

International Telecommunication Union

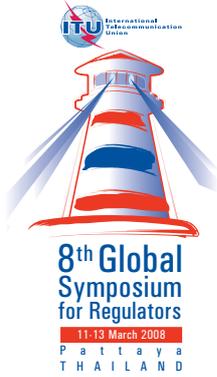
GSR 2008

Discussion Paper

Comments are welcome and should be sent by 13 April 2008 to GSR08@itu.int



International
Telecommunication
Union



INTERNATIONAL TELECOMMUNICATION UNION

8th Global Symposium for Regulators

Pattaya, Thailand, 11-13 March 2008

Work in progress, for discussion purposes

BREAKING UP IS HARD TO DO: THE EMERGENCE OF FUNCTIONAL SEPARATION AS A REGULATORY REMEDY

AUTHOR: MALCOLM WEBB, PARTNER, MGF WEBB*

© ITU

February 2008

The views expressed in this discussion paper are those of the author and do not necessarily reflect the opinions and official positions of ITU or of its Membership.

COMMENTS ARE WELCOME AND SHOULD BE SENT BY 13 APRIL 2008 TO

gsr08@itu.int

ACKNOWLEDGEMENTS

The author is grateful for valuable input from Jordan Cox, summer clerk, MGF Webb, but remains solely responsible for the contents of this paper.

© ITU, 2008

International Telecommunication Union (ITU), Geneva

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

Denominations and classifications employed in this publication do not imply any opinion on the part of the International Telecommunication Union concerning the legal or other status of any territory or any endorsement or acceptance of any boundary. Where the designation “country” appears in this publication, it covers countries and territories.

The views expressed in this paper are those of the authors and do not necessarily reflect the opinions of ITU or of its membership.

TABLE OF CONTENTS

| | <i>page</i> |
|---|-------------|
| 1..... Introduction | 3 |
| 2..... Meaning of functional separation..... | 3 |
| 3..... Reason for requiring functional separation..... | 4 |
| 3.1 Discrimination by the incumbent | 4 |
| 3.2 Relaxation of other regulation | 6 |
| 4..... Current methods to limit discriminatory behavior..... | 6 |
| 4.1 Wholesale price control | 6 |
| 4.2 Accounting separation..... | 6 |
| 4.3 Non-discrimination rules..... | 7 |
| 4.4 Ex-post competition law | 8 |
| 5..... Key features of functional separation | 8 |
| 5.1 Virtual separation | 8 |
| 5.2 Equivalence requirements..... | 9 |
| 5.3 Monitoring and enforcement..... | 9 |
| 6..... Case studies | 10 |
| 6.1 European Union | 10 |
| 6.2 United Kingdom..... | 10 |
| 6.3 New Zealand | 11 |
| 6.4 Italy..... | 11 |
| 6.5 Sweden | 12 |
| 6.6 Ireland | 12 |
| 6.7 Australia | 12 |
| 6.8 France | 13 |
| 6.9 Poland..... | 13 |
| 6.10 Mongolia..... | 13 |
| 7..... Common ground on functional separation..... | 13 |
| 7.1 Costs of implementing functional separation..... | 14 |
| 7.2 Functional separation not likely to be reversible | 14 |
| 7.3 A drastic remedy | 14 |
| 7.4 Continuing regulatory control | 15 |
| 8..... Areas of debate on functional separation | 15 |
| 8.1 Impact on investment incentives | 15 |
| 8.2 Transition to fibre-based next-generation access networks | 16 |
| 8.3 Difficulty in achieving stability in the asset base..... | 16 |
| 8.4 Service quality | 17 |
| 9..... Application of functional separation in developing countries | 17 |
| 9.1 Promotion of broadband..... | 17 |
| 9.2 The discrimination problem | 19 |
| 9.3 Investment incentives..... | 19 |
| 9.4 Institutional capabilities | 19 |
| 9.5 Impact if subsequent privatization | 20 |
| 9.6 Conclusion on applicability of functional separation to developing countries..... | 20 |
| 10.... Alternatives to functional separation..... | 20 |
| 10.1 Enhanced non-discrimination rules | 20 |

| | | |
|------|--|----|
| 10.2 | Accounting separation..... | 21 |
| 10.3 | Competition law capabilities..... | 21 |
| 10.4 | Using elements of functional separation..... | 21 |
| 10.5 | Separation of the entire network..... | 22 |
| 11 |Conclusion..... | 22 |

FIGURES

| | | |
|-----------|---|----|
| Figure 1: | Basic network structure..... | 4 |
| Figure 2: | Fixed-line and fixed-line broadband penetration worldwide, 1996-2006..... | 18 |

1 INTRODUCTION

There has been a tremendous amount of interest around the world recently in functional separation as a regulatory remedy in the telecommunications sector. Functional separation is one of the most drastic regulatory remedies that are available in a regulator's arsenal, with enormous implications for the incumbent, and also for the regulator in charge of its implementation and enforcement. It is also perhaps the most potent regulatory remedy under discussion in the set of 2008 GSR Discussion Papers.

The primary reason that has been given for considering functional separation is that existing regulatory remedies have failed to deal adequately with anti-competitive discriminatory behavior by incumbents. In particular, the concern has arisen in relation to competitor access to fixed line bottleneck assets to provide broadband services.

This paper will:

- consider the reasons given for implementing functional separation and the current remedies that are available in certain countries to address discriminatory behaviour;
- look at the key features of functional separation and examine case studies from countries that have implemented, or are considering implementing, functional separation;
- examine the arguments that are flowing around functional separation, including the common ground that exists and the major issues being debated; and
- consider the application of functional separation in a developing country context and look at some alternatives to implementation of functional separation.

2 MEANING OF FUNCTIONAL SEPARATION

But first, it is necessary to put forward a basic definition for the term "functional separation", sometimes also known as operational separation. In this paper, the term applies to the fixed line business of incumbent operators¹ and means:

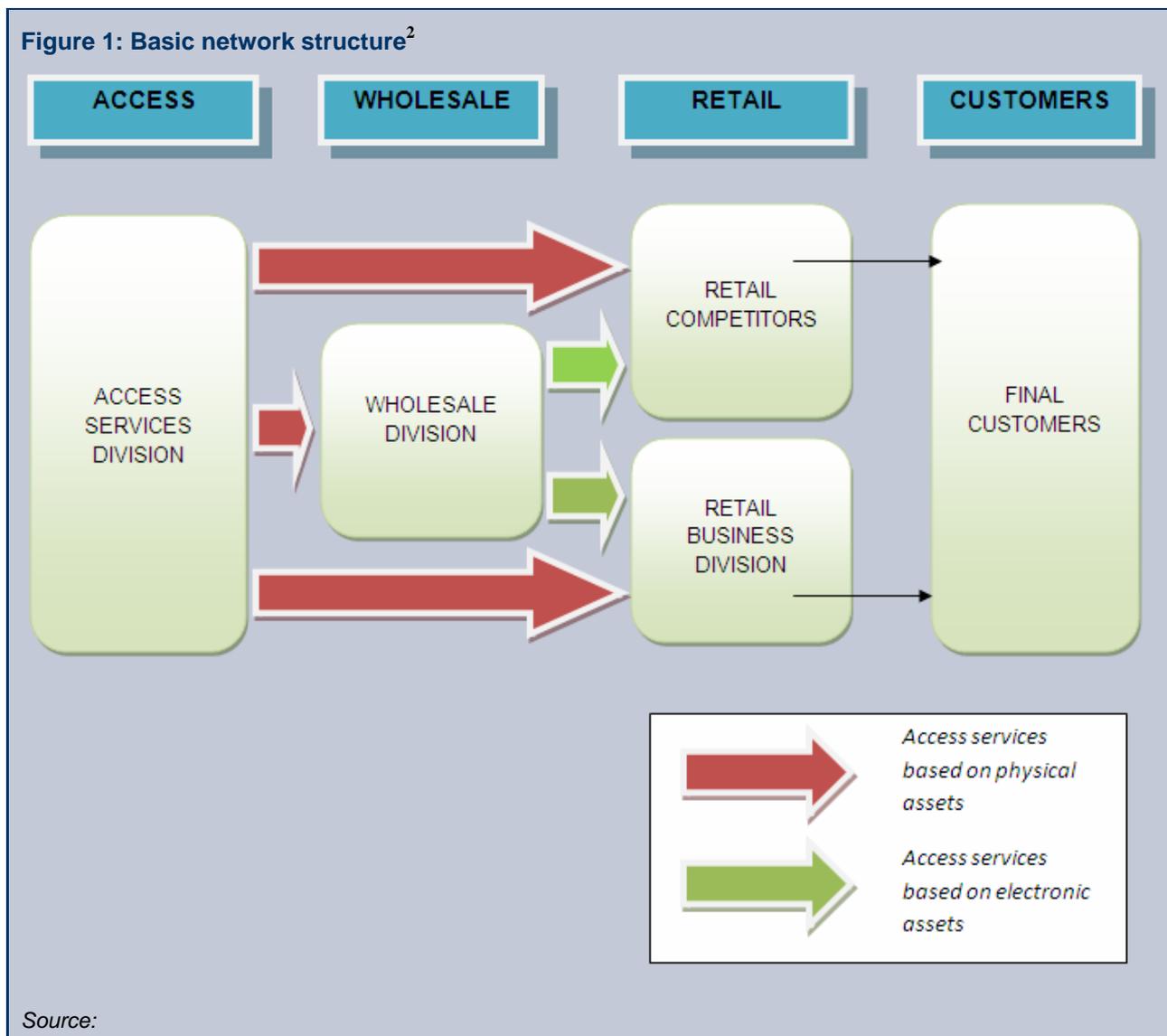
- the establishment of a new business division, which is kept separate from the incumbent's other business operations;
- this separate business division providing wholesale access to the incumbent's non-replicable (or bottleneck) assets, which are required by competitors in order to compete with the incumbent in downstream retail markets; and
- the separate access services division being required to supply wholesale access to competitors, and the incumbent's own retail divisions, on a non-discriminatory basis.

Often this structure is complemented by the establishment of a separate wholesale services division. This wholesale services division would also acquire access to the bottleneck assets from the access services division and create wholesale products, which can then be sold to competitors and the incumbent's own retail divisions on a non-discriminatory basis.

The access services division would provide access based on the physical assets under its control (e.g., local loop unbundling), to which the competitors and the incumbent's retail divisions can then add their own electronics to produce a retail service (e.g., broadband access).

The wholesale services division may also acquire access to the physical assets from the access services division and add its own electronics to produce a service (e.g., bitstream access) that can be resold by competitors and the incumbent's retail divisions.

This relationship between these various divisions of the incumbent, and competitors, is shown in the following diagram.



3 REASON FOR REQUIRING FUNCTIONAL SEPARATION

3.1 Discrimination by the incumbent

Regulators are concerned about discriminatory behavior by incumbents in providing wholesale access to bottleneck assets. This behavior can be difficult to identify and can be damaging to competitors seeking access to these assets.

- Discriminatory behavior is difficult to identify because there normally isn't any "smoking gun".
- Discriminatory behavior is seen as damaging because it causes delay and uncertainty on the part of the competitor, and a sense of impotence or lack of confidence in the

regulator in being able to combat the discriminatory behavior. This in turn may lead to under-investment or delayed investment by the competitor.

Incumbents, and their management, are considered to have both the incentive and the ability to discriminate and therefore to frustrate competition³. There has been some evidence of this type of discriminatory behavior in some countries⁴.

Economic theory holds that exclusionary discrimination (i.e., behavior that is designed to limit a competitor's ability to compete in downstream markets) is definitely harmful. Downstream competition is hindered, leading to increased prices and a lessening of the quality of services.

It is the vertical integration of the incumbent that gives rise to discrimination concerns, and it is this vertical integration that functional separation seeks to address.

Discrimination can take two basic forms:

- price discrimination, where the incumbent prices access for competitors at a level which makes it difficult to compete with the incumbent, even for an efficient competitor; and
- non-price discrimination, where through the implementation of access terms, the incumbent provides access to its competitors on a less favorable basis than it provides that access to itself.

Examples of price discrimination include:

- cross subsidies between products where the incumbent has market power and products where the incumbent does not have market power;
- vertical price squeeze between the incumbent's retail price and the wholesale access price; and
- using the relative price of different wholesale products to mould the type of competition that the incumbent faces (e.g., reducing the wholesale price of bitstream relative to local loop unbundling prices to discourage local loop unbundling-based access by competitors).

Examples of non-price discrimination include⁵:

- undue delay in processing competitor's orders for access;
- providing greater levels of information about access products to the retail parts of the incumbent's business, than provided to the competitor;
- preferring the incumbent itself when developing the network or the means of access to the bottleneck assets;
- providing information on competitors' plans for access, received by the incumbent's wholesale group on a confidential basis, to the retail parts of the incumbent's business; and
- providing access to a competitor at a lower quality of service than it provides that access to itself.

David Currie, the Chairman of Ofcom, spoke recently on the harmful effects of discriminatory behavior⁶:

“It does not even require active non-price discrimination. All that is needed is for the incumbent not to try their hardest to achieve reliability, timeliness and predictability to disrupt significantly the launch by competitors of a rival retail proposition. A significant mismatch between the promise of a marketing campaign and consumers’ actual experience of waiting weeks or even months to get what is promised can do significant and lasting damage to a competitor’s market entry.”

3.2 Relaxation of other regulation

Another reason for implementing functional separation, which is not clearly articulated in the general discussion of the topic, is that it can lead to a relaxation of other forms of regulation of the incumbent’s activities. An example is retail price controls, which may be present in addition to regulation of access to bottleneck facilities.

In the United Kingdom, Ofcom was motivated to lift BT’s retail price controls, as well as lifting or relaxing other regulated services, after functional separation. It represents an “upside” for the incumbent, when otherwise faced with the perceived “downside” of functional separation.

4 CURRENT METHODS TO LIMIT DISCRIMINATORY BEHAVIOR

4.1 Wholesale price control

In most countries in the world where competition has emerged, the regulator has sought to control the prices that incumbents charge for access to bottleneck assets. Typically, this is on the basis of cost-based charges, which attempt to mimic the charges that would apply if there was a competitive market for access to those assets.

If properly implemented, cost-based pricing will effectively resolve some price discriminatory behavior, such as vertical price squeeze.

However, cost-based pricing is very difficult and very costly to apply in practice, even for the most well-resourced regulator.

4.2 Accounting separation

Another remedy to address price discrimination is accounting separation⁷:

- this means providing separate financial reporting for the incumbent’s line of business that provides wholesale access to the bottleneck assets and for the competitive parts of the incumbent’s business;
- it identifies internal transfer prices within the incumbent;
- it is designed to ensure parity of access pricing between that paid by the competitor and the notional accounting price paid by the incumbent;
- accounting separation can assist in identifying excessive returns made by the part of the incumbent’s business that provides wholesale access to the bottleneck assets;
- it can identify vertical price squeeze by lower returns/losses in the competitive part of the incumbent’s business; and
- it can increase the validity of accounting data, and provide a more robust data-set, in regulatory proceedings.

Accounting separation is relatively common and is regarded as an effective tool to address price discrimination⁸.

However, accounting separation does not escape criticism as a regulatory instrument:

- the complex and subjective allocations of costs and revenues between the different parts of the incumbent's business can make it difficult for the regulator to monitor and check the accounting information;
- the amount of time required by the regulator to process and interpret the accounting information provided, means that discrimination may have occurred, but remain undetected for long periods; and
- the lack of power that regulators may have to gather data or require incumbents to report.

4.3 Non-discrimination rules

Most countries will have rules in place that require non-discriminatory treatment of competitors by incumbents when it comes to granting access to bottleneck assets. These rules can be broad and general in scope, supplemented by more specific and detailed rules to deal with particular situations.

For example, in the European Union regulatory framework, guidance is provided to national regulatory authorities in relation to obligations of non-discrimination⁹:

“Obligations of non-discrimination shall ensure, in particular, that the operator applies equivalent conditions in equivalent circumstances to other undertakings providing equivalent services, and provides services and information to others under the same conditions and of the same quality as it provides for its own services, or those of its subsidiaries or partners.”

Several weaknesses have been identified with non-discrimination rules as a means of dealing with discriminatory behavior:

- it can be difficult for the regulator, or competitors, to identify when there has been a breach of these rules – have the rules been bent, or broken? It can also be difficult for the incumbent to identify when it has been in breach;
- there will normally be a time lag between when the discriminatory behavior has occurred, and when it is investigated and resolved, which can be enough time to cause damage to the competitor concerned;
- without careful drafting, there is a risk that the rules will be ambiguous, presenting opportunities for the incumbent to continue discriminating; and
- some regulated services are not used by the incumbent, such as interconnection circuits, and therefore prohibitions on discriminatory behavior may be difficult to apply in these circumstances.

The first two of these are also weaknesses of ex-post competition law remedies, as referred to below.

The regulator will require meaningful enforcement and investigatory powers to supplement the non-discrimination rules. The regulator will also require sufficient funding and resources to make full use of these enforcement and investigatory powers.

4.4 Ex-post competition law

Ex-post competition law remedies are also available to control anti-competitive forms of discriminatory behavior.

However, these remedies have also been criticized as being problematic as a means to control discriminatory behavior. For the same sorts of reasons as non-discrimination rules are criticized, the ex-post application of competition law remedies means the behavior will have occurred, potentially some considerable time after the abuse has taken place. They can be complex to enforce, as well as being uncertain, costly and time-consuming to pursue.

Having said that, competition law is well equipped to deal with discriminatory behavior and the principles derived from decisions of the courts and national competition authorities can be applied in dealing with abusive discrimination.

5 KEY FEATURES OF FUNCTIONAL SEPARATION

The whole point of functional separation is to reduce the incentive and ability of an incumbent to engage in discriminatory behavior when it comes to access to bottleneck assets. The very reason for considering functional separation arises out of the misgivings that the current methods to control discriminatory behavior may not be fully effective.

The three key features of functional separation are:

- the “virtual” separation of the incumbent’s business;
- the “equivalence” or “equivalence of inputs” (EoI) obligation; and
- monitoring of the incumbent, to ensure compliance with the separation and equivalence obligations, and effective enforcement.

5.1 Virtual separation

The important thing to note about functional separation is that it is a “virtual” separation of the incumbent’s business. That is, the incumbent remains intact, both from a legal and an ownership perspective, but is required to restructure itself into distinct divisions.

The critical parts of a functional separation are that the business division that provides access services to bottleneck assets is separate and distinct from downstream retail business divisions and also the wholesale division.

By separating these divisions, the incentive and ability of an incumbent to engage in discriminatory behavior is blunted. This new institutional framework means that discriminatory behavior will be much more difficult for the incumbent to achieve, and easier for the regulator and competitors to identify, which should deter the behavior in the first place.

By being a “virtual” separation, separate subsidiaries are not required and ownership is retained by the existing shareholders. This preserves a number of the benefits of vertical integration for the incumbent (see the discussion of investment incentives below).

To that extent, functional separation can be distinguished from the sort of structural or ownership separation that has occurred in the energy sector in a number of countries. In these countries, the distribution and transmission networks (the equivalent bottleneck assets) have been placed in separate ownership to the theoretically competitive upstream generation assets and downstream retail assets. Structural or ownership separation is rarely used in the telecommunications sector, although examples can be found (notably) in the United States, and also in some developing countries such as Mongolia (see case study below).

Because the separation is “virtual”, various mechanisms are required under functional separation to simulate a distinct and independent business unit. Procedural barriers (or Chinese Walls) are erected, with rules designed to enhance their impermeability.

Various measures may be used to ensure that the management and staff of the division that controls the bottleneck assets are kept independent and separate from the management and staff of the downstream divisions. Their remuneration incentives may be linked to the performance of the division of which they are a part; they may be kept physically separate and operate under a distinct brand (e.g., Openreach in the United Kingdom and Chorus in New Zealand).

5.2 Equivalence requirements

While the virtual separation puts in place the institutional framework for functional separation that blunts the opportunities for discriminatory behavior, this will normally be further enhanced by requirements on the access services division to treat competitors in an equivalent fashion to how it treats its own downstream divisions.

In the United Kingdom and in New Zealand, functional separation has required equivalence of inputs. This means the equivalent wholesale products and services are provided to downstream divisions of the incumbent, and to competitors:

- on the same timescales and terms and conditions (including price and service levels);
- with the same service, system and process reliability and performance;
- with the same commercial information provided; and
- by means of the same systems and processes.

Ofcom uses the expression “equivalence of outputs”, which describes the first three of these requirements, but where the systems and processes used by competitors will be approximations of the systems or processes used by the incumbent’s retail activities (rather than identical systems and processes).

This last requirement for full systems and process equivalence is perhaps the most burdensome element of the equivalence requirement on the incumbent, which will have systems and processes that are integrated with various parts of its business that fall outside the access services division¹⁰. Given this, full systems equivalence may not be justified for access services with a short lifetime (e.g., services based on a technology that is being phased out), which are intended to be replaced over time by more advanced access services.

Equivalence of information will help overcome the information asymmetries that exist between the incumbent and competitors, but also between the incumbent and the regulator.

Although equivalence is the general principle that underlies functional separation, there will typically be exceptions that apply to equivalence, where it is necessary for the efficient operation of the incumbent. The exact definition of these exceptions in the separation plan will be a critical factor in the success of functional separation as a remedy.

5.3 Monitoring and enforcement

Functional separation involves a series of promises by the incumbent. There must be effective monitoring and enforcement of these promises by the regulator (or a proxy, such as an independent oversight group); otherwise there is a significant risk that they will not be complied with.

An independent oversight group may be established to monitor compliance by the incumbent with its separation and equivalence obligations. These sorts of groups have been established in the United Kingdom and in New Zealand¹¹. Success of this independent oversight requires mandatory

reporting and information flows to the oversight group from the separated divisions and strong powers of investigation to assess potential non-compliance.

Another key feature that facilitates monitoring is whistleblower protections, which can be a powerful disincentive to incumbents in seeking to avoid the functional separation requirements.

Effective enforcement powers by the regulator or the government are also a prerequisite to effective functional separation. The ability to cancel a licence for flagrant breach of separation requirements may be required as an ultimate deterrent.

6 CASE STUDIES

6.1 European Union

In November 2007, the European Commission (**EC**) announced a series of proposals to amend the existing electronic communications framework, that provides the ground rules for how telecommunications is regulated throughout the European Union. Among these proposals is an amendment to the Access Directive, to allow national regulatory authorities (**NRAs**) to order functional separation as a remedy.¹² This is intended to be used as a last resort, and the NRA must seek prior approval from the EC. In seeking approval, the NRA must demonstrate that the competitive problem has not been, and cannot be, resolved through other means. The NRA must also undertake a detailed cost-benefit analysis. The reason for the requirement for the EC to give permission lies in the extremity of the remedy. As functional separation is such a drastic move, the EC wishes to ensure harmony between the Member States. This desire for harmony must be balanced with individual circumstances – hence the country-specific cost-benefit analysis.

The proposal also allows for the acceptance of voluntary separation plans. It mandates disclosure by the telecommunications operator to the NRA of any voluntary separation plans and a subsequent market analysis by the NRA. The NRA may then impose obligations on the operator. These voluntary arrangements are not reliant on the European Union framework, but Member States may not act contrary to the framework.¹³ In addition, the mandatory nature of the disclosure and analysis increases the NRA's involvement in the separation process.

The proposals (of which functional separation is only a part) are being debated throughout the European Union at the moment. Most commentators believe the proposals will be watered down before being put to the European Parliament and the Council of Ministers for endorsement, although any watering down might not be material in the case of the functional separation proposal. The changes are expected to become law before the end of 2009 and take effect in 2010.

6.2 United Kingdom

On 22 September 2005, Ofcom published a statement setting out its conclusions from its Strategic Review of Telecommunications and accepting more than 230 undertakings offered by British Telecommunications plc (**BT**) in lieu of a reference under Part 4 of the Enterprise Act 2002 (the **Undertakings**). The Undertakings given by BT have been subject to extensive interest around the world and formed the basis of the functional separation model adopted in New Zealand and the model discussed in this paper.

It is important to note that the Undertakings were a result of an agreement with Ofcom, following negotiations with BT being under pressure with the potential threat of a reference to the Competition Commission under the Enterprise Act. BT became an active supporter of the Undertakings in the negotiation process.

The key features of the Undertakings are:

- the establishment of a new and operationally separate business division, called Openreach. The division is staffed by BT employees who were previously responsible for the operation and development of BT's local access networks and with senior managers who are incentivized solely on the objectives of Openreach, rather than the objectives of BT Group plc;
- working to achieve equality of access, where Openreach is required to support all communication providers' activities (including BT Retail's) on an equivalent basis. Accordingly, it is intended that BT's competitors benefit from the same wholesale products, prices and processes as BT itself; and
- creating an Equality of Access Board that monitors BT's compliance with the Undertakings.

As part of the Undertakings, Ofcom has the power to issue directions to BT to remedy any breaches. Ofcom can bring an action in the High Court if BT breaches the Undertakings.

6.3 New Zealand

Functional separation is well underway in New Zealand. An Act was passed in 2006 requiring functional separation of Telecom New Zealand.¹⁴ Following an investigation and determination by the Minister of Communications that it should be split into three divisions – retail, wholesale and access network – Telecom New Zealand submitted a plan for separation to the Minister. The separation process formally begins on 31 March 2008, and is expected to finish by 2012.

Through the separation, the Minister hopes to improve competition in the telecommunications market through a non-discriminatory retail market, with the end result being improved choice and lower prices for consumers. Each of Telecom's separated divisions must operate at arm's length from each other, and cannot give preference to a Telecom division over a competitor.

6.4 Italy

Italy was one of the first countries in the world to go down a separation path. In 2002, the Italian telecommunications regulator, Agcom, released a decision¹⁵ introducing the concept of "administrative separation". The aim of this separation was to allow non-discriminatory access to the network services offered by the dominant operator, Telecom Italia.

Telecom Italia's response to this decision resulted in the establishment of several separate commercial units, TI Retail and TI Wholesale. TI Wholesale provides services to competitors. Both TI Retail and TI Wholesale are served by TI Field Services and TI Technology on a non-discriminatory basis. Telecom Italia introduced a number of safeguards to enforce the separation of these units. These include annual audits by an independent examiner, separate information systems with individual password levels, and a code of practice.

This regime has some differences, as compared to functional separation discussed in this paper. The key difference lies in the treatment of the access services division¹⁶. Under the Italian model, the core network and access services are both within the same division. In other words, this separated division includes both replicable and non-replicable assets.

More recently, there have been moves towards a more heavy-handed model. A public discussion document was published by Agcom and the Italian Ministry of Communications in May 2007¹⁷ in relation to functional separation, along with a proposed supplement to the Italian Electronic Communications Code that would allow Agcom to impose functional separation on an operator with significant market power as a last resort in the event of all other forms of regulation being unsuitable.

In February 2008, and in an apparent attempt to appease Agcom, Telecom Italia announced that it would establish a new unit, to be called Open Access. The new unit would be completely

autonomous and separate from Telecom Italia's other commercial operations. It will form part of a new division called Technology and Operations. Apart from Open Access, the new division will also have a network branch to design and build a modern network, an information technology branch and a technical infrastructures branch for real estate, plants and facilities management. Telecom Italia said it plans to spend the next year fully implementing the creation of the new unit. Agcom has been reported to have reacted positively to this development.

6.5 Sweden

The National Post and Telecom Agency in Sweden has recommended the creation of a new regulatory tool to allow regulators to impose both functional separation and structural separation¹⁸. At a minimum, the recommendation provides that the separated unit should comprise LLU and ancillary assets, and would include fibre access networks.

The agency advocates that the functionally separate unit should be its own legal entity, as a limited liability company. They go on to say that "the commitment to introduce functional separation should aim to expedite the introduction of the LLU market and its closely related markets".

This recommendation is in response to the perceived shortcomings of existing regulation to control a number of competition issues arising from TeliaSonera's actions. These problems were summarized in the recommendation report¹⁹ as relating to information asymmetry and the protracted nature of legal proceedings as a remedy.

6.6 Ireland

Eircom is currently undertaking discussions with the Irish regulator, ComReg, on a voluntary separation²⁰. Eircom's proposal, which is still in the formative stages, would lead to a full legal separation between the retail and network divisions, with Eircom's retail customer base and mobile phone unit being sold off.

If accepted by ComReg, this will be one of the first full structural separations undertaken anywhere in the world (at least since the separation of AT&T in the United States). It is noteworthy that the split is being driven by Eircom, rather than the regulator. While Eircom does not need Comreg's permission to go ahead with the proposed separation, it does rely on ComReg for pricing certainty and stability. Eircom believes that this voluntary sale is the best way to retain shareholder value.²¹ It has also been argued that this is an example of the "strategic hypothesis", which says that the increased competition from separation leads to an expansion of the wholesale division. The profits from this expansion may then be greater than if the wholesale division had remained integrated.²²

6.7 Australia

Telstra, the incumbent telecommunications provider in Australia, has recently undergone a functional separation²³. This separation led to autonomous retail, wholesale and network units. This autonomy includes a separation of personnel and premises.

The purpose of this separation was stated in the Explanatory Memorandum to the separating Act:²⁴

The aim of operational separation is to promote the principles of transparency and equivalence in relation to the supply by Telstra of wholesale and retail services.

The Australian version is separation "lite".

Telstra's separation plan, which was accepted by the Minister in June 2006, involves the separated wholesale division providing products to competitors exclusively, while the equivalent products are provided to the retail divisions within the fully integrated framework.

This variation of functional separation contrasts with the other models discussed in this paper, where equivalence goes further and requires the retail divisions of the incumbent to access services from the access services division and the wholesale division on an equivalent basis to competitors.

In contrast to some other countries, the Government's role in the separation process focused on the Minister, rather than the regulator. The regulator's role is limited to monitoring and reporting on Telstra's compliance with the functional separation plan once in place.

6.8 France

ARCEP imposed accounting separation on France Télécom in 1996, when the telecommunications sector was opened up to competition, and renewed this form of separation in 2006²⁵. This accounting separation requires France Télécom to treat its separate divisions individually in its accounts, and to create equivalence between its retail arm and alternative operators in relation to wholesale services.

The regulator has been unwilling to expand this accounting separation to functional separation. This reluctance is based on concerns over the difficulties involved in imposing functional separation. The consequences of these difficulties include increased network costs imposed on all operators by the newly separated access services division, the loss of incentives to invest, the long-term nature of functional separation in a fast-moving market and difficulties in setting the boundaries of the separated divisions²⁶.

ARCEP did acknowledge the potential benefits of functional separation, such as reducing incentives for one division to assist another division, increasing transparency and resolving information asymmetry concerns. However, ARCEP held that, in comparing the costs and benefits as opposed to other regulatory tools, functional separation was unlikely to be an "effective and proportionate measure"²⁷.

6.9 Poland

The Polish regulator (**UKE**) is proposing to commence functional separation of the incumbent operator (**TP SA**) into two companies, one managing the infrastructure and one providing the telecommunications services. However, there appear to be mixed views on when this is expected to take place. Some observers expect a decision from UKE by June 2008, with the entire process completed by the end of 2010²⁸. Others expect UKE to wait until the outcome of the European Commission's proposals regarding functional separation is known. TP SA does not currently accept the legality of functional separation, and has indicated that it is likely to challenge UKE in the courts if there is any attempt to enforce functional separation.

6.10 Mongolia

In 2007, the Mongolian regulator went beyond functional separation and imposed compulsory legal and ownership separation on the incumbent. Under the terms of the separation, the incumbent's local loop, as well as microwave and fibre transmissions, has been legally vested in public ownership. The partially privatized incumbent, Mongolia Telecom, now owns and operates the retail and wholesale division.

7 COMMON GROUND ON FUNCTIONAL SEPARATION

There is considerable debate internationally over the use of functional separation as a regulatory remedy.

It is useful to try and identify the areas where there is some general agreement, or common ground, among the participants in the debate:

- functional separation is expensive and time-consuming for the incumbent to put in place;
- once implemented, functional separation is probably not capable of reversal;
- functional separation is a drastic remedy, which many believe is appropriate only where other regulatory remedies have proven to be insufficient to deal effectively with the discriminatory behavior; and
- functional separation will not remove the need for continuing regulatory control over the access services division.

Surprisingly, there also seems to be little debate over the critical fact that, once properly implemented with suitable monitoring and enforcement, functional separation will be largely effective at controlling discriminatory behavior by the incumbent. This will lead to more vigorous downstream competition, with consequent welfare gains.

7.1 Costs of implementing functional separation

The costs to the incumbent of implementing functional separation can be significant²⁹.

There are the direct costs, which include:

- the additional staff and advisor costs involved in reorganizing the incumbent into separate divisions; and
- the additional computer systems that may be required to ensure equivalence.

The ongoing costs can also be significant, as a certain duplication of employees will be required to ensure independent and stand-alone divisions.

There are also the indirect costs that arise as a result of diversion of management resources to achieve separation and the loss of some of the previous synergies that the incumbent enjoyed as a result of full vertical integration (see the discussion on investment incentives below).

Given these direct and indirect costs, it may be the case that regulators will need to consider an increase in the incumbent's charges for access to the bottleneck assets, as compared to the levels of those charges prior to the separation.

The timescale for implementation of functional separation can be measured in years. In New Zealand, Telecom considers it will take the best part of four years to fully roll-out functional separation.

7.2 Functional separation not likely to be reversible

Once a company has gone through functional separation, it is unlikely that it will ever be able to return to its previous, fully vertically-integrated state. However, if the appropriate powers are granted, it will be possible to reset the boundaries for the assets controlled by the access services division (see the discussion on stability of the asset base below).

7.3 A drastic remedy

In the scale of regulatory remedies, functional separation is right up towards the top end.

Only structural or ownership separation, or licence revocation, would be more heavy-handed regulatory remedies.

7.4 Continuing regulatory control

Although functional separation should lead to some deregulation of the incumbent, the new division that holds the bottleneck assets will still require regulatory control. Its prices for access products and services will need to be controlled, as well as quality and availability of services.

As an alternative to cost-based price regulation, it may be possible to consider the introduction of utilities-style regulation, such as a regulated rate of return on the asset base of the access services division (the rate of return, and value of the asset base, being determined by the regulator). The rate of return, and value of the asset base, could be reset periodically (say, every 3 to 5 years), with agreed efficiency and capital expenditure targets. This style of regulation is employed in many countries for controlling the prices and revenues of electricity and gas distribution networks.

8 AREAS OF DEBATE ON FUNCTIONAL SEPARATION

The debate on functional separation has tended to focus on two issues:

- whether the benefits of functional separation outweigh the costs (not only in terms of directly attributable costs, but also any adverse effect on incumbent and competitor investment); and
- whether the existing remedies, or potential enhancements to the existing remedies, are sufficient to control discriminatory behavior.

8.1 Impact on investment incentives

In the United Kingdom, BT's undertakings provide that "any investment decisions shall be considered solely on their own merits and should not take into consideration the potential impact on other products"³⁰.

A vertically-integrated company without functional separation is more conducive to investment than a vertically-integrated company with functional separation. This is because coordination is optimally required among different vertical segments of the company in order to make an investment.

An example is where access investment (bottleneck) needs to complement backhaul investment (competitive). This is more difficult to achieve when the company is functionally separated, than when it is fully vertically-integrated.

It will also be more difficult for the retail division to communicate demand signals to the access services division or the wholesale division, or for the wholesale division to communicate demand signals to the access services division. This communication will be particularly important with significant new investments such as next-generation access networks, where much of the risk comes from the considerable demand uncertainties, which the customer-facing divisions will be most knowledgeable about.

Although difficult to quantify, this increased difficulty in coordination can lead to a reduction in investment incentives for a functionally separated company to invest in new infrastructure. In the case of new wholesale products, the incumbent may be reluctant to invest in product development if it had to share the benefits of any innovation with its downstream competitors.

Another dimension of the investment incentives concern is that the access services division would behave as a virtual monopoly removed from competitive pressure. The concern is that this division will not have strong incentives to make the investments required by the retail market.

This coordination concern may be overstated. After all, the incumbent remains vertically-integrated after functional separation. The main board of directors of the incumbent will be

charged with investment decisions, and they oversee the entire functionally separated organization.

Indeed, some argue that the incumbent's incentives are enhanced as it reduces the incumbent's risk of future harsh remedial actions by the regulator, which allows the incumbent to invest and innovate with greater freedom. It can allow the incumbent to effectively "ring fence" the regulated part of its business, and enable the other parts of the business to be operated like an entrepreneurial competitive telco.

Another view on investment incentives is that competitors must also be considered, and functional separation will give them greater confidence (because of the reduced risk of discriminatory behavior) to invest and innovate. The counter-argument to that is that the incentives of competitors to invest and innovate are in fact dampened, as competitors will be content to rely on the incumbent for inputs based on the stronger equivalence obligations, rather than to invest in their own infrastructure.

8.2 Transition to fibre-based next-generation access networks

In developed countries, copper local loop access networks are increasingly being replaced by next-generation access networks (fibre-based or wireless), particularly in urban areas.

There is a concern that, just as the copper local loop access network was an enduring bottleneck, fibre-based next-generation access networks may also become enduring bottlenecks, at least in some parts of the country. The European Regulators Group, in its opinion on functional separation in October 2007³¹, identified that "next-generation access investments are likely to reinforce the importance of scale and scope economies...potentially leading to an enduring economic bottleneck".

In fact, there is a view that, if a functionally separate access services division does invest in a widespread new fibre-based next-generation access network, it will pre-empt any potential new investment in this sort of network by other investors (be they competitors, financial investors or potentially governments). This would mean the creation of a new next-generation access network monopoly, using the functional separation model.

The approach taken in the United Kingdom and New Zealand is for the access services division to be responsible for new investment by the incumbent in fibre-based next-generation access networks. This is an attempt to "future proof" the access services division, in case the regulator determines that fibre-based next-generation access networks are non-replicable and that access is required to compete. In that event, competitors will be able to access those networks on an equivalence basis.

The debate over the whole issue of whether, and if so how, to regulate this new infrastructure is at an early stage in most developed countries.

8.3 Difficulty in achieving stability in the asset base

The intention is that the access services division contains the bottleneck network assets. Today, this list comprises the copper local loop access network, but also sometimes some backhaul assets (where those assets are considered non-replicable). As discussed above, it may be advisable to ensure that investment by the incumbent in fibre-based next-generation access networks is included in the asset base to allow a competing fibre-based network to be established.

However, it is true to say that, given the pace of technological change within the telecommunications industry, particularly in wireless, today's bottleneck assets may well not be the bottleneck assets of tomorrow. Or alternatively, technological change may mean that assets cease to be bottleneck assets in some parts of the country, but remain bottleneck assets in other

parts of the country. This can make it difficult to set the boundaries of the assets to be controlled by the access services division.

Flexibility will be required to remove, and add, assets from the access services division as markets develop over time, potentially on a geographic basis. This means that the demarcation point of which assets should be a part of the access services division is likely to be subject to fairly regular review.

Some view this ability to change the asset base as being inconsistent with a long-term and irreversible remedy such as functional separation³².

8.4 Service quality

There were concerns following the establishment of Openreach in the United Kingdom that the quality of certain access services was diminishing, with the fear that the equivalence requirement may in fact cause a general “leveling down” of quality, rather than a “leveling up”.

The theory goes that access services division will remain, and will be perhaps entrenched as, a monopoly provider of access and monopoly providers may not have strong incentives to maintain and improve service quality to their customers. The early evidence coming out of the United Kingdom may confirm this.

Although evidence collected by Ofcom appears to suggest that these concerns have abated in the United Kingdom, it may still become an issue in other jurisdictions implementing functional separation and may mean that quality of service issues will need to be carefully dealt with through the separation process.

9 APPLICATION OF FUNCTIONAL SEPARATION IN DEVELOPING COUNTRIES

A cautious approach is advocated in this paper for any developing country considering functional separation.

When considering the applicability of functional separation as a remedy in a developing country, several factors should be taken into account by policy makers and regulators:

- | |
|---|
| ➤ Whether the discrimination problem that functional separation is designed to address is present to the same extent as in developed countries. |
| ➤ Whether the regulatory infrastructure necessary to create and maintain functional separation is present. |
| ➤ Whether existing remedies may be adequate, in the circumstances. |

Before examining those issues, we look more closely at the context in which functional separation has arisen in developed countries³³.

9.1 Promotion of broadband

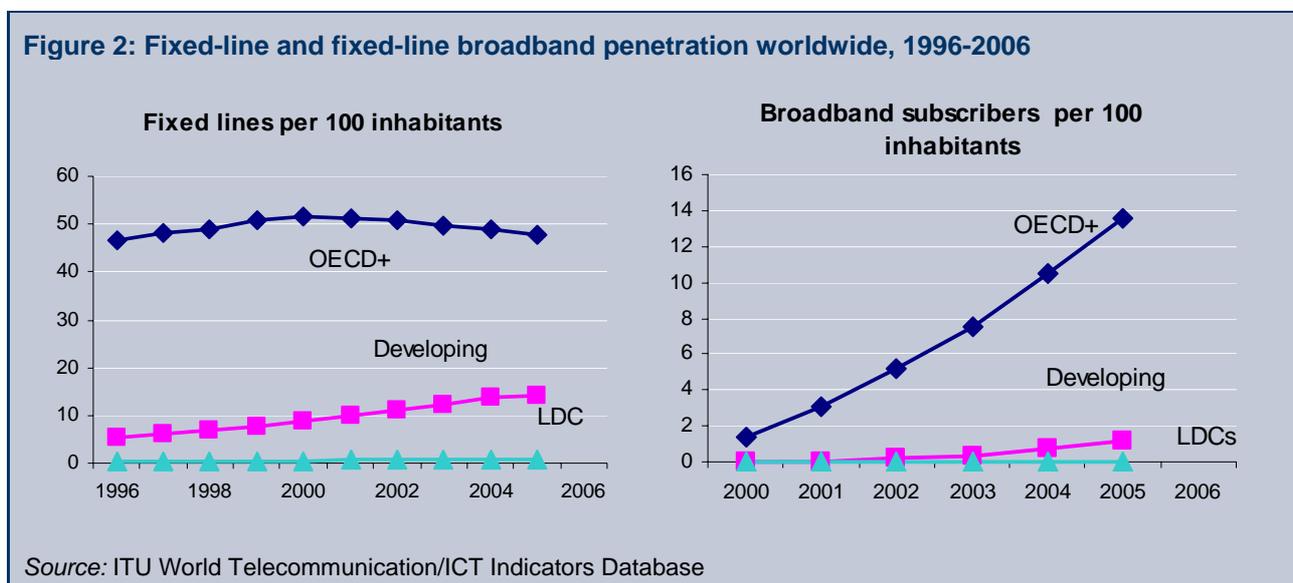
In the developed countries referred to above that have implemented, or are actively considering, functional separation to date, it is apparent that functional separation is regarded as an important tool to promote the rapid development of broadband services. In particular, broadband services over fixed access network infrastructure.

Increasing broadband network deployment is important to all countries. Broadband is seen as a critical enabler of economic and social development throughout the world.

However, when comparing developed and developing countries, and the likely development of broadband networks over the short to medium term, the developed countries are primarily relying on fixed access network infrastructure as the basis of their broadband networks, and developing countries may be more likely to primarily rely on wireless access network infrastructure.

Perhaps the main reason for this difference is the high levels of fixed access network infrastructure penetration in developed countries (on which broadband networks are normally based), but relatively low levels of fixed access network infrastructure penetration in developing countries.

The following graph shows the number of fixed lines per 100 inhabitants in OECD countries, as compared to developing and lesser developing countries³⁴:



An additional factor that may explain the difference between developed and developing countries is that, where there is fixed access network infrastructure in developing countries, it may not be of sufficient quality to support reliable broadband services.

In fact, this presents an excellent opportunity for broadband competition in developing countries. There is the potential for a number of competitors to provide widespread and affordable wireless broadband access in developing countries, without the need for access to fixed line bottleneck infrastructure from the incumbent.

In some parts of developing countries, it may even be economic to deploy new fibre networks and simply leap-frog the stage of copper local loop-based broadband. In some cases, such a fibre network may be deployed with minimal requirement for access to any incumbent local loop infrastructure, although access to ducts and rights of way could facilitate such fibre rollout, as addressed in the GSR Discussion Paper on Extending Open Access to National Fibre Backbones in Developing Countries.

9.2 The discrimination problem

This then gives rise to the question of whether the discrimination problem, identified as the primary reason for implementing functional separation in the countries referred to above, is such a problem in most developing countries.

At least with the first generation of regulated services (e.g., interconnection), discrimination may not be such a major problem. Interconnection has its own set of issues, particularly around connection in the first place and interconnection pricing. However, once the parties have connected up their networks, by and large it is not the type of service that creates strong incentives for discriminatory behavior.

Nor is interconnection a service that fits all that well with the concept of equivalence, as the incumbent does not provide interconnection to itself. In the New Zealand model, interconnection services are not required to be provisioned by either the access services division or the wholesale division.

It is primarily where there is a requirement for deeper forms of access that the opportunities for discriminatory behavior present themselves. Local loop unbundling is a classic case, where it is necessary for the incumbent to switch its customer's local loops to the access seeker, at the same time as the incumbent is competing fiercely to provide new broadband services to that customer over that loop. In these circumstances, the incentives for discriminatory behavior on the part of the incumbent are very strong.

9.3 Investment incentives

In developed countries where functional separation is being considered, or is being implemented, there is a concern that the existing environment was not conducive to infrastructure investment by competitors, because of the damaging effect of the incumbent's discriminatory behavior in providing access to bottleneck assets.

However, this may not be such a strong factor in developing countries. It is likely that the driving factor that will incentivize greater investment by competitors and incumbents in broadband infrastructure in developing countries will be competition from other infrastructure investors.

9.4 Institutional capabilities

Any regulation that is designed to address discriminatory behavior can be complex and institutionally demanding for the government or regulator to develop and implement.

However, this is particularly the case with functional separation. Functional separation appears on its face to be a relatively straightforward thing to achieve. In practice, it is anything but straightforward.

In New Zealand, Telecom's current draft separation plan³⁵ is over 130 pages long, dense with arcane legal language, with subtle nuance upon subtle nuance. The devil is most certainly in the detail when it comes to the development and implementation of the functional separation requirements.

It will be very difficult to develop functional separation requirements without extensive input from the incumbent. This is because these requirements cannot be developed without a high degree of knowledge about the incumbent's business and its products, which only the incumbent will possess. When you get extensive input from the incumbent, this will also mean extensive negotiation. Normally, incumbents will be much better equipped to deal with this sort of situation than regulators and governments. If the regulator or the government is out-gunned in this encounter, the result will be a sub-standard and ineffective separation.

Strong institutional capabilities are also required by the regulator or the government to monitor and enforce the obligations. Skilled and expert regulatory staff are required that can identify and require compliance with complex obligations, particularly involving compliance with behavioral obligations which are an inherent part of functional separation. Big calls may need to be made against the incumbent to enforce compliance, which requires staff with considerable experience and expertise. Constant vigilance is required.

If these institutional capabilities are not present, or cannot be brought in or developed in the time period for implementation of functional separation, this alone may be a reason to avoid functional separation as a remedy and consider the other options discussed in this paper.

9.5 Impact if subsequent privatization

In developing countries where the incumbent has not gone through a privatization process, it should be noted that functional separation is likely to negatively impact on the value of the incumbent in the eyes of the investment community, potentially materially. On the other hand, a government may consider that it will be easier to develop and implement a functional separation while the incumbent is still in public ownership.

9.6 Conclusion on applicability of functional separation to developing countries

It is uncertain whether the remedy of functional separation is advisable in many developing countries. A cautious approach is recommended.

The main reason for requiring functional separation in developed countries may not arise in the case of most developing countries. The access network bottleneck that is the root of most of the regulatory problems in developed countries may not be a big problem and discriminatory behavior that is so pernicious with local loop unbundling may not be such an issue either.

Also, not every developing country will have the institutional capabilities to efficiently design, implement, monitor and enforce functional separation obligations.

10 ALTERNATIVES TO FUNCTIONAL SEPARATION

There may be alternatives to functional separation that help to address the problem of discriminatory behavior in developing countries. This section of the paper considers ways in which existing regulatory instruments may be improved or enhanced, to reduce some of the weaknesses discussed earlier in this paper. It also looks at whether some of the aspects of functional separation may be selectively adopted, and whether “whole network” separation could be considered.

10.1 Enhanced non-discrimination rules

A stronger focus on creating clear rules to ensure an equivalent treatment between an incumbent and its competitors when dealing with access to bottleneck facilities, and more intensive monitoring and enforcement of these rules, can be considered.

The rules could include examples of behavior that is prima facie regarded as discriminatory, which must be ceased immediately. Or, the regulator could issue “cease and desist” orders where the regulator is satisfied that there is sufficient evidence of a prima facie breach of the rules.

This would stop the behavior and place the burden of proving that the behavior is not discriminatory on the incumbent.

It would be less demanding on the regulator to implement, but may have the effect of preventing behavior that, upon further analysis, is not discriminatory.

However, the process could be supplemented by the ability to seek an authorization, where the incumbent may obtain the regulator's approval in advance for a particular behavior if it can demonstrate that the behavior is not discriminatory.

Breach of the enhanced rules may result in significant penalties as deterrence.

- There could be higher penalties again in the case of repeated breach.
- Firm managers could be subject to penalties (with no ability for the incumbent to compensate the managers for their behavior).
- Incumbents that are found to be in breach of the rules could be required to pay compensation to harmed competitors.

Non-discrimination rules may be supplemented by appropriate service level agreements and service level guarantees in areas where there is a risk of discrimination. Service levels would need to be measurable and subject to meaningful penalties to be fully effective.

10.2 Accounting separation

To the extent that it has not been implemented already, accounting separation will likely deal with many of the problems of price discrimination. Accounting separation is nowhere near as complex and burdensome to implement and maintain as functional separation.

10.3 Competition law capabilities

Although it would not entirely deal with the shortcomings identified above in relation to competition law remedies, the beefing up of resources involved in ex-post competition law monitoring and enforcement, and potentially an increase in penalties, is likely to be at least partially effective in deterring anti-competitive discriminatory behavior. "Cease and desist" orders could also be used in the case of prima facie breach, as discussed above in relation to enhanced non-discrimination rules.

Competition law offers a range of alternatives for dealing with anti-competitive behavior, of the type that arises with discrimination. In some countries, these remedies can go as far as requiring separation. A credible threat of competition law remedies will have a deterrent effect on incentives on incumbents to behave badly.

A strengthening of the competition law capabilities in government is also likely to be of benefit to other parts of the economy where anti-competitive behavior arises.

10.4 Using elements of functional separation

It may be possible to design a regime where elements of functional separation can be used to provide some of the benefits of a full functional separation, in conjunction with enhanced non-discrimination rules and accounting separation.

For example:

- requiring the establishment of a code of conduct for incumbent employees, including:
- statements of duties and roles of management;
- commitments to serve wholesale customers equitably; and

- clear rules on information sharing and use of Chinese Walls;
- creating a program of incentives for management involved with bottleneck assets that reward certain types of non-discriminatory behavior;
- where the incumbent wishes to introduce a new retail product or service in areas where it has dominance, then the incumbent must satisfy the regulator that it has provided an equivalent wholesale service before the new retail service can be provided; and
- the use of an independent oversight group to investigate and report on allegations of breach of non-discrimination rules and code of conduct.

10.5 Separation of the entire network

In some countries, such as the earlier iterations of separation in Italy, the model involves a separation of the entire network assets (not just the bottleneck assets) from the retail units of the incumbent. An advantage of this is that it will probably be simpler to implement than the other forms of functional separation referred to above.

However, the equivalence rules that would apply to such a “netco” would be potentially more difficult to define, as equivalence would not normally be required for those non-bottleneck assets which can be replicated by competitors.

11 CONCLUSION

Functional separation is a recent response by regulators and governments to the serious problem of anti-competitive discriminatory behavior by incumbents, and the concern that existing rules and remedies are inadequate to deal with the problem. It has so far been limited mainly to a small community of developed countries, although it appears to be gaining traction in a number of other countries around the world.

It represents a leap in potency from today’s rules and remedies to deal with discriminatory behavior and can rightly be described as a drastic response. It is also relatively untested.

Even the European Commission, which has supported the move to functional separation, has taken a cautious approach, recognizing that it should not be considered unless:

- it can be demonstrated that the competitive problem has not been, and cannot be, resolved through other means; and
- a detailed cost-benefit analysis has been conducted.
- Likewise, developing countries may wish to take a cautious approach if considering functional separation.
- At this stage, it has not appear that the discrimination problem, identified as the main reason for introducing functional separation in developed countries, is a critical issue facing most developing countries.
- The issues and challenges that developing countries face with telecommunications regulatory policy are perhaps different in nature and extent as compared to developed countries. For example, the access bottleneck that bedevils regulatory policy in developed countries may not be so important in developing countries. In developing countries, the mobile and wireless sectors have, to date, been the primary arenas for competition, and bottlenecks are not a major feature of those sectors.

Other alternatives identified in this paper can be considered before going down a functional separation path. Well designed rules and remedies, tailored to the needs of the particular developing country, may well resolve most discrimination problems.

-
- * Malcolm Webb is the founding partner of MGF Webb, a law firm operating in the Asia Pacific region, with a particular focus on regulatory issues and commercial transactions in the telecommunications sector. Its website is www.mgfwebb.com. Malcolm is also the chair of the Communications Law committee of the International Bar Association.
- 1 The expression "incumbent operators" is used throughout the paper. However, non-incumbent operators with significant market power may also be considered candidates for functional separation.
 - 2 The image is adapted from a presentation by Andrea Gavosto: Functional Separation: the Italian debate (Le Chatelain All Suite Hotel, Bruxelles, October 17 2007).
 - 3 This is the case even where a separate wholesale division is established by the incumbent, with a dedicated management team (the most basic form of separation after accounting separation)
 - 4 Ofcom Notice under Section 155(1) of the Enterprise Act 2002 (30 June 2005) <www.ofcom.org.uk/consult/condocs/sec155/sec155.pdf>.
 - 5 Ofcom's Strategic Review of Telecommunications, Phase 2 consultation document, Policy Annex G, paragraph 41
 - 6 David Currie LBS Global Communications Consortium Conference – Regulation, investment and the consumer interest, 12 November 2007
 - 7 European Regulators Group ERG Opinion on Proposed Changes to Commission Regulation of 1998 on Accounting separation and cost accounting ERG (04) 15rev1 <www.erg.eu.int/doc/publications/erg_0415rev1_caas_opinion.pdf>.
 - 8 Hogan & Hartson and Analysys Preparing the Next Steps in Regulation of Electronic Communications – a contribution to the review of the electronic communications regulatory framework (July 2006).
 - 9 Directive 2002/19/EC, Article 10, Paragraph 2
 - 10 A logical separation of ordering and provisioning systems may be capable of being achieved prior to a physical separation, and Eol may require the logical separation to take place before moving to physical separation over time.
 - 11 This task could be fulfilled by the regulator, but it is clear that some form of effective oversight and monitoring is required in order for functional separation to be effective.
 - 12 Commission of the European Communities Proposal for a Directive of the European Parliament and of the Council of 2007 COM (2007)697 rev1.
 - 13 Commission of the European Communities Impact Assessment SEC(2007)1472.
 - 14 Telecommunications Amendment (No.2) Act 2006.
 - 15 Agcom, Resolution no. 152/02/CONS <www.agcom.it/eng/resolutions/2002/d152_02_CONS.pdf>.
 - 16 G Amendola, F Castelli & P Serdengecti Is Really Functional Separation the Next Milestone in Telecommunications (De)regulation? Paper presented to 18th European Regional ITS Conference, Istanbul, Turkey, 2-5 September 2007 <www.itseurope.org/ITS%20CONF/istanbul2007/downloads/paper/11.08.2007_Amendola-Castelli-Serdengecti.pdf>.
 - 17 Agcom, Delibera 208/07/CONS <www.agcom.it/provv/d_208_07_CONS/d_208_07_CONS_eng.htm>.
 - 18 Improved broadband competition through functional separation Post & Telestyrelsen PTS-ER-2007:18 (14 June 2007) <www.pts.se/Archive/Documents/EN/Improved_broadband_competition_through_functional_separation_2007_18.pdf>.
 - 19 Ibid, page 61
 - 20 Richard Curran "Eircom in talks with Comreg on splitting company" The Post 16 September 2007 <<http://archives.tcm.ie/businesspost/2007/09/16/story26661.asp>>
 - 21 The Independent Eircom seeks approval to split company in two, October 5 2007 <www.independent.ie/business/irish/eircom-seeks-approval-to-split-company-in-two-1116112.html>
 - 22 Chris Doyle "Vertical Separation" Paper presented at Training on Competition and Changing Market Conditions: Impact on ICT Regulation (Addis Ababa, 6-9 November 2007) <www.itu.int/ITU-D/treg/Events/Seminars/2007/Ethiopia/pdf/Session_9_Doyle.pdf>
 - 23 Telecommunications Legislation Amendment (Competition and Consumer Issues) Act 2005 <www.comlaw.gov.au/comlaw/Legislation/Act1.nsf/0/3A7249812A637E4FCA2570890077F668?OpenDocument>

-
- 24 Explanatory Memorandum to the Telecommunications Legislation Amendment (Competition and Consumer Issues) Act 2005, p.1
www.fedlaw.gov.au/ComLaw/Legislation/LegislativeInstrument1.nsf/bodylodgmentattachments/E203E1E4B72A4C8CCA2570DC0080C000?OpenDocument.
- 25 ARCEP Decision No. 06-1007 < www.art-telecom.fr/uploads/tx_gsavis/06-1007.pdf>.
- 26 ARCEP La Lettre de l'Autorité – Functional Separation Special Edition No. 55, March/April 2007 < www.art-telecom.fr/uploads/tx_gspublication/lettre55-eng.pdf>.
- 27 Ibid, Page 5.
- 28 Pawel Olszynka and Marcin Kedzierski European reform favours large telecoms separation November 2007, page 3 < www.polishmarket.com/index.php?item=free_articles&id_form=234> (registration required).
- 29 BT's 2006 Annual Report and Accounts showed a charge of GBP 70 million for estimated incremental and directly attributable costs arising from functional separation < www.btplc.com/report/Report06/index.htm>
- 30 BT Undertakings given to Ofcom by BT pursuant to the Enterprise Act 2002 Section 5.13.2 (22 September 2005)
<http://oft.gov.uk/shared_of/monopolies/btundertakings.pdf>.
- 31 ERG (07) 44
- 32 ARCEP, page 4
- 33 The author notes that the GSR discussion paper on Mobile Sharing considers the issue of functional separation of mobile networks.
- 34 ITU (2007). Trends in Telecommunication Reform 2007: The Road to Next-Generation Networks (NGN).
- 35 www.med.govt.nz/upload/52553/telecom-draft-undertakings.pdf