

*Study on the Impact of Prospective Fiscal Initiatives on
Commercially Sustainable Broadband in
the United Kingdom*

Phase 1 – International Evidence

Interim Report

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1. Executive Summary

The objective of this project is to identify fiscal initiatives to stimulate the development of commercially sustainable broadband for further investigation. It has been undertaken in the context of the UK government's stated policy objective of ensuring that the UK has "*the most extensive and competitive broadband market in the group of seven leading industrial nations by 2005*".

Prospective ideas for fiscal incentives have been developed following an investigation of public policy in other G7 countries together with Sweden and Korea. The key initiatives undertaken by other countries are discussed in Section 4 of this report and shown in detail in Section 8. In addition, we have undertaken some top level statistical relationship analysis between broadband penetration and certain variables

The analysis highlights three key lessons:

- Countries where broadband has the highest penetration (Korea, Canada and USA) all have actively involved governments, at both national and local level, promoting the development of broadband;
- Broadband infrastructure ownership appears to be critical to sustainable performance; and
- There is evidence of a relationship between broadband penetration and broadband availability.

The government's policy objective is to be delivered by private enterprise companies operating in a competitive market. It must, therefore, use policy incentives to ensure that the conduct of firms in the market supports national policy. Developers of broadband rely on a supply of investment funds from the capital markets and customers willing and able to pay for their services. Capital is less available and demand is materialising slower than anticipated.

We have put forward a "shopping list" of tax incentives designed to offer incentives to both customers and suppliers of broadband and to encourage the release of investment capital. From this list we propose that two should be considered in detail by government and industry to test the hypothesis that they would be beneficial to the develop of broadband:

- *Tax credits for companies investing in broadband infrastructure.* This would involve an extension of the existing tax credit scheme for investment in Research and Development (R&D) to broadband access networks. Evidence from the Institute for Fiscal Studies suggests that expenditure on R&D responds to changes in user cost with an elasticity

greater than unity¹. If capital expenditure responds to the same degree, then tax credits would stimulate broadband investment.

- *Tax relief on broadband access devices and services.* To stimulate take up of broadband, tax payers should be able to claim the cost of equipment and services against income tax so reducing the effective price. Fiscal measures are used to reduce demand, for example fuel tax. The targeted use of tax incentives could therefore be used to help increase demand.

We recommend that two further pieces of analytical work should be conducted:

- *An econometric analysis of the drivers of demand for Internet usage and broadband services.* This would require the development of econometric model examining the influence of key variables, for example domestic PC penetration, on the take up of Internet and, if feasible, broadband. Depending on the availability of data, the model could be constructed using time series data for one or more countries and/or cross sectional data across several countries.
- *An economic impact analysis of the two tax incentives proposed above.* A model needs to be produced calculating the impact of tax incentives on the overall economy. This would, *inter alia*, examine the secondary and tertiary effects of the extra investment stimulated by the incentive.

¹ "Do R&D Tax Credits Work? Evidence from an International Panel of Countries 1979 – 1994"
Institute of Fiscal Studies Working Paper Series No W99/8, March 1999

2. Introduction

The UK government (HMG) has set a target for the UK to have “*the most extensive and competitive broadband market in the group of seven leading industrial nations by 2005*”². The Organisation of Economic Co-operation and Development (OECD) has stated that the UK has lowest penetration of broadband service in the G7 and is 13th of the 15 European Union member states. There is a significant gap between government’s policy objectives and the OECD’s findings.

The purpose of this project is to identify prospective fiscal initiatives which should be considered by the HMG to achieve *commercially sustainable* development of “broadband” by 2005.

For the purposes of this project, “broadband” means *bi-directional access by residential and business consumers to entertainment, information and commercial services, using data or voice and data devices, at speeds greater than that accessible on the PSTN or GSM networks.*

“Commercially sustainable” means *the generation of a risk-proportionate return to investors from operational cash flows.*

To identify such measures, the project has examined activities in other G7³ countries, together with Sweden and Korea, for examples of commercially sustainable behaviour and the regulatory and fiscal policy which supports it.

² “UK Online: The Broadband Future” Office of the e-Envoy, February 2001

³ Canada, France, Germany, and USA only. Italy and Japan have not been included in this report.

3. Methodological Approach

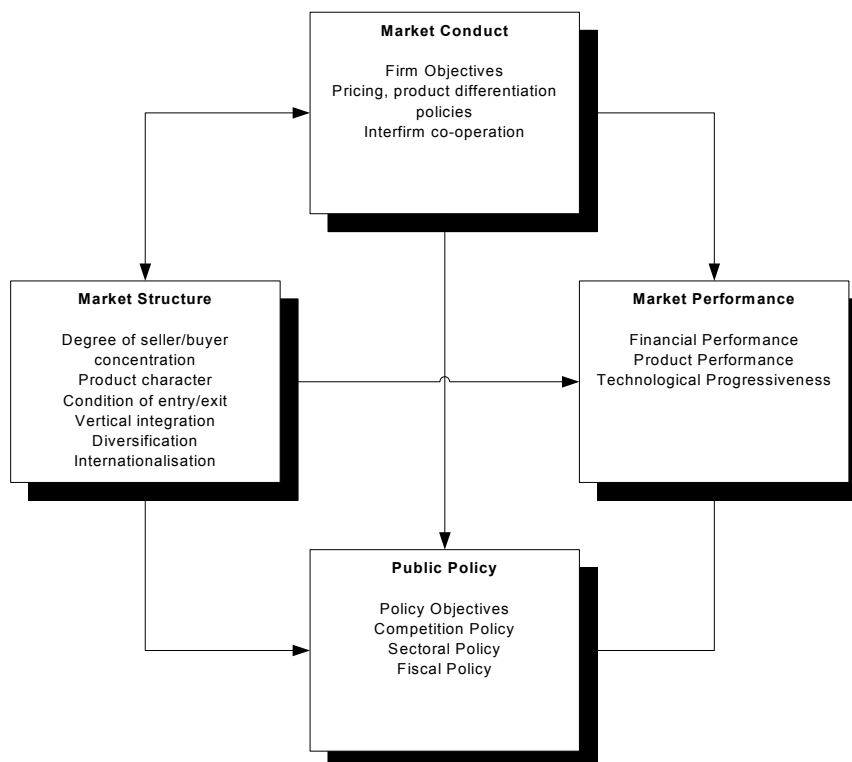
3.1 Analytical Framework

Given the task of establishing a link between commercial performance and public policy, EAG has used the “structure-conduct-performance-regulation” (SCPR) paradigm for examining markets and the dynamic relationships which exist within the market.

The paradigm starts from the premise that the way in which a market is organised (*structure*) influences the *conduct* of firms which affects the overall market *performance*, and that none of these three can be separated from public policy (*regulation*). Causal links run in all directions, thus whilst *conduct* affects *performance* the reverse is also true.

Figure 1 illustrates the relationship between structure, conduct, performance and regulation and the key features to be examined.

Figure 1: SCP Paradigm



This approach is particularly valid for this project as it allows us to illustrate the relationship between policy and performance, rather than examine either in isolation. Other standard approaches for market analysis, e.g. Porter’s “five forces” do not provide this opportunity.

Establishing examples of “commercially sustainable” behaviour has been challenging, largely due to the youth of broadband as an access technology. We have, therefore, had to look for examples of behaviour with a clear progress towards sustainability.

We have also particularly looked for examples of government actions, especially fiscal measures, which have helped to kick-start the development of broadband, but which can be removed once sustainability has been achieved.

Finally we have discussed the implications of activities in other countries for the UK, and put forward suggestions for policy initiatives in the UK.

3.2 Research Sources

Information has been obtained from a variety of sources. Primarily we have used the following:

- Newspaper articles
- National Regulatory Authorities’ websites
- OECD
- National and local government websites
- UBS Warburg Report on Broadband in Korea

Full details of information sources are included in Annex A.

4. Summary of Findings

This section presents a summary of the main findings of the research conducted for this report. Detailed information on each country is contained in Section 8.

4.1 Public Policy

All the countries examined in this study have a national objective for telecommunications, especially broadband, policy, some of which are more substantial than others. Sweden, for example, states its objective as becoming the “first information society”. Generally, governments all have the objective of being the “leader”. A range of policy initiatives are then put forward to achieve this goal.

Fiscal incentives, for both supply and demand side initiatives, have been relatively small scale with many focussed on meeting social policy goals. For example, in Germany, companies have been encouraged to sponsor PC’s in schools and other public institutions by removing the obligation to pay VAT.

In the USA, the Broadband Internet Access Act (equivalent to a Bill in the UK) is currently being debated by Ways and Means Committee of the House of Representatives. This Act would give tax credits of either 10% or 20% to companies building “current generation” or “next generation” broadband infrastructure in rural and underserved areas.

Some countries and regions within countries have been very active in providing more direct support through grants, soft loans and “anchor contracts”. At a national level, Korea is particularly active in funding broadband development, whilst State and Provincial governments are very active in the USA and Canada respectively.

Intervention in North America has tended to be targeted towards social policy, such as supporting underserved areas, rather than broadband through the whole nation. In general, local government bodies put out a tender for the development of a broadband network for their own use which is awarded to one supplier, or to a consortium. A key stipulation of any contract is that the network must be “open” to other access providers⁴.

The French government is beginning to support the development of broadband through the provision of “soft” loans.

Countries with more active governments, such as Korea, USA and Canada, have more developed broadband markets measured by percentage of population using broadband.

⁴ For further information on one scheme in the USA see www.state.pa.us or www.adelphia.com

4.2 Market Structure

Where broadband markets are flourishing there is an oligopoly with the incumbent operator against one or two competitors, mainly cable companies. The evidence suggests that cable companies are often proving more successful. For example, in the USA cable companies have 70% of the broadband market.

A key finding of this report is that competing DSL suppliers are struggling to establish commercial sustainability, and may not be able to do so.

In the USA, for example, competitive local exchange carriers (CLECs) have only 15% of the DSL market. The largest supplier (Covad) which has a 66% market share of that 15% (i.e. 10% of the DSL market) is now in Chapter 11 to protect itself from creditors, whilst two other suppliers, Rhythms and NorthPoint have recently ceased service. Likewise, in Germany, where local loop unbundling (LLU) has been available since January 1st 1998, Deutsche Telekom has over 95% of DSL connections. In Korea, which has far and away the highest penetration of broadband services, three companies have over 90% of the total market. Korea Telecom (KT) through its DSL service increased its market share by 7% in the six months to January 1st 2001.

This finding has particular implications for the United Kingdom as it appears that ownership of infrastructure may be key to establishing a sustainable market position.

4.3 Market Conduct

The heavy downward pressure on prices appears to be bottoming out, with evidence from Sweden, the USA and Germany that the low level of prices available there are making the market unsustainable for suppliers.

In Sweden, on 1st September Telia increased the price of DSL access for individual access from 250 SEK (£16.66) to 325 SEK (£21.66) per month. This price was considered too low and so customers were being tied into three year contracts, which proved unpopular⁵. Telia has also stated that revenues from advertising etc. was not making up for low access prices and so the price rise was a commercial imperative⁶.

In Germany, Deutsche Telekom was required to reduce its price for LLU by just 1 DM to DM24.40 (£7.80) after a detailed cost analysis conducted by Wissenschaftliches Institut für Kommunikationsdienste (Scientific Institute for Communication Services - WIK) on behalf of the German regulator

⁵ "The Swedish Telecommunications Market 2000", National Post & Telecom Agency, www.pts.se

⁶ Telia press release 20th March 2001

(RegTP). Competitors had called for a much larger reduction, whilst DT had asked for a 9DM price rise, both of which were rejected suggesting that DM24.40 is the long run average cost for DT⁷.

4.4 Sustainable Performance

Where the broadband market enjoys the highest penetration, Korea, evidence is beginning to emerge of commercial sustainability. Average Revenue per User (ARPU) for Korea Telecom's DSL is some 10% more than ARPU for ordinary telephone services and allows Korea Telecom to payback the cost of installing broadband services within 16 months. In Korea we also see a much greater time spent on line and the highest use of Internet based video and audio services⁸.

⁷ EAG has not seen the Analytical Cost Model and so can make no comment on its quality.

⁸ Korean Broadband Sector Review" UBS Warburg 2001

5. Analysis

2.1 Delivery of Government Policy Objectives

The UK government is dependent upon private enterprise firms operating in competitive markets to deliver its objectives. It cannot directly intervene to achieve its objectives and so must use policy instruments to change firms' conduct. Such policy instruments must provide incentives which meet the commercial imperatives of four key constituencies which are critical to the development of broadband:

Capital Markets and their regulators (i.e. the Bank of England and the Financial Services Authority) must believe that broadband represents an investment opportunity which will provide a risk-proportionate return;

Broadband Suppliers must believe that a market exists for their broadband service and so be prepared to spend their shareholders' funds on such developments;

Content Providers must believe that they will have a sufficient paying audience to justify investing shareholders' funds in generating material not available over existing channels.

Customers must see a benefit to them such that they are prepared to buy the service.

Unless the interests of all three parties are met, then there can be no guarantee that the UK will have *the most extensive and competitive broadband market in the group of seven leading industrial nations by 2005.*

At a time when capital markets have become less willing to invest in telecommunications, leading to broadband suppliers finding access to capital difficult *and* when customers have yet to take up broadband in significant numbers, government action is required to move forward. Several infrastructures owners have suggested that due to current market conditions, capital expenditure on broadband has been deferred. Some form of government intervention is therefore essential if its own objectives are to be met.

5.2 Drivers of Broadband Penetration

Using data available from the OECD, together with information from some other sources⁹ we have sought to establish whether there is any strong statistical relationship between the penetration of broadband and other variables.

Table 1 shows the correlation coefficients (R) for broadband penetration against each of the variables analysed.

Table 1: Correlation Coefficients

Variable	Correlation Coefficient (R)
Months since commercial launch of DSL	0.55
DSL Coverage %	0.49
Months since commercial launch of Cable Modems	0.35
DSL Price - Kbps per US\$ PPP per month	0.32
Internet Penetration (%)	0.27
GDP per capita	- 0.13
ISDN Penetration (%)	- 0.21

The strongest correlation is with the length of time that commercial DSL services have been available. Figure 2 plots the relationship between time available and penetration of broadband. The UK is represented by the square at the bottom of the chart and is rather below the expected penetration given the length of time broadband has been available. Korea, by contrast is substantially ahead of expectation.

Of course, there is nothing that can be done to change the date on which DSL services were launched. The second highest correlation, however, is between broadband penetration and the coverage of DSL¹⁰. Each country measures coverage slightly differently, some use households and some use customers. Despite this slight difference in metrics, a clear trend emerges. Figure 3 plots the relationship between the two variables.

Again we see a relationship between the two, though with an R2 of 0.33 it is not particularly strong. The slight curve in the trendline indicates an exponential relationship. Once again, however the UK is rather below the trendline, whilst Korea is substantially ahead of it.

⁹ In particular www.nua.ie

¹⁰ The available statistics are for DSL coverage. It would be necessary to undertake a similar analysis including cable coverage providing overlapping areas could be accounted for.

Figure 2: Relationship between months since DSL available and broadband penetration

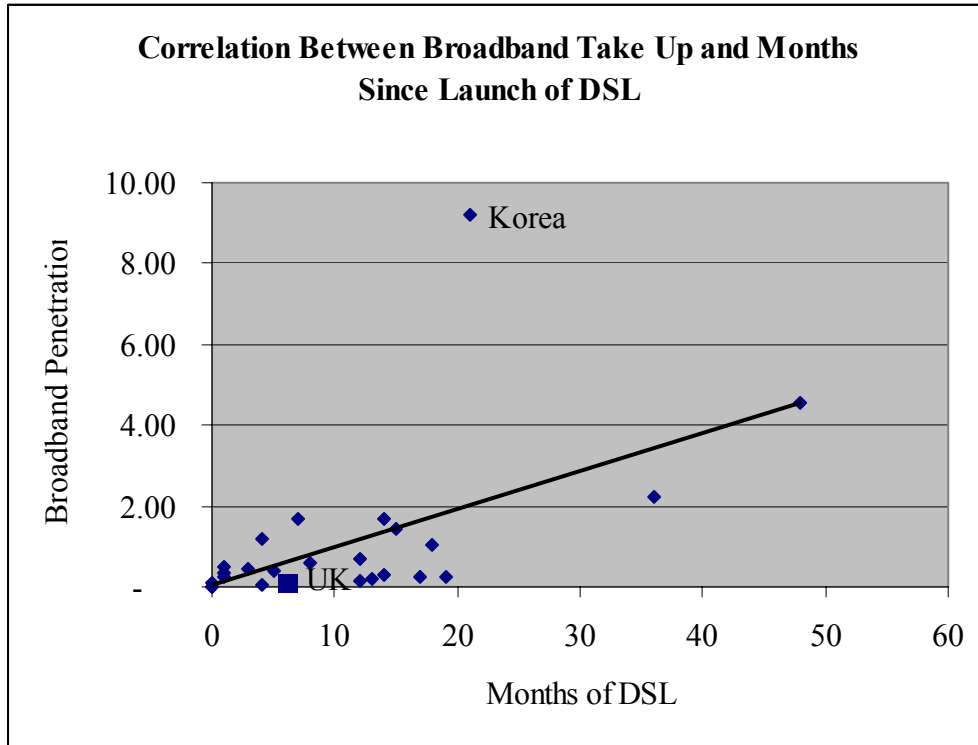
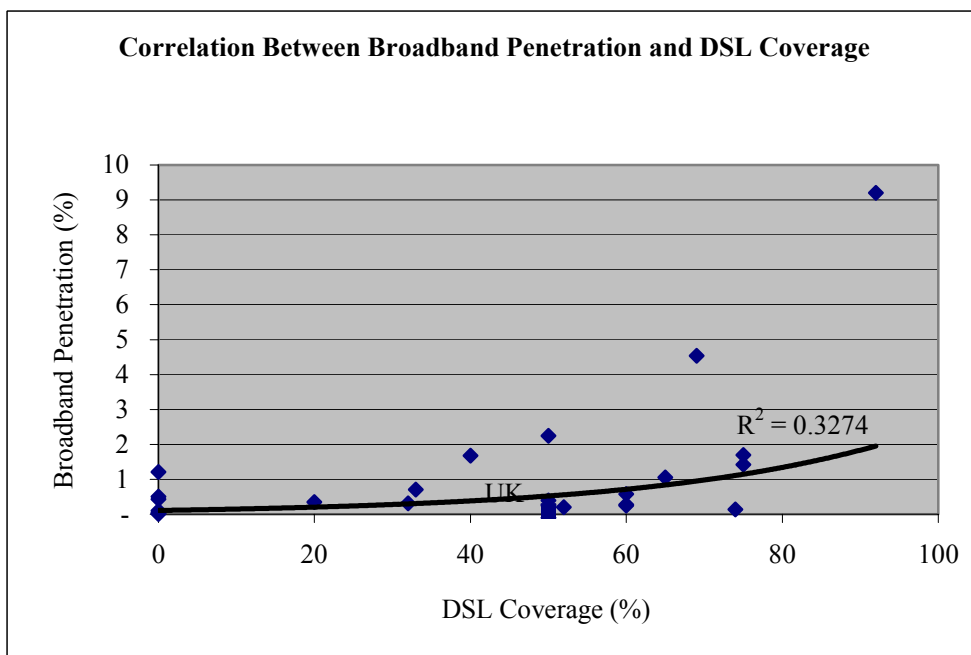
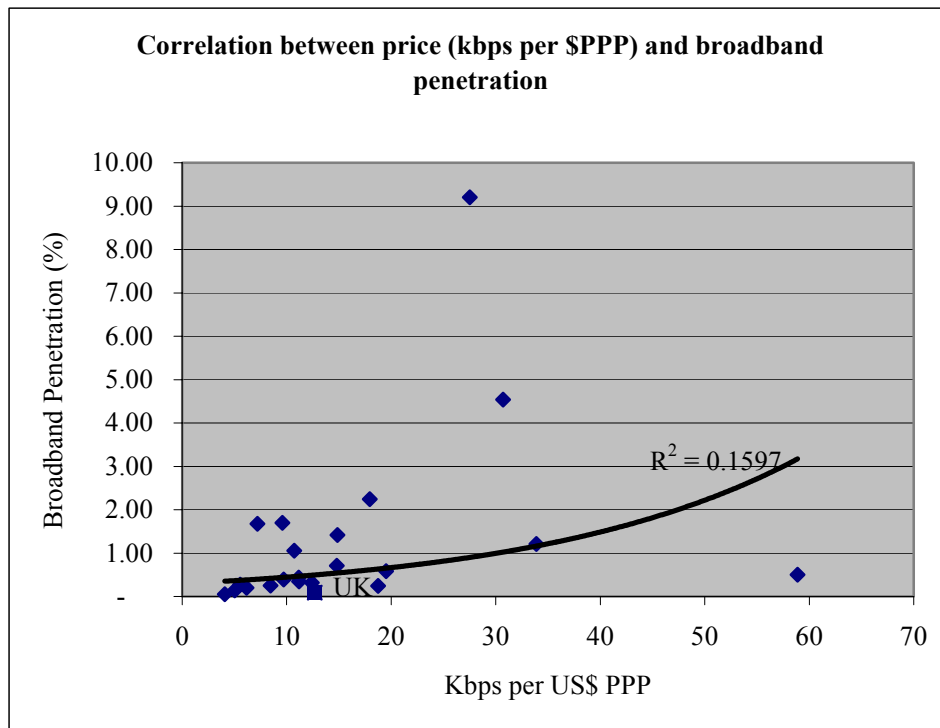


Figure 3: Correlation between Broadband Penetration and DSL Coverage



The correlation coefficient for “price” at +0.32 may appear surprising as price is normally negatively correlated to penetration. In this instance however, price is expressed as the number of kilobits per second, so the positive correlation is expected. Again we see a slight exponential trend with the UK slightly below the trendline.

Figure 4: Correlation between price and penetration



The correlation coefficient for GDP also appears surprising as it is negative. One would normally expect richer countries to enjoy a greater take up of services. Examining the data this surprising result is caused primarily by Korea and Canada which have a low GDP per capita but high take up of broadband. Both countries tend to be more interventionist which may explain the greater uptake of broadband.

6. Implications for the United Kingdom

If the UK government wishes to achieve its stated policy objectives it will need urgently to take focused initiatives, concentrating primarily on economic rather than social policy. Social policy goals can be delivered as a result of economic success.

The analysis of correlations shown in section 4 indicate two policy imperatives for the UK:

- i. Broadband coverage needs to be rapidly expanded to a level beyond that of the UK's competitors;
- ii. Prices need to be made more internationally competitive to unlock price elasticities of demand.

The specific observations below are made in the light of these two imperatives.

However, the statistical analysis above is high level and we would recommend that a more detailed econometric analysis is conducted to examine the causes of broadband penetration. This would involve the use, for example, simultaneous equations to examine causal feedback effects.

In contrast to measures aimed at promoting an area of social policy, fiscal measures aimed at promoting the broadband market generally, may lead to wider economic benefits and therefore have a neutral or even positive impact on tax revenue. This would come through increased economic activity and employment. Such an effect is particularly important at a time when government tax revenues are expected to fall.

How the public sector uses its power as a buyer of services, through aggregation of demand, to stimulate broadband is the subject of a different study being carried out by Rothchilds on behalf of the e-Envoy and is therefore not covered in this report.

We expect that stimulating the market through the provision of loans and grants would not be acceptable to HMG as it would be perceived as the government "picking winners".

Therefore, we have focused our recommendations on fiscal measures designed to stimulate both supply *and* demand. It is our strong view that a balanced approach must be taken to ensure that supply is not created without suitable demand or demand created which the cannot be met. Not all the measures would be equally effective or attractive to the market. The key suggestions we take forward are ones that, in our view, would allow broadband to emerge in a non-discriminatory manner.

6.1 Supply Side Measures

For companies to be encouraged to roll out broadband faster, and/or to targeted areas, the perceived risk to suppliers needs to be reduced. One way of achieving this could be through an effective reduction in the cost of capital for network build by using fiscal measures to encourage investment. Any policy should be technology neutral favouring neither wireline nor wireless services.

Our analysis above suggests that companies which do not own their own infrastructure find it difficult to enter and remain active in the market and that competition for broadband subscribers is between cable and DSL. Usually there is only one supplier for each of DSL and cable available to any single customer. Therefore urgent action needs to be taken to encourage the development of alternative infrastructures, e.g. broadband wireless or 3G Mobile, to make more alternatives available to customers.

Two specific measures need further investigation to establish their economic impact.

- **Capital Cost Allowances (CCA):** these allow companies to offset capital investment against taxable profit. Currently set at 25% of residual value per year, CCA could be brought forward so that more could be written off in the early years. Taxable profit is the profit as per the P&L account but with disallowable items added back, the most significant of which is depreciation. Whilst many telecommunications companies are making a loss on the P&L, the adding back in of depreciation may change to position.
- **Tax Credits** which tend to work in two ways: either a company may claim more of a given type of expenditure against tax than was actually spent, or loss making companies may surrender the ability to carry forward some losses in exchange for cash from the Exchequer. Current UK policy allows small and medium enterprises to claim tax credits on R&D either by increasing the amount a company can deduct for qualifying current expenditure from 100% to 150%, or loss making companies can surrender loss attributable to the Exchequer and receive a cash payment of 24% of qualifying R&D expenditure in return.

In the case of broadband, it would be possible to apply a similar scheme of relief to expenditure on developing certain types of network build. In the current circumstances, where most companies are loss making, a tax credit based system would be more attractive if the cash payment element was included.

The potential impact of both these measures on increasing the supply of broadband services and revenues for the Treasury, need further examination, as would there secondary and tertiary effects on the UK economy.

6.2 Demand Side Measures

A number of measures could be taken which would help stimulate demand for broadband services through an effective reduction in costs to the consumer, either residential or business. As with supply side measures, we propose that such measures should be technology neutral.

Some suggestions are made below, which need further investigation.

- A generally applied tax relief on the cost of broadband access devices and services. At this stage in the development of broadband, the topology of demand is difficult, if not impossible, to determine. A generally applied relief, i.e. not targeting any particular application or user segment, would therefore allow the demand side of the market to develop in an undistorted manner.
- Tax free use of company equipment: currently personal computers provided by a company to its employees for use at home are taxed as a benefit in kind. The government should consider allowing such personal use of all Broadband Access Devices to be exempt from taxation. This would include wireless broadband devices such as GPRS and UMTS devices.
- Similarly company funded broadband access lines to the home should be made free of tax.
- Tax breaks available to self employed persons, should be extended to the employed for the costs of all items related to broadband access. For example, Broadband Access Devices purchased by an individual, but used for business, should be tax deductible.
- Tax breaks for personal investment in training related to current employment should be extended to cover broadband access devices and services used to access education and training whether or not these are related to current employment, e.g. acquiring skills for a career change. Non-tax payers should receive a cash payment for proposed training using broadband.
- VAT exemption on Broadband Access Devices, network connections, subscription and usage charges. Eliminating VAT would have the effect of reducing prices for individuals and small

companies below the VAT threshold. Depending on the price elasticity of demand for such goods and services such an effective price reduction would therefore stimulate demand.

- The use of tax credits, discussed under supply side measures, could also be extended to business investment in broadband access devices and related equipment and services for access to services.

The possible effect of the above measures would need to be examined through a detailed analysis of the likely stimulant to demand resulting from the price reduction and its secondary and tertiary effects on economic activity and tax revenues.

3.1.1 Wider Regulatory Issues

We have stated earlier that broadband markets have become an oligopoly with intense competition between the incumbent (providing DSL) and usually one cable operator per area. Competing DSL providers have found it difficult to develop a sustainable business. Clearly alternative providers are finding both high barriers to entry and, perhaps more importantly, high barriers to *sustainable business development*. To the extent that such barriers can be reduced by further regulatory intervention, this needs to be done so as soon as possible.

To encourage investment in fibre to the curb/home (FTTC/H) any move to enforce unbundling of assets other than copper local loops should be resisted.

7. Recommendations

Based on the list of possible fiscal measures outlined in Section 6, we recommend that two proposals should be examined in more detail: Tax Credits for investment in broadband infrastructure, and tax incentives for domestic use of broadband. The hypothesis, which needs to be tested, is that both measures would lead to a substantial increase in the development of commercially sustainable broadband.

7.1 Tax Credits

The current tax credit regime for R&D expenditure by SME's allows companies either to increase their qualifying expenditure by 50% or, for loss making companies, to forgo offsetting attributable losses against future profits in return for a 24% cash payment.

We recommend that the government should examine a potential extension of this regime to cover investment by companies in broadband infrastructure. The incentive should not be restricted by size of company.

The purpose of this incentive would be to encourage additional investment. It would therefore need to be proved that such tax credits would stimulate such investment.

The Institute for Fiscal Studies (IFS) has conducted a study on tax credits for R&D¹¹. The study examined evidence from Australia, Canada, France, Germany, Italy, Japan, UK and USA, which all had rather different tax credit regimes for R&D. The primary conclusion of the study was that

“R&D responds to changes in its user cost with a long run elasticity of around unity. More interestingly, we also find that changes in the foreign user cost of R&D has an impact over where firms locate their R&D. This is consistent with tax competition models where governments compete for cross border R&D of multinational companies.”¹²

The study further established that responses to R&D tax credits varied by industry. The industry level regressions were conducted for manufacturing sectors and so did not include telecommunications. However, the sector Electronic Components, which includes network equipment, showed one of the highest elasticities, at -1.24 ¹³

¹¹ “Do R&D Tax Credits Work? Evidence from an International Panel of Countries 1979 – 1994”, IFS, March 1999. Available from www.ifs.org.uk

¹² *ibid*, p 2.

¹³ *ibid*, p 23

Were such a policy to prove effective, then the UK would benefit from both increased investment in broadband and a more attractive environment for overseas firms to invest.

Prima Facie, there is no reason to presume that firms' response to tax credits aimed at particular investments should be substantially different to their response to R&D tax credits. However, more detailed modelling would need to be undertaken looking at, for example, industry responses to changes in cost of capital.

7.2 Demand Side Tax Relief

As we have shown in this report, several countries are using some small scale tax incentives to increase demand for broadband. Specifically, Germany is offering tax relief to employees for business use of home computers.

We recommend that the UK government investigate how demand for broadband could be increased by the targeted use of tax relief for broadband access devices and services.

Tax policy can be used in a variety of settings to reduce demand. Arguably, above inflation increases in petrol and tobacco duty have been used deliberately to reduce demand for petrol leading to lower pollution levels. EAG recommends a reversed policy, i.e. using deliberately *lower* effective tax levels to stimulate demand. The principles of such a policy is already in place to stimulate charitable donations.

At the widest interpretation, tax payers should be allowed to claim part or all of the cost of broadband access devices and services against income tax. This would have the effect of lowering the price of such products and services. Assuming demand is responsive to price, there should therefore be an increase in demand for broadband.

We consider it important that tax relief of broadband should not be targeted towards any application area or user community. The broadband market is still in early days and consumers should be allowed to find their own areas of demand and not have their decisions affected by discriminatory policies.

Price elasticity of demand for long distance and international telecommunications is around -0.5 and tends to increase with the size of bill before slightly decreasing again¹⁴. Again, assuming such price elasticities are transferred to broadband services, any effective reduction in price should

¹⁴ See for example "The Changing Market for Inland and International Calls" D. Cracknell in "The Future of the Telecommunications Industry: Forecasting & Demand Analysis" D. Loomis and L Taylor ed. 1999.

result in an increase in demand. This assumption, however, would need further analysis to test in more detail.

8. Country by Country Analysis

Over the following pages are descriptions of the state of the broadband market in Germany, Korea, Sweden, France, USA and Canada using the structure-conduct-performance paradigm described in Section 3.

	Policy Framework		Market Structure	Market Conduct	Market Performance
Germany	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> Increase the speed of broadband technology to achieve a world leading position by 2005 	<ul style="list-style-type: none"> DSL market dominated by DT – low level of competition for DSL: DT 800,000 lines (although 1,000,000 lines had been sold by June 2001); CLECs 30,000 lines Cable assets of DT sold-off to private companies and being upgraded. Cable not yet ready to compete Little product differentiation 	<ul style="list-style-type: none"> Current objective for most firms is to build the market for broadband. DT's late divestiture in cable and its high penetration of ISDN has arguably delayed the broadband market DT able to dominate, and aims to have 2.6 million T-DSL subscribers by the end of 2001 (OECD). DT is offering DSL flatrate services to business users (particularly SMEs) and aggressively promoting these services with price reductions of upto 69%. In March 2001 over 335,000 customers were using a flat-rate T-DSL package DT plans to invest USD 1 billion in rolling out DSL infrastructure between 2001 and 2002. DT's goal is to enable 90% of households to connect to T-DSL by end of 2001 QSC, the largest of the CLECs, has installed DSLAM equipment in 	<ul style="list-style-type: none"> ULL price set (3/10) at DM 24.40 (£7.70) per month – only DM1 lower than previous rate. Can therefore be regarded as the lowest cost attainable by DT – disregarding x-inefficiency. DT had argued for the rate to be set higher at DM 34.03 (£10.75) a month Competitors finding it difficult to win market share at this cost given price ceiling also set by DT
	<ul style="list-style-type: none"> Demand side Fiscal measures 	<ul style="list-style-type: none"> Use of personal PC and Internet for work claimable against income tax 			
	<ul style="list-style-type: none"> Supply side Fiscal measures 	<ul style="list-style-type: none"> 			
	<ul style="list-style-type: none"> Loans & Grants 	<ul style="list-style-type: none"> 			
	<ul style="list-style-type: none"> Direct Investment 	<ul style="list-style-type: none"> DM 400m (£126.3m) for new network technology; DM 160m (£50.5m) for R&D networks; DM 100m (£31.6m) for curriculum development; min DM 4m p.a. for SME e-commerce programme; DM 115m (£36.3m) for e-libraries; DM 913.8m (£288.5m) for other direct funding (Industry Canada) 			
<ul style="list-style-type: none"> Education 	<ul style="list-style-type: none"> Internet skills part of general education Internet skills for 				

		<ul style="list-style-type: none"> unemployed Provision of PCs to schools free of VAT 		<p>over 40 German cities and 945 central offices. QSC plans to have 40,000-50,000 DSL lines sold in 2001. By the end of June 2001, QSC had 15,636 lines. Starting as an SDSL provider, QSC began offering an ADSL residential service after loss of investor confidence led to its share price to plummet</p> <ul style="list-style-type: none"> In May 2001, Mannesmann Arcor had approximately 10,000 DSL lines Shared line access is available for DSL competitors 	
	<ul style="list-style-type: none"> Price Regulation 	<ul style="list-style-type: none"> DT forced to cut access charges 			
	<ul style="list-style-type: none"> Other 	<ul style="list-style-type: none"> Promotion of competition for Internet access E-government Legal protection on e-commerce Bringing German VAT & other regulations in line with world practice Other directly funded programs to provide free or heavily subsidised Internet access to schools, R&D facilities. 			

	Policy Framework		Market Structure	Market Conduct	Market Performance
Korea	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> To set broadband connections ranging from 155 Mbps to 5 Gbits available nationally by 2005 	<ul style="list-style-type: none"> Broadband market dominated by 3 companies (CR3 = 90.5%) but KT increasing market share Cable modem market is dominated by Thrunet but has seen aggressive competition from KT and Hanaro, which has reduced its market share from 49%, at the end of 1999, to 19% by year-end 2000. Thrunet launched its own ADSL service in early 2001 As of May 2001, the cable market was led by Thrunet, Hanaro and Onse – with a combined market share of 90.5% 	<ul style="list-style-type: none"> For the DSL market in May 2001, KT had almost 74%, Hanaro had almost 23% whilst Dreamline had 3.3%. Hanaro announced in July 2001 that it had plans to take over Dreamline KT DSL prices range from \$23 - \$140 (£15.65 - £95) per month. In general there is heavy investment in the DSL market and low-priced connections to residential users with strong competition from cable operators Hanaro Telecom, KT's main competitor in the broadband market, was the first to offer DSL services in Korea. IP telephony is also a factor in the vigorous growth of broadband. By December 2000 there were 4.3 million subscribers to an IP 	<ul style="list-style-type: none"> 50% KT revenues expected to come from new growth areas, especially broadband. Forecast EBITDA growth of 17% CAGR for 3 years¹⁵ Broadband ARPU ca. 35,000 Won (£18) cf. 31,000 Won for fixed line. Broadband capex per sub = 550,000 Won – payback = 16 months. Product performance: DSL accounts for over 55% of the broadband market in Korea whilst cable modems account for over 31%. There were 342,000 DSL subscribers and 198,000 cable TV subscribers in March 2001. Building and Apartment LANs, broadband wireless and satellite are other competing technologies making up the remaining 14%
	<ul style="list-style-type: none"> Demand side Fiscal measures 				
	<ul style="list-style-type: none"> Supply side Fiscal measures 				
	<ul style="list-style-type: none"> Loans & Grants 	<ul style="list-style-type: none"> Low interest long term loans provided for R&D and facilities investment of small firms 			
	<ul style="list-style-type: none"> Direct Investment 	<ul style="list-style-type: none"> Govt. to invest 600 billion Won (£325m) to 2005 to promote digital content. Part of investment to be spent on infrastructure Fibre optic backbone to be funded by the govt. Local access by private sector. Approximately 32 trillion won (£17bn) will be invested in building the Korean Information Infrastructure by 2010 			

	<ul style="list-style-type: none"> • Education 	<ul style="list-style-type: none"> • Access to PCs at schools and offices • Tax & legal support for IT training agencies • 101 billion won (£51m) to train ICT experts 		<p>telephony service. IP telephony companies offer heavily discounted or free PC to PSTN phone international calls</p> <ul style="list-style-type: none"> • Due to high urban density, providers have been quick to exploit this market niche and offer Building and Apartment LANs (approximately 13% of the broadband market) • KT reallocated its advertising budget in 2001 shifting the emphasis on its broadband services from international and national telephony services. 	<ul style="list-style-type: none"> • Thrunet signed an agreement with Softbank Corp in Japan, December 2000, for US\$250 million (£170.15m) of investment
	<ul style="list-style-type: none"> • Price Regulation 	<ul style="list-style-type: none"> • Internet service via high speed network “at reasonable prices” 			
	<ul style="list-style-type: none"> • Other 	<ul style="list-style-type: none"> • KT & Hanaro investment in new FTTC lines protected from unbundling requirements – ULL only applies to KT copper 			

¹⁵ Source; UBS Warburg

	Policy Framework		Market Structure	Market Conduct	Market Performance
Sweden	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> Broadband connectivity to reach 98% of towns and villages by 2004 	<ul style="list-style-type: none"> 10 providers of DSL, 5 Cable TV, many property network providers offering Building and Apartment LANs 5 applications for wireless broadband licences. To be released in October 2001 Com Hem (Telia's cable network) has approximately 60% of the cable TV market share Telia had, in May 2001, over 68,000 DSL and LAN broadband connections B2 increased its subscribers, in Q1 2001 to 18,700 from 12,000 	<ul style="list-style-type: none"> BB prices have been too low, at ca. 200 SEK (over £12) per month. To compensate for low prices companies have locked in customers on long term contracts. From Spring 2001 this is changing as prices are going up, but contract lengths going down: higher returns for suppliers, more flexibility for consumers. Telia announced in September 2001 that it intends to raise the price of its residential DSL services by 30% Property networks tend to have exclusive agreements with content providers so creating vertical integration – PTS concerned about new monopolies. Operators defend practice by saying that high content margins are needed to off set costs of network. However increased prices (see above) may reduce this need. 	<ul style="list-style-type: none"> Low returns commensurate with low prices. Product performance: Approx 200,000 broadband (> 500 kbit) users at Dec 2000: 13% DSL, 38% Cable TV, 47% “other > 2 Mbit/s”, 2% “other < 2 Mbit/s”. Other is mainly Building & Apartment LANs. B2 announced in September 2001 that it has raised SKr 2.4 billion (£154.5m) in new equity to fund its roll-out of broadband network in 32 Swedish cities. Since December 2000, B2 had losses of upto SKr 1.26 billion (£81.1m) while revenues were only SKr 73 million (£4.7m). B2's biggest shareholder is NTL
<ul style="list-style-type: none"> Supply side Fiscal measures 	<ul style="list-style-type: none"> Tax relief proposed as a means of encouraging access to bb infrastructure 				
<ul style="list-style-type: none"> Demand side measures 	<ul style="list-style-type: none"> Tax relief to subscribers aimed at encouraging accession to bb networks. PC Reform in 1998, tax relief for businesses buying PCs which were sold to employees, tax free, for home use 				
<ul style="list-style-type: none"> Direct Investment 	<ul style="list-style-type: none"> 17 billion SEK (£1.09bn) investment in broadband technology over 4 years, includes the following: <ul style="list-style-type: none"> 5.8bn SEK (£373m) allocated for direct funding and tax relief (IC) SEK 2.5bn (£161m) 				

		invested by Swedish National Grid (Kraftnat) to extend the 10,000 km dark fibre backbone (IC)			
	• Education	<ul style="list-style-type: none"> • SEK 30m (£1.93m) on IT competence training for small businesses • Special IT programme for schools • 40,000 additional higher education places by 2003 with emphasis on technology and natural sciences 			
	• Price Regulation	•			
	• Other	<ul style="list-style-type: none"> • Introduction of EU legislation on electronic signatures • National IT infrastructure programme • Introduction of broadband programme for disabled people 			<ul style="list-style-type: none"> • Telia has broadened its range of broadband services – it had, in November 2000, agreements with 22 providers of Internet-based services in education and entertainment. Telia is promoting its ADSL service and has entered into a co-operation agreement with the Swedish Association of Private House Owners to provide ADSL to homes. • Bredbandsbolaget (B2), one of Telia’s rivals, is currently rolling out a fibre-optic network linking key metropolitan areas in Sweden and Norway. B2 extends its fibre-optic networks to customers’ buildings and switched Ethernet networks within buildings. B2, which offers SDSL, was connected to 103,000 households in January 2001 and had 18,700 subscribers in Q1 2001. It encourages users to host

		<ul style="list-style-type: none"> Utility Easements Act was revised in July 2001 to facilitate the expansion of backbone, regional, urban and local loop broadband networks 		<p>multi-media content. This is a contrast to most DSL providers who discourage users from running servers and set limits on the amount of material uploaded</p>	
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	Policy Framework		Market Structure	Market Conduct	Market Performance
France	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> To have national broadband access by 2005 	<ul style="list-style-type: none"> There are over 8 providers in the cable modem market. The market is dominated by Noos (Suez) and France Telecom Cable with 51% and 24% respectively. By the end of 2000, Noos had 63,000 cable modem subscribers 	<ul style="list-style-type: none"> ART, the French telecoms regulator, has stated that the deregulation of the high-speed data transmission market is unsatisfactory. ART has advised FT to lower rental lines tariffs to alternative operators, as there are still zones where FT is the only operator with network 	<ul style="list-style-type: none"> FT has so far resisted having to introduce flat-rate charges to allow unlimited Internet access.
	<ul style="list-style-type: none"> Demand side Fiscal measures 	<ul style="list-style-type: none"> 			<ul style="list-style-type: none"> Seven operators (originally 39 companies) are expected to set up and offer DSL services by leasing local loop from FT.
	<ul style="list-style-type: none"> Supply side Fiscal measures 	<ul style="list-style-type: none"> Cheap loans of about \$1.3bn (£885m) to construct high speed web connections 			
	<ul style="list-style-type: none"> Loans & Grants 	<ul style="list-style-type: none"> \$130m (£88.5m) cheap credits to support rural 3G infrastructure – matched by \$52m (£35.4m) from local telcos \$190 (£129) to lay fibre trunks to rural areas Under Collective Use of the Internet by SMEs (UCIP) initiative, SMEs could receive direct subsidies, specific grants (for training and education) and financial aid to promote access to broadband networks. No amounts specified. UCIP was first 	<ul style="list-style-type: none"> The French broadband market is dominated by FT – its cable and DSL high speed Internet access. FT announced plans to float its cable business in the future By June 2001, FT had sold an estimated 177,000 DSL lines 11 million FT lines were DSL capable of providing DSL services. FT’s goal is to have 66% of all its lines DSL capable by the end of 2002. (OECD) According to March 2001 figures from AFORM, the French multiservices 	<ul style="list-style-type: none"> ADSL prices were relatively high in France - approx. 475F/ month all included (£45). In 2001, FT decreased the price of its residential ADSL service to approximately 300F (£28), including tax per month FT stated that it planned “to make DSL a mass market phenomenon in France.” FT plans to invest USD 354 million (£241m) during 2000-2002, to upgrade its DSL network. FT aims to have 600,000 DSL subscribers by the end of 2001. 	<ul style="list-style-type: none"> Product performance: France had 60,000 DSL subscribers and over 151,000 cable subscribers by June 2001. Mangoosta, a pioneer of ADSL technology in France, was put into liquidation in August 2001. Subiteo, another alternative ADSL access operator, is also having serious financial problems.

		launched in 1998 and the Secretary of State for Industry has issued an Invitation to Tender for 2001	network association, over 4.8% of households subscribing to cable has high-speed Internet access.		
	• Direct Investment	•			
	• Education	•			
	• Price Regulation	•			
	• Other	<ul style="list-style-type: none"> • Bourdier report, commissioned by the Secretary of State for Industry, issued in March 2000, to provide the foundation for a broadband access development policy. The report reviewed broadband development and made specific policy proposals. • Proposed the following: no citizen to be more than 15 Km from. Also broadband access subsidies and tax deductions for entities to upgrade to broadband access 	<ul style="list-style-type: none"> • Wireless Local Loop licences (Licences BLR) were awarded in July 2000 (38 regional and 7 national licences have been awarded). 	<ul style="list-style-type: none"> • According to the European Commission, no unbundled lines were being used to deliver DSL in June 2001. Shared line access is available for DSL competitors • Wholesale DSL services are available from FT for resale by ISPs 	

	Policy Framework		Market Structure	Market Conduct	Market Performance
USA	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> The Broadband Internet Act 2001 aims to accelerate deployment of current generation broadband access to the Internet for users located in low income and rural areas and to accelerate deployment of next generation broadband access for all Americans 	<ul style="list-style-type: none"> DSL Market 3.3m in service -ILEC's 84%, CLECs 15% and IXC's 1% (2nd Q 2001) Covad represents ca. 66% of CLEC DSL lines The cable market was led by Time Warner Cable (with 26% of the market) closely followed by AT&T (25%) and Comcast (12.5%) in Q2 2001. There are over 10 providers offering cable modem services but not all compete in the same geographical regions For the DSL market as of June 2001, SBC had 1,042,000 subscribers, followed by Verizon and Bell South with 840,000 and 381,000 respectively 	<ul style="list-style-type: none"> DSL Access providers beginning to put together deals with content providers to mix of services Cable providers already have good mix of services SBC's Pronto project aims to invest \$6 billion (£4.08bn) to provide 77 million Americans with DSL by the end of 2002 M&A activity is expected in the cable market. AT&T Broadband and Comcast announced, in July 2001, a proposal to merge. This was followed by an announcement, in September 2001, from AOL Time Warner of a proposal to merge its cable television operations with AT&T Broadband Aggressive marketing campaigns not only promoting the provider but also the broadband technology. Charter 	<ul style="list-style-type: none"> Covad, Rhythms and NorthPoint (all CLECs) are in chapter 11. Rhythms announced on 10th August 2001 that it would issue service termination notices to its customers. Covad has made an agreement in writing to vote in favour of a reorganisation plan to eliminate \$1.4 billion (£953m) of long term debt by January 2002 Product performance: cable companies have 70% share of broadband market, cf 30% for DSL Significant cable product development helping cable remain competitive. Cable lines are reportedly cheaper and quicker to install than DSL. Also DSL is suffering from some bad press and word-of-mouth, via Internet sites SBC and Verizon are experiencing a slowdown in growth of their new
	<ul style="list-style-type: none"> Demand side measures 	<ul style="list-style-type: none"> 			
	<ul style="list-style-type: none"> Supply side Fiscal measures 	<ul style="list-style-type: none"> Broadband Internet Access Act 2001: 10 – 20% tax credits for deployment of 1.5 Mbits/200 Kbits or 22 Mbits/5 Mbits respectively to residential customers in rural and underserved areas. So far a proposal and currently stalled in the "Ways and Means Committee" of Congress. 			
	<ul style="list-style-type: none"> Loans & Grants 	<ul style="list-style-type: none"> Various local initiatives (see below) with highly localised 			

		funding arrangements.			
	<ul style="list-style-type: none"> • Direct Investment 	<ul style="list-style-type: none"> • Ditto 			
	<ul style="list-style-type: none"> • Education 	<ul style="list-style-type: none"> • 			
	<ul style="list-style-type: none"> • Price Regulation 	<ul style="list-style-type: none"> • 			
	<ul style="list-style-type: none"> • Other 	<ul style="list-style-type: none"> • PA – 5 year \$230 million (£156.5m) contract to build state-wide bb network: State is the “anchor tenant”. Sate government telecoms to be on a single open network so that access providers can us it as their backbone. • First contract extend network along I-99 corridor to underserved areas. • 251 community broadband projects with variety of funding systems¹⁶ 		<p>Communications filed a lawsuit against SBC, in September 2001, for its DSL adverts which claim that cable modem speeds decrease during peak usage periods</p> <ul style="list-style-type: none"> • SBC increased its monthly DSL charges 25%, from \$40 to \$50 (£27 to £34) in March 2001 	<p>DSL subscribers. Verizon is falling short of its own target of 1.25 million new DSL connections by the end of 2001. Bell South set a target of 600,000 new subscribers by year end but currently needs to increase its new subscriber rate by almost 40% to achieve this target</p>

<ul style="list-style-type: none"> Canada 	<ul style="list-style-type: none"> Policy Objective Demand side Fiscal measurer Supply side Fiscal measures Loans & Grants Direct Investment 	<ul style="list-style-type: none"> Basic broadband access for all Canadians by 2004 Broadband Task Force has issued a report with recommendations to stimulate demand by way of a Community Aggregator Model – governments would invest in user-based demand aggregators Broadband Task Force also recommends an Infrastructure Support Model which focuses on incentives (such as funding to network builders) to stimulate broadband development Broadband Task Force proposed Infrastructure Support Model & Community Aggregator Model to promote development of supply and demand of broadband. May 1996 Ontario government launched 	<ul style="list-style-type: none"> The Canadian cable modem market is dominated by four operators – Shaw (43%), Rogers (32%), Videotron (15.5%) and Cogeco (8%) Bell Canada is leading the DSL market with 78% of the market (529,000 subscribers) as of June 2001. Followed by Telus and Manitoba with 18% and 3% market share respectively. However these cable companies do not compete in the same geographical areas Wildblue, a satellite broadband operator, plans to launch an interactive broadband service to cover Canada by 2003. Spectrum at 24 and 38 Gigahertz frequency band was auctioned in October 1999 for broadband wireless. 13 licences for Multipoint Communications Systems (MCS) in the 2500 MHz 	<ul style="list-style-type: none"> TELUS announced in November 2000, that it would invest USD 321 million (£218.5m) over 5 years, to expand DSL services in British Columbia and Alberta. In 2001, TELUS plans to invest USD 122 million (£83m) on ADSL to double the number of subscribers Rogers Communications and Le Groupe Videotron, both cable operators, announced in March 2001, that they plan to merge. Rogers-Videotron will pass 47% of Canadian households (5.1 million homes) and have 3.6 million cable TV subscribers Rogers Cable and Bell Canada are competing aggressively on bundling services as well as prices for their DSL services. In September 2001, Rogers Cable has bundled its @Home service with Dell 	<ul style="list-style-type: none"> 93% of Canadian households are passed by cable, of which 73% were cable subscribers in 1999 There were 1,211,988 cable modem subscribers in June 2001. Whilst DSL subscribers totalled to over 541,814 for the same period Slowdown in the DSL market, Bell Canada added 63,000 new subscribers in Q2 of 2001 compared to 171,000 in Q1 2001.
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		<p>Telecommunications Access Partnership fund to promote initiatives around the State – wound down in 1999 as part of cost savings. Example projects: Broadband Multimedia Wireless System, CND\$1m (£0.43m) TAP funding matched by CND\$2.6m (£1.13m) private funding; Region of Waterloo Rural Community Networks, CND\$525k (£227.6k) matched by CND\$933k (£404k)</p> <ul style="list-style-type: none"> • Replaced by SuperBuild Growth Fund of CND\$50m (£21.65m) to develop 50 smart communities across Ontario by 2005. • Government of Quebec has provided accelerated depreciation for investments in rural fibre-optic transmission facilities • Alberta’s government is 	band were awarded in March 2000. MCS enables operators to offer a variety of services – voice, data, multimedia and broadcasting directly to residential and business users	and Futureshop PC leases	
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		<p>providing \$193 million (£83.6m) to fund the Alberta SUPERNET, which will connect every hospital, school, library and government facility in the province</p>			
	<ul style="list-style-type: none"> • Education 	<ul style="list-style-type: none"> • Connect Yukon initiative plans to provide interactive video conferencing capabilities to rural schools and affordable high-speed Internet access to rural businesses and homes. The Yukon government will contribute over \$20 million (£8.7m) of funding in capital and operating costs over 5 years • Government of Saskatchewan has developed the CommunityNet project, with financial support from the Government of Canada (Western Economic Diversification). Plans to provide high-speed Internet access to 366 communities, 839 			

		educational facilities and 86 First Nation schools as well as health and governmental facilities.			
	• Price Regulation	•			
	• Other	•			

	Policy Framework		Market Structure	Market Conduct	Market Performance
Korea	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> To set broadband connections ranging from 155 Mbps to 5 Gbits available nationally by 2005 	<ul style="list-style-type: none"> Market dominated by 3 companies (CR3 = 90.5%) but KT increasing market share (37% - 44% in 6 months) For the DSL market in May 2001, KT had almost 74%, Hanaro had almost 23% whilst Dreamline had 3.3%. Hanaro announced in July 2001 that it plans to take over Dreamline in the next 2 – 3 months. Cable modem market is dominated by Thrunet 	<ul style="list-style-type: none"> KT DSL prices range from \$23 - \$140 per month Hanaro Telecom, KT's main competitor in the broadband market, was the first to offer DSL services in Korea. Hanaro aims to double its subscriber base to 2.1 million by IP telephony is also a factor in the vigorous growth of broadband. By December 2000 there were 4.3 million subscribers to an IP telephony service (OECD). IP telephony companies offer heavily discounted or free PC to PSTN phone international calls Due to high urban density, providers have been quick to exploit this market niche and offer Building and Apartment LANs (approximately 13% of the broadband market) 	<ul style="list-style-type: none"> 50% KT revenues expected to come from new growth areas, especially broadband. Forecast EBITDA growth of 17% CAGR for 3 years¹⁷ Broadband ARPU ca. 35,000 Won (£18) cf. 31,000 Won for fixed line. Broadband capex per sub = 550,000 Won – payback = 16 months. Product performance: DSL accounts for over 55% of the broadband market in Korea whilst cable modems account for over 31%. There were 342,000 DSL subscribers and 198,000 cable TV subscribers in March 2001. Building and Apartment LANs, broadband wireless and satellite are other competing technologies making up the remaining 14%
	<ul style="list-style-type: none"> Demand side Fiscal measures 				
	<ul style="list-style-type: none"> Supply side Fiscal measures 				
	<ul style="list-style-type: none"> Loans & Grants 	<ul style="list-style-type: none"> Low interest long term loans provided for R&D and facilities investment of small firms 			
	<ul style="list-style-type: none"> Direct Investment 	<ul style="list-style-type: none"> Govt. to invest 600 billion Won (£325m) to 2005 to promote digital content. Part of investment to be spent on infrastructure Fibre optic backbone to be funded by the govt. Local access by private sector. Approximately 32 trillion won (£17bn) will be invested in building the Korean Information Infrastructure by 2010 			
<ul style="list-style-type: none"> Education 	<ul style="list-style-type: none"> Access to PCs at schools and offices 				

		<ul style="list-style-type: none"> • Tax & legal support for IT training agencies • 101 billion won (£51m) to train ICT experts 			
	• Price Regulation	<ul style="list-style-type: none"> • Internet service via high speed network “at reasonable prices” 			
	• Other	<ul style="list-style-type: none"> • KT & Hanaro investment in new FTTC lines protected from unbundling requirements – only applies to KT copper 			

	Policy Framework		Market Structure	Market Conduct	Market Performance
Sweden	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> Broadband connectivity to reach 98% of towns and villages by 2004. (OECD) 	<ul style="list-style-type: none"> 10 providers of DSL, 5 Cable TV, many property network providers offering Building and Apartment LANs 5 applications for wireless broadband licences. To be released in October 2001 Com Hem (Telia's cable network) has approximately 60% of the cable TV market share (OECD) Telia had, in May 2001, over 68,000 DSL and LAN broadband connections 	<ul style="list-style-type: none"> BB prices have been too low, at ca. 200 SEK per month. To compensate for low prices companies have locked in customers on long term contracts. From Spring 2001 this is changing as prices are going up, but contract lengths going down: higher returns for suppliers, more flexibility for consumers. Telia announced in September 2001 that it intends to raise the price of its residential DSL services by 30% Property networks tend to have exclusive agreements with content providers so creating vertical integration – PTS concerned about new monopolies. Operators defend practice by saying that high content margins are needed to off set costs of network. However increased prices (see above) may reduce this need. Telia has broadened its range of broadband services – it had, in November 2000, agreements with 22 providers of Internet-based 	<ul style="list-style-type: none"> Low returns commensurate with low prices. Product performance: Approx 200,000 broadband (> 500 kbit) users at Dec 2000: 13% DSL, 38% Cable TV, 47% “other > 2 Mbit/s”, 2% “other < 2 Mbit/s”. Other is mainly Building & Apartment LANs.
<ul style="list-style-type: none"> Supply side Fiscal measures 	<ul style="list-style-type: none"> Tax relief proposed as a means of encouraging access to bb infrastructure 				
<ul style="list-style-type: none"> Demand side measures 	<ul style="list-style-type: none"> Tax relief to subscribers aimed at encouraging accession to bb networks. PC Reform in 1998, tax relief for businesses buying PCs which were sold to employees, tax free, for home use 				
<ul style="list-style-type: none"> Direct Investment 	<ul style="list-style-type: none"> 17,000 million SEK investment in broadband technology over 4 years, includes the following: <ul style="list-style-type: none"> 5.8bn SEK allocated for direct funding and tax relief (IC) SEK 2.5bn invested by Swedish National Grid (Kraftnat) to extend the 10,000 km dark fibre backbone (IC) 				
<ul style="list-style-type: none"> Education 	<ul style="list-style-type: none"> SEK 30m on IT competence training for small businesses Special IT programme for schools 40,000 additional 				

		higher ed. Places by 2003 with emphasis on technology and natural sciences		services in education and entertainment. Telia is promoting its ADSL service and has entered into a co-operation agreement with the Swedish Association of Private House Owners to provide ADSL to homes.	
	• Price Regulation	•			
	• Other	<ul style="list-style-type: none"> • Introduction of EU legislation on electronic signatures • National IT infrastructure programme • Introduction of broadband programme for disabled people • Utility Easements Act was revised in July 2001 to facilitate the expansion of backbone, regional, urban and local loop broadband networks 		<ul style="list-style-type: none"> • Bredbandsbolaget (B2), one of Telia's rivals, is currently rolling out a fibre-optic network linking key metropolitan areas in Sweden and Norway. B2 extends its fibre-optic networks to customers' buildings and switched Ethernet networks within buildings. B2, which offers SDSL, was connected to 103,000 households in January 2001. It encourages users to host multi-media content. This is a contrast to most DSL providers who discourage users from running servers and set limits on the amount of material uploaded (OECD) 	

	Policy Framework		Market Structure	Market Conduct	Market Performance
France	<ul style="list-style-type: none"> • Policy Objective 	<ul style="list-style-type: none"> • To have national broadband access by 2005 	<ul style="list-style-type: none"> • There are over 8 providers in the cable modem market. The market is dominated by Noos (Suez) and France Telecom Cable with 51% and 24% respectively. By the end of 2000, Noos had 63,000 cable modem subscribers (OECD) • The French broadband market is dominated by FT – its cable and DSL high speed Internet access. FT announced plans to float its cable business in the future • FT stated that it planned “to make DSL a mass market phenomenon in France.” FT plans to invest USD 354 million during 2000-2002, to upgrade its DSL network. FT aims to have 600,000 DSL subscribers by the end of 2001 • 11 million FT lines were DSL capable of providing 	<ul style="list-style-type: none"> • ART, the French telecoms regulator, has stated that the deregulation of the high-speed data transmission market is unsatisfactory. ART has advised FT to lower rental lines tariffs to alternative operators, as there are still zones where FT is the only operator with network • ADSL prices were relatively high in France (approx. 475F/ month all included). In 2001, FT decreased the price of its residential ADSL service to approximately 300F, including tax per month 	<ul style="list-style-type: none"> • FT has so far resisted having to introduce flat-rate charges to allow unlimited Internet access. • Seven operators (originally 39 companies) are expected to set up and offer DSL services by leasing local loop from FT. • Product performance: France had 60,000 DSL subscribers and over 151,000 cable subscribers by June 2001. • Mangoosta, a pioneer of ADSL technology in France, was put into liquidation in August 2001. Subiteo, another alternative ADSL access operator, is also having serious financial problems.
	<ul style="list-style-type: none"> • Demand side Fiscal measures 				
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	<ul style="list-style-type: none"> • Loans & Grants 	<ul style="list-style-type: none"> • \$130m cheap credits to support rural 3G infrastructure – matched by \$52m from local telcos. • \$190 to lay fibre trunks to rural areas • Under Collective Use of the Internet by SMEs (UCIP) initiative, SMEs could receive direct subsidies, specific grants (for training and education) and financial aid to promote access to broadband networks. No amounts specified. UCIP was launched in 1998 and the Secretary of State for Industry has rela 			
	<ul style="list-style-type: none"> • Direct Investment 				
<ul style="list-style-type: none"> • Education 					
<ul style="list-style-type: none"> • Price Regulation 					

	<ul style="list-style-type: none"> • Other 	<ul style="list-style-type: none"> • Bourdier report, commissioned by the Secretary of State for Industry, issued in March 2000, to provide the foundation for a broadband access development policy. The report reviewed broadband development and made specific policy proposals. • Proposed the following: <ul style="list-style-type: none"> - no citizen to be more than 15 Km from broadband access - subsidies and tax deductions for entities to upgrade to broadband access. • Collective Use of the Internet by SMEs (UCIP) – promotes improvements to SME access to broadband networks 	<p>DSL services. FT's goal is to have 66% of all its lines DSL capable by the end of 2002. (OECD)</p> <ul style="list-style-type: none"> • According to March 2001 figures from AFORM, the French multiservices network association, over 4.8% of households subscribing to cable has high-speed Internet access. • Wireless Local Loop licences (Licences BLR) were awarded in July 2000 (38 regional and 7 national licences have been awarded). 		
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	Policy Framework		Market Structure	Market Conduct	Market Performance
USA	<ul style="list-style-type: none"> Policy Objective 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> DSL Market 3.3m in service -ILEC's 84%, CLECs 15% and IXC's 1% (2nd Q 2001) Up by 14% on Q1. Covad represents ca. 66% of CLEC DSL lines Cable companies have 70% share of broadband market, cf 30% for DSL 	<ul style="list-style-type: none"> DSL Access providers beginning to put together deals with content providers to mix of services Cable providers already have good mix of services 	<ul style="list-style-type: none"> Covad, Rhythms and NorthPoint (all CLECs) are in chapter 11 Significant cable product development helping cable remain competitive. Product performance: cable companies have 70% share of broadband market, cf 30% for DSL
	<ul style="list-style-type: none"> Demand side measures 	<ul style="list-style-type: none"> 			
	<ul style="list-style-type: none"> Supply side Fiscal measures 	<ul style="list-style-type: none"> Broadband Internet Access Act 2001: 10 – 20% tax credits for deployment of 1.5 Mbits/200 Kbits or 22 Mbits/5 Mbits respectively to residential customers in rural and underserved areas. So far a proposal and currently stalled in the “Ways and Means Committee” of Congress. 			
	<ul style="list-style-type: none"> Loans & Grants 	<ul style="list-style-type: none"> Various local initiatives (see below) with highly localised funding arrangements. 			
	<ul style="list-style-type: none"> Direct Investment 	<ul style="list-style-type: none"> Ditto 			
	<ul style="list-style-type: none"> Education 	<ul style="list-style-type: none"> 			
	<ul style="list-style-type: none"> Price Regulation 	<ul style="list-style-type: none"> 			
	<ul style="list-style-type: none"> Other 	<ul style="list-style-type: none"> PA – 5 year \$230 contract to build state-wide bb network: State is the “anchor tenant”. Sate government telecoms to be on a single open network 			

		<p>so that access providers can use it as their backbone.</p> <ul style="list-style-type: none">• First contract extend network along I-99 corridor to underserved areas.• 251 community broadband projects with variety of funding systems			
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	Policy Framework		Market Structure	Market Conduct	Market Performance
Canada	<ul style="list-style-type: none"> • Policy Objective • Demand side Fiscal measurer • Supply side Fiscal measures • Loans & Grants • Direct Investment 	<ul style="list-style-type: none"> • Basic broadband access for all Canadians by 2004 • • • • Broadband Task Force proposed Infrastructure Support Model & Community Aggregator Model to promote development of supply and demand of broadband. • May 1996 Ontario government launched Telecommunications Access Partnership fund to promote initiatives around the State – would down in 1999 as part of cost savings. Example projects: Broadband Multimedia Wireless System, CND\$1m TAP funding matched by CND\$2.6m private funding; Region of Waterloo Rural Community Networks, CND\$525k matched by 	<ul style="list-style-type: none"> • Wildblue, a satellite broadband operator, plans to launch an interactive broadband service to cover Canada by 2003. 	<ul style="list-style-type: none"> • TELUS announced in November 2000, that it would invest USD 321 million over 5 years, to expand DSL services in British Columbia and Alberta (OECD). In 2001, TELUS plans to invest USD 122 million on ADSL to double the number of subscribers 	<ul style="list-style-type: none"> • 93% of Canadian households are passed by cable, of which 73% were cable subscribers in 1999 (OECD) • Product performance: by December 2000, there were over 918,000 cable modem subscribers. • DSL subscribers totalled to over 465,000 in the end of 2000.

		CND\$933k <ul style="list-style-type: none"> Replaced by SuperBuild Growth Fund of CND\$50m to develop 50 smart communities across Ontario by 2005. 			
	•	•			
	• Education	•			
	• Price Regulation	•			
	• Other	•			

ANNEX 1

Data Sources

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- Cyber Korea21 Initiative, Ministry of Industry and Communications (MIC) web-site
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- ISP-Planet report on DSL and Cable providers, August 2001
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- News releases from Covad, 2000-2001
- News releases from Comcast, 2000-2001
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- xDSL Analysis of DSL technologies, August 2001
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