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Understanding the role of the Ladder of Investment
Business-to-Business Communications

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1 EXECUTIVE SUMMARY

BT commissioned Ovum Consulting to fill a gap in the current literature which focuses the Ladder of Investment (LOI) concept predominantly on the requirements of the consumer sector. This report therefore focuses specifically on the application of the LOI to business services. The views expressed in this Report are those of the authors.

There are two main conclusions. To enable an effective European market in the provision of communications to the business community it is necessary for regulators to:

consider allowing multiple access services, or LOI rungs, for operators serving multi-site business customers even where such services have been withdrawn from operators serving residential customers; and

modify the LOI so that, rather than being based on a time-bound pre-commitment for regulatory withdrawal based on a prediction of competitive entry, the criterion for the removal of rungs for business services should be the actual state of competition.

Some regulatory experts recommend a phased withdrawal from access regulation to encourage alternative operators to develop their own facilities in competition with the incumbent. Some argue for withdrawing services at predetermined intervals. Professor Martin Cave, for example, has argued that access services that are economically replicable should be withdrawn after two to three years.

These arguments partly reflect a view that, to be beneficial and sustainable in the long-run, competition should be only minimally dependent on third-party access. Regulation is not only expensive to administer but can also distort markets and limit incentives to invest in next-generation networks and services. Competition is therefore to be encouraged to the maximum extent feasible.

Although the principles of regulation are largely the same regardless of whether they are applied to the business or residential sectors, the practical application differs significantly. This results from the fact that business services are typically supplied by a single supplier to multiple sites and the much greater complexity of services offered to business customers.

The communications needs of business customers are complex and demanding. Business customers typically operate in a range of locations that include a corporate HQ, regional offices, international offices and home working facilities. Business customers strongly favour the appointment of a single partner to serve their communications requirements on a national and, increasingly, on a global basis. Although multiple sourcing is often used for more basic services, for complex services it is both expensive and inefficient.

Access is crucial to competition for multi-site business customers – absent regulatory measures to ensure the availability of access in all regions in which the development of own-infrastructure is not economically viable, customers will default to the incumbent. Margins for large business contracts are generally low and without regulated access where necessary, entrants face substantial difficulties in providing effective competition in situations where failure to provide access to just one regional site or even to a small number of home working sites would result in the loss of the entire contract.

Pre-commitments to the withdrawal of regulated access under the LOI thus have a high cost of error if the initial calibration is too optimistic about the strides that new entrants can make in self-proving access. This is an important difference between B2B and B2C services that has far-reaching implications for regulation. For B2C services, the damage caused by the premature withdrawal of an access product would be largely confined to the geographic areas in which the access product has been withdrawn.

But demand for multi-site B2B services creates linkages between regions - entry needs to happen everywhere if it is to happen at all. The danger of premature withdrawal would not just be to force exit from the isolated regions where infrastructure is less developed, but potentially from the market altogether. As a result, following through with such a commitment before the market is ready could permanently harm competition in B2B multi-site communications services.

These considerations have profound implications for regulatory policy in the EU. Communications services are key enablers of the ICT services and applications in which European business must invest if they are to compete effectively with their global rivals.

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2 INTRODUCTION

The “Ladder of Investment” (LOI) is not a new idea but it has received unprecedented attention following a paper by the European Regulators Group (ERG) in 2003.¹ Most studies have focused on its applicability to business-to-consumer (B2C) services with relatively little research on its relevance to business-to-business (B2B). The aim of this study is to fill this gap.

We find that the needs of business customers differ from those of residential customers in several important respects, particularly the following:

- The multi-site nature of business premises and services compared with the single site nature of residential premises
- The far greater degree of variety or product differentiation between the offerings of business compared with residential service providers.

Some commentators use the LOI framework to recommend a pre-determined timetable of exit from regulation as competition develops. We find that this is unlikely to work for B2B services. When the actual outcome of investment differs even to a small degree from assumptions made at the time of the commitment, the costs of withdrawing an access product when it is still needed are potentially much larger for B2B than B2C services. In such circumstances, when the main source of the uncertainty and risk is the outcome of investment programmes, a pre-commitment to a phased withdrawal of regulated access may actually deter investment - precisely the opposite of the intended result.

In some cases, regulators may choose to commit to a phased withdrawal of regulation based on a belief that this maximises the long-run welfare of consumers. Although a full evaluation of this approach is beyond the scope of this paper, our thesis is that it is unlikely to lead to an optimal outcome in B2B markets. Therefore, a different

approach is needed. One candidate would be for a regulator, when it removes a LOI rung, to maintain it for B2B services. We do not consider in detail how such a policy might be implemented in practice, although we offer some suggestions for consideration.

In balancing the needs of businesses and consumers, regulators may wish to consider adopting a separate approach for each. An example of such an approach would be to maintain regulated access products necessary to provide multi-site B2B services even where they have been withdrawn for use with B2C services.

A drawback of such an approach is greater regulatory complexity, which has costs. It is reasonable to ask whether the benefits of such an approach exceed the costs. A comprehensive cost-benefit analysis of this option is beyond the scope of this report. However, to provide some insight on the benefits side, we review some empirical evidence relating to how such an approach might contribute to productivity growth through stimulating ICT investment by businesses.

The remainder of this paper is structured as follows.

Section 3 sets out the LOI framework in broad overview.

Section 4 outlines some of the special characteristics of B2B services that need to be taken into account when understanding how the LOI framework applies to these services. It also considers the applicability of Professor Cave’s LOI recommendations to B2B services.

Section 5 reviews some of the empirical evidence on the relationship between ICT investment and productivity and the implications of such a relationship, if any, for the regulation of B2B services.

Section 6 presents our conclusions.

¹ ERG Common Position on the approach to Appropriate remedies in the new regulatory framework, 2003

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3 THE LADDER OF INVESTMENT FRAMEWORK

This section presents a broad overview of the LOI. Figure 3.1 illustrates the LOI in diagrammatic form. It shows a telecommunications network in three parts. Of course, as networks cannot in practice be subdivided in this way (although traditional voice networks can to some extent), the diagram is a simplification of reality.

The "local loop" (which might be copper or fibre) shown at the top represents the cable(s) that connect to customer premises. Building local loops is expensive because it involves a single, dedicated line for every customer, many of which generate low revenue.² The cost per line declines as the number of customers rises because digging costs, ducts and cables can be shared between customers. Put another way, the local loop exhibits strong economies of density. Because of these economies of density, competitors to the historic incumbent operator are usually (though not always) unable to build their own local loop networks.

At the other extreme is the core network, which carries traffic over long distances between major hubs. These long distance networks exhibit strong economies of scale (the unit cost of traffic declines as the volume of traffic increases) but, as in most liberalised countries, several alternative core networks exist, it can be concluded based on this observation that the threshold beyond which new entrant operators find it becomes profitable to build alternative core networks is not particularly high.

In between the core network and local loops is the so-called "middle mile", which represents network routes between large national hubs and smaller

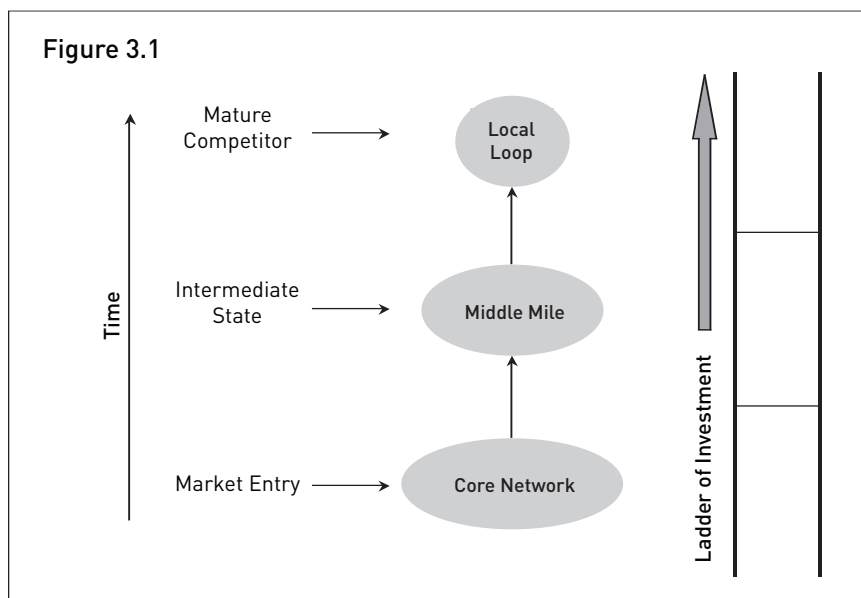
regional ones. Because of the smaller volumes of traffic carried on these network routes, it is less common for new entrant operators to achieve the requisite scale for development of "middle mile" networks.

Starting initially with high-capacity long-distance routes between major hubs, a new entrant builds a core network, followed by regional, or "middle-mile" networks, progressing finally to the local loop. In following this process, the new entrant is said to "climb the ladder of investment".

There are several reasons why a new entrant might build alternative networks. One reason is that it can do so cheaper or with better technology than is available from other networks. Another reason might be to gain greater control over the quality of service and other service parameters. The regulatory framework has a strong influence on the build-buy decision. High prices charged by other networks may cause new entrants to build rather than buy, although following the LOI framework, high prices are likely to prevent entry altogether.

In reality, it is common for new entrants to self-provide facilities over long distance networks on high capacity routes with high revenue potential, less common for them to self-provide over thinner routes and less common still for them to provide access to the customer. Most new entrants serving business customers provide their own fibre access in some cases but only in dense urban locations and for very high revenue services.

In the following section, we consider how the implications of the LOI framework for B2B services and the factors that should be taken into consideration when designing policies to achieve effective and sustainable competition.



2 The viability of building alternative local infrastructure for business customers varies significantly with the bandwidth of the services offered.

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4 ACHIEVING COMPETITION IN BUSINESS-TO-BUSINESS SERVICES

This section outlines the key features of Business-to-Business (B2B) services, in so far as is relevant to applying the LOI. For the present purpose, two differences between B2B and B2C are particularly important. These are:

The characteristics of B2B services (covered in section 4.1). Key points here are that B2B services are:

Largely platform independent. Services are largely independent of the network infrastructure over which they run. This is a key distinction between B2B and B2C services: in the latter, the service is usually integral to the network (this will change as "Next Generation Networks" based on a unified core become more widespread);

Complex and diverse. The range of B2B services is much wider, more complex and has greater scope for product differentiation than B2C services.

The multi-site nature of B2B services (covered in section 4.2). B2B services are usually provided to multiple sites, often spanning international boundaries.

Section 4.3 considers, in the light of the previous sections, which ladder rungs are necessary for a competitive market for B2B services to operators. In section 4.4 we outline some particular issues for policy arising from the international scope of B2B services.

4.1 THE CHARACTERISTICS OF B2B SERVICES

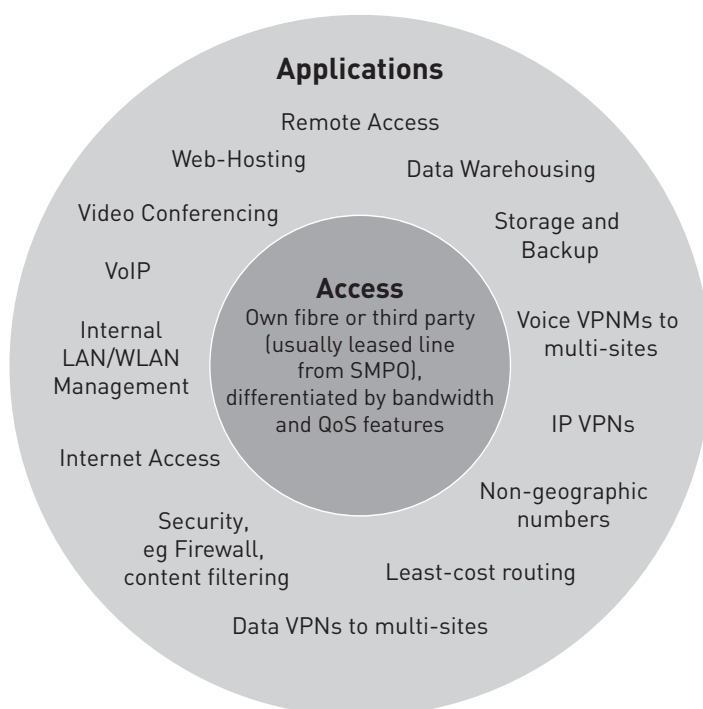
Figure 4.1 illustrates the characteristics of B2B services. The key point to observe in figure 4.1 is the scope for product differentiation in B2B services, which is substantially greater in B2B services compared with B2C services.

In B2B services, the access pipe, represented by the inner circle in figure 4.1 is usually provided either by a third party leased line, including new technologies such as Ethernet. Access may be distinguished by bandwidth and quality of service features but little else. Access is a "low level" service (in terms of the OSI network layer model) and therefore highly platform independent, meaning that, as illustrated in figure 4.1, just about any electronic communications service can run over it.

The key differentiators between the offerings of different B2B service providers are the applications, some of which are represented in the outer circle of figure 4.1. Any combination of the applications shown, or all of them at the same time, can be offered over the same access pipe. In the current context, the B2B applications under consideration have at least three important properties:

- developing applications is R&D intensive, involving substantial sunk costs and risk. Sometimes the applications are developed in-house by the service provider. Sometimes product development can be outsourced to specialists

Figure 4.1: Nature of B2B services



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- the quality, range and diversity of the applications offered differ substantially from one operator to another
- providing these applications often involves a high degree of bespoke tailoring to each individual customer's needs. There are very few one-size-fits-all products in this market and customisation involves a high fixed cost.

4.2 MULTI-SITE SERVICES

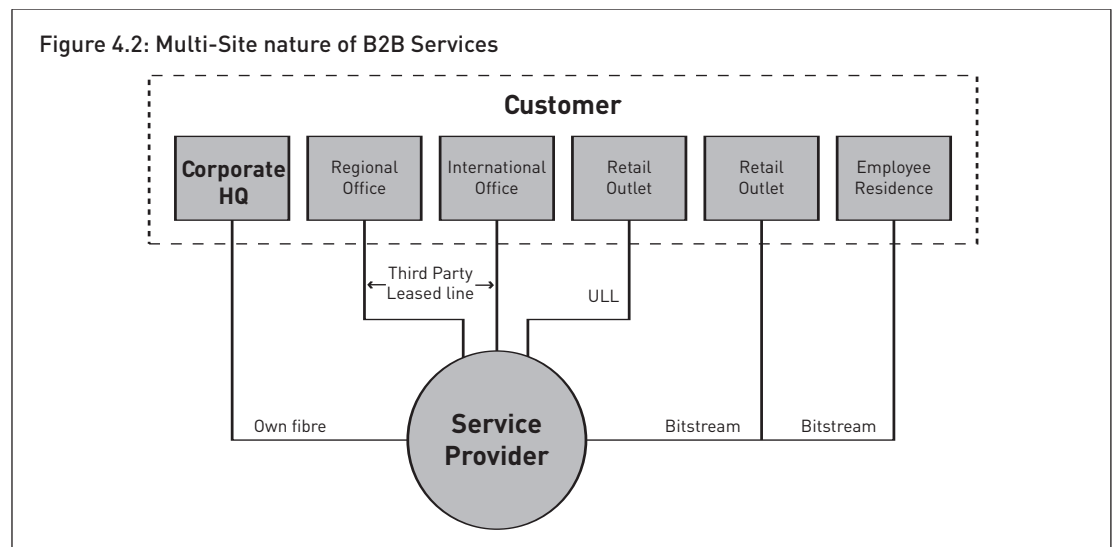
The second key difference between B2B and B2C services is the multi-site nature of B2B services. Figure 4.2 below illustrates how alternative network operators (ANOs) typically provide services to their business customers.

- On the left of figure 4.2 is the Corporate HQ, typically accommodating hundreds or even thousands of employees and often located in business districts. High bandwidth requirements sometimes justify the ANO providing its own fibre-to-the-premises especially if the HQ is close to the ANO's own network.
- Second from the left is a regional office, which is usually smaller than HQ, has fewer employees, lower bandwidth requirements and is typically further from the ANO's infrastructure. A regional office may be, but is not necessarily, located in a central business district (often such offices are located in suburban or rural business parks with lower real estate and labour costs). Because of this combination of factors, the ANO usually relies on third party access provided by the SMP Operator (SMPO) to connect the site to the corporate network.
- Third from the left is an International office (ie

an office in a separate country). Customers running a global network will usually require a single operator to provide access to all their international sites. Access will be provided either by own-build fibre or a third party leased line.

- Third from the right is a retail outlet based in a concentrated location, where unbundled local loops are viable for the ANO. The retail outlet has lower bandwidth requirements, so A/SDSL is usually sufficient.
- Second from the right is another retail outlet in a more provincial location where unbundled local loops are not economically viable. In this case the only means of connecting it is to use a product lower down the LOI, such as bitstream access.
- On the right is the residence of one of the customer's employees, who needs to connect to the corporate network from home in order to access email, intranet resources and centrally stored data. The employee can connect over an existing broadband connection, provided by any service provider. However, many customers prefer their employees to connect to their networks using a secure managed IP-VPN connection, which requires the service provider to provide the connection. Full unbundled local loops will normally not be an option as it requires the telephone service to be transferred, which the employee may not want. Therefore shared unbundled loops (ie the high frequency path only) or bitstream access will be required.

In the next section we consider which ladder rungs are necessary for competition in B2B services to operate effectively.



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4.3 LOI RUNGS REQUIRED FOR COMPETITIVE B2B SERVICES

From the above, it should be clear that for ANOs to provide service to a typical multi-site customer, the following “ladder rungs” should be available:

- third party leased lines, short and long, including substitute technologies to traditional leased lines such as ethernet.³ Short leased lines to serve offices in concentrated locations close to the ANO’s network infrastructure, longer lines to serve sites in less concentrated locations
- third party leased lines to serve international sites (supra-national organisations such as the European Commission and the WTO have an important role to play to ensure that leased lines are available under liberal conditions to allow service providers to provide service internationally)⁴
- Unbundled Local Loops (ULL) where this is an economically viable access methodology
- bitstream access to serve small sites (eg retail outlets) in provincial locations⁵
- bitstream access to connect employees to the corporate network via a secure IP-VPN (shared access where ULL is a viable option)

If any of the LOI rungs are not available to the ANO community, this may result in the customer having no choice but to take service from the SMP Operator (SMP0).

5 APPLYING THE LADDER OF INVESTMENT TO B2B SERVICES

Most literature on the LOI has focused on its application to B2C services. In this section we consider some of the issues that arise when applying the LOI framework to B2B services. A typical and well-known approach is that advocated by Professor Cave⁶, which interprets the LOI as a model whereby regulators actively manage a phased transition between infrastructure and service competition. Following this approach, as ANOs ascend the ladder, rungs should be removed. We consider whether this approach should be followed in relation to B2B services. Section 5.1 outlines Professor Cave’s approach and section 5.2 considers its applicability to B2B services.

We find that the existence of network externalities within private corporate networks strongly suggests that a policy of timed withdrawal of regulated access may not be the optimal approach to ensuring long-run sustainable competition in B2B services. Furthermore, we note that the costs involved in migrating services from one interconnect platform to another are likely to be

very high for B2B services and may deter users from taking service from ANOs.

Section 5.3 provides some preliminary ideas to be taken into consideration when designing a LOI to serve the needs of business customers.

5.1 PROFESSOR CAVE: “MAKING THE LADDER OF INVESTMENT OPERATIONAL”

Professor Cave advocates a regulatory programme involving a pre-commitment to timed withdrawal from regulation. This is considered important to:

- Provide ANOs with incentives to develop competing facilities
- Reduce the costs of regulation (both in terms of the resources expended by the regulator and compliance departments within the regulated entity, and in terms of the effect of regulation in constraining otherwise welfare enhancing activity).

The paper envisages a market that evolves, through steadily diminishing access-based regulation, towards one that progressively depends less on regulation until the only access requirements remaining relate to “non-replicable assets” – assets that cannot be economically installed by new entrants.

Professor Cave argues that to construct ladder rungs, the regulator should study the underlying cost structures of the activities of interest. In the context of DSL based broadband access, he argues that such a study gives rise to the following ladder rungs:

- 1 Access to the customer via a copper loop or shared loop
- 2 DSLAMs located at the local exchange
- 3 ATM backhaul
- 4 Access to an IP network
- 5 Access to the world wide web via transit or peering services
- 6 Retailing functions (marketing, billing, helplines etc.)

Professor Cave then advocates a timed withdrawal from regulation (either by increasing prices or withdrawing regulation) from ladder rungs to encourage ANOs to develop their own facilities. He recommends a 6-12 month withdrawal period for easily replicable assets and a 2-3 year withdrawal period for less easily replicable assets. Furthermore, he emphasises the importance of pre-announcing and committing to such a policy.

3 As Ethernet is increasingly becoming the access technology of choice for business customers, this may also be required as an alternative to leased lines.

4 Leased lines need to be available at a variety of different bandwidths. Furthermore, they must include terms and conditions to facilitate easy migration to different bandwidths as demands change.

5 Bitstream access needs offer a variety of quality of service features such as CBR, UBR, r-t, n-rt) to allow greater differentiation and innovation.

6 “Making the ladder of investment operational”, Professor Cave (2004)

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5.2 ASSESSMENT IN RELATION TO B2B SERVICES

Much of telecoms regulation is designed to address problems created by dominance in access. However, when considering how to extend competition to multi-site customers an additional problem must be addressed.

This is the phenomenon of **network externalities**. The existence of network externalities is well recognised in telecoms. As users join a network, the benefits do not just accrue to themselves, but also to other users of the network. The significance of network externalities can be seen in relation to voice telephony, fax, email, the Internet and indeed almost all network based communications services. In mobile telephony, some regulators have allowed an additional mark-up to interconnect fees to reflect the value to other telephony users of increasing the number of mobile users.

The same phenomenon also exists in private communications networks provided to business customers. For example:

- the value of the internal telephone and email and conferencing networks rises with the number of corporate employees on the same network;
- the value of server-client based services such as intranet based applications and data storage and access rises with the number of employees able to access such services. The value of such services increases still further if employees are able to access them from a wide range of locations such as from home or via wireless devices.

The important point about network externalities in this context is that the full value of B2B communications services will not be realised if some business locations cannot be connected to the corporate network. This translates into a strong advantage for an operator able to provide connectivity in all locations.

It also has important implications for policy because where an operator holds a dominant position in access in one location or set of locations, such dominance can in theory be leveraged across to locations in which it does not hold dominance. The greater the number of locations in which an SMPO holds a dominant position in access, the greater is its ability to leverage those dominant positions into other geographic locations, even those in which it does not enjoy a dominant position in access.

Multi-site services may thus exhibit strong “tipping” (or unstable equilibrium) effects.

Professor Cave’s suggestion of a gradual withdrawal from regulation with the aim of encouraging alternative infrastructure investment would be ineffective for ANOs focusing on multi-site business customers because without economic access to provincial sites they would never develop a foothold, even in the urban locations. Thus, the market for services to multi-site business customers has an inherent tendency to tip towards no entry. Of course, in situations in which the customer’s sites are all located in districts with well developed competitive access for all services required, this might not be such a problem, but this would be the exception rather than the rule.

In voice telephony, market power conferred by network externalities is addressed through rules requiring all operators to offer a service to terminate calls originating on other networks. However, such rules fail to deal with situations where a customer requires the **same** operator to provide services to **all** its locations. Under such circumstances, arguably the only tool available to regulators for addressing dominance arising from network externalities is to address local dominance in all locations. Otherwise, failure by an SMPO to provide access⁷ to even a very few sites will be sufficient to prevent an ANO from providing service to any.

This point is very important when considering how to extend competition in B2B services provided across international boundaries, for example to pan-European customers. Many large corporate customers require services to be supplied in a number of EU countries. This strongly suggests a need for regulatory harmonisation across EU countries to ensure that, as far as possible, access conditions are relatively homogeneous across Member States. This can either be achieved through competition, in areas where competition is sufficient to ensure that access is available to ANOs, or through regulated access where competition is not sufficient.

The Commission therefore needs to be pro-active in seeking harmonisation. An SMPO belonging to a country without a pro-competitive regulatory regime has an inherent advantage over one in a country with one. Pan European customers will “tip” towards taking service from the SMPO in the country without favourable access conditions and away from operators in the country with them. This leads to perverse incentives on governments and regulators to support their national operators in international markets by preventing access by ANOs, many of which will be from different countries and attempting to address the same pan-European markets.

7 Or failure to provide an interconnection point on a backbone network, discriminatory access prices or a degraded quality of service.

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5.2.1 PLATFORM MIGRATION

There is a further problem with applying Professor Cave's proposals that becomes apparent when considering the requirements of business customers in general, particularly multi-site customers. The ANO would be forced by regulatory withdrawal to migrate its interconnect arrangements to another platform. Migration can be very costly eroding further the low margins on B2B services.⁸ Migration also introduces a significant risk of service disruption, typically involving outages of hours. Business customers tend to require 24/7 service availability and insist on penalty-backed SLAs (with provision for damages) to protect them from service disruption. Residential customers generally do not. An ANO that expects the interconnect platform to be changed might not be able to offer business customers the SLAs they require.

5.2.2 APPLYING THE LOI TO MULTI-SITE B2B SERVICES: CONCLUSIONS

What, therefore, are we to make of Professor Cave's proposals of a pre-committed programme of regulatory withdrawal in the light of the requirements of multi-site customers?

We offer two main conclusions, as follows:

- 1 **To avoid damaging competition for multi-site business customers, any withdrawal programme must allow multiple ladder rungs to exist simultaneously.** This will allow service to be provided in locations with varying geo-demographic characteristics and to allow service to be provided to different types of sites (eg HQ and retail outlet) within the same geo-demographic area.
- 2 **Any withdrawal of regulated access to business customers must be based on the actual development of competition and not just on a projection about how competition might develop.** This is due to the tipping nature of the market. If a decision to withdraw from regulation is made on the basis of prospective entry, the withdrawal may by itself destroy the very prospect of market entry occurring as prospective competitors on whom the hoped-for new competition depends would be eliminated by the withdrawal. Therefore, it is reasonable to conclude that the "error costs" of withdrawing of access required to serve multi-site customers are **far** greater than those required to serve single-site customers. Another reason why a pre-commitment to withdraw a product after three years (as suggested by Professor

Cave) is unlikely to be effective is that this is often the length of time from when an access product is first mandated to when it becomes commercially useable.

5.3 DESIGNING A LOI FOR B2B SERVICES

How might a regulator reconcile a policy of withdrawing LOI rungs for B2C services but maintaining them for B2B services? One approach would be to adopt a different withdrawal programme for service providers offering services to single sites and multiple sites. If such a policy could be practically implemented, it would allow regulators to follow their desired regulatory programme for the residential sector whilst avoiding the loss of competition in the business sector.

Practical implementation of such a policy would obviously present a challenge. To enforce it, the operator might be required to provide evidence if required (for example if there was a reasonable suspicion that the rule was being breached) that it was using the product in question only for multi-site customers.

If there is no cost effective way of making ladder rungs available for ANOs serving multi-site customers whilst restricting their availability to single-site customers, the question arises, which policy should prevail? Should the benefits of phasing out services outweigh the benefits of retaining them, or vice versa?

It is impossible without a detailed analysis to answer this question definitively. However, it is a reasonable hypothesis that the benefits of retaining services would outweigh the benefits of withdrawing them. The projected benefits of withdrawing services in terms of greater incentives to invest and innovate are at best, based on economic models that are unproven empirically, whilst the loss of competition of withdrawing access is arguably more obvious. Considering the hypothesis that competition between service providers may act to boost productivity-enhancing ICT investment, and that such competition depends on regulated access, it is reasonable to suppose that the economy-wide costs of withdrawing access would be high.

The benefits of ICT investment on economic performance – and the role of a competitive market in B2B communications services in promoting it – are considered in the next section.

8 As an example, one ANO in Europe (the details must remain confidential) recently migrated its entire business customer base in a medium sized European country from SMPPO-provided retail leased lines to the lower priced wholesale equivalent. Although the cost savings were worthwhile in the long-run, the migration process required over six staff-years of time. The same ANO was faced with a similar problem in France, although in this case it concluded that there was no business case to conclude the migration.

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6 THE CONTRIBUTION OF B2B COMMUNICATIONS SERVICES TO ECONOMIC PERFORMANCE

In this section we consider how B2B Communications services can contribute to the performance of an economy more broadly. Despite the famous "Solow Paradox"⁹, that "you can see the computer age everywhere but in the productivity statistics", more recent experience has led commentators to believe the use of ICT is a powerful contributor to economic performance.

B2B communications services comprise an important input to the use of ICT, providing the platform on which businesses can deploy and enhance the use of ICT. Corporate networking, through its ability to link and propagate technology throughout an organisation, has the potential significantly to enhance the effectiveness with which information technology can be deployed.

6.1 LINKAGES BETWEEN ICT DEPLOYMENT AND ECONOMIC PERFORMANCE

There is a considerable body of research indicating that investment in ICT-related activity generates benefits for the economy at large. Much of it is devoted to understanding why productivity growth in Europe has lagged that in the United States in recent years.

In designing regulatory policy in electronic communications, it is important for policy makers to understand:

- the nature of the link between ICT investment and economic growth. How in practical terms does ICT investment affect economic performance?
- the extent of the link between ICT investment and economic growth. How much would a given increase in ICT investment increase economic growth?
- the types of policies that are likely to lead to an improvement in ICT investment. This is considered in the section below on "Policy Analysis".

These are considered in the sections below.

6.1.1 HOW DOES ICT INVESTMENT IMPACT ECONOMIC PERFORMANCE?

Most studies on the impact of ICT have focused on its ability to create efficiencies inter alia by:

- Allowing greater automation of production in goods and services (an example would be the

retail banking industry where the introduction of ATM machines reduce the labour intensity of banking. Another would be the use of software in knowledge intensive industries.)

- Allowing greater automation of sales and marketing. The increased use of the Internet allows traders of goods and services to reduce the dependency on retail outlets and costly advertising for attracting customers and sales
- Allowing business-critical data such as financial information and stock information to be stored more efficiently and accessed more easily
- Creating opportunities for communicating with suppliers and customers more efficiently than face-to-face or telephone communications.

A study by the Economist Intelligence Unit (EIU) for Microsoft¹⁰ found three ways in which ICT investment can boost the economy, as follows:

- First, ICT investment leads to "capital deepening", meaning that it improves labour productivity (as opposed to "capital widening" which refers to the addition of capital and labour in constant proportions).
- Second, the ICT producing sector comprises a significant and growth proportion of economic output.
- Third, (which the EIU considered the largest contribution), ICT investment creates spillover effects that create a sustainable boost to productivity growth in the rest of the economy.

The OECD¹¹ argued that the strongest evidence for the impact of ICT use comes from studying firm level performance. In this study, the OECD reported evidence that computer networks are particularly important as they allow a firm to outsource certain activities, to work closer with customers and suppliers, and to better integrate activities throughout the value chain.

A report by Indepen¹² reported evidence from the US that approximately 75% of the growth in GDP attributable to ICT investment results from indirect rather than direct effects. In this context a "direct" effect refers to economic growth resulting from value added attributable to investment in the ICT producing sector, whilst an "indirect" effect refers to the impact of ICT investment on productivity in other sectors of the economy. The same study referred to the example of the pioneering work by Wal-Mart, which introduced innovations such as bar code scanning. This created significant efficiency improvements in a wide range of functions such as stock control and supply chain management leading to a jump in productivity growth and an increase in Wal-Mart's market share. These innovations have had strong spill over effects as similar companies throughout the world have followed Wal-Mart's lead.

0 Reaping the benefits of ICT: Europe's productivity challenge, A report from the Economist Intelligence Unit, sponsored by Microsoft, 2004

11 ICT and Economic Growth, Evidence from OECD countries, industries and firms, 2003

12 Restoring European Economic and Social Progress: unleashing the potential of ICT: A report for the Brussels Round Table by Indepen, January 2006

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A report by HM Treasury¹³ in the UK has identified a further source of productivity improvement resulting from ICT investment. According to this report, the ICT revolution has intensified trade in services by eliminating many of the technical constraints that had hitherto required the place of consumption to be at or close to the point of production. The effective use of communication allows companies to eliminate duplication and other inefficiencies, centralising the production and delivery of services to the points where skills and expertise can most effectively be deployed.

6.1.2 QUANTIFYING THE IMPACT

The EIU argued that almost 80% of the difference in GDP per head growth rates in the US and the euro zone big three (Germany, France, Italy) in 1995-2002 can be attributed to ICT use. During this period, GDP per head growth rates were 0.52 percentage points higher in the US, of which the EIU considered 0.4 percentage points were the result of superior ICT use. The EIU argued that it is not merely the amount of ICT deployed that accounts for the difference but the combination of a range of factors including the business and network infrastructure environment that allows investors to deploy ICT more effectively. This conclusion supports the hypothesis above that effective ICT deployment is related to effective communications services.

The OECD presented similar conclusions, arguing that investment in ICT capital has supported strong labour productivity growth in Australia, Canada and the United States. In a number of countries, notably Finland, Ireland and Korea, they argue that ICT production has not only improved labour productivity but also economy-wide total-factor productivity (TFP).

Following a growth accounting approach, the OECD found that ICT investment accounted for between 0.3 and 0.8 percentage points of economic growth in OECD countries between 1995 and 2001 and found a positive correlation between total factor productivity growth and ICT investment at the aggregate level.

Indepen found that lack of ICT use accounts for Europe's decline in productivity growth relative to the US. The authors quote the results of research that shows that the absolute contribution of ICT to productivity growth in the EU-15 countries (whilst productivity growth declined) remained almost static between 1983 and 2000 whilst in the US productivity growth accelerated rapidly in the late 1990s, virtually all of the acceleration was accounted for by the use of ICT in the technology based private sector.

6.2 POLICY IMPLICATIONS

The evidence that ICT investment contributes to economic performance is strong. Moreover, B2B communications is a fundamental input to ICT capital through its ability to provide the networking infrastructure linking technology and applications – and providing the technology and applications themselves. What types of regulatory policies are likely to increase ICT investment?

One factor that is likely to lead to greater and more effective use of ICT is effective competition between communications service providers. Competition allows customers to choose suppliers on price, features and service quality and forces competitors to innovate, differentiate, invest and improve their efficiency in order to stay ahead of the pack. Therefore, successful regulatory policies are likely to be those that create opportunities for effective competition.

This paper has two policy recommendations for improving competition among B2B communications providers. It recommends that regulators:

consider allowing multiple access services, or LOI rungs, for operators serving multi-site business customers even where such services have been withdrawn from operators serving residential customers; and

modify the LOI so that, rather than being based on a time-bound pre-commitment for regulatory withdrawal based on a prediction of competitive entry, the criterion for the removal of rungs for business services should be the actual state of competition.

What impact are such policies likely to have on ICT investment? It is sometimes claimed that access-based regulatory policies can disincentivise investment in new access infrastructure. Such a view is the basis for many LOI type policies involving gradual withdrawal of regulation, including that advanced by Professor Cave. The EIU argues that boosting competition in the telecoms sector is particularly important, stating:

“governments must maintain the assault on barriers to competition, particularly in telecommunications markets. This is particularly critical for the growth of broadband access. Moreover, the benefits of enhanced telecoms competition must be extended to businesses and consumers in the EU accession countries”

The OECD's assessment (page 89) is similar to the EIU's. They argue that increased competition in telecommunications, resulting from regulatory reform has delivered benefits in terms of price,

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technological diffusion, new service development, improved efficiency and quality of service. However, the OECD argues that efforts to improve competitive conditions are not yet sufficient and calls upon countries to increase competition and continue with regulatory reform in the telecommunications industry to enhance the uptake of ICT.

Some commentators refer to the FCC's Triennial Review order of 2003 when attempting to explain the superior productivity performance in the US. The order removed regulated access to unbundled network elements and newly deployed fibre-to-the-home. The decision was extended to fibre-to-the-curb in 2004.

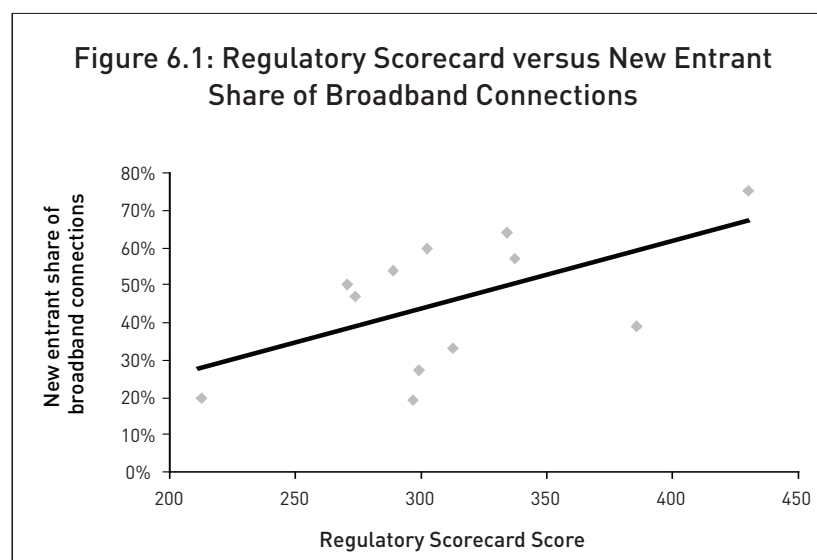
However, it should be noted that the acceleration in productivity growth in the US occurred mainly in the 1990s, long before the 2003 Triennial Review order. Second, it is not true that the FCC has entirely withdrawn from regulated access as is sometimes claimed. Crucially, the LECs still have a limited obligation to provide "special access" (the US term for a leased line part circuit) to ANOs. This is important in the current context because leased line part circuits represent the access service most commonly used by ANOs to deliver B2B services.

The section immediately below considers whether regulatory policies such as those advocated here have had a positive effect on use of and investment in ICT and related services.

6.2.1 EFFECT OF REGULATORY POLICY ON SERVICE TAKE-UP, COMPETITION AND INVESTMENT

Testing the impact of the recommended policies on competition is difficult due to lack of data. Although based on data for B2C services, Figure 5.1 may provide some indication of the strength of the relationship between policy and market structure. Jones Day and SPC Network regularly prepare a "regulatory scorecard", which attempts to rank regulators according to their effectiveness according to a number of criteria. Many of these criteria are based on the implementation of access policies that are believed to be conducive to greater competition. Based on a number of weightings, the authors produce a country ranking. The absolute score is unimportant - more important is the ordinal rank.

Figure 6.1 shows the relationship between market share of new entrants in the consumer broadband market and "regulatory effectiveness" as interpreted in the scorecard. The figure shows a reasonably strong positive relationship between the two, suggesting that effective regulation can contribute to greater competition. Clearly, caveats apply when interpreting this relationship. First, neither the dependent nor the independent variable relate to services provided to business customers but all electronic communications services. Second, the regulatory scorecard (the independent variable) is only loosely connected with the policy environment we are trying to test. A third caveat is that the scorecard score is necessarily partly a subjective variable and therefore open to interpretation. Other commentators might rank the countries in a different way. Finally, the existence of a correlation does not necessarily imply causation.



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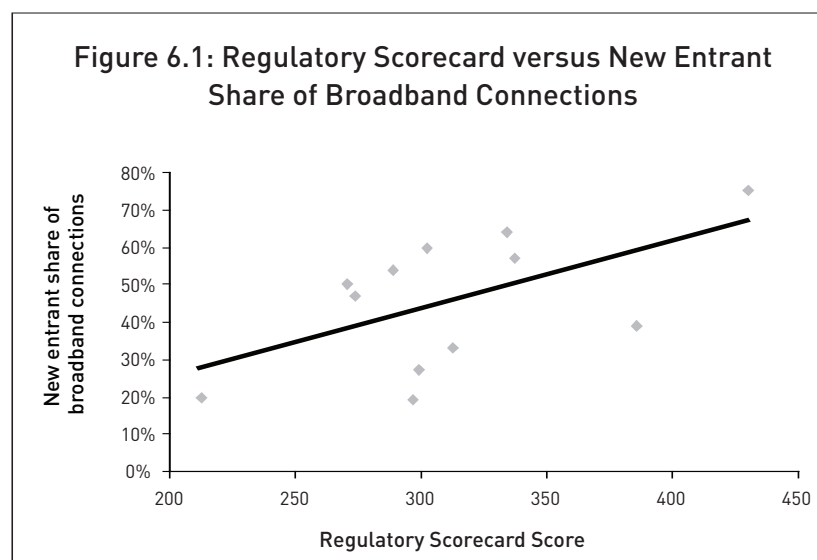
	Regulatory Scoreboard	New entrant share of broadband connections
Austria	334	64%
Belgium	271	50%
Denmark	386	39%
France	337	57%
Germany	213	20%
Ireland	313	33%
Italy	299	27%
Netherlands	289	54%
Portugal	297	19%
Spain	274	47%
Sweden	302	60%
UK	430	75%

Source: "Report on the relative effectiveness of the regulatory frameworks for electronic communications in Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, The Netherlands, Poland, Portugal, Spain, Sweden and the United Kingdom", Broadband Competition Report, ERG 2005

Using a similar methodology, we can also test the relationship between regulatory policy and investment in electronic communications, the latter provided by the OECD. Figure 6.2 plots the regulatory scorecard score against electronic communications investment as a percentage of GDP, as reported by the OECD.

The figure shows a positive, although weaker, relationship between "regulatory effectiveness" as measured by the scorecard and investment in electronic communications. As before, there are a

number of caveats in interpreting such a comparison. One is that the data on investment from the OECD (2003) and the scorecard score (2005) are not contemporaneous, although the ordinal ranking of countries is similar to that in previous years. Again, another is that neither the dependent nor the independent variable relate to services provided to business customers but all electronic communications services. Also, investment in electronic communications is only a subset of investment in ICT in general. Finally, as before a correlation does not necessarily imply causation.



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	Regulatory Scoreboard	Investment in Electronic Communications as a % of GDP
Austria	334	0.61%
Belgium	271	0.27%
Denmark	386	0.40%
France	337	0.25%
Germany	213	0.23%
Ireland	313	0.38%
Italy	299	0.54%
Netherlands	289	0.36%
Portugal	297	0.61%
Spain	274	0.54%
Sweden	302	0.48%
UK	430	0.61%

Source: "Report on the relative effectiveness of the regulatory frameworks for electronic communications in Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, The Netherlands, Poland, Portugal, Spain, Sweden and the United Kingdom", 2005, OECD 2003

6.3 REGULATORY POLICY, ICT AND INVESTMENT: SUMMARY

There is strong evidence that ICT investment has a positive impact on economic performance. Several studies have pointed to the superior productivity performance in the US compared with Europe in the 1990s and have ascribed it, at least in part, to greater investment and superior use of ICT. Communications services provide the means for linking and networking ICT applications and services and are thus fundamental to allowing ICT to be deployed effectively.

More recently, the US has changed its policy towards the communications sector by removing regulated access in a number of areas. The longer-term effects of these policies remain to be seen.

Most commentators agree that effective competition in electronic communications has the potential to boost ICT investment through allowing customers a greater choice of services and creating incentives for service providers to invest, innovate and differentiate to stay ahead of competitors.

The thesis of this paper is that to allow effective and sustainable competition in B2B services, regulators should allow multiple LOI rungs and base any decision to withdraw regulated access from services on an ex-post assessment of the state of competition and not any prediction of the development of competition. Testing empirically whether such policies would have their intended effect is difficult due to lack of data. However, there is some evidence that access-based regulatory policies can lead to greater competition and investment. It is also reasonable to expect that the effect of such policies would be felt more strongly in the business sector than the residential sector. This is for two reasons. First, businesses are more intensive users of ICT. Second, any potentially investment suppressing effects of access-based regulatory policies are less likely to be seen in the business sector because of the greater separation between network infrastructure and services and because fibre access is already widespread in many situations.

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7 CONCLUSION

There is evidence that Europe is falling behind its major global competitors in most areas of economic performance, particularly productivity growth. Key to Europe's ability to bridge the gap will be its ability to deploy technology as cheaply and effectively as elsewhere in the world. The competitiveness of the B2B communications sector is a fundamental factor in whether or not it achieves this. Of course, it is not the only factor: in the eyes of most commentators, labour market rigidities and restrictive labour laws are other main contributors to Europe's relatively poor performance in recent years.

Policies of regulatory withdrawal designed to achieve sustainable competition in residential services are unlikely to be effective in B2B communications for two reasons as follows:

Premature removal of LOI rungs would harm competition in B2B services to a greater extent than in B2C services because, as a consequence of the multi-site nature of B2B services it will cause business customers to default to the SMPO;

The reason for removing LOI rungs is arguably less applicable to B2B services in the first place because the key areas in which innovation and differentiation occur are not in the infrastructure but in the services.

The propensity of business customers to default to the incumbent in the absence of appropriate access may also be described as a "tipping effect" in reference to the tendency for the market to "tip" towards monopoly and away from competition. The tipping effect can work internationally as well as nationally, implying a role for the European Commission in ensuring that conditions are amenable to competitive entry in all EU markets. The Commission should be aware of the potentially perverse incentives facing governments and regulators who, by denying competitive access in their country, can provide local operators with significant advantages in pan-European markets, to the detriment of competition in the EU as a whole.

The inherent tipping effect in the B2B communications market has an important implication for policy. If a regulator announces a plan of regulatory withdrawal based on a forecast of the development of competition over a specified period of time and competition fails to take off as forecast, the cost to competition in B2B markets will be very high as customers will naturally tip towards the SMPO. It follows that regulators should guard against policies based on a predetermined plan of regulatory withdrawal of access products for business services because of the high costs of erroneous forecasts.

The need to serve sites with widely varying bandwidth requirements in geographic areas that differ markedly in terms of competition also implies that regulators should allow multiple access points along the LOI for B2B services.

A potential problem may exist if regulators decide the optimal policies for B2B services and residential services are different. This may arise if the regulator prefers a programme of access withdrawal to serve the competitive needs of residential customers but sees the risk to competition in B2B services of such a policy. One possible resolution would be to maintain regulated access for LOI rungs for use in serving multi-site customers after withdrawing them for single site customers.

8 ABOUT THE AUTHOR

Barney Lane is a Principal Consultant in Ovum's Telecoms Consulting Practice in London. He is a leading expert advisor in telecom regulation and strategy. Barney has over 10 years experience in the telecoms industry and has covered a variety of sectors including fixed, mobile and internet services in Europe, North America, the Middle East and Africa.

Before joining Ovum, Barney spent 6 years at MCI, the global telecoms and IP carrier, focussing on the UK and European markets. Barney graduated from Oxford University with Bachelors and Masters degrees in Economics, which he followed up with an M.B.A. from Cranfield University.