

# **BROADBAND PRICING FRAMEWORK**

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## **1.0 INTRODUCTION**

In general, broadband refers to telecommunication in which a wide band of frequencies is available to transmit information. With a wide band of frequencies, information can be multiplexed along different frequencies or channels within the band concurrently, allowing more information to be transmitted for a given amount of time

The affordability and accessibility of broadband services is largely determined by the prices charged for those services. As a consequence the regulation of these prices is very tempting for policymakers and regulators who are interested in increasing the adoption and use of broadband services.

It is however not advisable to regulate broadband prices in developing economies given their markets for broadband are generally yet to attain maturity and demand within these markets is largely uncertain. Furthermore, the tried and tested regulatory tools developed and applied in the price regulation of narrowband markets, is inapplicable for the nascent broadband markets. Therefore, the application of the aforementioned regulatory tools in broadband markets, even where it is possible, potentially can distort price discovery mechanisms and investment incentives<sup>1</sup>.

The above notwithstanding, a key determinant of affordability, adoption and usage of broadband is pricing. And at both retail and wholesale levels, pricing can and does influence the broadband investment and product offering decisions of network operators and service providers. This is confirmed in ITU studies further that recommend caution on the part of regulators, on how and why they intervene. Heavy handed and or early interventions in markets characterised by new and innovative services with uncertain demand, is ill advised. It is for these reasons, amongst others, that regulatory intervention, if deemed necessary, must avoid the pitfalls of distorting the development of that market, an outcome that invariably negatively impacts the level of investment needed to develop and grow the said markets, and prepare them to respond in a timely manner to latent demand.

## **2.0 BROADBAND PRICING FRAMEWORK**

The first step for developing broadband pricing framework requires a clear understanding of the broadband, its services, markets and supply chain. These are described in detail below.

### **2.1 BROADBAND SERVICES AND MARKETS**

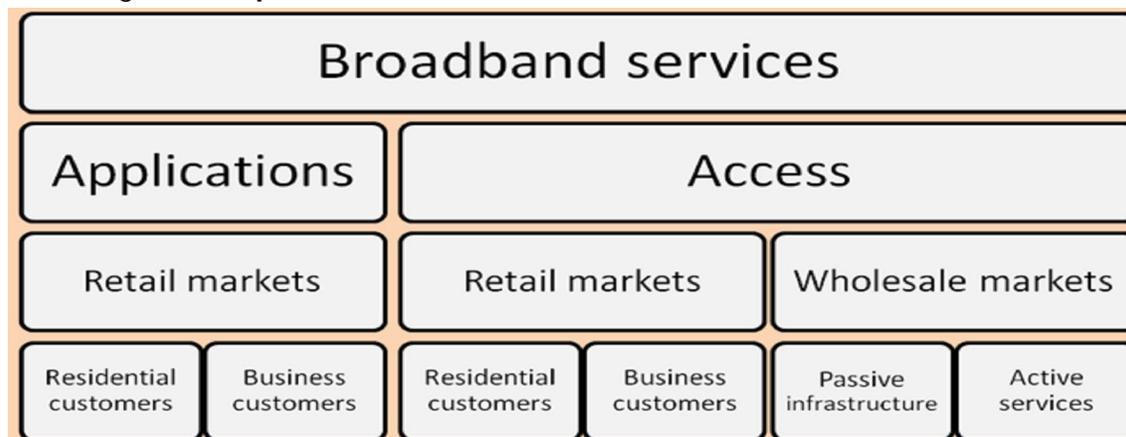
An indepth and comprehensive appreciation of broadband services and markets is is pre-condition to the application of appropriate regulatory remedies if they are needed. Broadband market is comprised of Application and Access markets, that are

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<sup>1</sup> ITU Regulating Broadband Prices – Broadband Series

further decomposed along wholesale and retail dimensions. As such, different approaches are needed to regulate prices in those markets depending on the objective to be attained or problem to be addressed. This is illustrated in figure 1.

Fig 1: **Conceptualization of Broadband Services and Markets**



Source: ITU Regulating Broadband Prices – Broadband Series

Regulators must adopt minimalist and or arms-length approaches to ex ante price regulation in a manner that promotes competition whilst minimising the risk of distorting the demand for, and or the development of, broadband services. This means that regulators should have targeted regulatory intervention(s) aimed at particular points in the broadband supply chain where market dominance may be exercised over pricing and address those areas with the least level of regulation that is still effective. To do this, regulators need to conceptualise broadband markets in the context of wholesale versus retail, and adopt relevant approaches to the regulation of prices in each. This conceptualization must also be cognizant of broadband services in terms of **Access** and **Applications** (often referred to generally as services), and consider each carefully<sup>2</sup>

## 2.2 BROADBAND SUPPLY CHAIN

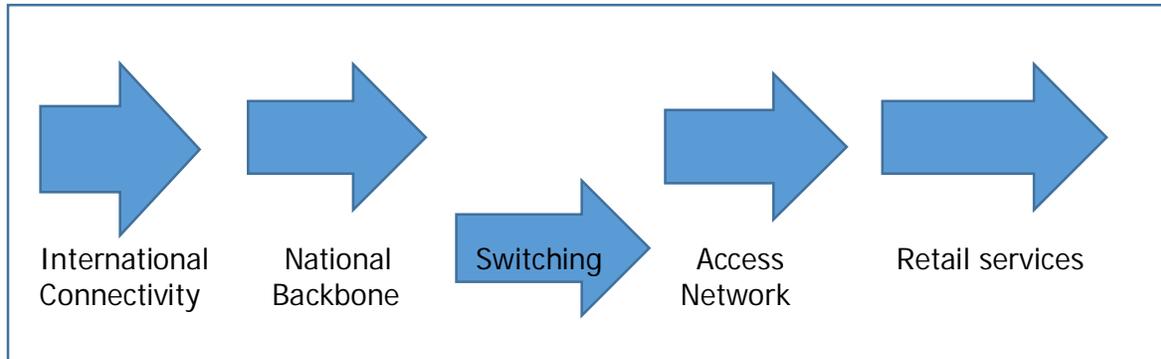
The broadband supply chain describes the ecosystem comprised of facilities and processes used in the delivery of a broadband service to an end-user<sup>3</sup> At the top of the chain is the international connectivity that links with the rest of the world, typically through terrestrial or submarine cables or satellite links or some combination thereof. At the second level are the national backbone networks that carry traffic between the landing points for the international connectivity and other points of presence within a country. These backbone networks typically consist of fibreoptic cables, microwave links and satellite links. The third level is the “intelligence” contained in the networks that ensures correct routing of data, while the fourth is the access network. This access network may be xDSL over a copper local loop, some other form of cable or various types of wireless (including mobile) technologies. The

<sup>2</sup> ITU Regulating Broadband Prices – Broadband Series

<sup>3</sup> The following discussion of the broadband supply chain is adapted from Williams, M.D., *Broadband for Africa: Developing backbone communications networks*, available at [www.infodev.org/en/Publication.526.html](http://www.infodev.org/en/Publication.526.html)

final level in this supply chain are the various retail activities that enable service providers cover the last mile to their customers. This supply chain is illustrated in Figure 2.

Fig 2: **Generic Broadband Supply Chain**



Source: Adapted from Williams, M.D. (2008), *Broadband for Africa: Developing backbone communications networks*

In the broadband market, regulators must consider: services provided to end-users (applications market); and access to facilities essential to the provision of such services to end-users (access market)<sup>4</sup>. It is possible to identify both types of market in each stage of the broadband supply chain. Within these two broad market definitions further market distinctions may be made depending on demand and supply side patterns. In access markets distinctions are typically made between the provision of infrastructure to other operators (a wholesale service) and its provision to end-users (a retail service). At the retail level, both applications and access markets are further segmented by consumer category, residential versus business customers.

### 2.3 BROADBAND INFRASTRUCTURE

Sometimes it is critical that the regulator require a dominant operator to provide access to certain network infrastructure to his/her competitors to promote infrastructure sharing and invariably enhancing competition and reducing barriers to market entry. The infrastructure to be shared may be either passive or active or both.

- Passive infrastructure includes all the civil engineering and non-electronic elements of infrastructure, such as physical sites, towers, ducts, unlit (that is, dark) fibre, and electricity supplies.
- Active infrastructure refers to the electronic elements of infrastructure, such as lit fibre, spectrum, access node switches, and broadband remote access servers and access node switches and management systems for fibre networks.

<sup>4</sup> See European Commission, Notice on the application of the competition rules to access agreements in the telecommunications sector (OJ C 265, 22.8.199), paragraph 45, available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:c:1998:265:0002:0028:en:PDF>

The decision path available to a regulator, will vary according to the stage in the broadband supply chain that he/she is focused and the particular market being examined. If a regulator chooses price regulation, it is recommended that such regulation is based on, and cognizant of, the economic cost of the service being provided. For example, if the regulated price for active infrastructure is above the economic cost of building that infrastructure, the result is the unintended and often undesirable consequence of excess supply of infrastructure. However, if the regulated price is below the economic cost, then there is the real possibility of under-investment in infrastructure and lead to an over-reliance on the existing infrastructure of the dominant operator.

## 2.4 WHOLESALE PRICE REGULATION

- *Regulation in wholesale markets minimises but does not eliminate the need for regulation in the retail markets.*

In general, when regulators direct their regulatory focus on ensuring optimal and competitive operation of wholesale markets for access, there is a positive knock on effect in the downstream retail markets for broadband access and applications service. Anti-competitive practices and or abuse of market dominance in the retail markets that lead to excessive retail prices, are often the result of anti-competitive practices and or abuse of market dominance in an upstream wholesale market. It is for this reason that regulators should seek to regulate as far upstream in the supply chain as practicable given the nature of the competition problem they are trying to correct.

### **The justifications for focusing in wholesale markets:**

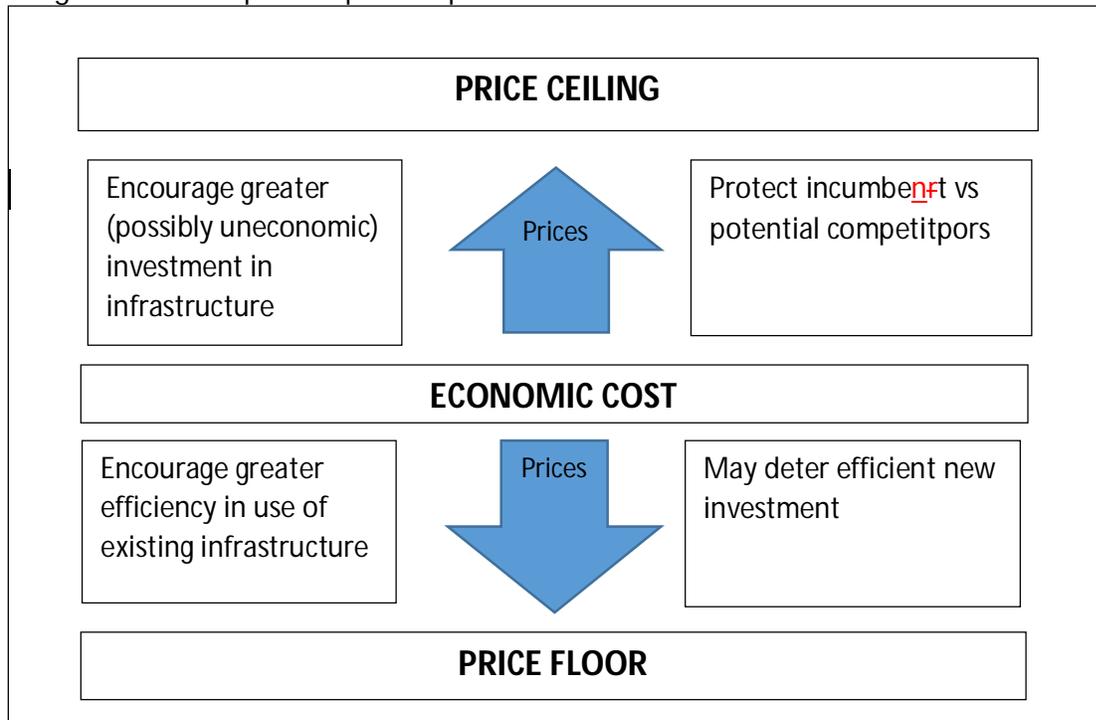
- Wholesale price regulation is considered to represent the least intrusive form of regulation as it does not directly seek to control the pricing or sales strategy of service providers in the retail market.
- It is an effective use of a regulator's limited resources, and if correctly targeted, helps address price-related competition problems along the entire supply chain.
- It allows maximum scope for the emergence of competitive service alternatives
- It minimises the risk of discouraging new firms from entering the market because opportunities for profit at retail level are unrestricted.

## 2.5 RETAIL PRICE REGULATION

Addressing market dominance concerns in upstream wholesale markets is the preferred minimalist way for regulators to ensure competitive pricing in downstream and retail broadband access and service markets. However this doesn't rule out the need for retail price regulation in downstream and or retail market for specific instances.

Under price cap regulation, the regulatory focus is the prices charged by firms, and not their earnings, in order to establish an incentive structure that promotes the preferred behaviour in the market. This is done through a price formula whose periodicity of update, and consequently change, is usually annual. Under a typical price cap, the regulated firm is permitted to alter its average price for a basket of regulated services at the rate of the general level of inflation minus an efficiency factor based on the regulated firm's expected efficiency (the  $-X$ -factor).

Figure 3: Impact of price caps to Broadband environment



Source: ITU Regulating Broadband pricing – Broadband series

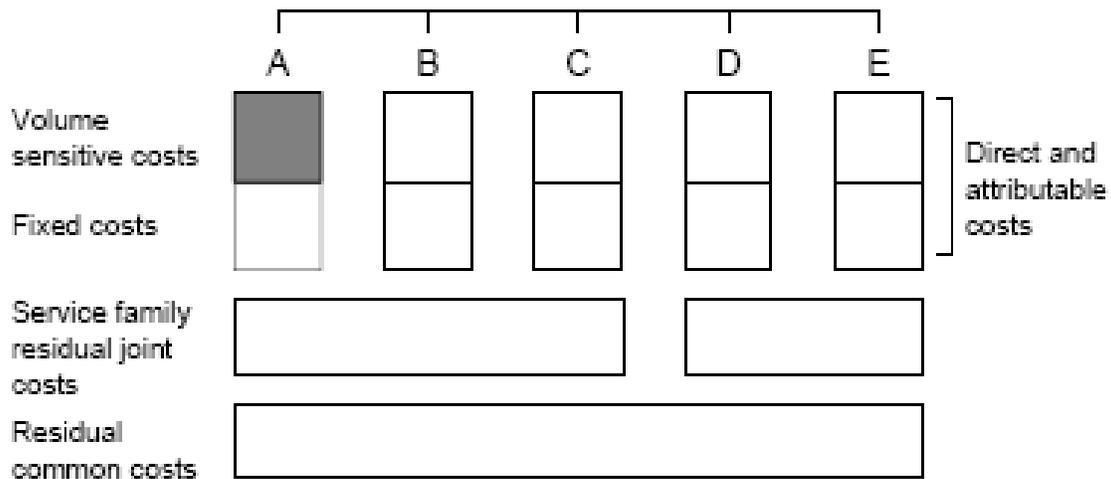
## 2.6 COST CATEGORISATION AND COST STANDARDS

The choice of cost standard depends on a regulator objectives and the problem being addressed. This can range from attracting more investments, promoting service uptake, encouraging infrastructure and essential facility sharing and or providing universal services. More generally costs can be grouped into:

*Variable costs* - Assets purchased for use in more than one year

- *Capital costs* - Costs incurred entirely within the current year
- *Operating expenditure* - Cost incurred entirely within the current year
- *Fixed costs* - Costs whose magnitude changes with output changes
- *Variable costs* – Costs associated with assets whose usage spans more than one year

Fig 4: Cost categorization and standards



The focus here is on a combination of costs, be they variable or fixed that:

- are directly incurred in the provision of a particular service (directly attributable cost), the cost of inputs that contribute to the production of two or more different increments (joint or shared cost),
- are a result of inputs necessary to produce several services, which cannot be directly assigned to specific services (common cost),
- are increasing in the provision of the service and are incurred by efficient firm using new technology (long run incremental costs),
- reflect all costs taken into account and allocated to the products and services of a company (fully allocated cost) and
- are associated with supply assuming a firm only provides one service (stand alone cost).

## 2.7 WACC DETERMINATION

Weighted Average Cost of Capital (WACC) is the minimum expected rate of return to investors in a project. WACC is central in the pricing of broadband services since it is the discount factor applied to future cash flows, as well as in the amortization of capital costs over the project lifetime.

WACC represents the cost of capital and is a weighted combination of the costs of debt and equity that are borne by a company. It is an estimate of total cost of capital conditional on the different sources of funds and their pricing. Debt and Equity as two sources of funds are weighted by their proportion to total investment to derive the weighted average cost of capital for the company in question. The formula is set out below:

$$WACC_{pretax} = \frac{\left( r_{Debt\ post\ tax} \frac{D}{D+E} + r_{Equity\ post\ tax} \frac{E}{D+E} \right)}{(1 - T_c)}$$

Whereby:

$r = \text{Debt post tax} = (\text{Risk free rate} + \text{debt risk premium}) * (1 - T_c)$

$r = \text{Equity post tax} = \text{Risk free rate} + \text{Beta} * \text{market risk premium}$

$T_c = \text{Marginal tax rate}$

$D = \text{Market value of debt}$

$E = \text{Market value of equity}$

The cost of equity is estimated using the CAPM model. The basic foundation of this model is that, the risky nature of equity assets requires that they command a higher premium from investors (market risk premium) than if they just invested in risk-free assets. Furthermore, different equity assets have different levels of risk. For this reason, the market risk premium is multiplied by an industry-specific parameter (beta) which measures how much more or less risky a specific asset is when compared to the market as a whole.

### 3.0 BROADBAND PRICING PRINCIPLES

In terms of regulation, the best practices are those that encourage early investment in broadband infrastructure and stimulate competition at the lowest levels of the market. However, caution should be the key by-word since best practice for regulatory policies on pricing is country-market specific. In other words, application of best practice might require tweaking to suit and accommodate local circumstances, including being cognizant of factors like retail affordability and other demand-driven parameters. The best practices in the regulation of broadband pricing are an embodiment of seven principles that are described in Fig 5 below.

Fig 5: **Best practice principles for the regulation of broadband pricing**

| PRINCIPLE          | CATEGORY                   | EXPLANATION   |
|--------------------|----------------------------|---|
| <b>Principle 1</b> | General best practice      | Retail and wholesale prices are best determined by market forces provided that those markets are effectively competitive.   |
| <b>Principle 2</b> | General best practice      | Regulatory intervention in the setting of retail prices for broadband access and applications should be avoided in favour of the facilitation of retail competition by the regulation of wholesale markets for access to broadband facilities and services.           |
| <b>Principle 3</b> | Wholesale Broadband prices | Regulatory price-setting methodologies for wholesale access to broadband facilities should take into account : <ul style="list-style-type: none"> <li>• Policy objectives, if they exist, that might favour the development of intra-modal competition for</li> </ul> |

|                    |                            |   |
|--------------------|----------------------------|---|
|                    |                            | <p>fixed broadband services and intra- and inter-modal competition for broadband services as a whole; and</p> <ul style="list-style-type: none"> <li>• Whether the supplier of wholesale facilities access is a pure wholesale operator or a vertically integrated operator with wholesale and retail operations.</li> </ul>  |
| <b>Principle 4</b> | Wholesale Broadband prices | <p>Regulatory price-setting methodologies for wholesale access to broadband applications (including bitstream access) should take into account the following factors:</p> <ul style="list-style-type: none"> <li>• The difficulties in establishing reliable and useful costs for such services, either through cost modelling or benchmarking;</li> <li>• The difficulties in establishing suitable discount factors or estimates of avoidable costs when applying techniques based on avoidable retail costs to determine wholesale price levels; and</li> <li>• Whether the outcome should be subject to sunset provisions and be permitted only to ensure the early traction of new competitive entrants in the retail broadband market.</li> </ul> |
| <b>Principle 5</b> | Retail Broadband prices    | Retail price regulation should be avoided but where it is justified it should be limited to entry-level service pricing and access  |
| <b>Principle 6</b> | Retail Broadband prices    | The only broadband application service price that regulation should be concerned within a broadband environment is voice and that should be for a limited period of migration to broadband platforms on a transitional basis. The basis for ensuring the availability of low cost options for voice service is for social cohesion and service continuity to meet the expectations of end users whose needs may not be addressed through broadband application service competition. The need for regulation in this area should be reviewed regularly.  |
| <b>Principle 7</b> | Retail Broadband prices    | Regulators should avoid regulating the terms and conditions, including prices, of higher speed broadband access and application services. If regulation is necessary, it is best applied as ex post competition regulation directed at anti-competitive behaviour.  |

Source: ITU Regulating Broadband Prices – Broadband Series