

Structural separation and investment in the National Broadband Network environment

A report for SingTel Optus

**Dr. Chris Doyle
Associate, University of Warwick**

June 2008

Table of Contents

About the author	ii
Executive Summary	iii
1. Introduction	1
2. Vertical integration and telecommunications	5
3. Separation remedies and vertical competition problems	9
3.1. Forms of vertical separation	9
3.2. Where to separate?	12
3.3. Key elements of functional separation	15
4. Mandating separation in telecommunications	17
4.1. Introduction	17
4.2. BT Openreach	17
4.3. Telecom Corporation New Zealand	27
4.4. Current arrangements in Australia	33
5. Conclusion – Australia needs more separation	38
References	40

About the author



Dr. Chris Doyle, Ph.D., MA (Cantab), B.Sc. (Econ) Hons.

Dr. Doyle is an Associate of the Centre for Management under Regulation, Warwick Business School and the Department of Economics, University of Warwick in the UK.

He has a Ph.D. in economics from the University of Warwick and has held senior positions at Cambridge University, London Business School, and Gonville and Caius College, Cambridge. He has also held visiting positions at Charles University, Prague; INSEAD in Paris and Queen's University, Canada.

Dr. Doyle work on regulation and competition issues in telecommunications has been published widely, and he has presented seminars and lectures at numerous universities and major industry conferences.

He is currently advising a number of clients on matters related to the separation of incumbent operations, and provided advise to the incumbent operator Eircom in Ireland (owned by Babcock & Brown) on voluntary structural separation. Dr. Doyle also advised the Communications Regulatory Commission in Mongolia earlier this year on the implementation of a government sponsored structural separation policy.

Dr. Doyle provides independent economic consulting services to a broad range of private and public sector clients in the telecommunications sector and is currently advising several national regulatory authorities on a range of issues including: market liberalization, licensing, spectrum management policy and competition policy.

He is a joint author of *Essentials of Modern Spectrum Management* published by Cambridge University Press in 2007 with Martin Cave and William Webb.

Further information can be obtained at: www.cdoyle.com
Email: chris.doyle@cdoyle.com

Executive Summary

The Australian Government is committing \$4.7 billion of public funds to enable the extension and development of a high-speed National Broadband Network (NBN) delivering services reaching out to 98% of the population. In this report the author examines the impact of proposals for structural separation in the context of the NBN.

The economic arguments for and against structural separation are elaborated. On the one hand, the costs of a network might be higher as a result of structural separation because coordination between retail activities lying downstream and investment activities in the network upstream are disconnected. On the other hand, structural separation is favourable for downstream competition as it removes the incentives for discrimination – the regulated monopoly network which is independent of the downstream retailers is interested in maximising profits by selling to as many of the retailers as possible. Competition effects may dominate investment effects.

Structural separation is argued to be more appealing than alternatives such as operational or functional separation as it requires a lighter regulatory framework. It is also unclear whether the costs of requiring structural separation in the NBN context would be greater than the costs associated with implementing an alternative regulatory environment that would deliver equivalence of inputs and non-discrimination, such as functional separation.

The paper addresses the conceptual arguments surrounding separation and discusses some of the literature that has examined the impact of separation on investment. To date, it appears there is little compelling evidence on this issue, but a number of academics have noted that structural separation does not appear to jeopardise investment. As investment harm forms the cornerstone of the opponents' position on structural separation, the author suggests in the context of the NBN that this concern may be over-stated.

The author discusses in detail the application of vertical separation remedies in telecommunications and focuses on the application of measures in Australia, New Zealand and the UK. He argues that the measures to ensure non-discrimination on the part of Telstra fall woefully short of the regulatory measures that have been applied in New Zealand and the UK. In the latter, regulators have facilitated functional separation and accepted legally binding undertakings submitted by the respective incumbents.

The arrangements operating in New Zealand and the UK have not been in place for long enough to determine their effectiveness, with functional separation not completely implemented in both countries. Nevertheless, the structures that have been erected are elaborate and embed and deepen regulatory activities. One communications provider in the UK has stated:

“The creation of Openreach [the access network services company formed as a result of functional separation] is fundamentally flawed because if Openreach is to work properly, the way the regulator wants it to, you are asking the main board directors of BT to make decisions that are not in the best interests of shareholders. I find it odd that anyone would have thought it could possibly work given that structure and the fundamental conflict involved.”

And went on further to state that:

“BT selling Openreach is one route to what I have always advocated, which is a full structural separation of the business”¹

The report concludes by arguing that structural separation has a number of attractive features in the context of the Australian NBN process. At the very least, policy with respect to the NBN should adopt a robust functional separation model as in the case of the New Zealand approach towards its vertically integrated incumbent operator Telecom New Zealand.

¹ John Pluthero, CEO of Cable & Wireless UK (one of BT’s main wholesale competitors). See note 11 below.

1. Introduction

The purpose of this report is to consider investment and innovation effects of vertical separation remedies applied to a next generation network (NGN) operator in Australia offering fibre to the node (FTTN). It has been proposed by the Terria consortium² bidding for the National Broadband Network (NBN) tender that structural separation is desirable:

“The G9 submits that the only appropriate policy response to protect and promote competition on the NBN, regardless of who builds the network is to ensure that there is structural separation between the entity which owns the NBN and any entity which delivers retail services over the NBN.”³

Where structural separation is offered voluntarily, as is the case by the Terria consortium, it seems reasonable to adopt a permissive stance, as argued by Cave and Doyle (2007a):⁴

“For this reason we believe that no barriers should be placed in the way of proposals from operators to separate vertically”

The debate on the effects of vertical separation in telecommunications has a long history and focuses on two key areas:

1. Investment and;
2. Competition.

It is often contended, though rarely substantiated, that mandated vertical separation is bad for investment. It is often asserted that vertical separation undermines *coordination*⁵ among the different parts of the value chain and in the case of large scale durable and irrevocable investments this may precipitate *opportunistic* behaviour. Both these effects, in theory, would tend to dampen investment incentives. It is then argued by many commentators and economists that the best organisational form is vertical integration, as this overcomes both problems.⁶

² The Terria consortium was formerly known as the G9 consortium.

³ Para. 2.3 in the G9 ‘Submission to the Expert Panel for the National Broadband Network’, 28 March 2008.

⁴ See also Lehr and Hubbard (2003) on the case for voluntary structural separation.

⁵ For example, Cave (2002) raises investment coordination as the main factor against structural separation in modern telecommunications networks. This position was also robustly presented in Crandall and Sidak (2002). Cadman and Carrier (2002) responded to Cave and argue “while there would certainly be a need for co-ordination of investment activities in a structurally separated market, this is no different to the situation today and is actually likely to be better. Indeed it could be argued that greater investment coordination would be a good problem to have as it suggests that both investment and innovation are more intense” (page 11).

⁶ Vertical integration as the preferred organisational form was essentially the thrust of the argument in an appendix of a Telstra submission concerning the NBN, see Ergas (2007).

On the other hand linking upstream and downstream activities via vertical integration can and has been shown to compromise competition. In particular competition concerns arise where some parts of the value chain can accommodate competition (such as the retailing of telecommunications services) whereas others are better suited to monopoly (such as the provision of fibre to the node and related access network facilities). Vertical integration in this setting poses competition dangers, as an integrated entity will be tempted to *leverage* market power residing in the monopoly segments into the prospectively competitive segments. As von Hirschhausen *et al.* (2004) state in their review of utility regulation:

“In many and probably most cases, vertically integrated utilities have strong incentives to discriminate against potential competitors”

Vertical competition concerns in telecommunications markets have heightened over the last few years.⁷ The strength of incumbent players like Telstra in wholesale local access markets raises justifiable concerns about discriminatory conduct. While competing infrastructures have lessened the extent to which market power can be exercised by incumbent operators, the migration to NGNs and Next Generation Access Networks (NGANs) will tilt the playing field against newer operators lacking network access ubiquity.⁸ As Marcus and Elixmann (2008) have remarked recently on the regulatory implications of NGNs and NGANs:⁹

“it is clearly premature to assume that market power will no longer be a concern Unfortunately, some familiar forms of market power are likely to persist well into the future – most notably, access associated with last mile facilities.”

Over the last few years a number of telecommunications regulators have examined the case for structural separation in light of persistent discriminatory practices. In the United Kingdom (UK) the regulator Ofcom considered during a review in 2004-05 whether structural separation would resolve vertical competition problems. In the end Ofcom chose not to mandate structural separation of the incumbent operator BT and instead accepted legally binding undertakings for functional (i.e. operational) separation.

The approach adopted by Ofcom embeds regulation and according to some is not conducive to facilitating investment.¹⁰ John Pluthero, CEO of Cable & Wireless UK (one of BT’s main wholesale competitors), has stated¹¹:

⁷ For example see Cubbin and Currie (2002).

⁸ Modern telecommunications networks are essentially IT networks and systems. This is certainly the case with ubiquitous broadband use and the deployment of fibre systems which facilitate IP (Internet Protocol) networks. The extension of fibre to the node (FTTN) and the associated investment in backhaul extension services needed to accommodate higher traffic volumes, is, paradoxically, likely to strengthen ‘natural monopoly’ characteristics in some parts of the vertical chain. In other words, it is unlikely to be cost-effective to have two separate providers roll-out large-scale FTTNs. Further, it is likely to be uneconomic in most areas for one operator to co-locate equipment at the ‘node’. See Marcus and Elixmann (2008) for a discussion on NGNs and regulatory models.

⁹ Marcus and Elixmann (2008) page 23.

¹⁰ For example see ‘Telecommunications: functional separation, a cure worse than the disease’, IEM June 2008 available at <http://www.institutmolinari.org/pubs/note20082en.pdf>, IEM (2008).

“The creation of Openreach [the access network services company formed as a result of functional separation] is fundamentally flawed because if Openreach is to work properly, the way the regulator wants it to, you are asking the main board directors of BT to make decisions that are not in the best interests of shareholders. I find it odd that anyone would have thought it could possibly work given that structure and the fundamental conflict involved.”

He went on to state that:

“BT selling Openreach is one route to what I have always advocated, which is a full structural separation of the business”

The move to separate vertically integrated incumbent telecommunications operators has gathered momentum in Europe since the functional separation of BT in 2006. Legislators in Sweden will shortly enact legislation to allow the regulator PTS to mandate functional separation. The regulators in Italy and Poland are also actively considering additional measures to vertically separate their respective incumbent operators. The European Commission (EC) is also proposing amendments to legislation to allow national regulatory authorities to apply functional separation.¹²

Leveraging market power in telecommunications is a live and real issue and is becoming more pertinent in the context of NGN and NGAN investments. Next generation telecommunications infrastructures will shift the structure of the industry ever closer to that witnessed in computing and software markets. In such markets innovation and investment drive forward competition, and despite the need for significant vertical coordination, contractual relationships rather than vertical integration are deployed extensively.¹³

Nevertheless, high tech industries are not without vertical competition problems. A case of vertical leverage, for example, was undertaken by Microsoft in the market for media players on personal computers in the European Union (EU).¹⁴ The competition authority in the EU responded to complaints raised about the way in which Microsoft tied its Windows Media Player (WMP) product to its Windows operating system (Windows 2000). Microsoft made available to OEMs (original equipment manufacturers, such as Dell) Windows 2000 with the WMP bundled as part of the package. OEMs were not given the option to install Windows 2000 without WMP. Suppliers of competing media players were extremely concerned that the conduct of Microsoft would foreclose them out of a new and fast growing market.

The competition authority in the EU concluded that Microsoft's conduct was anti-competitive and applied a substantial fine and a *structural remedy* requiring Microsoft to

¹¹ Guardian newspaper May 29, 2007, available online at <http://www.guardian.co.uk/media/2007/may/29/internet.digitalmedia>.

¹² See PTS (2007) and EC (2007).

¹³ See Cave and Doyle (2007b) section 4.7.

¹⁴ See <http://ec.europa.eu/comm/competition/antitrust/cases/microsoft/> and references therein.

offer OEMs the option of having the operating system software installed without WMP.¹⁵ In computer markets, anti-trust authorities have not shied away from applying vertical separation remedies, as illustrated in the case of Microsoft in the EU.

In this paper I discuss whether structural separation, undertaken to deal with vertical competition problems, would compromise investment incentives in telecommunications. I start by looking at the economics of vertical industries and whether the economic case for integration is self-evident in the context of NGN and NGAN evolution. I conclude that vertical integration is not the default or only organisational form for a company offering FTTN facilities.

This is followed by a look at the different vertical separation remedies available to regulators. I show that there are essentially three broad classes of remedies available. I address, by way of case study analysis, the application of different vertical separation remedies in the UK, New Zealand and Australia. I conclude by arguing that current arrangements in Australia for dealing with non-discrimination and the leverage of market power are weak and do not constitute the robust models of functional or operational separation applied in New Zealand and the UK.

I conclude overall that structural separation in modern telecommunications and in the context of the NBN need not jeopardise investment. Further, in the NBN setting structural separation would help simplify and lighten the regulatory burden. The simplification of regulation point is echoed by Kirsch and von Hirschhausen (2008) in their discussion on NGNs:

“Structural separation can supplement access regulation where the potential for infrastructure competition is low”

And the view that investment need not be jeopardised is supported by von Hirschhausen *et al.* (2004) in a review of investment effects across a range of regulated utilities:

“The vertical separation of utilities may lead to new, more complex coordination mechanisms, but this is not necessarily bad for investment”

Gomez-Ibanez (2003, pp. 326-339) in an extensive review of regulated infrastructures estimates that the net benefits of separation in telecoms are *positive*, and *higher* than in any other ‘mass market’ sector he considers, despite the presence of some interdependence of network elements.

¹⁵ Microsoft was also required to disclose to third parties source code relevant for corporate server markets. This remedy was applied in response to the original complaint submitted by Sun Microsystems in 1998. Since the original structural remedy was applied, Microsoft has been penalised further by EU competition authorities for failing to adhere to the remedies applied.

2. Vertical integration and telecommunications

The supply of electronic communications services to end-users involves the use and sale of network elements (physical infrastructure – pipes and access nodes), the provision of content and applications (voice telephony, email, video streaming, messaging, etc.) and customer retail management (billing, customer care, etc.). Firms operating in the sector decide what to ‘make’ and what to ‘buy’ – that is they supply services through a combination of in-house production and out-sourcing.¹⁶ For example, a telecoms company may build and operate its own network and outsource customer care services. Alternatively, a telecoms company may choose to outsource network build and operation to a specialist company and choose to concentrate on customer relationship management.

In a recent survey of vertical integration and firm boundaries by Lafontaine and Slade (2007), they highlight three factors influencing the make versus buy decision. Before discussing these, it is helpful to illustrate the framework used by economists to characterise firms operating in a vertical framework.

At the apex of the vertical structure lies the principal (shareholders) who designs an incentive scheme (contracts) for managers lying below. Because shareholders are usually unable to observe all the events that affect a firm’s day-to-day performance, contracts need to be carefully constructed to reward (and therefore induce) effort rather than luck. Hence contracts feature more reward for better performance. On the other hand, employees may prefer to be sheltered from exposure to bad outcomes arising from events beyond their control. Insurance may be provided in contracts in the form of stable salaries. The insurance role and effort inducement role of contracts are important factors which determine what to make rather than what to buy.¹⁷

The Lafontaine and Slade factors influencing the make versus buy decision are:

1. **Moral hazard** – where (downstream) managerial effort is important and information about factors influencing performance not easily obtained, it may be better to organise production via contracts (buy) rather than produce in-house.¹⁸ This is because production in-house runs a risk of moral hazard, as insurance provided within a firm (in the form of a basic salary) does not induce sufficient effort. By outsourcing functions, a firm can negotiate contracts that provide better incentives for external (usually downstream) agents to behave appropriately and therefore minimize moral hazard. However, in riskier environments the value of insurance is higher and this may better suit in-house production.

¹⁶ The decision by firms of what to buy-in as opposed to what to make has been extensively analysed in the academic economics literature, building upon the seminal contribution of Coase (1937). It is a decision that telecoms companies make taking into account operational and strategic consequences.

¹⁷ See Laffont and Martimort (2001).

¹⁸ The converse also holds – the more important upstream effort the more likely an integrated structure is superior.

Comment: Arguably the evolution towards IP networks and the greater emphasis on service diversity raises the significance of downstream effort. This suggests that downstream managerial effort will become more important as the nature of end-products becomes more sophisticated. Therefore companies are likely to find that there are increasing benefits to be obtained by separating retail activities from upstream wholesale network activities.

2. **Transactions costs** – are the costs of establishing and administering business relationships within and between firms. These costs include those associated with opportunistic behaviour and haggling *ex post*. Writing contracts is costly and it may not be possible to cover all contingencies (as some are not foreseeable and others may be too complex). Where contingencies are not easily captured in a contract this can give rise to *ex post* opportunism, particularly if parties to a transaction have made investments that have greater value inside than outside the relationship (what is sometimes referred to as *asset specificity*).¹⁹ In these circumstances one party may try and *hold-up* the other party in a relationship. Vertical integration lessens the extent of the hold-up problem. Economic theory predicts that vertical integration is more likely when transactions are complex, involve specific investments, and investments are durable and the quality of the assets difficult to verify. Uncertainty also favours integration, as does scale – the larger the specific investments, the more attractive is in-house production.²⁰

Comment: Cave and Doyle (2007a) note that companies in a number of high technology industries are able to engage via contracts despite the possibility of hold-up. Cremer et al. (2006), however, show in a specific model where it is assumed to be difficult to protect investments in a network via contracts, an upstream firm will not take into account the interests of its clients when choosing its size and so will tend to under-invest in capacity. This effect can be mitigated by allowing it to own part of the downstream industry. Inevitably they conclude that ownership separation is more detrimental to welfare than legal unbundling. However, regulation offers a possibility to remedy such hold-up problems. Crocker and Masten (1996) illustrate how regulatory intervention can help overcome problems of opportunism, and Bös (1999) shows in a theoretical model that regulation can enable the social optimum to be achieved. As telecommunications is a sector featuring regulation, this suggests that opportunism in a separated context may be less of a concern than is often perceived to be the case.

¹⁹ The issue of asset specificity is developed by Klein, Crawford and Alchian (1978), who show that as assets become more specific, the scope for opportunistic behaviour grows. Assets might be specific for a number of reasons (Williamson 1985 pp. 95-6); they might be site-specific, or designed to serve a particular area; their specificity might be due to their functionality – for example, they might only be useful for highly specialised purposes, and for that reason lack resale value; or they might be dedicated to producing goods or services for a particular buyer. In some cases one contracting party has specific assets. In others they both do – in other words the assets are co-specialised. It is clear that assets providing wireline access for telecommunications services satisfy these conditions.

²⁰ Closely related to the transactions cost approach is that known as the property rights or incomplete contracting approach, see Hart (1995). We do not focus on that here but note that it may have some bearing on the issues under consideration.

3. **Market power** – if parties in a vertical relationship have market power, this may result in outcomes which are inferior to those which can be achieved by integrating activities. An extreme example of this is when a monopoly upstream faces a monopoly downstream. Each monopolist selects a price which marks-up above cost, but because the cost of the downstream firm is the price set by the upstream firm, the effect on the downstream firm's profit of the upstream firm's price is not factored into the decision making (this is known as an *externality*).²¹ These externalities under separation result in investment and aggregate profit falling below levels that would occur were the two entities vertically integrated. Hence, vertically integration may be motivated by a desire to eliminate the harmful effects of conflicting market power.²²

Comment: Cremer et al. (2007) state that the economic profession has provided little guidance that would enable regulators to weigh up the cost and benefits of different ownership and management structures in more sophisticated ways. Nevertheless, Bolle and Breitmoser (2006) demonstrate that ownership separation can be more beneficial for end-users than legal separation because the reduced price of network elements results in competitors expanding outputs, more than offsetting losses that arise from lost scope economies.

The market power effect has had a profound influence on the shape of regulation in telecommunications. This is because vertically integrated incumbent operators competing in downstream markets against non-vertically integrated rivals' pose the biggest danger to the development of effective competition. A vertically integrated firm can leverage market power to squeeze the (profit) margin available to competitors by setting wholesale charges above cost and/or engaging in cross-subsidy to set retail rates below costs. A combination of the two would make it difficult for competitors to achieve market share and earn a normal return. Competitors who may be more efficient than the incumbent in the downstream elements of the market would be foreclosed and consumers would be denied benefits.

It may appear straightforward to remedy the problem of margin squeeze via price regulation. Through a combination of a price ceiling on wholesale charges and a price floor on retail rates, a regulator should be able to safeguard consumers and hence competitors. Nevertheless, it is challenging to acquire all the relevant accounting data to ensure that price regulation is effective in these circumstances. At the very least the regulator needs the incumbent to present detailed separated financial accounts that are subject to appropriate external and independent audit. It is also essential that the regulator is able to trace all the transactions within the integrated firm to ensure that internal terms accord with regulated external rates.

Accounting separation has been part of the regulatory armoury for dealing with margin squeeze problems for many years, but experience suggests that on its own it fails to deliver effective competition. While suitably designed accounting separation may deal

²¹ The double marginalization effect, originally due to Spengler (1950).

²² Other market power factors such as the application of vertical foreclosure may also impact upon the vertical integration decision.

adequately with anti-competitive *price* discrimination – the setting of different prices by an incumbent favouring its own affiliates – the problem of using other variables to exercise discrimination, notably through lowering quality of service, so-called non-price discrimination, presents a more formidable challenge. Much of the UK case in favour of the functional separation of BT rested on the proposition that the company was practising non-price discrimination and was likely to persist in doing so (Cave, Correa and Crocioni (2006)).

3. Separation remedies and vertical competition problems

The persistence of market power held by vertical integrated incumbent telecoms operators has resulted in the application by regulators of separation obligations that seek to deter the application of anti-competitive discriminatory practices. Accounting separation is widely applied on incumbent operators having market power in one or more wholesale markets and/or retail markets. However as discussed above, the complexity of accounting data and the fast changing nature of the market have compromised the efficacy of accounting separation.

As a result, more robust forms of vertical separation, such as functional separation, have been applied by regulators (for example by Ofcom and by the Ministry of Economic Development in New Zealand) to promote effective competition in markets where persistent bottlenecks may be used by dominant operators to leverage market power through discriminatory conduct (see also EC (2007), MED (2007a,b) and Box 3.1 below).

3.1. Forms of vertical separation

Table 3.1, based in part on Cave (2006), contains a specification of the vertical separation options available to regulators. At the bottom of the regulatory options lies accounting separation and at the top is full ownership or structural separation.

Table 3.1 Forms of vertical separation

6	Ownership separation (in whole or part)	Full structural separation – may involve club ownership of bottleneck
5	Legal separation (separate legal entities under common ownership)	Legal separation (which may or may not embody elements of functional separation)
4	Functional separation with localised incentives and/or separate governance arrangements	Variants on functional separation
3	Functional separation	
2	Virtual separation	Variants on accounting separation
1	Creation of a wholesale division	
	Accounting separation	

Accounting separation entails the compilation of separate profit and loss statements and balance sheets for the separate entities within an organisation. This can be accompanied by the creation of a special wholesale (or otherwise named) unit, with a dedicated management (1 in Table 3.1). This will be responsible at a managerial level for the production and supply of the relevant products, but with no guarantee, at this

degree of separation, of non-discrimination between affiliated and competitive access seekers. Such accounting separation has been a regulatory obligation on most EU telecommunications incumbents since 1998 and appears close to the form of separation operating in Australia at present (discussed in section 4.4 below).

Under this regime, the regulator can make attempts to ensure some loose equivalence between services to affiliated units and to competitors. However, these efforts are hampered by two factors in particular:

- The absence of a precise target level of equivalence – an ambiguity which leads to opportunities for the incumbent to continue to discriminate;
- The fact that the incumbent's network, IT systems and business processes were broadly designed within the context of a fully integrated firm supplying end-users directly, but not supplying access services to third parties; the historic situation was thus “discriminatory” at that time of market liberalisation, when access products were grafted onto the network through the adoption of special procedures and technological fixes; commercial motives then perpetuated discrimination, whether intentional or unintentional.

Virtual separation (2) is the *modus operandi* of many European telecommunications incumbents at present, given the obligations for non-discrimination imposed on them since 1998. Companies typically establish retail, access, and wholesale divisions and service level agreements are intended to ensure that discrimination does not occur. The key issue here is the actual and perceived feasibility of achieving full equivalence of treatment of affiliated and unaffiliated downstream or upstream organisations in such circumstances.

Functional separation (3) of a telecoms company requires the reworking of underlying business practices and not just changes at the transaction boundary, as with virtual separation. The aim is to segregate particular assets and other inputs within a separate unit, which then trade using *identical processes* with both internal and external customers in ways that can be verified. Key functions are identified and assigned to specific divisions and where necessary information exchanged between the different divisions is anonymous to deter discriminatory practices. In practice functional separation will necessitate new training for the workforce, to enable employees to appreciate the importance of respecting newly erected Chinese walls. Box 3.1 reproduces the European Commission's description of functional separation.

Box 3.1 European Commission view on functional separation

The purpose of functional separation, whereby the vertically integrated operator is required to establish operationally separate business entities, is to ensure the provision of fully equivalent access products to all downstream operators, including the vertically integrated operator's own downstream divisions. Functional separation has the capacity to improve competition in several relevant markets by significantly reducing the incentive for discrimination and by making it easier for compliance with non-discrimination obligations to be verified and enforced. In exceptional cases, it may be justified as a remedy where there has been persistent failure to achieve effective non-discrimination in several of the markets concerned, and where there is little or no prospect of infrastructure competition within a reasonable timeframe after recourse to one or more remedies previously considered to be appropriate. However, it is very important to ensure that its imposition preserves the incentives of the concerned undertaking to invest in its network and that it does not entail any potential negative effects on consumer welfare. Its imposition requires a coordinated analysis of different relevant markets related to the access network, in accordance with the market analysis procedure set out in Article 16 of the Framework Directive. When performing the market analysis and designing the details of this remedy, national regulatory authorities should pay particular attention to the products to be managed by the separate business entities, taking into account the extent of network roll-out and the degree of technological progress, which may affect the substitutability of fixed and wireless services. In order to avoid distortions of competition in the internal market, proposals for functional separation should be approved in advance by the Commission.

Source: Recital 43 from the proposed DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and services, and 2002/20/EC on the authorisation of electronic communications networks and services. Brussels, 13.11.2007 COM(2007) 697 final.

A higher level of functional separation (4) involves incentives for senior managers in the separated entity, and/or separate governance arrangements. A further escalation of measures in a similar vein would require the creation of a divisional board with non-executive directors independent of the group, or of a special scrutiny regime to enforce separation. This could take the further form of legal separation (5), a regime in which a separate board is created and separate statutory accounts are filed – all designed to emphasise and support the independence of the separated entity.

The final option (6) requires separate ownership of the separated assets. This could be incomplete, in the sense that the group might exercise partial ownership.

An assessment of the pros and cons of functional versus structural separation as presented in OECD (2001) is shown in Table 3.2 below.

Table 3.2 The pros and cons of functional and structural separation

Policy	Advantages	Disadvantages
Ownership Separation	Eliminates incentives for discrimination; allows for lighter-handed regulation of downstream entities	Potential loss of economies of scope; may require costly and arbitrary separation
Functional Separation	May facilitate control of discrimination and anti-competitive behaviour	Possible lack of profit motive reduces incentive to provide innovative and dynamic services

Source: OECD (2001)

It should also be noted that functional separation has the additional disadvantage of maintaining the conflict of interest with respect to key strategic investments at the group level. Ideally a functionally separated entity should have as much operational discretion as possible, but full independence is clearly impossible because of the need to retain shareholder accountability.

In addition to determining the best form of separation to achieve competition goals, an important closely related issue is the position of the boundary of separation. This matter is taken up in the next section.

3.2. Where to separate?

In a complex business like telecommunications there is enormous scope for choosing different points of separation, not least because the number of different activities involved is very large. Separation may be chosen voluntarily, in which case the decision rests largely with the firm in question. Under mandatory separation, the regulator may have the last word, though in practice negotiation will typically be involved.

In either case, the decisions are likely to reflect economic considerations addressing benefits and costs, see de Bijl (2005). For example, the greater the degree of

separation the higher the threat might be to the co-ordination of investment and according to some (e.g. Crandall and Sidak (2002)) this could present a considerable cost. On the other hand, the more robust is separation the more likely would discriminatory practices be eliminated and effective competition promoted.

It is concerns about discrimination and market foreclosure that are used by policy makers to justify some form of mandatory separation. The boundary of separation should occur between markets where an incumbent exercises persistent market power (and hence is able to discriminate with anti-competitive effect) and markets which are potentially competitive – as proposed by de Bijl (2005). It follows from this that the appropriate division depends upon current and predicted market developments. These will vary with the size of the economy which the telecommunications sector is serving: in a small country the scope for competition will probably be smaller.

There is also a crucial question of priorities. In some countries, proposals for functional separation may focus on current generation access networks – notably copper loops providing ADSL. In others, separation efforts aimed at achieving full equivalence between third party buyers of access services and the integrated firm's retail affiliate are focussed on NGNs and NGANs.

In Australia the Australian Labour Party set out a position advocating equivalence in the context of investment in higher speed broadband services and the NBN by promising to:²³

“Ensure competition in the sector [telecommunications] through an open access network that provides equivalence of access charges and scope for access seekers to differentiate their product offerings”

In discussions on separation, the two principal candidates for making a single split are to do so between retail and wholesale (hereafter called the “NetCo” model) and between access or the local loop and all non-access services including retail (hereafter called the “LoopCo” model). Underlying this is a three-way classification as shown in Table 3.3.

²³ ALP (2007) Executive Summary.

Table 3.3 Three-way classification of telecommunications services

	Services	Separation model	
1. Retail	Marketing and selling services to end-users and managing the end-user relationship	Retail	Retail
2. Network (non-access)	Core network services Call origination, call termination, transit, etc. Trunk segments of leased lines Some backhaul	NetCo	Wholesale
3. Network (access)	Copper loops Fibre to the node/cabinet or to the home Ducts Wholesale line rental Some backhaul Tail segments of leased lines		LoopCo

The form of structural separation considered most appropriate in the context of the NBN is along the lines of the NetCo model, where the wholesale network elements are separated from the downstream retail functions. The NetCo model is better suited for the NGN and NGAN environment, as there is less need to worry about identifying the boundary between ‘access’ and ‘non-access’ elements. As the boundary between access and non-access elements is likely to vary over time, determining a point of separation at one moment and forming a LoopCo carries additional risks. It is also likely that the channelling of market information for investment purposes between retail and network components will be easier in the NetCo model than in the LoopCo model.

While retail is actually or potentially competitive in most geographical areas in Australia and the local loop is hard to replicate, the potential for competition in non-access network services is highly variable. It is unlikely effective competition will surface in an NGN and NGAN context in Australia for many years and therefore most network elements are likely to constitute a persistent bottleneck.

Structural separation along the lines of the NetCo model appears feasible within the context of the NBN. By contrast, functional separation would appear to require considerably more regulatory effort and foresight. Identifying the key elements of functional separation is challenging and its implementation complex. These issues are discussed next.

3.3. Key elements of functional separation

Functional separation involves the judicious compartmentalisation of company assets so that a business operates on a non-discriminatory basis and applies full equivalence (parity between the vertically integrated incumbent and downstream competitors) while retaining common ownership and a single legal entity. It builds on the foundation of accounting separation but requires substantial changes to the internal operations of a firm so as to ensure that non-discrimination occurs in practice leading to Equivalence of Inputs (EoI). As we note below, functional separation involves considerable set-up costs and imposes a substantial regulatory burden onto the incumbent and competing communications providers.

There are six key components of functional separation which are shown in Table 3.4.

Table 3.4 Six key components of functional separation

1	Separation of functions
2	Separation of brand
3	Separation of employees
4	Separation of information
5	Financial separation
6	Transparency requirements and compliance

Separation of functions (1), which leads to the name functional separation, is only one part of functional separation. This involves the creation of a separate business unit responsible for the supply of products in question. This can be likened to the formation of a new wholesale division in Table 3.1 above. This new business unit would be obliged to supply all customers (its own affiliate and other operators) on equal terms (i.e. equivalence). Crucial to enabling non-discrimination is that the Operational Support Systems (OSS) must also be separated in accordance with the new business unit.²⁴ The latter is likely to be non-trivial and involve considerable resources.

The new business unit should be seen by other operators as a distinct brand – in the UK, which is discussed more fully below, BT established Openreach as a BT Group business dealing with access network services distinct from BT Retail and BT Wholesale.

Separation of employees (3) can take a number of forms but essentially involves the creation of a separate management board for the new business unit. Importantly this board should be independent of the management elsewhere in the group but understandably will report to the group CEO to comply with stakeholder accountability requirements. Employees in the new business unit should not be allowed to work at the same time for other units in the group. The need to separate employees will also

²⁴ The OSS are computer systems that deal with the telecom network itself and support processes such as maintaining network integrity, provisioning services, configuring network components, and managing faults.

necessitate the physical separation of offices and places of work to minimise the prospects for information to pass hands and be used in a discriminatory manner. Incentive schemes should be designed to reflect the performance of the new business unit and not the group. Employees should sign up to a code of conduct that emphasises confidentiality of information.

Separation of information (4) will require a structure to be put into being that limits information flow between the new unit and other parts of the group, through the establishment of firewalls and Chinese walls. Management information systems will need to be separated.

Financial separation (5) will strengthen existing accounting separation obligations and ensure that the new business unit compiles its own profit and loss accounts and balance sheet data. Financial budgets should be separated and as much financial autonomy granted as possible. Given the magnitude of some investments, however, it is likely that group wide investment decisions will need to be taken. Note, as discussed in the Introduction, this is always likely to handicap functional separation compared to structural separation.

Finally functional separation features transparency requirements (6). These are intended to ensure that (1)-(5) operate satisfactorily and involve a system for monitoring compliance with obligations and performance targets. There needs to be a system in place for reporting breaches of compliance and an independent committee that oversees the compliance regime. Performance and compliance reports should be published.

4. Mandating separation in telecommunications

4.1. Introduction

In this section we present a number of case studies looking at functional (operational) separation and other forms of separation in telecommunications. We start by looking in detail at BT Openreach, where there is over two years experience of working with a functionally separated local access network division. We follow this with an examination of the three-way separation model applied in New Zealand, which took the Openreach model as a starting point. Finally, we contrast the position in these countries with current arrangements in Australia for dealing with discrimination in telecommunications markets.

4.2. BT Openreach

The most talked about example of functional separation is that of BT – the assets separated, in a division known as Openreach, comprising BT’s local access network (or the first mile as it is sometimes known). Openreach is responsible for maintaining the wires, fibres and connections linking end-users to communications providers’ networks (usually at the local exchange but sometimes via backhaul extension from the local exchange to the network of a communications provider).²⁵ The main products offered by Openreach are wholesale line rental (WLR), local loop unbundling (LLU), extension services (ES) and wholesale leased lines (WLL). Effectively the UK has applied a LoopCo model, addressing competition concerns in a legacy model that arose in around 2003.

The separation of the local access network emerged from undertakings offered by BT to the regulator Ofcom at the end of a ‘Telecoms Strategic Review’ (TSR) undertaken during 2004-05 using powers under UK competition legislation, the Enterprise Act 2002, rather than its sector-specific regulatory powers.²⁶ The Enterprise Act 2002 enables competition authorities (which includes Ofcom) to make a reference to the Competition Commission²⁷ to investigate a market where it has reasonable grounds to suspect that features of a market, prevent, restrict or distort competition. A market investigation which leads to the finding that there are adverse effects on competition requires the Competition Commission to take such action as it considers to be reasonable and practicable to remedy, mitigate or prevent the adverse effects. A remedy openly considered by Ofcom during its strategic review was structural

²⁵ Openreach manage the connections between the Main Distribution Frame (MDF) and the BT Wholesale/Local Loop Unbundling (LLU) termination points located in the exchange, often referred to as jumper connections.

²⁶ Ofcom (2005b).

²⁷ The Competition Commission is an independent public body operating under provisions in the Competition Act 1998 and the Enterprise Act 2002. The Commission undertakes market investigations in accordance with powers under the Enterprise Act 2002. A market investigation may only be initiated following a referral from the Office of Fair Trading (OFT) or another legal body holding concurrent powers, such as Ofcom.

separation, and this would have been one option considered by the Competition Commission under a referral if the investigation had found adverse effects.

The TSR launched with a consultation paper on 18 November 2004, in which a concern was expressed about non-discrimination being applied by Significant Market Power²⁸ (SMP) operators, notably BT, in input markets. Three broad options were put forward in the consultation:

1. Rely on existing *ex ante* regulatory obligations and the application of competition legislation to deal with the problems;
2. Structurally separate BT using powers under the Enterprise Act 2002; and
3. Impose a stronger '*per se*' prohibition and functionally separate BT.

BT and many other respondents to the consultation favoured option 3. There was a strategic reason for BT to offer functional separation in the form of undertakings. The Ofcom review of BT was happening at a time when the company was at an advanced stage in developing plans for implementing the rollout of its NGN called 21CN²⁹ and it was anxious to resolve regulatory uncertainty about a possible break-up. BT decided that offering functional separation was strategically superior to a possible break-up following a referral to the Competition Commission, and that closing the regulatory review rather than having a further two or more years regulatory intervention and uncertainty about separation was preferable for the operations of the business. On 23 June 2005 Sir Christopher Bland, Chairman of BT was reported as saying that the deal with Ofcom struck "the right balance" for every player in the market. He also stated that the process "has been a tough journey but it is important that we have regulation that encourages investment and innovation". In the same report Ofcom's then chief executive Stephen Carter welcomed BT's proposal "on the critical assumption that BT does not merely deliver the letter of the undertakings, but also the spirit."³⁰

In the event of BT offering undertakings, a referral to the Competition Commission did not materialise as the undertakings were regarded by Ofcom appropriate remedies for the problems in the market it identified.³¹ The problems identified largely stemmed from unequal treatment (discrimination) between rival competition providers and BT's retail and wholesale affiliates, notably in the fast developing broadband service markets. While accounting separation remedies worked reasonably well at ensuring equal price terms, and the obligation of non-discrimination worked effectively where verification was relatively straightforward (for example, when dealing with prices), there were

²⁸ Significant market power is the term used in European regulation to characterise situations where an operator possesses market dominance, meaning an operator is perceived as being able to act to an appreciable extent independently of competitors.

²⁹ See for example a presentation by Ittai Hershman, Director, 21CN Commercial Development, BT Wholesale, 22 June 2005 to the EU Open Workshop on NGN Policy and Regulatory Issues available at http://ec.europa.eu/information_society/policy/ecomm/doc/info_centre/public_consult/ngn/comments/hershman.ppt

³⁰ See 'BT ducks break-up with price cuts' BBC News at <http://news.bbc.co.uk/1/hi/business/4122060.stm>

³¹ Under section 154 of the Enterprise Act 2002 a firm can offer undertakings to Ofcom, which if accepted as appropriate in the circumstances, would not result in a referral.

numerous and growing numbers of competition concerns related to non-price discrimination matters. Ofcom found “no equality of access to bottlenecks (e.g. access and backhaul networks)”³² in the TSR.

The undertakings formed the basis of the functional separation and Ofcom accepted them in September 2005.³³ The undertakings are legally binding and are enforced by a newly established Equality of Access Board (EAB, see below) and Ofcom. Any breaches of the undertakings carry the possibility of a fine and can trigger legal action by injured parties. There is also an element of self-regulation with self-imposed penalties (by way of compensation to communications providers) for some relatively minor breaches of the Undertakings.

The BT Undertakings are expressed in a 55-page document (Ofcom 2005a), are, as follows, to:

- establish an operationally separated access services division (subsequently named Openreach which came into being in January 2006), located on separate premises;
- ensure full equivalence for key access products by agreed dates;
- establish an independent Equality of Access Board (EAB) to police the undertakings;
- separate operational and management information systems;
- ensure greater transparency of processes and erect internal Chinese walls; and
- consult on the development of its next generation networks.

To date, an access services division has been established under the name of Openreach; fully equivalent services are available for a number of products; the EAB has been established; and collaboration on NGNs has progressed via an industry group called NGNUK. BT has also recorded its progress in meeting its key performance indicators, though it has failed to meet a number of deadlines and Ofcom has expressed concerns (Ofcom 2007).

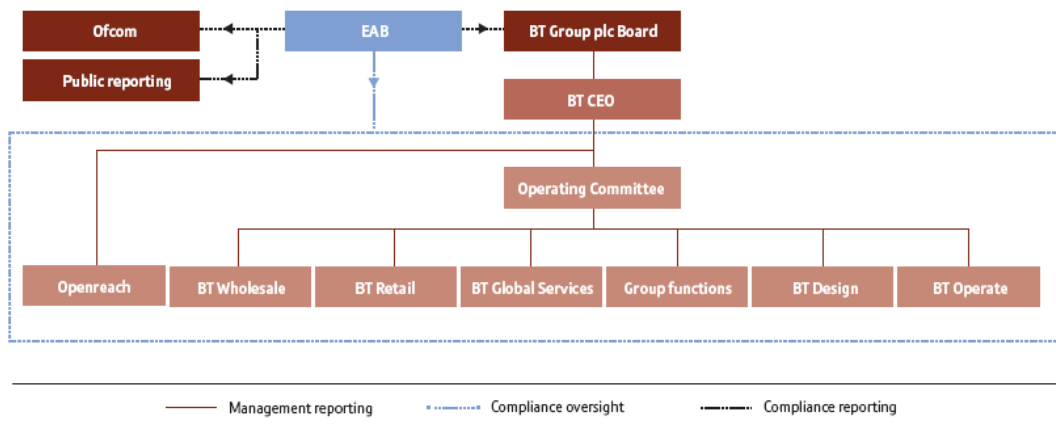
Openreach was established in January 2006 and has around 20,000 employees – the employees came almost equally from BT Retail and BT Wholesale. For the 2007 financial year, Openreach reported for the first time as a separate line of business. Revenues were £5,177 million and assets are estimated to be worth about £8 billion.

Figure 4.1 illustrates the governance and new corporate structure following the implementation of the undertakings bringing about functional separation and creation of Openreach.

³² Alex Blowers “Functional Separation – the UK ‘Openreach’ Model”, Anacom 10th Seminar, Lisbon 9 November 2007.

³³ Ofcom (2007) “Report on the implementation of BT’s Undertakings” – Fifth quarterly report, 12 February.

Figure 4.1 Modified corporate structure under functional separation



Source: Equality of Access Board Annual Report 2008.³⁴

The BT group comprises five main divisions with Openreach having greater autonomy than the other four. The EAB acts as an important ‘independent’ enforcer of the undertakings and acts as a bridge between the BT group board and the regulator Ofcom. Communications Providers may submit complaints to the EAB if there are reasonable grounds to suspect BT has violated its undertakings. The first complaint was made in August 2006 by IDT Direct Limited (trading as ‘Toucan’), which was not upheld.

The BT undertakings sought to assure Ofcom that it could restructure its business under common ownership and deliver effective downstream competition by removing anti-competitive obstacles from Openreach systems and processes. At the heart of the undertakings is a commitment to provide equality of access to access services, information and product development. The cornerstone for equality in Openreach is the concept of Equivalence of Inputs (Eoi), whereby both BT and external customers of Openreach:

- use the same ordering systems,
- have the same ability to influence, and
- are offered the same prices, terms and conditions and have access to the same sets of services and commercial information.

In addition to providing Eoi for any new or replacement wholesale services to be developed on its Next Generation Network (NGN), BT has committed to Eoi for the following existing services:

³⁴ In April 2007, BT announced a new structure, which includes two new business units. With effect from 1 July 2007, BT Design has been responsible for the design and development of the platforms, systems and processes which support services across the Group; BT Operate is responsible for their deployment and operation. Around 20,000 BT employees – from design, operations, IT and networks – have moved into the new units, BT (2007).

- IPStream, which is a Layer 3 IP based bitstream service provided by BT Wholesale - Eol ready for service in December 2005 and all services migrated by December 2006
- Local Loop Unbundling (LLU) provided by Openreach - Eol ready for service in June 2006 and all services migrated by December 2006. LLU has two products (Metallic Path Facility (MPF) which is full unbundling, either at the local exchange or remote concentrator (sub-loop unbundling), and Shared Metallic Path Facility (MPF) which is partial unbundling whereby a non-BT communications provider typically supplies a broadband service but relies on BT for voice service). The LLU obligations are second in size only to the Wholesale Line Rental (WLR) obligations. Ready for Service June 2006 was achieved.
- Wholesale Line Rental (WLR) provided by Openreach. Wholesale Analogue Line Rental (WLR analogue voice). Conventional Public Switched Telephone Network (PSTN) access service where Openreach provides the physical access line, telephone number and basic calling capability. Openreach purchases the electronic services required for telephone calling from BT Wholesale and packages them with the access line to provide a single point of sale for wholesale customers. Wholesale ISDN2 and ISDN30 Line Rental (digital voice). This is identical to the analogue line rental service described above, except that ISDN provides a digital access line with either two (ISDN2) or thirty (ISDN30) independent voice channels. WLR Eol ready for service by June 2007 and all services (existing customers) migrated by June 2010.
- Broadband Ethernet access and Backhaul Extension Services (BES) provided by Openreach. Wholesale Extension Service (Ethernet partial private circuits (PPCs) from customer to the first BT exchange). Ofcom identified fibre based broadband Ethernet access as a key access bottleneck in the UK. It is a managed service transport capability which could be used by the communications providers to supply broadband access to their IP based service capabilities, such as Voice over IP (VoIP) and Data Centres. It is, equivalent to an ISO Layer 2 Data Link service, requiring electronic interface capability which must be purchased from BT Wholesale by Openreach. Backhaul Extension Service (BES) (Ethernet partial private circuits from first exchange to a customer point of presence (POP) or second exchange). This is simply an extension of the wholesale broadband Ethernet access service to reach access seekers who do not currently have network capability near to the BT exchange which is closest to the access seeker's customer. Ethernet access and backhaul Eol ready for service in September 2006 and any existing customers migrated by March 2007.

With the exception of some aspects of the Ethernet access product, all of these specific services for which BT is to provide Eol can be classified as *legacy services*.

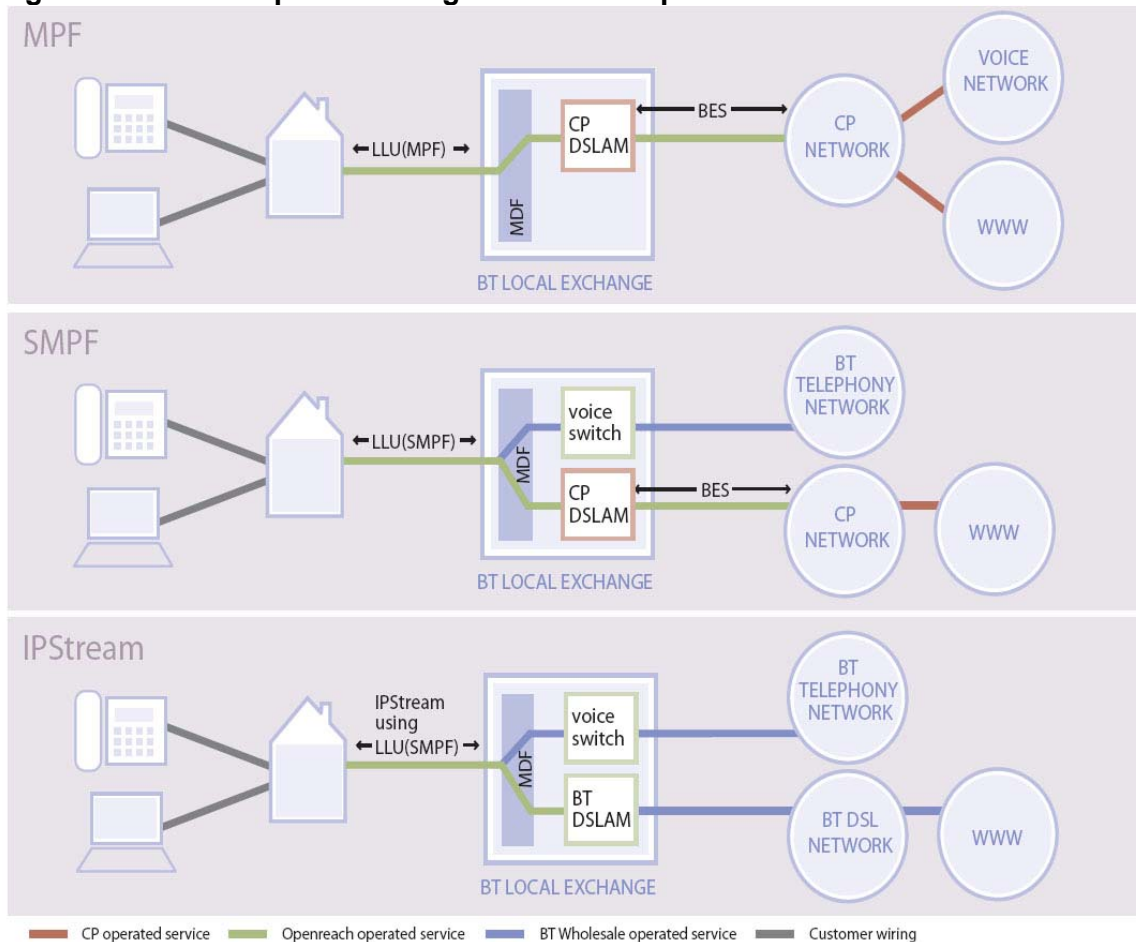
BT agreed a staged Eol implementation timetable for each of the named services, specifying when Eol must be "ready for service" (RFS) for use in provisioning service to new customers and when all end-users must be migrated to the Eol system. The Eol migration timetable extends out to 2010.

By March 2007 BT had met most of its Eol milestones on or before time, with the exception of three deadlines deemed trivial by the EAB. In the future, Eol is expected to apply to all Openreach products and to:

- IP based successor products to BT's IPStream and DataStream (DataStream is the current layer 2 ATM based bitstream product which supports IPStream)
- any successor to wholesale line rental provided over the NGN, which may be "broadband dial-tone" (assuming that BT is deemed to retain SMP).

In Figure 4.2 some of the key Openreach LLU products are illustrated. The products shown enable non-BT communications providers to lease local loop infrastructure so as to offer telephony and broadband services to end-users. Communications providers can offer a broadband service by investing in their own access facilities, purchasing LLU from Openreach or by buying IPStream from BT Wholesale. Buyers of the IPStream products use LLU as an input but also rely on BT Wholesale supplied products. The Undertakings required BT to reach RFS for MPF and SMPF by 30 June 2006. The EAB validated the delivery of LLU RFS in October 2006. BT achieved its target by installing a new Equivalence Management Platform (EMP) over which MPF and SMPF orders from the RFS date are handled.

Figure 4.2 Local loop unbundling and IPstream portfolio



Source: EAB Annual Report 2007

Delivering EoI to meet the expectations and standards required by Ofcom involves creation of new service ordering and management gateways to be used by all customers (including BT) and separating out the operations and information systems which previously held data and functionality for many unrelated services. This systems separation is potentially very costly and time consuming, especially for older fully integrated systems designed for BT's previous company structure.

The EMP is the system designed to handle the majority of transactions for EoI products. The EMP was established in June 2006 and is the largest IT capability of its kind in the UK telecommunications industry. It is designed to deliver service with a greater degree of automation, processing up to 100,000 orders a day and with the capacity to carry out up to 60,000 line checks an hour. However, testing, implementation and deployment of the EMP "has been a major cause for industry concern reported to the EAB with recurring problems leading to system downtime".³⁵

³⁵ EAB Annual Report 2007 page 9.

According to BT in 2007 capital expenditure on property, plant and equipment and computer software was £1,108 million, an increase of 7% in the 2007 financial year. BT argued that this reflected significant investment in new systems to ensure compliance with the Undertakings and increased spend to meet LLU demand.³⁶ Additionally BT claims that over 2006 and 2007 the cost of establishing Openreach was £100 million.³⁷ Other communications providers have reported to the EAB that “the introduction of newly-equivalent products by BT can require costly and time consuming systems changes in order to use those products”.³⁸

4.2.1. Openreach functional separation in practice

The functional separation of BT is being undertaken in accordance with the Undertakings and with subsequent modifications to the Undertakings agreed with Ofcom. The Undertakings set out a timetable specifying RFS dates and other key deliverables. Compliance with these targets is enforced through the new governance structures brought into being as a result of functional separation. Within BT the role of the EAB is pivotal in this regard. Externally the regulator Ofcom reports on a quarterly basis on the implementation of BT’s Undertakings.

The EAB was set up to monitor, report on, and advise BT regarding the implementation of the Undertakings. The terms for establishing the EAB are set out in the Undertakings in section 10. This required that the EAB be established within six months of the Undertakings taking effect. The EAB was established in November 2005 and comprises five members. It is chaired by a non-executive director of the BT Group (Carl Symon). Of the other four members, three are independent and the other a senior manager from within BT (currently Himanshu Raja, the Chief Financial Officer of BT Operate). The Undertakings provide certain restrictions on the eligibility of EAB members to ensure as much as possible independence and to avoid a conflict of interest. The BT Group Chairman appoints the Chairman of the EAB and the BT senior manager committee member. The Chairman of the EAB appoints the three independent members, subject to agreement with the BT Group and in consultation with Ofcom.

The EAB operates as a committee of the BT Group plc Board with a structure and membership unlike any other Board committee because of the obligations to Ofcom. The EAB oversees the whole of BT in order to ensure compliance with the Undertakings. The EAB is supported by the EAB Secretariat and the Equality of Access Office (EAO). The EAO monitors BT’s performance in delivering the Undertakings and assesses complaints regarding the Undertakings from communications providers. The EAB Secretariat arranges EAB meetings and briefs individual members.

³⁶ BT Annual Report and Form 20-F 2007 page 37.

³⁷ BT Annual Report and Form 20-F 2007 page 40.

³⁸ EAB Annual Report 2007 page 3.

One of the EAB's main responsibilities is monitoring and reporting on BT's delivery of the Undertakings. On behalf of the EAB, the EAO monitors BT's performance in a number of areas, including:

- Progress towards delivery of key Undertakings deadlines
- Ongoing compliance
- Product KPIs
- Behavioural measures and other measures relating to the spirit of the Undertakings.

The EAO reports on all these areas in detail to the EAB on a monthly basis. In addition the EAO performs validation reviews for all key Undertakings in order to verify for the EAB whether BT has delivered all requirements of the Undertaking and that it has mechanisms in place to demonstrate compliance on an ongoing basis.

Validation reviews are based on a set of success criteria that have been agreed between the EAO and BT, and begin once BT has provided all the detailed evidence that is required to demonstrate that the success criteria have been achieved. The EAO may choose to conduct these reviews itself or employ the services of internal audit. Once the delivery of the Undertaking has been validated, and confirmed by the EAO Director, then it will be subject to regular ongoing compliance reviews.

Additionally, the EAO monitors BT's compliance with any additional obligations arising from exemptions to the Undertakings or the amended or varied Undertakings agreed by Ofcom.

The EAO also holds regular meetings with communications providers to discuss progress towards the delivery of the Undertakings. These discussions can result in the EAO conducting an informal review of issues and concerns raised during meetings. These reviews take place on a confidential basis when requested, and the EAO will advise both the communications provider and BT of the outcome of the review as appropriate.

During 2007 the EAB devoted much of its resources to understanding and assessing the operations of Openreach. The Openreach CEO met regularly with the EAB to discuss the annual operating plan, the division's response to service challenges, the development of the EMP and plans for influencing employee behaviour. The EAB also consults with industry and in particular with communications providers using products supplied by Openreach.

Box 4.1 below³⁹ summarises some of the recent activities undertaken by the EAB. The material in this box is the detail of regulation required to ensure that functional separation succeeds in practice.

³⁹ Source: <http://www.bt.com/eab>

Box 4.1 Recent activities undertaken by the EAB in the UK

Undertakings delivery update: OSS separation (30 June 2007)

The EAB completed a validation of BT's delivery of the first stage of Operational Support Systems (OSS) separation (User Access Controls) at 30 June 2007. The validation covered OSS access controls for Metallic Path Facility (MPF), Shared Metallic Path Facility (SMPF) and Wholesale Line Rental (WLR) and included sample testing of the user access controls. Based on this sample the EAB raised concerns with BT that access controls for one of the twenty relevant systems had not been adequately applied. This was because some users had inappropriate access to a search engine for almost three months after the milestone date.

BT investigated these concerns further and notified the EAB of a trivial breach of the Undertakings. As required by Ofcom the milestone is also the subject of an external audit currently in progress by PwC. The audit includes testing of the user access controls of all 20 systems in scope of the changes and the findings are due to be reported by June 2008.

The EAB confirmed that this was a trivial breach of the Undertakings and considered that although BT delivered the majority of this milestone by the required date of 30 June 2007, it only met the milestone in full in late September 2007 when the breach was remedied. That aside, the rest of the systems tested appeared to have satisfactory controls in what was a large and complex systems development programme undertaken by BT.

21CN validations

The EAB has validated the delivery of the first two products in BT's 21st Century Network (21CN) programme. Although not strictly a 21CN network access product, the EAB monitored the delivery of NGN Virtual Interconnect Circuit product (VIC) as a trial run ahead of the forthcoming NGN product validations. It found that BT had met the necessary requirements for delivery of this product, although the EAB made some minor recommendations to BT regarding aspects of the product. The EAB validated that a second NGN product, NGN Openreach Network Backhaul Services (ONBS) was delivered compliantly by BT. ONBS was launched on 9 October 2006 to support the start of the 'Pathfinder' trial in the Cardiff area.

Breaches

In March 2008 the EAB reported that it had been notified of four new breaches of the Undertakings. One of these was classified by the EAB as non-trivial and the remainder as trivial. The EAB had been notified of a breach concerning the delivery of the Openreach Special Faults Investigation (SFI) product. The SFI product enables communications providers to have an extensive range of tests undertaken on the Openreach access network and at the end customer's premises to resolve broadband faults. BT reported to the EAB that two aspects of this product did not comply with the Equivalence of Input (EoI) requirements. The EAO investigated the non-compliant aspects and found that the design of the SFI product had failed to encompass fully the EoI requirements even though it had been launched months after Openreach's establishment. The EAB considered this to be a non-trivial breach of the Undertakings.

Reporting: NGN and 21CN update

The EAO provided a regular update to the EAB on progress towards the implementation of 21CN. The EAO updated the EAB on industry concerns regarding IPStream migrations. It also described how Ofcom requested that BT publish its 21CN 'plan of record' on a quarterly basis to provide some reassurance for plans going forward. It also explained that as BT's 21CN programme had started before the Undertakings were signed, some early decisions were not consistent with the principles of the Undertakings. As a result, the EAB recommended to BT that it should review all design decisions to ensure equivalence was built in wherever appropriate.

Openreach quarterly report

Openreach gave a regular update to the EAB in February 2008. It explained that the creation of BT Design and BT Operate had tested the existing understanding of how it should work on an end-to-end basis with the rest of BT.

4.3. Telecom Corporation New Zealand

In May 2006 the New Zealand government announced a package of measures that were intended to promote “faster, better broadband Internet services”.⁴⁰ The measures included a requirement for the incumbent operator Telecom Corporation New Zealand (Telecom) to unbundle the local loop and sub-loop copper-wires to allow other Internet Service Providers to compete “fully” with Telecom. There was also a measure aimed at improving transparency by a requirement for Telecom to separate its financial accounts.

These measures arose out of a ‘Stocktake’ review of the telecoms sector undertaken by the government.⁴¹ The review started in December 2005 in response to evidence that New Zealand was slipping behind its OECD peers in broadband services. The review noted that other OECD countries had moved in the direction of more rigorous pro-competitive regulatory frameworks (including the UK). Analysis undertaken in the review supported the view that the current performance gap would not be resolved by application of current regulatory provisions. The stocktake found that the market for the local loop access bottleneck service dominated by Telecom was restricting the development of effective competition. The government acknowledged that new entrants needed access on fair and non-discriminatory terms to Telecom’s network.

A wide range of options were considered, ranging from the status quo through to the structural separation of Telecom’s wholesale and retail businesses. A key factor that was to influence the government’s policy was the balance to be struck between facilitating increased competition through intervention at the wholesale level in the local loop and incentives for investment in new infrastructure such as fibre, wireless and satellite. The final package produced the following measures:

- LLU
- Greater range of unbundled bitstream products including naked DSL
- Accounting separation of Telecom’s wholesale business
- Compliance measures
- Undertaking further analysis on the desirability of structural and operational separation options

The Government noted that the operational or structural separation of Telecom were options the Government were prepared to consider in order to facilitate non-discrimination and equality of access to wholesale telecommunications markets. The Government indicated that if the full benefits of separation could be achieved by an operational split, then a full structural split might not be required. The Government proposed new legislation in the form of an amendment to the Telecommunications Act 2001, The Telecommunications Amendment Bill, which included the Stocktake

⁴⁰ Statement made by Communications Minister David Cunliffe, 3 May 2006, see <http://www.beehive.govt.nz/node/25636>

⁴¹ For further details on the Telecommunications Stocktake see http://www.med.govt.nz/templates/ContentTopicSummary_20266.aspx

measures and provisions for operational separation.⁴² The operational separation required a “robust” three way operational separation of Telecom. In late November 2006 the Bill was submitted to Parliament and the Telecommunications Amendment Act (No. 2) 2006 came into force on 22 December 2006.

Part 2A of the Act outlines the detailed provisions requiring the operational separation of Telecom. Under the amended Act the Minister was required to issue a determination of further requirements for separation of Telecom (section 69F of the Act). A consultation document was published on 5 April 2007 seeking comment on the Ministry’s preferred model for implementation of Telecom’s operational separation, upon which it was intended the Minister’s Determination would be based.⁴³

Part 2A of the Act stipulates that operational separation:

- To promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services in New Zealand; and
- To require transparency, non-discrimination, and equivalence of supply in relation to certain telecommunications services; and
- To facilitate efficient investment in telecommunications infrastructure and services.

The operational separation of BT provided a key reference model to the authorities in New Zealand and greatly informed the policy rationale upon which the proposed separation model was based. However, the separation model proposed contained a number of differences with that in the UK. The New Zealand proposal became known as the ‘3-way model’ and is summarised below:

1. The separation of Telecom into separate Access Network Services, Wholesale and Retail business units (*3-way split*);
2. A requirement for Access Network Services to be operated on a stand-alone basis and for Telecom Wholesale to be operated at arms-length from any retail business units; (*key difference with BT*)
3. The establishment of an Independent Oversight Group, backed up by Commerce Commission enforcement, to ensure Telecom faithfully implements the Separation Plan; (*similar to the EAB and Ofcom*)
4. A requirement that relevant products, especially LLU and unbundled bitstream access services, are available to all market participants on equivalent terms. (*analogous to the Eol measures in the UK*)

The split in New Zealand builds on the Openreach model by reinforcing separation between the wholesale businesses and retail businesses. In the UK, BT’s retail and wholesale divisions are controlled by the same management board.

⁴² The Telecommunications Amendment Bill implemented changes arising from the 2004 Implementation Review of the Telecommunications Act 2001 in addition to the ‘Stocktake’ package.

⁴³ Telecommunications Act 2001 “Development of requirements for the operational separation of Telecom”, April 2007 Consultation Document Ministry of Economic Development, New Zealand.

An Independent Oversight Group (IOG) was proposed having the responsibility for monitoring implementation and compliance with Telecom's Separation Plan. The IOG was expected to play an important internal scrutiny role within Telecom and be charged with monitoring Telecom's operational separation commitments. The IOG is analogous to the EAB.

The IOB members would be appointed by the Telecom Board in consultation with the Commerce Commission, and would have a majority of independent members, including an independent chair. The IOG would be supported by an IOG office having access to necessary information required for it to fulfil its functions. The IOG would not be a sub-committee of the Telecom Board (unlike the EAB which is a committee of the BT Group Board), nor would it perform any management functions, or approve any management or capital plans. It may, however, have a role in investigating and reporting on the consistency of any corporate plans with relevant obligations on Telecom under the operational Separation Plan.

As in the UK, it was proposed that the regulator (the Commerce Commission) would have formal responsibility for enforcing Telecom's operational separation undertakings. In practice, however, it was recognised that there would likely be a practical delineation between the work of the Commerce Commission and the IOG that would evolve over time.

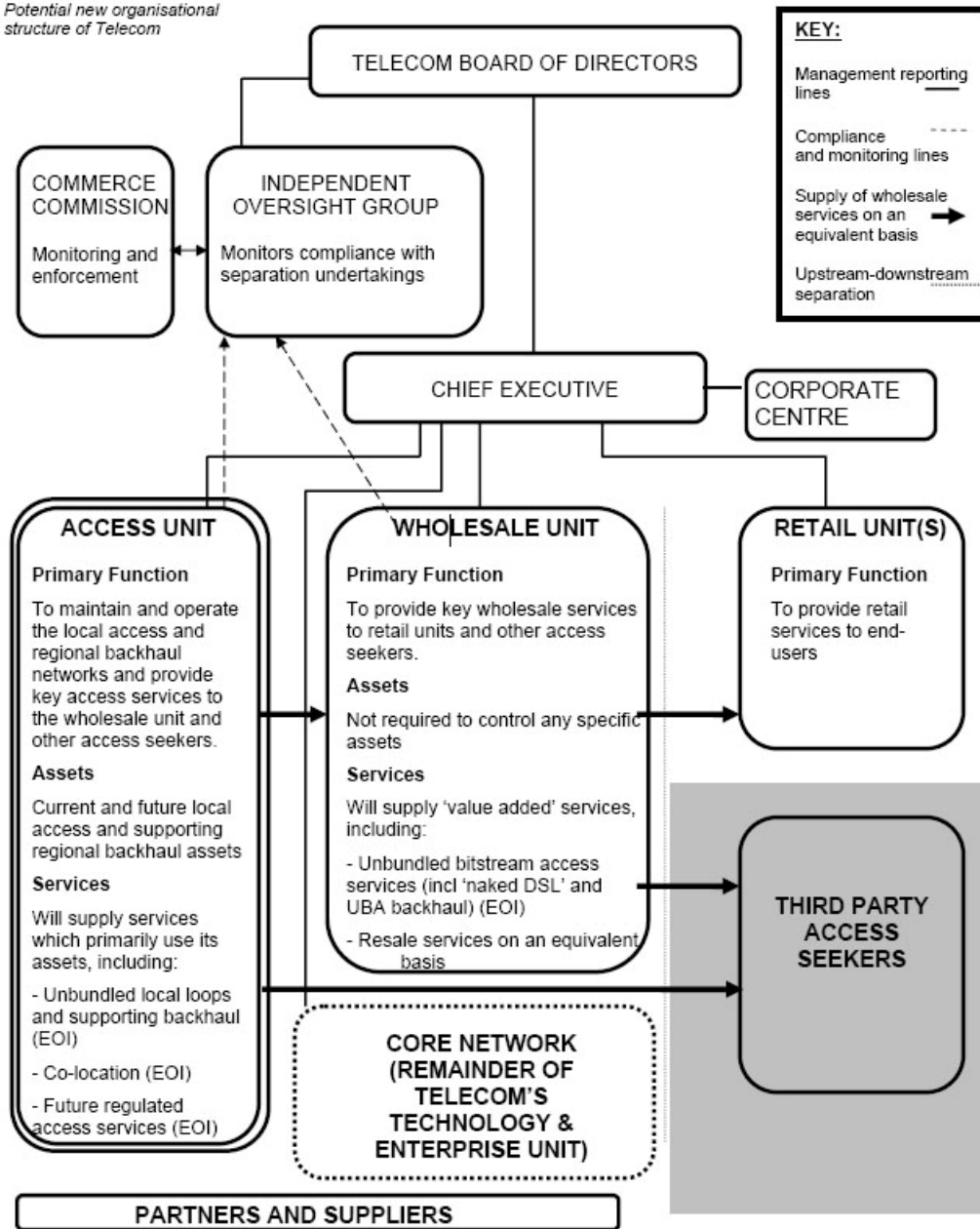
It was expected that implementation in full would take between 2 and 5 years, though in some areas, such as the establishment of an Access Network Services (ANS) unit and the IOG implementation would take a matter of months. The timeframe is similar to that in the UK for the Openreach model.

The Act required Telecom to develop a separation plan which would contain undertakings, analogous to the Undertakings provided by BT to Ofcom. The undertakings would be legally binding and breaches can result in financial penalties (section 156L and 156M of the Act).

The proposed separation model proposed in the consultation is illustrated in Figure 4.3

Figure 4.3 Proposed 3-way split of Telecom New Zealand

Potential new organisational structure of Telecom



Source: MED (2007a).

Following the public consultation, the Minister published a determination on 26 September 2007.⁴⁴ The Minister decided to apply the 3-way split outlined in the consultation, with some revisions to improve the efficacy of the separation and provide better incentives for network upgrade investments. 31 March 2008 was set as the official Separation day and Telecom had 20 working days from the date of the Determination to prepare and submit a draft separation plan. On 26 October 2007 Telecom submitted a draft separation plan which was then the subject of a public consultation, which closed on 23 November 2007.

Following the conclusion of the public consultation, Telecom had to prepare an Amended Separation Plan in consultation with the Minister within 15 working days. The Minister could approve or decline to approve the Amended Separation Plan. On 24 December 2007 the Minister invited comments on the Amended Separation Plan, which were due before 25 January 2008. On 29 February 2008 the Minister declined to approve Telecom's Amended Separation Plan, as allowed under section 69K of the Act. The Minister gave notice of requirements of further changes needed to the Telecom undertakings in order to finalise the operational separation process. Two areas of contention had arisen during the public consultation. These were group based incentives and matters connected with IP interconnection. The Minister required Telecom to revise the separation plan and submit it by 25 March 2008. On 30 March 2008 the Minister approved the revised separation plan submitted by Telecom.⁴⁵ The main elements of operational separation are shown in Box 4.2.

⁴⁴ MED (2007b).

⁴⁵ Telecom (2008) Telecom Separation Undertakings as provided to the Minister of Communications on 25 March 2008 in accordance with section 69k(2)(c) of the Telecommunications Act 2001.

Box 4.2 Elements of operational separation in New Zealand

- A requirement to establish a separately branded, stand-alone ANS unit that will control all present and future access network assets, including fibre and wireless access assets. This will ensure broad and comprehensive service coverage, and ensure the unit is forward-looking and future-proofed.
- Generally speaking no Telecom employees are allowed access to ANS unit commercial or customer confidential information unless the service provider that provided that information consents.
- A requirement that any future commercial fibre-to-the-premises and access to the NGN core be provided on a non-discriminatory basis.
- A requirement for an arms-length wholesale division that will provide access to key fixed network regulated services, including advanced bitstream services to all service providers (including Telecom).
- A requirement that the definition of relevant wholesale services include IP interconnection, and Telecom to provide details of its future consultation programme with service providers regarding IP interconnection.
- A requirement that the key regulated services be supplied to an "Equivalence of Inputs" (EOI) standard, and that ANS services (including fibre and access to the NGN core) be developed to be "EOI ready" to underpin future non discriminatory access.
- A requirement for Telecom to develop all necessary EOI infrastructure and transition all its services to that infrastructure within a four-year window. Telecom may (and has) propose migration plans for its legacy services to EOI compliant networks within four years as an alternative.
- Strict governance and arms-length rules that enable the Telecom group to be managed consistently with a robust operational separation, including the ability for the Telecom CEO to direct units subject to transparency requirements.
- Formal oversight of Telecom's implementation and internal compliance by an Independent Oversight Group (IOG) backed up by Commerce Commission enforcement.
- A requirement for Telecom to meet key organisational change requirements by "separation day", which must be no later than 31 March 2008.

4.4. Current arrangements in Australia

Telstra was the monopoly provider of telecommunications services in Australia until 1989 when Optus entered the market. Telstra was privatised in three stages beginning in 1997 when the telecommunications market was opened to full competition.

Telstra remains as the monopoly provider of fixed line services over the local copper loop. It also owns mobile, transmission and cable networks. Telstra faces competition from mobile networks and from cable networks operating in higher density areas in most state capital cities. Broadband markets have also been opened up to competition by unbundling of the local loop. As at 31 January 2007, ACMA reports that around 460 exchanges have had more than two digital subscriber line operators installing infrastructure. At this time Telstra retains a market share of around 40% of broadband services in Australia.

Since competition was introduced in Australian telecommunications markets, the government has imposed accounting separation, of various forms, on telecommunications carriers. Recently, the government has imposed a loose form of operational separation on the local loop incumbent, Telstra.

Accounting separation was first introduced under the *Telecommunications Act 1991*. The Act required the regulator (AUSTEL) to develop an accounting separation regime referred to as the chart of accounts (COA) and a cost allocation manual (CAM). The regime required horizontal accounting separation between each carriers' retail services.

Vertical accounting separation was introduced by the new regulator (the ACCC) in 2001 under its Telecommunications Industry Regulatory Accounting Framework (Record-keeping rules) issued under section 151BU of the *Trade Practices Act 1974*. The first generation of the rules required accounts to be kept on an historic cost accounting basis and reported revenues and costs for Telstra's retail and wholesale services (including its 'internal' wholesale services) separately.

The second generation of the rules (implemented in June 2003) brought the accounting separation under a current cost accounting basis. These coincided with a direction from the then Minister to the ACCC to implement an enhanced form of accounting separation of Telstra's wholesale and retail accounts. In addition to current cost accounting the direction required the ACCC to report on key performance indicators for non-price terms and conditions that compare service performance between retail and wholesale supplied services and also report imputation tests for some key wholesale services supplied to access seekers.

Operational separation was introduced under the Telecommunications Legislation Amendment (Competition and Consumer Issues) Act 2005 and subsequent ministerial determinations made under the Telecommunications Act.

The stated objective of the operational separation framework was to provide greater equivalence and transparency in Telstra's supply of certain key wholesale services. The framework required Telstra to prepare its own framework for separation (the operational separation plan or OSP) and have for it approved by the Minister. The

ACCC was given the role to monitor and report on the implementation of the Telstra separation plan once it had been approved by the Minister, though Telstra itself produces quarterly and annual reports on its compliance with the OSP. The Minister approved Telstra's OSP on 23 June 2006.

Under its plan, Telstra has divided itself into three business units – a wholesale business, a retail business and a 'key network' service business unit. The key network service business provides service activation and provisioning as well as fault notification, handling and rectification services. Telstra has undertaken that these businesses will operate "substantially separate" from one another. For example, an employee of the retail business unit must work principally for that unit and they are "not permitted to undertake any work" for the wholesale business unit. The level of the separation is however relatively mild, allowing:

- employees of the key network and wholesale business units to work for another business unit as long as it "only forms a small part of that employees role";
- "legitimate" short-term secondments or transfers; and
- employees of the "corporate business unit" to operate across each of the separated units.

The principal focus of the separation is between the wholesale business and the retail business with various undertakings to separate offices, staff and activities. For example:

"the staff of the Wholesale Business Unit are located in premises that are physically separate from any premises occupied by staff of the Retail Business Unit (although this does not mean that the staff need to be located in a separate building) [and] have security measures in place that prevent a member of the staff of the Retail Business Unit from gaining access to the premises where staff of the Wholesale Business Unit are located"

Importantly, no similar provisions seem to apply to separate staff between the network business unit and the retail business unit, likely making the operational separation plan distinctly less effective than operational separation plans adopted in overseas jurisdictions, including the United Kingdom and New Zealand.

Telstra's OSP adopts a number of 'strategies' for matters such as 'service quality', 'information equivalence', 'information security' and a 'customer responsiveness. These strategies variously require Telstra to prepare reports (overseen by a "Director of Equivalence") and adopt protocols to demonstrate that the service provided to wholesale customers is equivalent in some respects to the service provided to Telstra's own retail business unit. Though notional contracts will be put in place between the key network services unit and the wholesale and retail business units, the provisions do not require Telstra to use the same systems or platforms to service wholesale customers as they do their own retail business unit. For example, the OSP indicates:

*"The Strategies will assist in the **achievement of equivalence in the operational quality** of Designated Services supplied to wholesale customers and the Retail Business Unit by describing, among other things, the measures Telstra will*

implement: (a) to ensure that the standard of delivery of Designated Services supplied to wholesale customers is equivalent to the standard of delivery of Designated Services provided to the Retail Business Unit, through a commitment to the implementation of processes to promote the principle of equivalence of supply by the Key Network Services Business Unit of Fault Detection, Handling and Rectification, and Service Activation and Provisioning”

The Telstra OSP could be described as one that seeks to report on ‘equivalence of output’. This is in contrast to more detailed separation models such as that for which required more fundamental separation designed to provide ‘equivalence of inputs’. For example, the UK operational separation regime required the separated Openreach entity to use the same ordering system to all customers including BT’s retail business unit.

Telstra’s OSP also imposes an imputation test under the guise of a ‘Price Equivalence Framework’ with the intention of assessing the impact of Telstra’s price changes on the margin available to an efficient competitor. The principles by which the imputation test was to be developed were as follows:

- (a) “the price equivalence framework should focus on services and markets where there are bottlenecks such that there is a significant concern that pricing behaviour may raise concerns about compliance with the Trade Practices Act;*
- (b) the price equivalence framework should not impose unreasonable costs or delays on Telstra and should allow Telstra to obtain legitimate benefits from vertical integration;*
- (c) the price equivalence framework does not duplicate, replace, affect or extend the Trade Practices Act but will be consistent with that Act;*
- (d) the implementation of a price equivalence framework will not directly affect Telstra’s pricing conduct or pricing decisions nor is it a price setting mechanism;*
- (e) the price equivalence framework should provide the ACCC with greater transparency and understanding of Telstra’s pricing behaviour, and will enable the ACCC to provide public assurances about the degree of transparency available to it (which, for the avoidance of doubt, does not include allowing the ACCC to disclose to the public or a wholesale customer any pricing strategy of a Retail Business Unit);*
- (f) outcomes resulting from the application of the price equivalence framework will not be determinative of whether Telstra has or has not acted inconsistently with the Trade Practices Act and any test results will remain confidential; and the ACCC will not be inhibited in its exercise of its functions under Parts XIB and Part XIC of the Trade Practices Act by any material resulting from, or by the application of, the price equivalence framework.”*

An imputation test is conducted whenever there is a material change in retail prices (material is defined as resulting in a 3% change in retail revenue). The imputation test is conducted for residential and business customers separately as well as together. The scope of the imputation test in terms of retail services includes ADSL and PSTN voice telephony services. The OSP matches the retail services to the ‘least cost’ wholesale service (or “Designated Services”. For example, the retail bundle of ADSL and PSTN is

matched with the ULLS rather than the LCS and wholesale ADSL Layer 2 Service. The matching from the OSP is as follows:

Designated Services	Relevant retail service(s)
1. Domestic PSTN Originating Access Service	National long distance calls, International long distance calls, Fixed-to-mobile calls
2. Domestic PSTN Terminating Access Service	National long distance calls
3. Local Carriage Service (LCS)	Basic Access and Local Calls
4. Wholesale ADSL Layer 2 Service	BigPond ADSL
5. Line Sharing Service (LSS) aka Spectrum Sharing Service (SSS)	BigPond ADSL
6. Unconditioned Local Loop Service (ULLS)	Basic access, Local calls, National long distance calls, International long distance calls, Fixed-to-mobile calls and BigPond ADSL
7. Domestic Transmission Capacity Service	BigPond ADSL

The imputation test adopts the following major inputs:

- **“Internal Wholesale Price:** *The internal wholesale price for Designated Services used in Telstra’s imputation test will initially be based on the average wholesale yield calculated across all wholesale customers taking the relevant Designated Service. Telstra may also run its imputation test using the internal wholesale price set at the wholesale yield associated with the lowest available or actual wholesale price.*
- **Avoidable Transformation Cost:** *Telstra’s imputation test will incorporate the avoidable cost of transforming the Designated Service to a retail service to the extent practicable. If sufficient estimates of avoidable costs are not available, Telstra may use the average costs of transforming the Designated Service to a retail service.*
- **Revenues:** *In general, Telstra’s imputation test will incorporate all revenues derived from the relevant retail services associated with the full relevant customer base, regardless of whether customers were on superseded plans.”*

The imputation test is broad and seeks to identify equivalence in an ex post context. That is, it asks whether the result of the actions by Telstra resulted in an unequal outcome for wholesale customers compared to Telstra's retail business unit. Notably there is nothing in the operation separation plan would appear to prevent Telstra from changing prices that resulted in a price squeeze or require Telstra to rectify its conduct by offering prices that would alleviate the price squeeze.

Imputation test are, by nature, complex and involve a number of choices regarding inputs that might draw attention to or away from potentially anti-competitive conduct. Choices regarding the treatment of bundled revenues, costs (average versus incremental), the timeframe for the test and treatment of customer segments or customer plans are likely to have a significant impact on the results.

Cave (2008) is sceptical about the efficacy of current vertical separation arrangements in Australia remarking:

“a loose form of separation was implemented by Telstra in 2006. It involved the creation of a separate wholesale division, to be responsible for sales by the incumbent to competitors. Exactly how this would achieve the goal of equivalence was not clear.”

This echoes an earlier negative position expressed in Cave (2006) on the then proposed approach in Australia:

“seems singularly ill-equipped to achieve any kind of equivalence in the services offered by to internal and external customers, as it exaggerates the differences in institutional arrangements between them. In any case, these considerations suggest that creation of a wholesale division by itself will be ineffective.”

The current arrangements in Australia are variants on accounting separation and are not comparable to the robust arrangements erected in New Zealand or the UK. At best they conform to the model of virtual separation, but fall short of the regulatory rules required to make effective non-discrimination.

5. Conclusion – Australia needs more separation

The wholesale services to be provided over the NBN appear likely to be clearly specified in contracts. This is an important observation, as it is likely to diminish transactions costs and make the case for structural separation more attractive. The separation of the local access network in an NBN environment at a point above the xDSL and transmission equipment limits the extent of scope economies between the retail and operational functions because control of most network assets is under the control of one entity. This fact makes co-ordination between activities at the service provider level more easily dealt with by contracts and limits the likelihood of hold-up.

The potential for contracts to address objections to structural separation has been summarised by Cave and Doyle (2007a) as:

“There are thus numerous examples, some of them discussed above, others summarised in literature reviews and collections, of how flexible and sophisticated contract design can overcome problems of opportunism. Examples of such methods are long-term contracts, take or pay arrangements, demand projections made by disinterested third parties, and customer engagement. These methods do not solve all the problems which result from regulation in conditions of asymmetric information, but they can solve or mitigate problems associated with separation, and allow consumers to benefit from the advantages of separated structures.”

It is difficult to know with certainty what model would prevail in the industry absent the incentive created for the owner of the (regulated) monopoly network to be vertically integrated. However, it appears that in the context of the NBN vertical externalities between the operation of the NBN and downstream service provision are likely to be limited, certainly more limited than in the case for separating the local loop.

Structural separation requires ownership separation of the network and other business divisions (the NetCo model). In this setting the network owner ought to behave in a neutral manner and treat all equivalent purchasers similarly. Needless to say, separation would result in some lost economies of scope (vertical economies) – though it is unclear whether these would be significant given the capacity for market participants to design contracts to deal with many contingencies.

But the key advantage of structural separation is that it removes the incentives for the owner of the network to behave in a discriminatory manner. While scope economies mean operating costs may be slightly higher when compared against an integrated structure, the promotion of more effective competition downstream could confer benefits that outweigh these. Furthermore, structural separation greatly reduces the job of regulating the principle of non-discrimination – which substantially lessens the regulatory burden. Notwithstanding, regulation of the monopoly network would be needed – but this would be the case in the event of an integrated entity.

By contrast **functional separation** requires an elaborate regulatory monitoring and compliance apparatus able to make effective Chinese walls and non-discriminatory procedures. The task of monitoring activities is considerable and compliance checks

need to be extremely thorough if they are to succeed in achieving a level playing field. As discussed in the BT and Telecom New Zealand case studies above, functional separation needs new sophisticated governance structures to be effective.

The judicious identification of appropriate physical boundaries for separation in a telecommunications IP network and structural division (through ownership separation) would likely involve a substantial one-off cost, but would provide greater regulatory clarity and more assurance of a level playing field. These benefits could outweigh adverse coordination issues. Other separation remedies would appear insufficient to deal with the magnitude of the vertical competition problems identified and in any case tend to entrench and deepen regulation (both self-regulation and externally applied regulation). The evolution towards NGNs and NGANs in many respects simplifies the task of identifying the boundary for separation. As a result the NetCo model is the preferred form of separation for the NBN.

The case against structural separation in telecommunications rests heavily on the notion that coordination between upstream and downstream elements in would be very costly. However, there is little supporting evidence to substantiate this claim. Indeed, Gomez-Ibanez (2003) has noted that the net benefits of separation in telecoms are positive.

Nevertheless, there are few illustrations of voluntary divestiture in the industry – which may suggest that separation benefits are limited. However, voluntary separation is motivated by private benefits and would not take account of wider social benefits associated with the pro-competitive effects arising. Furthermore, the prospect of regulatory appropriation of private gains associated with voluntary separation, in addition to costs associated with persuading regulators to allow separation, are likely to be factors that weigh against actioning voluntary separation. Finally, it is only in very recent times with the advent of NGNs and NGANs that the NetCo model of separation has become realistically feasible. It is unsurprising therefore that there have been so few cases of voluntary vertical separation.⁴⁶

The Terria proposal for structural separation of the NBN has merits and should not be dismissed on the nebulous grounds that coordination difficulties would adversely affect investment. While coordination may confer benefits within an integrated vertical structure, these are likely to be offset by the economic costs associated with anti-competitive conduct arising from non-discriminatory practices.

Current arrangements for dealing with discrimination in the Australian regulatory environment are weak. At the very least regulatory policy with regard to the NBN should adopt a more robust functional separation model as the case of New Zealand. If policy makers wish to avoid the additional regulatory intrusion and complexity of functional separation, then structural separation would be the obvious alternative remedy to apply.

⁴⁶ The Irish incumbent operator Eircom is currently seeking to structurally separate along the lines of the NetCo model by spinning-off its retail operations and creating a separate network company. The Irish regulator ComReg is in the process of assessing whether this proposal is consistent with the policy objectives for telecommunications set out in Irish law. TeliaSonera in Sweden and Telecom Italia have recently established separate access divisions.

References

ALP (2007) *New Directions for Communications – a broadband future for Australia – building a national Broadband Network*, Australian Labour Party Policy Statement, March.

De Bijl, P.W.J. (2005) 'Structural separation and access in telecommunications markets', CESIFO working paper no. 1554 category 9, Industrial organisation, September.

Bolle, F. and Breitmoser, Y. (2006) 'On the Allocative Efficiency of Ownership Unbundling', Europa Universität Viadrina Frankfurt (Oder) Department of Business Administration and Economics Discussion Paper No. 255.

Bös, D. (1999) 'Incomplete contracting and price regulation', *Journal of Public Economics*, 73, pp. 353-71.

BT (2007) Annual Report available at www.bt.com

Cadman, R., and Carrier, H. (2002) 'Market structure and innovation in the telecommunications sector: A framework for assessing the impact of structural separation of the incumbent', *info*, 4(6), pp. 9-15.

Cave, M. (2008) 'Separation and investment in telecommunications networks: a review of recent practice', Centre for Management Under Regulation discussion paper, Warwick Business School, February.

Cave, M. (2006) 'Six degrees of separation: operational separation as a remedy in European telecommunications', *Communications & Strategy*, No 64, pp 89-104.

Cave, M. (2002) 'Is LoopCo the answer?', *info*, 4(4), pp. 25-31.

Cave, M., Correa, I. and Crocioni, P. (2006) 'Regulating for non-price discrimination- the case of UK fixed telecommunications', *Competition and Regulation in Network Industries*, pp. 391-415.

Cave, M. and Doyle, C. (2007a) 'Contracting across separated networks in telecommunications: lessons from theory and practice', *Communications & Strategies*, No 68, pp. 21-40.

Cave, M. and Doyle, C. (2007b) 'Network separation and investment incentives in telecommunications', CMUR Discussion Paper, Warwick Business School, August.

Coase, R. H. (1937) 'The nature of the firm', *Economica*, 4, pp. 386-405.

Crandall, R.W. and Sidak, J.G. (2002) 'Is Structural Separation of Incumbent Local Exchange Carriers Necessary for Competition?', *Yale Journal on Regulation*, 19(2), pp. 1-75.

Cremer, H. Cremer, J. and De Donder, P. (2007), 'Costs and benefits of vertical divestiture', *Communications & Strategies* no. 68 (4th quarter), pp. 41-56.

Cremer, H., Cremer, J. and De Donder, P., (2006), 'Legal vs ownership unbundling in network industries', CEPR Discussion Paper number 5767, July.

Crocker, K.J. and Masten, S.E., (1996) 'Regulation and administered contracts revisited: lessons from transaction-cost economics for public utility regulation', *Journal of Regulatory Economics*, 9, pp. 5-39.

Cubbin, J. and Currie, D. (2002), 'Regulatory creep and regulatory withdrawal: why regulatory withdrawal is feasible and necessary', *Utility Week*, 31 May.

EAB (2008) Annual Report available at <http://www.btplc.com/Thegroup/Theboard/Boardcommittees/EqualityofAccessBoard/Publications/EABAnnualReport2008.pdf>

EC (2007) *Proposal for a Directive of the European Parliament and of the Council amending Directives 2002/21/EC, 2002/19/EC and 2002/20/EC*. COM(2007) 697 final.

Ergas, H. (2007) 'Vertical Integration, Vertical Separation and the Efficiency Consequences of the G9 SAU', 6 August 2007, CRAI appendix to Telstra submission concerning the NBN.

Gomez-Ibanez, J. (2003) *Regulating Infrastructure: Monopoly, Contracts and Discretion*, Harvard University Press.

von Hirschhausen, C., Beckers, T. and Brenck, A. (2004) 'Infrastructure regulation and investment for the long term – an introduction', *Utilities Policy*, 12, pp. 203-210.

IDATE (2008) *Functional separation in telecoms: panacea or plague? – An empirical assessment*, March.

IEM (2008) 'Telecommunications: functional separation, a cure worse than the disease', IEM June 2008 available at <http://www.institutmolinari.org/pubs/note20082en.pdf>.

Hart, O. (1995) *Firms, Contracts and Financial Structure* Clarendon Press, Oxford.

Kirsch, F. and von Hirschhausen, C. (2008) 'Regulation of NGN: Structural separation, access regulation, or No regulation at all?', *Communications & Strategies*, 69, pp. 63-83.

Klein, B., Crawford, R.A., and Alchian, A.A. (1978) 'Vertical integration, appropriable rents and the competitive contracting process', *Journal of Law and Economics*, 21, pp. 297-326.

Laffont, J-J. and Martimort, D. (2001) *The theory of incentives: the principal-agent model*, Princeton University Press.

Lafontaine, F. and Slade, M. (2007) 'Vertical integration and firm boundaries: the evidence' *Journal of Economic Literature*, 45(3), pp. 629-685.

Lehr, W.H. and Hubbard, R.G. (2003) 'Economic case for voluntary structural separation' presented to 31st Annual Telecommunications Policy Research Conference, George Mason University, September 2003.

Marcus, J.S. and Elixmann, D. (2008) 'Regulatory Approaches to NGNs: An International Comparison' *Communications & Strategies*, 69, pp. 19-40.

Masten, S. (ed.) (1996) *Case Studies in Contracting and Organisation*, Oxford University Press.

MED (2007a) *Development of Requirements for the Operational Separation of Telecom: Consultation Document*, Ministry of Economic Development, New Zealand.

MED (2007b) *Telecommunications (Operational Separation) Amendment Determination 2007*, Ministry of Economic Development, New Zealand

OECD (2001) *Recommendation of the Council concerning structural separation in regulated industries*, Paris. Available at <http://www.oecd.org/dataoecd/49/15/2474629.pdf>

OECD (2003) *The benefits and costs of structural separation in the local loop*, DSTI/ICCP/TISP(2002)13/FINAL, Paris. Available at <http://www.oecd.org/dataoecd/39/63/18518340.pdf>

OECD (2006) *Report of experiences in the implementation of the Recommendation concerning structural separation in regulated industries*, Paris. Available at <http://www.oecd.org/dataoecd/19/50/37318693.pdf>

Ofcom (2005a) *Final statements on the Strategic Review of Telecommunications, and undertakings in lieu of a reference under the Enterprise Act 2002* Statement, Ofcom 22 September.

Ofcom (2005b) *A Notice under Section 155(1) of the Enterprise Act 2002*.

PTS (2007) *Improved Broadband Competition through Functional Separation; statutory proposals for non-discrimination and openness in the local loop*, Post & Telestyren Report Number PTS-ER-2007:18.

Spengler, (1950) 'Vertical Integration and Antitrust Policy', *Journal of Political Economy* 58, pp. 347–52.

TCNZ (2007a) *Submission of Telecom New Zealand limited in response to MED consultation document*, Wellington, New Zealand.

TCNZ (2007b) *Development of requirements for the operational separation of Telecom*, Wellington, New Zealand.

Williamson, O. (1985) *The Economic Institutions of Capitalism*, Free Press.