentives for investment in the facilities by which the ICT services may be supplied, including the risks involved in making the investment.”*

15. Section 127 (1) of the Act empowers NICTA to initiate a public inquiry under Section 230 into:

“(a) whether a recommendation should be made to the Minister that a wholesale service should be declared or that an existing declaration of a declared service should be revoked or varied; and

(b) if so, the appropriate terms of any such declaration, revocation or amendment.”

16. Pursuant to Section 127(2) NICTA may hold a public inquiry:

“(a) on its own initiative, including prior to the expiry of an existing declaration; or

(b) upon receipt of a written request from any person asking NICTA to hold such a public inquiry, such request accompanied by a detailed submission identifying the grounds for that request.”

17. However, a declaration of service would need to fulfill the declaration criteria under Section 128 of the Act (the “Declaration Criteria”). In particular,

“(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

(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.”

18. Following a public inquiry under Section 127 of the Act, if NICTA is satisfied that all of the Declaration Criteria would be met by the declaration of a wholesale service,

“(a) NICTA shall recommend to the Minister that the wholesale service should be declared or continue to be declared; and

(b) NICTA shall publish a report identifying –

(i) NICTA's analysis of the extent to which the declaration criteria are met; and

(ii) the particular terms of the declaration, consistent with the declaration criteria; and

(iii) the extent to which the terms are technologically neutral and non-discriminatory; and

(iv) an expiry date for the declaration, which must be a date within five (5) years after its commencement date.”²

19. On receiving a declaration recommendation from NICTA, the Minister has 60 days to decide whether to accept or reject the declaration recommendation in accordance with Section 130 (5).

² Section 129 (1) of the Act.

4. REASON'S FOR NICTA'S INTERVENTION

20. Effective competition in the supply of the wholesale services proposed for declaration is non-existent and unlikely to come about in the near and medium term. The expired two declarations constrained the access provider to set prices in accordance with the General Pricing Principles under Section 134 of the Act, the Service-Specific Pricing Principles under Section 135, and in accordance with the non-discriminatory obligations under Section 136 of the Act. Those obligations have ceased to be in force. Furthermore, NICTA is proposing the declaration of new wholesale services which were not included in prior declarations.
21. The lack of effective competition in the markets for the wholesale services proposed for declaration signify that a declaration of service is necessary to further the competition objective of Part VI of the Act (the "Competition Objective") in accordance with Section 124. Without these declarations, market forces alone would not provide enough incentive to the access provider to advance the Competition Objective with respect to the supply of these wholesale services.
22. The wholesale services proposed for declaration are supplied via facilities that cannot be feasibly substituted, as a matter of commercial reality, via other facilities in order to supply that same level of service.
23. Increased access to these wholesale services is necessary for promoting effective competition in retail downstream markets including, but not limited to, mobile pre-paid bundled services (voice, SMS, and data), mobile post-paid bundled services (voice, SMS, and data), and fixed Internet service.
24. A declaration of service is required to promote the economically efficient use, and the economically efficient investment in the facilities by which these wholesale services may be supplied (i.e., the efficiency objective of Part VI of the Act). Reliance on the profit incentive of the supplier of these wholesale services and on market forces of supply and demand would not be enough to advance the efficiency objective of Part VI of the Act.

5. WHOLESALE INTERNATIONAL DEDICATED SUBMARINE CABLE CAPACITY SERVICE

25. The wholesale international dedicated submarine cable capacity service is defined as a network service:
 - (a) For the carriage of any combination of voice communications and/or data via dedicated capacity in an international fibre-optic submarine cable or cables between one point in Papua New Guinea and another point outside the national territory of PNG; and
 - (b) where the point of interconnection in PNG between the access provider and the access seeker is located either,
 - I. At a point of interconnection located at the access provider's cable landing station; or

- II. at a point of interconnection located in the access provider's switching centre the use of which for this purpose is mutually agreed to by the access provider and the access seeker.

26. For the avoidance of doubt,

- (a) the wholesale international dedicated submarine cable capacity service includes the supply of backhaul transmission capacity by the access provider to the extent that such is necessary to connect an access seeker's facilities at a virtual colocation site in the relevant switching centre to the access provider's facilities in a cable landing station.

5.1 Service characteristics

27. The wholesale service is supplied in PNG solely by DataCo and sold to access seekers (i.e., operator licensees) in need of transport capacity between two points, one of which is in the national territory of PNG and a second point abroad. This transport capacity is provided via fibre optic international submarine cables that enable high-quality dedicated circuits to connect an access seeker's point of interconnection in PNG with destinations abroad.
28. These dedicated links are leased based on various units of capacity (i.e., Megabits per second or Mbps) connecting two points. The leasing agreement between DataCo and the access seekers usually stipulate a recurrent monthly charge for leased capacity.
29. DataCo's monthly price of leased capacity depends on the capacity of the dedicated link. Higher capacity links command a higher monthly price. However, due to volume discounts, as the capacity of the link increases, the unit price (Kina per Mbps) of leased capacity declines.
30. These dedicated links offer uncontended point-to-point high-quality transmission capacity, often referred commercially as international private leased circuit or IPLC.
31. Currently, DataCo offers this wholesale service in two international cable systems: (i) the Coral Sea Cable System (CS2), and (ii) the PIPE Pacific Cable 1 (PPC-1). Most of the wholesale service is offered in the CS2 cable landing station located in Kila Barracks, Port Moresby. A much smaller portion is offered in the PPC-1 cable landing station located in Madang.

5.2 The market for wholesale international dedicated submarine cable capacity service

32. To define the relevant market within which the wholesale service is supplied, NICTA followed the widely accepted methodology known as the Hypothetical Monopolist Test (HMT), also known as the SSNIP test, explained in Annex B.
33. The first step is to start with a focal service or group of services that appear to be close substitutes from the point of view of a buyer (i.e., an access seeker in our case). Our focal service is the provision of wholesale point-to-point international dedicated capacity via fibre optic submarine cables. We posit whether the candidate market definition could also include the provision of international capacity using satellite technology. This satellite technology encompasses, geostationary satellites, medium earth orbit and low earth orbit satellites.

34. Analysing the demand-side substitution between these two services made us reject the hypothesis that satellite-based international capacity is in the same relevant market as the fibre optic submarine cable-based service for several reasons.
35. First, it has been observed in PNG and other jurisdictions, that access seekers in areas that relied on satellite-based international capacity, quickly shifted to fibre optic submarine cable-based service once enough international submarine cable capacity became available. We observed this same phenomenon after the Coral Sea Cable System (CS2) launched its service. This suggests that buyers (i.e., access seekers) of international capacity have a strong preference in favour of fibre optic submarine cable-based service and do not view the satellite-based services as a close substitute. Of course, access seekers would continue to buy satellite-based international capacity to serve remote localities where access to the fibre optic submarine cable service is not available or feasible.
36. Second, the unit price of international capacity via fibre optic submarine cables is significantly lower than for satellite-based service. This strongly suggests that a SSNIP on fibre-based international submarine cable capacity could be maintained by a hypothetical monopolist because not enough buyers would switch to the more expensive satellite-based service.
37. Third, due to the large distance that a signal needs to travel with the satellite-based services, the latency is much higher than for the fibre optic submarine cables. This higher latency translates into a lower quality for the satellite-based service, especially for applications such as live video streaming, and video games.
38. It is illustrative to cite what the International Telecommunications Union (ITU) says when comparing international connectivity with a satellite-based system and a fibre optic-based system:
- “Submarine cables remain the preferred technology for their technical superiority in terms of bandwidth and latency, and their operating cost effectiveness. Satellite signals are also prone to interference from climate conditions of the tropical Pacific islands.”³*
39. Similarly, an OECD publication states that:
- “Satellite networks were the backbone of the intercontinental telephone network from the 1960s to the 1980s. Since that time fibre cables have supplanted the use of satellites on routes with the highest traffic volume. The main drawbacks of satellite over fibre are the high latency, limited capacity and shared nature of satellite communications.”⁴*
40. In consequence, NICTA is of the view that the relevant wholesale market consists of international dedicated capacity service via fibre optic submarine cables only.
41. An analysis of the supply-side substitution effect does not change this conclusion as current suppliers of satellite-based service such as O3b (SES) would not be able to

³ International Telecommunications Union, “Maximizing availability of international connectivity in the Pacific.” Thematic Reports. Regulatory & market environment. ITU (2018) pp.11.

⁴ OECD Digital Economy Papers No. 232. “International Cables, Gateways, Backhaul and International Exchange Points”. 18 Feb. 2014, pp: 8.

rapidly deploy the necessary infrastructure to connect PNG with the rest of the world via a fibre optic submarine cable. These infrastructure investments take many years to materialize and therefore, does not provide any meaningful supply-side substitution effect.

42. With respect to the geographic market, it is important to consider that an access seeker could interconnect with the access provider at multiple points of interconnection within the national territory of PNG. Moreover, the number of possible points of interconnection have been increasing with the expansion of each operator licensee's own network in recent years. This trend is likely to continue. Therefore, NICTA's view is that the geographic market is the national territory of PNG.

Question 1. Do you agree with this market definition. If you do not, please explain your reasons.

5.3 The proposed declaration is consistent with the declaration criteria in accordance with Section 128 of the Act

5.3.1 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective

43. The proposed declaration furthers the competition objective by promoting effective competition in markets for ICT services in PNG. In particular, the proposed declaration will further the competition objective in three ways.
44. First, it would promote effective competition in several downstream markets including but not limited to, prepaid and post-paid mobile bundled service (voice/SMS and data), and fixed Internet service.⁵ Because the proposed declaration would set cost-based prices for the wholesale service, it would lower the price of an essential input for the supply of the downstream retail services mentioned. The retail licensed operators will experience a decline in their costs of supplying retail services. Suddenly, supplying those services will become more profitable and the retail licensed operators will respond by increasing the supply of those services. This in turn will put downward pressure on prices moving them closer to the competitive level, all else equal.
45. Moreover, by enabling lower retail prices, the proposed declaration would induce an increase in the usage of ICT services which in turn would prompt licensed operators to increase investment and expand or upgrade their network infrastructure, all of which promotes effective competition in downstream retail markets.
46. Second, the international dedicated submarine cable capacity (the "Wholesale IPLC") service is supplied via a facility controlled by DataCo that cannot be feasibly substituted as a matter of commercial reality, via another facility in order to supply

⁵ Section 128 (b) (i) of the Act requires a declaration to promote effective competition in at least one market other than the market for the wholesale declared services, in reality, this proposed declaration would promote competition in several downstream markets.

the Wholesale IPLC service. This is because the cost structure of these facilities and services involves a large portion of fixed and sunk costs and a very small portion of variable operating costs. Therefore, as more capacity is sold as has occurred with the CS2 cable in recent years, the average cost to DataCo (per Mbps) declines rapidly. Therefore, a potential competitor cable would not be able to enter the market because its initial small scale (relative to the CS2) would translate into a higher cost per unit of capacity relative to the CS2. This cost advantage makes the deployment of an alternative facility to supply international submarine cable transmission capacity not feasible from a commercial point of view, at least in the short term, and while there is plenty of spare capacity in the CS2 cable.

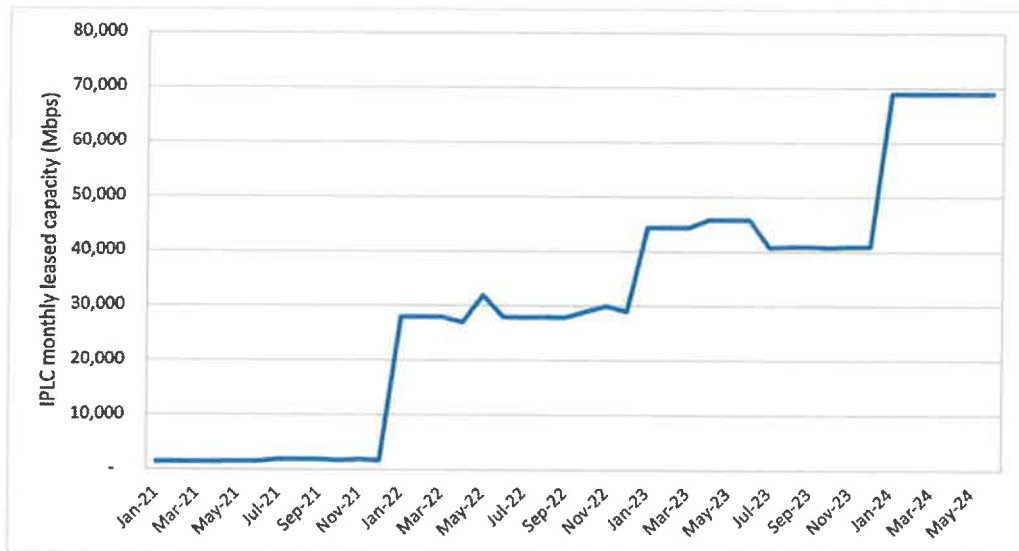
47. This cost advantage is even more significant once we take into account that the incremental cost of expanding the available capacity in the CS2 cable is negligible compared with the initial capital investment. At the start of service, the lit capacity in the cable was 100 Gbps. This lit capacity has been increased now, and can be easily doubled or tripled by purchasing electronic cards costing a small fraction of the initial investment. This implies low barriers to expansion as the incremental costs of expanding the available capacity in the CS2 cable is very low. This again, makes any potential replication of the existing facilities, by a potential competitor, not commercially viable, at least in the short to medium term.
48. Third, in the absence of the proposed declaration, the access provider would have the ability to sell the wholesale service to an access seeker, with which it competes in a retail market, at a price inconsistent with the cost-based pricing or the cost recovery principles in Section 134 of the Act. This in turn could render the retail services offered by the access seeker unprofitable, and in an extreme case, the access seeker may be forced out of the market.
49. For the avoidance of doubt, conferring the access provider with the ability to price at a certain level does not mean that the access provider will price at that level, or is pricing at that level, it merely means that it could if it wanted to do so. This is one of the reasons why the proposed declaration is necessary to advance the competition objective in the Act.

Question 2. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective? If you do not, please explain your reasons.

5.3.2 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective

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)

50. The proposed declaration is consistent with Section 124 (2) (a) of the Act in that it is technically feasible to supply the wholesale service or increase its supply, as evident by the increases supply of the Wholesale IPLC service over the past few years.



*Note: includes CS2 and PPC-1 cables
Source: Data source is PNG DataCo Limited*

Figure 1. Growth of wholesale international dedicated submarine cable capacity service (wholesale IPLC)

51. Moreover, the costs of providing access or increased access are reasonable as evident by it being supplied to access seekers in larger quantities through time. Therefore, any one-off costs of collocating and interconnecting equipment from the access provider with those from the access seekers were already incurred. In addition, the integrity, operation or performance of the access provider’s other ICT services or facilities would not be materially compromised by supplying the wholesale services to the access seekers, as evidenced by the experience from the past years.

It will further the efficiency objective by enabling the access provider’s exploitation of economies of scale and scope

52. By lowering the price of the wholesale service, the proposed declaration would induce an increase in the utilization of the available capacity in submarine cable systems controlled by the access provider. Because the supply of the wholesale service is characterized by large economies of scale, as the used capacity increases, the cost per unit of capacity would decline, permitting the access provider achieve greater economies of scale.

53. Greater economies of scale and lower cost per unit of capacity will enable an improved efficiency on the access provider's facilities used for the supply of this wholesale service.
54. The proposed declaration would also enable the access provider to achieve greater economies of scope. Economies of scope are present when the cost of supplying two or more services by one company is smaller than the total cost of supplying each service separately by standalone companies. This usually occurs when the services have joint or common costs⁶ such as the services supplied by DataCo. For example, the costs of the submarine cable facilities and associated infrastructure and equipment in DataCo's network, are largely, common with other wholesale services such as wholesale Internet access service.⁷ This commonality allows for spreading the fixed and variable (operating) costs of shared facilities and equipment over a larger number of services, thus achieving economies of scope.
55. As explained earlier, the proposed declaration would increase the supply of the wholesale service. Because this wholesale service is produced jointly with other wholesale (and retail) services, and these have substantial common costs, the proposed declaration would also enable the access provider exploit greater economies of scope, in addition to greater economies of scale.

The declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied

56. The proposed declaration would not compromise the incentives for efficient investment; on the contrary, by increasing the utilization of the available capacity in the submarine cables, it would allow greater economies of scale and scope. In consequence, this would reduce the average cost of each service supplied, increase

Question 3. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective? If you do not, please explain your reasons.

the access provider's efficiency, and the access provider's incentive for efficient investment in facilities used for the supply of the wholesale service.

⁶ See ABA Section of Antitrust Law. Telecommunications Antitrust Handbook (2005). American Bar Association, Chicago, IL, U.S., pp. 8. See also, John C. Panzar, "Technological Determinants of Firm and Industry Structure", pp. 15-16, in Richard Schmalensee and Robert Willig (eds.), *Handbook of Industrial Organization Vol.1*, Reprinted 2005, Elsevier Ltd.

⁷ For example, both services require the same fibre optic cable, cables landing facilities, and associated terminal equipment. In addition, Wholesale Internet access service requires the domestic segment of DataCo's national fibre optic network to transport the traffic from the domestic points of presence to the international gateway on either the PPC-1 or the CS2 international cables.

6. INTERNATIONAL SUBMARINE CABLE FACILITIES ACCESS SERVICE

57. The international submarine cable facilities access service is a facilities access service that provides an access seeker with such access to, or use of, the facility or facilities of an access provider at the access provider's:

- (a) Cable landing station; or
- (b) Switching centre that is nearest to the relevant cable landing station and which contains a point of interconnection between the access provider and an operator licensee (access seeker); or
- (c) Switching centre, the use for which for this purpose is mutually agreed by the access provider and the access seeker;

as is necessary to enable the access seeker to interconnect its facilities to an international fibre-optic submarine cable.

6.1 Service characteristics

58. The wholesale service is a facilities access services provided by an access provider of international submarine cable transmission capacity to enable an access seeker to:

- (a) Access the international gateway facilities of the access provider including but not limited to, physical network infrastructure, and/or
- (b) Physically collocate its facilities, if technically feasible, in any available space within the access provider's cable landing station; and/or
- (c) Virtually or physically collocate its facilities, if technically feasible, in any available space within the access provider's relevant switching centre.

59. This facilities access service is supplied in PNG solely by DataCo which is also the sole supplier of wholesale international dedicated submarine cable capacity.

6.2 The market for international submarine cable facilities access service

60. We used again the methodology described in Annex B to define the relevant market within which the supply of this facilities access service is provided.

61. There is very little or no demand-side substitution for this kind of facilities access service. Demand for this service is not only complementary to the wholesale international dedicated submarine cable capacity service but is also essential and specific to a particular submarine cable. Without it an access seeker will not be able to use the international submarine cable capacity in the corresponding submarine cable.

62. This correspondence between the facilities access service and the associated submarine cable for which international capacity is sought makes it unfeasible to find any other type of facilities access service that could be regarded as a close substitute.

63. Similarly, because the facilities access service is specific to a corresponding submarine cable, there is no feasible supply of an alternative supplier (supply-side substitution) of these facilities.
64. For the aforementioned reasons, NICTA is of the view that the relevant market consists of facilities access services that allow an access seeker to interconnect with an international submarine cable system for accessing capacity in a cable system.
65. Regarding the geographic dimension of the relevant market, NICTA is of the view that the geographic market is the national territory of PNG. This is based on the understanding that licensed operators are licensed to provide their services within the national territory of PNG. Moreover, the facilities access services can be supplied at various switching centres in PNG, and not only at the two cable landing stations. This flexibility in the geographic location where this service can be supplied makes us view the geographic market as the national territory of PNG.

Question 4. Do you agree with this market definition. If you do not please explain your reasons.

6.3 The proposed declaration is consistent with the declaration criteria in accordance with Section 128 of the Act.

6.3.1 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective

66. The facilities access service is not only complementary but essential for accessing international submarine cable transmission capacity service. An access seeker would not purchase one service without the other.
67. This mutual relationship between these two wholesale services means that the proposed declaration of this facilities access service will bring about the same benefits of promoting effective competitions as those stemming from the declaration of the wholesale international dedicated submarine cable capacity service. Namely that:
 - (a) The proposed declaration will further the competition objective by lowering the price of an essential input for the supply of various retail services such as mobile bundled voice/SMS and data service, and fixed internet service. This will cause retail prices to move closer to the competitive level, all else equal; and
 - (b) it would induce an increase in the usage of ICT services which in turn would induce licensed operators to increase investment and expand or upgrade their network infrastructure, all of which promotes effective competition on retail service markets; and
 - (c) given that the facilities access service is supplied via a facility controlled by the access provider that cannot be feasibly replicated over the term of the proposed declaration; in the absence of the proposed declaration, it would confer the

access provider with the ability to exclude or delay access seekers from accessing the wholesale service; and

- (d) in the absence of the proposed declaration, the access provider would have the ability to sell the wholesale service to an access seeker, with which it competes in a retail market, at a price inconsistent with the cost-based pricing or the cost recovery principles in Section 134 of the Act. This in turn could render the retail services offered by the access seeker unprofitable and unable to compete, preventing progress towards the achievement of the competition objective.

68. In consequence, it follows that the proposed declaration of this facilities access service is required to further the competition objective.

Question 5. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective? If you do not, please explain your reasons.

6.3.2 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective

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)

69. As mentioned earlier, because the facilities access service is essential for accessing the international capacity service (via the international gateway), and we demonstrated earlier that the proposed declaration of such service would further the efficiency objective, it follows that the proposed declaration of this facilities access service will also further the efficiency objective. In particular, the proposed declaration is consistent with Section 124 (2) (a) of the Act in that it is technically feasible to supply the facilities access service or increase its supply, as evident by several new access seekers, namely Digitec Communications Limited T/A Vodafone PNG (“Digitec-Vodafone”), collocating their equipment and or facilities to access capacity in the CS2 cable system in 2022. Granted, there are limits to the amount of space available for collocation in a cable landing stations, but physical collocation is also feasible at an access provider’s switching centre. Alternatively, virtual collocation is a feasible option when there is physically no additional space left.
70. As with the wholesale international dedicated submarine cable capacity service, NICTA considers that the cost the access provider would need to cover to supply the facilities access service is reasonable as evident by it being supplied to the new access seekers since the prior declaration in 2019. In addition, the integrity, operation or performance of the access provider’s other ICT services or facilities would not be materially compromised by supplying the facilities access service to the access seekers, as evidenced by the experience since the prior declaration.

It would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied

71. The proposed declaration would not compromise the incentives for efficient investment. On the contrary, by promoting a fuller utilization of the available collocation space in the access provider's facilities, it would increase the efficiency of the access provider's investment in said facility. This will in turn increase the access provider's return on investment and provide an incentive for efficient investment in any facility over which the facilities access service is supplied.

Increase access to the facilities access service would avoid inefficient replication of underlying facilities that may be efficiently shared.

72. The proposed declaration would increase the sharing of existing (and future) facilities which increases the efficiency of these investments. By having access seekers collocate their equipment and facilities with those of the access provider for the purpose of interconnecting with an international submarine cable system, the proposed declaration would avoid inefficient replication of underlying facilities.

Question 6. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective? If you do not, please explain your reasons.

7. WHOLESALE LONG-HAUL DEDICATED CAPACITY SERVICE

73. The long-haul dedicated capacity service is a network service for carrying traffic between two points of the access provider's fibre optic network within the national territory of PNG.
74. This wholesale service involves the provision of domestic dedicated capacity from a point of interconnection to a second point of interconnection.
75. For the avoidance of doubt,
- (a) this wholesale service could have one end at an international gateway within the national territory of PNG; and
 - (b) includes access to, or use of, the facility or facilities of an access provider to collocate an access seeker's equipment, physically or virtually, at the access provider's facilities in order to interconnect the two networks.

7.1 Service characteristics

76. The wholesale service is sold based on the dedicated capacity of the point-to-point link measured in Mbps. It is often referred in the industry as backhaul service, commonly used by licensed operators to connect base stations (mobile networks) or fixed network elements to their core networks. Typically, these links cover long distances between cities or urban centres.
77. DataCo, the sole provider of this wholesale service, relies on a network of fibre optic cables with its associated optical switches and supporting infrastructure. Part of this network goes in ducts underground, and other parts go overhead on poles or masts. Sometimes, fibre optic cables are installed on medium or high-voltage transmission lines. DataCo's national fibre optic cable network also includes a portion that goes underwater, the Kumul Submarine Cable Network (KSCN) around the coast of PNG.
78. In general, the service is expected to have a high standard of reliability, and customers are willing to pay a premium for redundancy and reliability.
79. The fixed costs of providing this service are considerable relative to the variable costs. This is reflected in large volume discounts for higher capacity links. Thus, the price per unit of capacity for high-capacity links is much lower than the unit price for low-capacity links. The table below listing DataCo's prices for June of 2024 illustrates this.

Table 1. Price of wholesale point-to-point long-haul dedicated capacity over fibre cable

Capacity (Mbps)	Unit Price per month (PGK per Mbps)
Less than 10	n.a.
10	242.00
50	206.00
100	182.00
150	172.00
300	161.00
500	149.00
1,000	139.00
2,000	136.00
5,000	n.a.
10,000	n.a.
More than 10,000	99.00

Note: Prices for June 2024

Source: PNG DataCo Limited.

7.2 The market for wholesale long-haul dedicated capacity service

80. NICTA used the methodology summarized in Annex B to define the relevant market. We started with a focal service and analysed possible demand-side substitution with

alternative services. Our focal service is long-haul dedicated capacity over fibre optic cables. This wholesale service can be supplied via overhead fibre optic cables, or via fibre optic cables buried underground, or underwater as in the KSCN without a significant change in the functionality or characteristics of the wholesale service.⁸ In consequence, NICTA is of the view that the wholesale services delivered via fibre optic links overhead (on masts, poles or towers), underground, or underwater, are close substitutes and as such, are part of the same wholesale product market.

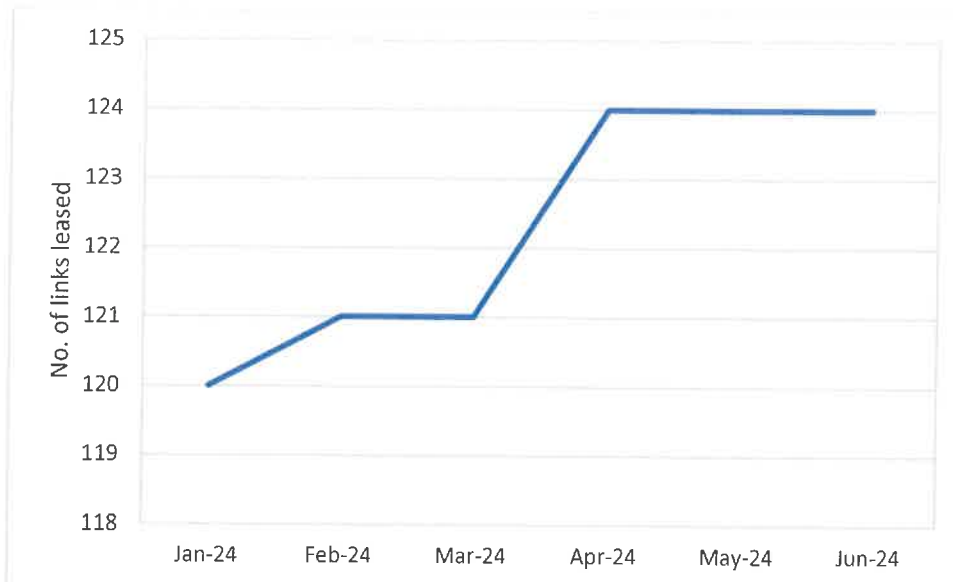
81. Traffic on telecommunications networks can also be transported via microwave links over long distances. Indeed, this has been the traditional way by which mobile service providers auto-transport their voice and data traffic. However, relative to a fibre-based alternative, microwave links have several limitations. One is that they are limited by line-of-sight considerations due to the pair of antennas needing to be on a straight line and with minimum obstruction between the two. This means that for long distances, microwave links would need multiple hops, increasing the total cost of ownership.
82. Second, microwave signals are subject to strong signal degradation with distance, which again makes it necessary to use multiple hops for long distance point-to-point links, all of which increases the costs. Third, microwave signals are prone to degrade with bad weather,⁹ which again, imposes serious restrictions on the length of each microwave link. In addition, and probably more important than the limitations mentioned, the capacity of microwave links is not able to match the amount of capacity that fibre-optic cables are able to deliver. However, we do acknowledge that for lower capacity needs, microwave links seem to be a closer substitute to fibre optic cables. However, our view is that for high-capacity links a SSNIP on fibre-based links would be able to be maintained as not enough access seekers would switch to a microwave link, to make the price increase unprofitable. Therefore, backhaul, microwave links do not belong to the same market as fibre-based links.
83. The experience in the past few years in PNG supports this conclusion. As the need for higher bandwidth arose with the expansion of 4G service, the bandwidth available via microwave links became insufficient. In segments where long-haul high-capacity links were needed, fibre optic links replaced microwave links as a means of transporting traffic. Figure 2 shows the growth of long-haul dedicated capacity links in the recent months. It must be kept in mind that just four years ago the number of leased links was negligible while now there are 124 leased links for a total leased capacity of 49 Gbps.¹⁰

Figure 2. DataCo's number of wholesale long-haul dedicated capacity links leased

⁸ A 10 Gbps dedicated link has the same properties whether it is supplied via an overhead fibre optic network, an underground fibre optic cable, or a submarine fibre optic link. The bandwidth, data rate, and latency would be equivalent.

⁹ See for example, Ray Horak. "Telecommunications and Data Communications Handbook." John Wiley & Sons, Inc. 2007.pp. 62-65.

¹⁰ Information provided by DataCo as of June 2024.



Source: DataCo.

84. Nevertheless, our view is that microwave links will continue to play an important role to auto transport each mobile network operator's traffic, especially in low density or rural areas where smaller link capacities are needed.
85. We also do not view backhaul via satellite as a close substitute to fibre-based links due to the higher price of satellite links. A SSNIP on the fibre-based links would not prompt enough users to switch to satellite to make the price increase unprofitable. Therefore, we maintain that only fibre-based links belong to this wholesale market.
86. We also considered possible supply-side substitution effect from alternative suppliers but rejected that possibility due to the large capital investment required and the long period of time required to deploy these fibre optic networks.
87. Regarding the geographic market, the fibre optic backbone network in PNG keeps expanding. DataCo, the sole provider of the wholesale service has a terrestrial and submarine fibre optic network with 14 fibre points-of-presence across 20 provinces. NICTA expects DataCo to continue to expand its national fibre optic network in the coming years. For these reasons, NICTA considers that the geographic market is the national territory of PNG.

Question 7. Do you agree with this market definition. If you do not please explain your reasons.

7.3 The proposed declaration is consistent with the declaration criteria in accordance with Section 128 of the Act

7.3.1 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective

88. The proposed declaration furthers the competition objective by promoting effective competition in markets for ICT services in PNG. In particular, the proposed declaration will further the competition objective in two ways. First, it would promote effective competition in several retail downstream markets,¹¹ including but not limited to, voice/SMS and data bundled services and fixed Internet. Because the proposed declaration would set cost-based prices for the wholesale service, it would lower the price of an essential input for the supply of various retail services, which in turn would lower retail prices. This would move retail prices closer to the competitive level, all else equal.
89. In the absence of the proposed declaration, DataCo would have the ability to price the wholesale service as a monopolist, and thus, cause the prices of various retail services to be higher than they would be with the proposed declaration.
90. Moreover, by inducing lower retail prices, the proposed declaration would cause an increase in the usage of ICT services which in turn would prompt licensed operators to increase investment and expand or upgrade their network infrastructure to match the increased demand, all of which promotes effective competition on retail service markets.
91. Second, the wholesale service is supplied via a facility controlled by the access provider that cannot be feasibly replicated over the term of the proposed declaration. This confers to the access provider (DataCo) a substantial degree of power in the market within which the wholesale service is supplied. In the absence of the proposed declaration, it would confer DataCo with the ability to exclude or delay supplying the wholesale service to access seekers with whom it may compete in retail markets.
92. For the avoidance of doubt, conferring the access provide with the ability to exclude or delay the supply of the wholesale service does not mean that the access provider will exclude or delay the supply of such service, it only means that it could if it wanted to. This is one good reason why the proposed declaration is necessary.
93. Moreover, in the absence of the proposed declaration, DataCo would have the ability to sell the wholesale service to an access seeker, with which it competes in a retail market¹², at a price inconsistent with the cost-based pricing or the cost recovery principles in Section 134 of the Act. This in turn could render the retail services offered by the access seeker unprofitable, and in an extreme case, the access seeker may be forced out of the market.

¹¹ While Section 128 (b) (i) of the Act requires a declaration to promote effective competition in at least one market other than the market for the wholesale declared services. In reality, this proposed declaration would promote competition in several downstream markets including but not limited to (i) pre-paid mobile voice/SMS and data bundled service, (ii) post-paid mobile voice/SMS and data bundled service, and (iii) fixed Internet service.

¹² For example, DataCo competes directly with operator licensees that provide fixed Internet services. Alternatively, DataCo may not compete directly with mobile operators in the retail market, but it indirectly does through its parent company, Kumul Consolidated Holdings (KCH), which controls Telikom.

94. For the avoidance of doubt, conferring the access provider with the ability to price at a certain level does not mean that the access provider will price at that level, it merely means that it could if it wanted to do so. It is precisely because of this reason why the proposed declaration is necessary.

Question 8. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective? If you do not, please explain your reasons.

7.3.2 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective

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)

95. The proposed declaration is consistent with Section 124 (2) (a) of the Act in that it is technically feasible to supply the wholesale service or increase its supply, as evident by the increase supply of long-haul dedicated capacity service experienced since the prior declaration. Although the wholesale service declared in the Wholesale Service Declaration No. [2] of 2019 is listed with a different name than the one we are using here, for all practical purposes it is the same wholesale service.
96. Moreover, the costs involved are reasonable as evident by it being supplied in larger quantities since the prior declaration. As indicated earlier, most of the cost of supplying this wholesale service is fixed, with very small variable costs. Therefore, the cost of interconnecting equipment from the access provider with those from the access seekers are negligible compared with the fixed costs of deploying such fibre optic infrastructure. In addition, the integrity, operation or performance of the access provider's other ICT services or facilities would not be materially compromised by supplying the wholesale services to the access seekers, as evidenced by the experience since the prior declaration.

It will further the efficiency objective by enabling the access provider's exploitation of economies of scale and scope

97. By lowering the price of the wholesale service, the proposed declaration would induce an increase in the utilization of the available capacity in DataCo's national fibre optic network. Because the supply of the wholesale service is characterized by large economies of scale, as the used capacity increases, the cost per unit of capacity would decline, permitting the access provider achieve greater economies of scale.
98. Greater economies of scale and lower cost per unit of capacity are signs of improved efficiency on the access provider investments.

99. The proposed declaration would also enable the access provider to achieve greater economies of scope due to a greater utilization of the fibre cables, and the underlying infrastructure. As indicated earlier, there are common costs in the supply of this wholesale service and others that are also proposed for declaration. For example, the same fibre optic infrastructure used to support the supply of long-haul dedicated capacity service, is used by DataCo to convey traffic for its wholesale Internet access service in PNG. This commonality in the joint production of various services allow these costs to be spread over various service types. Moreover, most of these common costs are fixed, which means that common fixed costs are spread over a larger amount of output, thus, reducing the unit cost of each service. This would allow the access provider exploit greater economies of scope.

The declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied

100. The proposed declaration would not compromise the incentives for efficient investment, on the contrary, as indicated earlier, by increasing the utilization of the available capacity in the national fibre optic network, it would allow the access provider exploit greater economies of scale and scope, thus, increasing the access provider's return on investment. This in turn would have a positive impact on the access provider's incentive for efficient investment in facilities used for the supply of the wholesale service.

101. The experience in the past few years has shown that following the prior declaration, DataCo continued to expand and improve its fibre optic network. At the same time, leased capacity of dedicated long-haul links has been growing since the prior declaration reaching 49 Gbps in June of 2024. Altogether, this strongly suggests that the proposed declaration would not materially compromise the access provider's incentive for efficient investment in facilities over which the wholesale service may be supplied.

Question 9. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective? If you do not, please explain your reasons.

8. WHOLESALE LOCAL DEDICATED CAPACITY SERVICE

102. The wholesale local dedicated capacity service is a network service for carrying traffic between two points of the access provider's fibre optic network within the limits of a city or a metropolitan area.

103. For the avoidance of doubt,

(a) this point-to-point service has at one end a point of interconnection between the access provider and the access seeker, and at the other end, an end-user (retail customer) premises or an access seeker point of interconnection; and

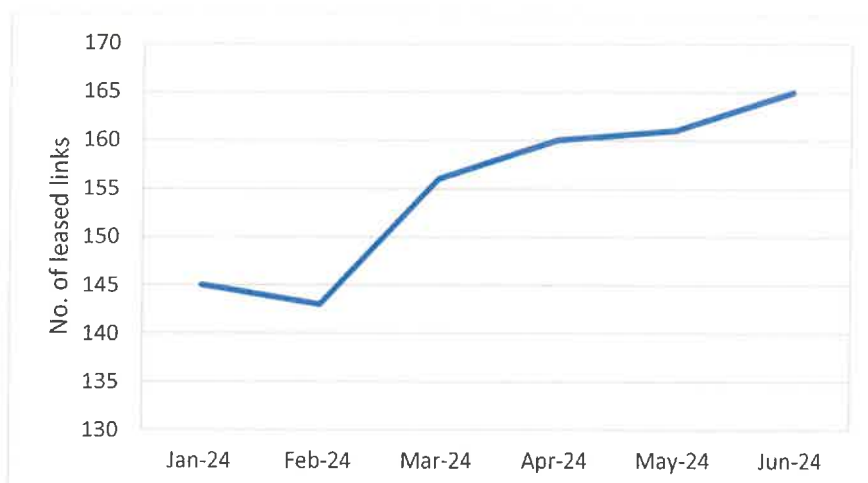
- (b) includes access to, or use of, the facility or facilities of an access provider to collocate an access seeker's equipment, physically or virtually, at the access provider's facilities to interconnect the two networks.

8.1 Service characteristics

104. The wholesale service is sold based on the capacity of the point-to-point fibre optic link measured in Megabits per second. Usually, the service is sold as leased dedicated capacity with monthly recurrent payments. The service is expected to have a high standard of reliability, and customers are willing to pay a premium for redundancy and reliability.
105. Typically, access seekers use this wholesale service to provide high-quality Internet service at fixed locations to private organisations and government entities. In the industry this is often referred as last mile connectivity. PNG DataCo Limited is the sole provider of this wholesale service using its fibre optic network in the main cities and urban centres. The service can be supplied via underground cables in ducts or overhead cables attached to poles.

8.2 The market for wholesale local dedicated capacity service

106. Again, NICTA used the methodology summarized in Annex B to define the relevant market. We started analysing possible demand-side substitution with alternative services that could be regarded as close substitutes. We started with fibre-based last mile dedicated capacity as the focal service. These point-to-point links are usually deployed buried underground inside ducts or attached to overhead poles. In the industry this is often referred as fibre-to-the-premises (FTTP), or fibre-to-the-home (FTTH), or fibre-to-the-cabinet (FTTC), or FFTX as a general term.
107. We considered that in addition to fibre optic cables, there are other ways to supply last mile dedicated capacity links within a city or metropolitan area. For example, fixed radio links, copper cables, and coaxial cables. We then asked whether an alternative service, such as, based on fixed radio links can be regarded as a close substitute.
108. We note that fixed radio links are used mainly by operator licensees to auto transport their traffic but very seldom to supply capacity to other operator licensees. We note that whenever fibre-based last mile connectivity has been deployed in cities, these have tended to replace radio links of lower capacity. The growth of fibre-based capacity links leased in PNG suggests that fixed radio links cannot be regarded as a close substitute to fibre-based links. Said in a different way, a SSNIP on fibre-based links would be maintained as not enough access seekers would switch to using fixed radio links to make the SSNIP unprofitable. In consequence, the radio-based service cannot be part of the same market as the fibre-based service.



Source: DataCo.

Figure 3. DataCo’s number of wholesale local dedicated capacity links leased

109. We also reject including services supplied via coaxial cables or copper cables in the same market for various reasons. First, we are not aware of a market for wholesale local dedicated capacity service using these technologies in PNG, neither do we anticipate a market emerging in the near future. Second, even if such market were to exist, traditionally copper-based capacity links were provided by the incumbent fixed line provider to other operator licensees in other jurisdictions. However, these were typically for low-capacity links which are no substitute for the higher capacity fibre-based links.
110. Our analysis of supply-side substitution leads us to reject any meaningful supply-side effect from other providers as the time and resources necessary to expand a fibre optic network in a metropolitan area are considerable.
111. Regarding the geographic market, the supply of the wholesale service is centred in cities and urban areas. We do not wish to limit the geographic market to name particular cities in PNG as the fibre infrastructure is expected to grow in the coming years. For that reason, we define the geographic market as urban areas within the national territory of PNG.

Question 10. Do you agree with this market definition. If you do not please explain your reasons.

8.3 The proposed declaration is consistent with the declaration criteria in accordance with Section 128 of the Act

8.3.1 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective

112. The proposed declaration furthers the competition objective by promoting effective competition in markets for ICT services in PNG. In particular, the proposed declaration will further the competition objective in two ways.
113. First, it would promote effective competition in several retail downstream markets, including but not limited to, fixed Internet service. The proposed declaration would set cost-based prices for the wholesale service and lower the price of an essential input for the supply of fixed retail Internet service. This in turn would lower the price of the retail service towards the competitive level, all else equal.
114. In the absence of the proposed declaration, the access provider would have the ability to price the wholesale service as a monopolist, therefore, increasing the cost of supplying retail fixed Internet services and causing the price of the service to be higher than it would be with the proposed declaration.
115. Moreover, by inducing lower retail prices, the proposed declaration would increase the usage of ICT services which in turn would incentivise access seekers to increase investment and expand or upgrade their network infrastructure, all of which promotes effective competition on retail service markets.
116. Second, the wholesale service is supplied via a facility controlled by the access provider that cannot be feasibly replicated over the term of the proposed declaration. This confers to the access provider a substantial degree of power in the market within which the wholesale service is supplied. In the absence of the proposed declaration, it would confer the access provider with the ability to exclude or delay access to the wholesale service to access seekers with whom it may compete in a retail market.
117. Moreover, in the absence of the proposed declaration, the access provider would have the ability to sell the wholesale service to an access seeker, with which it competes in a retail market,¹³ at a price inconsistent with the cost-based pricing or the cost recovery principles in Section 134 of the Act. This in turn could render the retail services offered by an access seeker unprofitable, and in an extreme case, the access seeker may be forced out of the market.
118. For the avoidance of doubt, conferring the access provider with the ability to price at a certain level does not mean that the access provider will price at that level, it merely means that it could if it wanted to do so. It is precisely because of this reason why the proposed declaration is necessary.

¹³ For example, DataCo competes directly with operator licensees that provide retail fixed Internet service.

Question 11. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective? If you do not, please explain your reasons.

8.3.2 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective

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)

119. The proposed declaration is consistent with Section 124 (2) (a) of the Act in that it is technically feasible to supply the wholesale service or increase its supply, as evident by the increased supply of the wholesale service in the past few years. Just four years ago the number of leased links for this wholesale service¹⁴ was negligible, while now is 165 with a total lease capacity of 36 Gbps.
120. Moreover, the costs involved are reasonable as evident by it being supplied by the access provider in larger quantities in recent years. It is important to emphasize that most of the cost of a fibre network are fixed. So once the infrastructure is in place, the incremental cost of deploying one more link to an access seeker is very small.
121. In addition, the integrity, operation or performance of the access provider's other ICT services or facilities would not be materially compromised by supplying the wholesale services to the access seekers, as evidenced by the experience from the past years.

It will further the efficiency objective by enabling the access provider's exploitation of economies of scale and scope

122. By lowering the price of the wholesale service, the proposed declaration would induce an increase in the utilization of the available capacity in DataCo's fibre optic network. Because the supply of the wholesale service is characterized by large economies of scale, as the used capacity increases, the cost per unit of capacity would decline, permitting the access provider achieve greater economies of scale.
123. Greater economies of scale and lower cost per unit of capacity are signs of improved efficiency on the access provider's investment.
124. Similarly, the proposed declaration would also enable the access provider to exploit greater economies of scope. As indicated earlier, the fibre optic infrastructure that supports the supply of the wholesale service is also used to

¹⁴ DataCo refers to this wholesale service as "Domestic P2P metro over fibre".

supply other services. This creates a situation where the supply of various wholesale services is characterized by joint or common costs that are largely fixed. These fixed common costs are spread across several services. Because, as indicated earlier, the proposed declaration would cause an increase in the supply of the wholesale service, it would lead to the fixed common or joint costs to be spread over a greater quantity of output, which translates into lower unit cost for each service, and greater economies of scope for the access provider.

The declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied

125. The proposed declaration would not compromise the incentives for efficient investment, on the contrary, it would have a positive impact on the access provider incentive for efficient investment. As indicated earlier, the proposed declaration will allow the access provider achieve greater economies of scale and scope. This in turn lowers the unit cost of the access provider's services, which translates into increased efficiency. This increased efficiency would lead to an increase in the access provider's return on investment, which would have a positive impact on its incentive for efficient investment in facilities used for the supply of the wholesale service.

Question 12. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective? If you do not, please explain your reasons.

9. WHOLESALE INTERNET ACCESS SERVICE

126. Wholesale Internet access service is a network service for accessing the global Internet using a high-capacity port from any location where the access provider has a point of presence in PNG. It provides Internet transmission capacity over the access provider's fibre optic network including Internet transit to the global Internet.

9.1 Service characteristics

127. The service is sold based on the capacity of the port measured in Megabits per second. Usually, the service is sold using a lease agreement with monthly recurring payments.
128. The service can be characterized as a bundle of services which includes non-dedicated (contended) transport of Internet traffic over domestic and international segments, plus Internet transit at a point overseas to access the global Internet.

129. As with the other wholesale services proposed for declaration, the unit price of this wholesale service exhibits large volume discounts.
130. This service is purchased by mobile network operators and ISPs to supply mobile and fixed retail Internet services.

9.2 The market for wholesale Internet access service

131. Again, we used the methodology summarized in Annex B to define the relevant market. We started analysing possible demand-side substitution with alternative services that may be regarded as close substitutes. We started with wholesale fibre-based Internet access service as the focal service. Access to this service is at a point of presence of an access provider.
132. We pondered whether satellite-based wholesale Internet access can be regarded as a close substitute to the fibre-based service. Our view is that a SSNIP on fibre-based wholesale Internet access would be maintained as not enough access seekers would shift to a satellite-based service when a fibre-based point of presence is within reach. This is because the price of the satellite-based service is much higher than the fibre-based alternative, especially for a high-capacity port. Quality of services is not comparable also due to the high latency of the satellite-based service. This is especially the case for video calls, video streaming and gaming.



Source: DataCo.

Figure 4. DataCo's number of fibre-based wholesale Internet access links leased

133. Our view is supported by the experience in PNG. Once enough international submarine cable capacity became available after the start of service of the CS2 cable system, most of the access seekers who were using satellite-based Internet access, switched to a fibre-based service. Figure 4 shows the growth in the number of DataCo's wholesale Internet access links leased this year.
134. Next, we analysed supply-side substitution. Our analysis leads us to reject any meaningful supply-side effect from alternative suppliers because of the considerable

time and resources needed to deploy a fibre optic network infrastructure to supply the wholesale service.

135. Regarding the geographic market, the supply of fibre-based wholesale Internet access can occur anywhere where the access provider has a point of presence. DataCo's points of presence have been growing over the years, with the number of districts with a fibre-based point of presence estimated to be 44. This trend is expected to continue in the near future. For that reason, we define the geographic market as the national territory of PNG.

Question 13. Do you agree with this market definition. If you do not please explain your reasons.

9.3 The proposed declaration is consistent with the declaration criteria in accordance with Section 128 of the Act

9.3.1 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective

136. The proposed declaration will further the competition objective in two ways. First, it would promote effective competition in several downstream retail markets,¹⁵ including but not limited to, prepaid voice/SMS and data bundled service, and fixed Internet service. Because the proposed declaration would set cost-based prices for the wholesale service, it would lower the price of an essential input for the supply of downstream retail services, which in turn would lower the price of those services moving these closer to the competitive level, all else equal.
137. In the absence of the proposed declaration, the access provider would have the ability to price the wholesale service as a monopolist, and cause the cost of supplying downstream retail services to be higher than they would be with the proposed declaration.
138. By inducing lower retail prices, the proposed declaration would cause an increase in the usage of ICT services, which in turn would incentivise access seekers who provide retail services, to increase investment and expand or upgrade their network infrastructure, all of which promotes effective competition on downstream retail services.
139. Second, the wholesale service is supplied via a facility controlled by the access provider that cannot be feasibly replicated over the term of the proposed declaration. This confers to the access provider a substantial degree of power in the

¹⁵ While Section 128 (b) (i) of the Act requires a declaration to promote effective competition in at least one market other than the market for the wholesale declared services, in reality, this proposed declaration would promote competition in several downstream markets including but not limited to (i) pre-paid mobile voice/SMS and data bundled service, (ii) post-paid mobile voice/SMS and data bundled service, and (iii) fixed Internet service.

market within which the wholesale service is supplied. In the absence of the proposed declaration, it would confer the access provider the ability to exclude or delay access to the wholesale service to access seekers with whom the access provider may compete in downstream retail markets.

140. For the avoidance of doubt, conferring the access provider with the ability to exclude or delay access to a wholesale service does not mean that the access provider will exclude or delay access, it merely means that it could if it wanted to do so. This is precisely one reason why the proposed declaration is necessary.

141. Moreover, in the absence of the proposed declaration, the access provider would have the ability to sell the wholesale service to an access seeker, with which it competes in a retail market, at a price inconsistent with the cost-based pricing or the cost recovery principles in Section 134 of the Act. This in turn could render the retail services offered by the access seeker unprofitable, which would hurt competition in the retail market.

142. This last point is important because PNG DataCo Limited (DataCo), the sole access provider of the wholesale service competes in the downstream retail fixed Internet market with several access seekers. As a related matter, Telikom PNG Limited which is owned by the same parent company as DataCo,¹⁶ competes against other licensed operators in the downstream retail markets for mobile and fixed voice and Internet services.

Question 14. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (b) by furthering the achievement of the competition objective? If you do not, please explain your reasons.

9.3.2 The proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective

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)

143. The proposed declaration is consistent with Section 124 (2) (a) of the Act in that it is technically feasible to supply the wholesale service or increase its supply, as evident by the increased supply of wholesale service in the recent past as shown in Figure 4.

144. Moreover, the costs of access or increased access are reasonable as evident by it being supplied in large quantities to access seekers. Most of the costs of deploying a fibre optic network are fixed. Once the main infrastructure is in place. The incremental cost of connecting one more access seeker is very low.

¹⁶ Both DataCo and Telikom are owned by Kumul Consolidated Holdings.

Furthermore, any one-off costs of interconnection between the access provider and the access seekers were already incurred. In addition, the integrity, operation or performance of the access provider's other ICT services or facilities would not be materially compromised by supplying the wholesale services to the access seekers, as evidenced by the increased supply of the wholesale service in recent years.

It will further the efficiency objective by enabling the access provider's exploitation of economies of scale and scope

145. By lowering the price of the wholesale service, the proposed declaration would induce an increase in the utilization of the available capacity in DataCo's fibre optic network. Because the supply of the wholesale service is characterized by large fixed costs, as the used capacity increases, the cost per unit of capacity would decline, permitting the access provider achieve greater economies of scale.
146. Greater economies of scale and lower cost per unit of capacity are signs of improved efficiency on the access provider's investment.
147. Similarly, the proposed declaration will also enable the access provider to achieve greater economies of scope. Economies of scope exists when the cost of supplying various services are shared between these services. Several of DataCo's wholesale services have joint and common costs that are largely fixed. The proposed declaration would cause a reduction in the unit price of the wholesale services causing an increase in the supply of the service. In consequence, these joint and common costs would be spread across a larger quantity of output, producing a reduction in the average cost of each wholesale service. This in essence means that the access provider would be able to exploit greater economies of scope.

The declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied

148. The proposed declaration would not compromise the access provider's incentive for efficient investment; on the contrary, as indicated earlier, by increasing the utilization of the available capacity in its fibre optic network, it would allow the access provider to exploit greater economies of scale and scope. This would reduce the unit cost of supplying these services and would increase the access provider's return on investment. This in turn will have a positive impact on the access provider's incentive for efficient investment in facilities used for the supply of the wholesale service.

Question 15. Do you agree that the proposed declaration fulfills the declaration criteria in Section 128 (a) and (c) by furthering the achievement of the efficiency objective? If you do not, please explain your reasons.

ANNEX A. DRAFT DECLARATIONS OF VARIOUS WHOLESALE SERVICES

ANNEX B. MARKET DEFINITION METHODOLOGY

1. To define the relevant markets, NICTA followed the widely accepted methodology known as the Hypothetical Monopolist Test (HMT), also known as the SSNIP test, after its acronym that stands for small but significant non-transitory increase on price.¹⁷
2. The methodology is based on the notion that a relevant market for a good or service includes all services that are considered to be close substitutes. The focus of the delineation of relevant markets is therefore based on those services that are possible close substitutes from the point of view of the consumer (i.e., demand-side substitution), and those suppliers who produce, or could quickly produce, those services (i.e., supply-side substitution). As the European Commission Guidelines states:

“According to settled case-law, the relevant product/services market comprises all those products or services that are sufficiently interchangeable or substitutable, not only in terms of their objective characteristics, by virtue of which they are particularly suitable for satisfying the constant needs of consumers, their prices or their intended use, but also in terms of the conditions of competition and/or the structure of supply and demand on the market in question. Products or services which are only to a small, or relative degree interchangeable with each other do not form part of the same market. NRAs [national regulatory authorities] should thus commence the exercise of defining the relevant product or service market by grouping together products or services that are used by consumers for the same purposes.”¹⁸

3. To implement this methodology, NICTA starts with a focal service or group of services and assess the demand-side substitution with alternative services outside the group that could be perceived by consumers as substitutes of the focal services. This is done by applying the SSNIP test to the focal group of services and asking whether an hypothetical monopolist supplying the focal services would be able to sustain a small but significant non-transitory increase on price (usually 5% to 10%)¹⁹ over the foreseeable future (usually one year) and remain profitable. If the price increase is such that it will lose sales to make the SSNIP unprofitable, it means that a nontrivial number of consumers would switch to buying the alternative services. Thus, the alternative services and the focal services would be close substitutes, and therefore, must belong to the same relevant market.

¹⁷ See for example, European Commission. Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services. (2002|C 165|03). Official Journal of the European Commission. 11.7.2002. Paragraphs 40-43. OECD, Defining the Relevant Market in Telecommunications (2014), pages 10-11. U.S. Department of Justice and the Federal Trade Commission. Horizontal Merger Guidelines. Revised, April 8, 1997, pages 4-7.

¹⁸ European Commission. Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services. (2002|C 165|03). Official Journal of the European Commission. 11.7.2002. Paragraph 44.

¹⁹ *Id.*, paragraph 40.

4. The group of services is then expanded to include the alternative services, and the thought experiment is repeated until a SSNIP on the group of services becomes profitable. At that point a tentative relevant market containing all the services in the group has been identified.
5. The assessment of demand-side substitution involves doing the assessment without regard for the technology used to supply the services.²⁰ The focus of the attention is on the characteristics and functionality of the services, how consumers use the focal services, and how easy or costly would be for consumers to switch to buying the alternative services. The analysis is performed holding all other factors constant.
6. The next step is to assess supply-side substitution; that is, how quickly suppliers of other services would be able to supply the focal services or a close substitute in response to a SSNIP on the focal services.
7. Once the relevant service market has been defined, one must assess the relevant geographic market. To that end, one must consider the geographic area where the services in the relevant market are demanded and supplied, and assess whether the conditions of competition in a geographic area, are sufficiently similar relative to those in contiguous geographic areas.²¹ In practice, regulatory authorities have often defined the relevant geographic market based on the area covered by a network or the area covered by an operator's license.²²

²⁰ *Id.*, paragraph 45.

²¹ *Id.* Paragraphs 55-56.

²² *Id.*, paragraph 59.