

Ubiquitous Broadband

Taking Universal Connectivity

From Pipe Dream to Reality



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Introduction

There is little argument over the importance of ubiquitous broadband. Consumers enjoy faster access to richer content. Businesses profit from improved efficiency and reduced transaction costs. Governments benefit from increased investment and growth, particularly in rural and remote areas.

To capitalize on this opportunity, governments around the world are currently undertaking programs to digitize and modernize their services on a massive scale. European governments have adopted a common mandate for widespread access to a competitive broadband infrastructure by 2005. Such enthusiasm is not surprising given the economic benefits expected to accrue from ubiquitous access to modern information and communications technology (ICT) infrastructure. A recent study, conducted in North America by Gartner Dataquest, links economic growth to higher-capacity network infrastructures. It states that creating ubiquitous access to broadband technology has the potential to yield a US\$5.4 trillion incremental gain in U.S. gross domestic product (GDP) over the next decade.

Despite strong statements of intent from governments around the world, the private-sector-led deployment of broadband has not resulted in widespread access. For example, availability figures for a majority of European countries hover around 60 to 80 percent of the total population. And while large population centers often enjoy easy access to broadband, less populated areas are frequently underserved.

Although this new form of the digital divide is likely to persist, a cooperative effort between government and industry could begin to close the gap. Ben Verwaayen, BT Group's chief executive, recently acknowledged that "our industry, along with government at all levels, has a huge role to play to accelerate broadband availability, demand and take-up." Under current conditions, the private sector cannot build a profitable business case for deploying infrastructure in rural areas. The risk of delaying or capping some economic growth, and of exacerbating social divides between urban and rural areas, is very real.

The question facing national and regional governments today is not whether to intervene to encourage infrastructure deployment, but how. For the telecommunications industry, the key question is how to best seize the global opportunities that intervention offers. This paper explores the answers to these questions.

CLOSING THE BROADBAND GAP

At its simplest, broadband has become shorthand for “faster and always on” internet connectivity. Beyond that, however, defining broadband becomes a matter of opinion (*see sidebar: Broadband Defined*). We believe it is not simply an asymmetric digital subscriber line (ADSL), rather, broadband is a bandwidth requirement for households, businesses and governments, which enables the running of content, applications and services that make large connectivity demands—examples include uses such as browsing websites, voice over IP and video conferencing.

Although there is an implicit link between broadband deployment and economic growth and investment, little data exists to quantify this

advantage. One recent study did, however, reveal that the United States stands to increase GDP by US\$5.4 trillion over the next decade and generate more than 13 million incremental jobs by deploying broadband infrastructure. On a smaller scale, several regional studies also point to the significant positive impact modern ICT infrastructure can have on local economies.

When telecom companies invest in broadband, every region and country benefits; however, companies typically target areas of high population density. In 2002, Sir Christopher Bland, chairman of BT Group, told the Select Committee on Culture, Media and Sport that in sparsely inhabited parts of the United Kingdom, broadband roll-out would not be achievable in

Broadband Defined

The availability of ADSL (asymmetric digital subscriber line) is commonly used as the measure for broadband access within many countries. In some countries, cable TV operators have also upgraded their networks in urban areas to provide a cable broadband service to some households. But focusing on the reach of ADSL and cable broadband service can cause misunderstandings about the true nature of broadband availability. Primarily aimed at the consumer market, these products may be suitable for smaller businesses, but are not a general business solution.

The delivery of any telecom service is based on the network infra-

structure, which in general terms is made up of cables (copper or fiber) and exchanges. The capacity of the cables and exchanges to support the various broadband options decides the availability of those services to the users served by that exchange. If the local exchange cannot support the required service, then either it is not available (which is typical with ADSL) or it costs more because it is delivered from an exchange farther away from the user. The exchanges that support a wide range of services are typically described as being part of the core network; expansion of this core network will increase the availability of affordable broadband products and services.

It is sometimes argued that broadband for business is available anywhere—at a price. But businesses in rural areas are clearly disadvantaged in terms of price and product range. The longer-term economic impact on these areas could be significant.

Accepting that the definition of broadband is not fixed has significant implications for economic development strategies that address connectivity. Simply improving speed without “future-proofing” regional infrastructure could exacerbate the prevailing urban-versus-rural digital divide and effectively undermine the effectiveness of any information and communications technology strategy.

economic terms for 10 or possibly 20 years. Last year, BT declared that “100 percent broadband coverage of every U.K. community is achievable by 2005 if industry and government pull together. This would put the United Kingdom in a position to lead the world.” The comparison of both statements highlights a change in thinking during the course of 2003, one that has not occurred in many other countries.

With the financial markets scrutinizing every telecom operator’s investment plans, operators will continue to be cautious about upgrading infrastructure in areas that offer low revenue potential, such as less populated rural areas. Most regulatory bodies cap prices and insist on uniform pricing, even when the cost per newly connected user is significantly higher in less populated areas than it is in cities. Clearly, the current incentives discourage broadband deployment in rural areas.

Many governments now realize they must intervene to increase broadband deployment, and thereby ensure delivery of the potential social and economic benefits. The key question is how best to intervene.

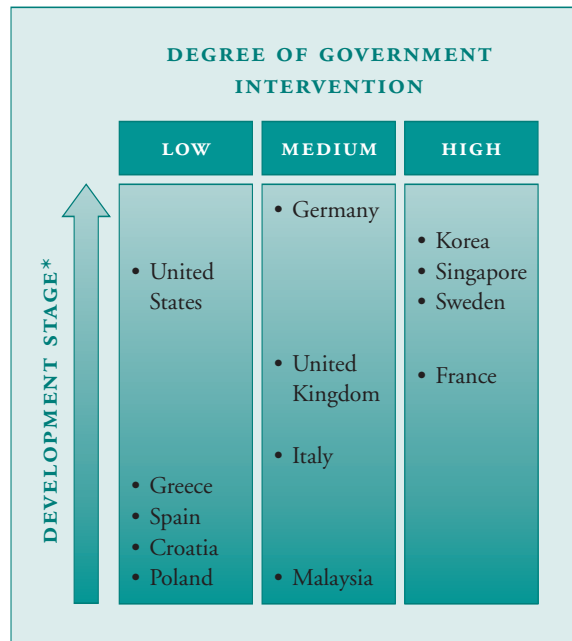
DEFINING AN OPTIMAL ROLE FOR GOVERNMENT

The spectrum of choice for government intervention ranges from full funding to allowing market forces to determine broadband expansion under a benign regulatory environment (see figure 1). The former demands strong governmental control, coupled with large investment. Some estimates suggest that for a country of 50 million people, the required investment could reach US\$10 to US\$15 billion over five years. Intermediate options require less investment.

Of course, there is no one-size-fits-all broadband solution for every government, but when exploring options, three key steps will help define the best strategy (see figure 2 on page 4).

First, the government must understand the size of the problem—that is, it must determine the gap between current and target broadband availability. This includes identifying areas where the market will largely provide the necessary investment and areas where only external intervention will ensure broadband availability. The current situation must be viewed in the national context and consideration given to factors such as competitive landscape, regulatory environment, computer availability and literacy, economic models and policy direction.

Figure 1: The levels of government intervention



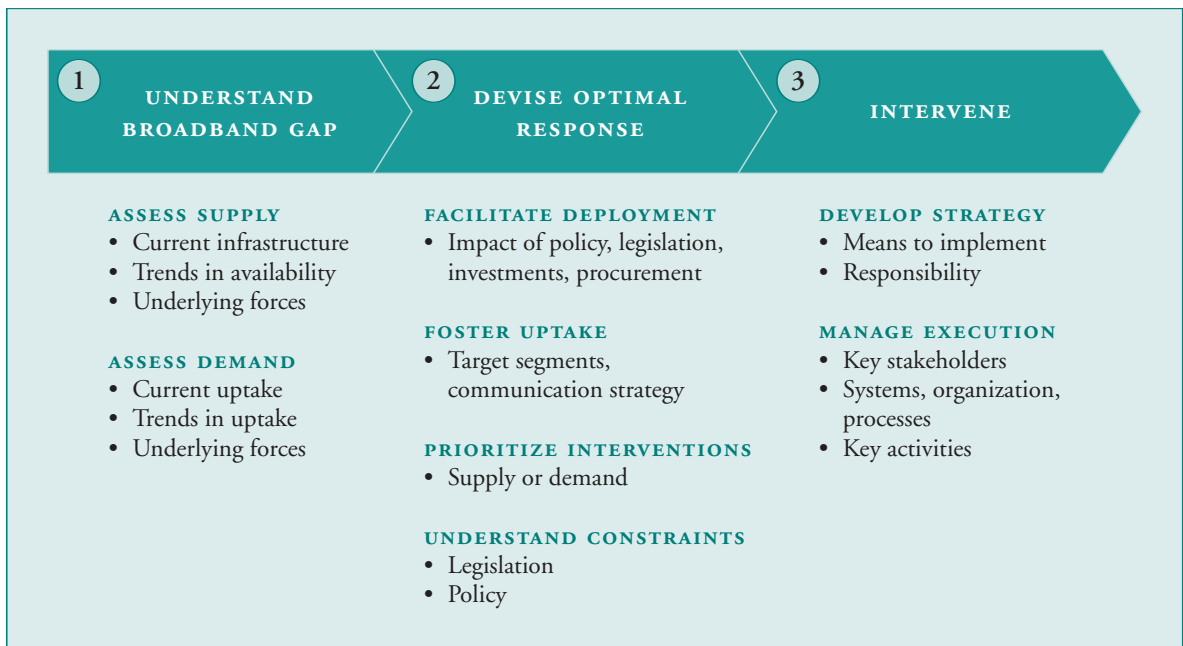
*As measured by current level of broadband availability against stated objectives
Source: A. T. Kearney

The second step involves determining the necessary level of investment (*see figure 3*). The biggest cost of deployment is upgrading the most expensive part of the network: the backhaul. This upgrade can be justified in commercial terms when there is a critical mass of broadband demand. Failure to reach critical mass means that the investment per user is unsustainably high. Key questions to answer include: How much investment is required? Who pays for it? If the government intervenes, what are the legal implications? Any intervention is likely to be scrutinized by a national telecommunications regulatory body or supranational bodies such as the European Commission or the World Trade Organization. In short, many governments are constrained by the level

of direct intervention allowable in their market.

Third, governments need to define the most effective and efficient means of intervention. This involves identifying ways to foster adoption and prioritize the intervention to deliver maximum impact while working within the government’s time and resource constraints. Governments must align their intervention efforts with their other policies and economic models. Most countries already have public bodies that promote technology use and adoption, and many devote funds to develop communications infrastructure. Nevertheless, few governments have created a sound, coordinated broadband policy—one that aligns investment with intervention to achieve nationwide, integrated broadband-network availability.

Figure 2: Forging a path for intervention



Source: A.T. Kearney

After completing these steps, the government must explore the issue of execution. How does the government ensure that its strategy is implemented within a specific timeframe and according to plan? Success in such a program invariably requires cooperation from various ministries, national and regional agencies, industry and the regulatory body. It requires aligning political agendas, interests, objectives and timeframes—areas where public bodies have diverging and sometimes even conflicting targets. The U.K. government’s strategy illustrates an interesting approach to this challenge.

THE U.K. IMPERATIVE: BROADBAND BY 2005

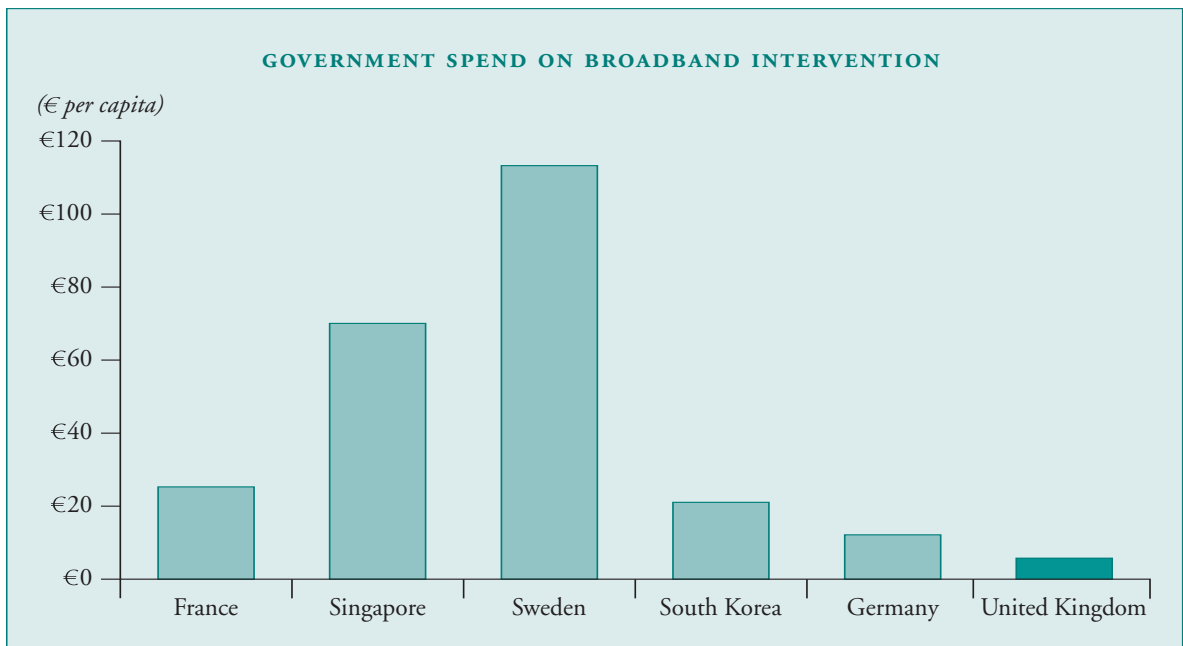
In 2002, the countries of the European Union

adopted the eEurope 2005 Action Plan, which aims to increase services, applications and content based on a widely accessible broadband infrastructure. As a result, broadband availability and adoption have taken a central, and fairly urgent, role in the ICT agendas of all European Union governments.

In the United Kingdom, e-Commerce Minister Stephen Timms announced that the government would aggregate public-sector broadband demand to save money and increase availability in rural and remote areas. The U.K. government’s affirmed objective is “to have the most extensive and competitive broadband market in the G7 by 2005.”

The U.K. project is steering the expansion of broadband via two main approaches. The first is

Figure 3: The size of the public purse



Sources: Governments, regulators, Ovum (2003)

to establish a regulatory framework that promotes increased competition in the telecommunications sector—in a country widely regarded as having a highly competitive telecommunications landscape. The second approach involves pooling government spending on broadband. In doing so, the combined demand is enough for broadband operators to serve the requirements in a given area.

The U.K. government is defining and implementing a strategy to aggregate government departments' broadband requirements regionally, and then buy broadband on the open market in each region. Because government departments will purchase connectivity in bulk, suppliers' unit costs will fall. These savings will be shared with public-sector customers, and in turn will trickle down to taxpayers. By bundling regional demand with a clever mix of urban and rural sites, this approach will drive the expansion of a core broadband network.

Prime Minister Tony Blair has promised to give every school, university, hospital and doctor's clinic a high-speed link to the internet. The government is spending more than £1 billion (US\$1.8 billion) on broadband for key public services over the next three years as part of a £6 billion (US\$10.8 billion) investment in information and communications technology.

The aggregation strategy

Within months of these announcements, the government set up nine regional aggregation bodies (RABs) across the United Kingdom to obtain maximum value for the public sector's £1 billion spend on broadband. The RABs, established in partnership with regional development agencies (RDAs), combine public-sector demand for broadband. In essence, they act as resellers of

broadband between telecommunication providers and public service bodies—RABs do not compete with telecommunications companies nor do they own any networks. For governments, such regional procurement strategies allow them to save money and increase broadband access in rural and remote areas.

A national aggregation body (NAB) supports the regional bodies and has the authority to sign a national contract, if appropriate. Although the RABs are initially only concerned with aggregating the connectivity requirements of the public sector, they will be structured in a way that allows them to extend their scope. This could mean moving into managed services or assisting segments of the private sector, if permissible within EU law.

The RABs will work with their corresponding RDAs to seek additional public-sector customers. The RDAs are charged with increasing broadband availability in remote or outlying areas—those unaffected by public-sector demand.

Contracts for service are awarded through a framework contract agreement, which complies with strict public-sector procurement policies. If a suitable supplier is not available, the contract will either go through the Official Journal of the European Union procurement process or through existing contracts managed through the RAB.

To ensure sufficient demand and the rapid delivery of benefits, the government enlisted the National Health Service and the Department for Education and Skills as anchor customers. These two ministries have enough hospitals, clinics, doctors' offices, schools and libraries throughout the United Kingdom to reap benefits of scale from their pooled broadband requirements.

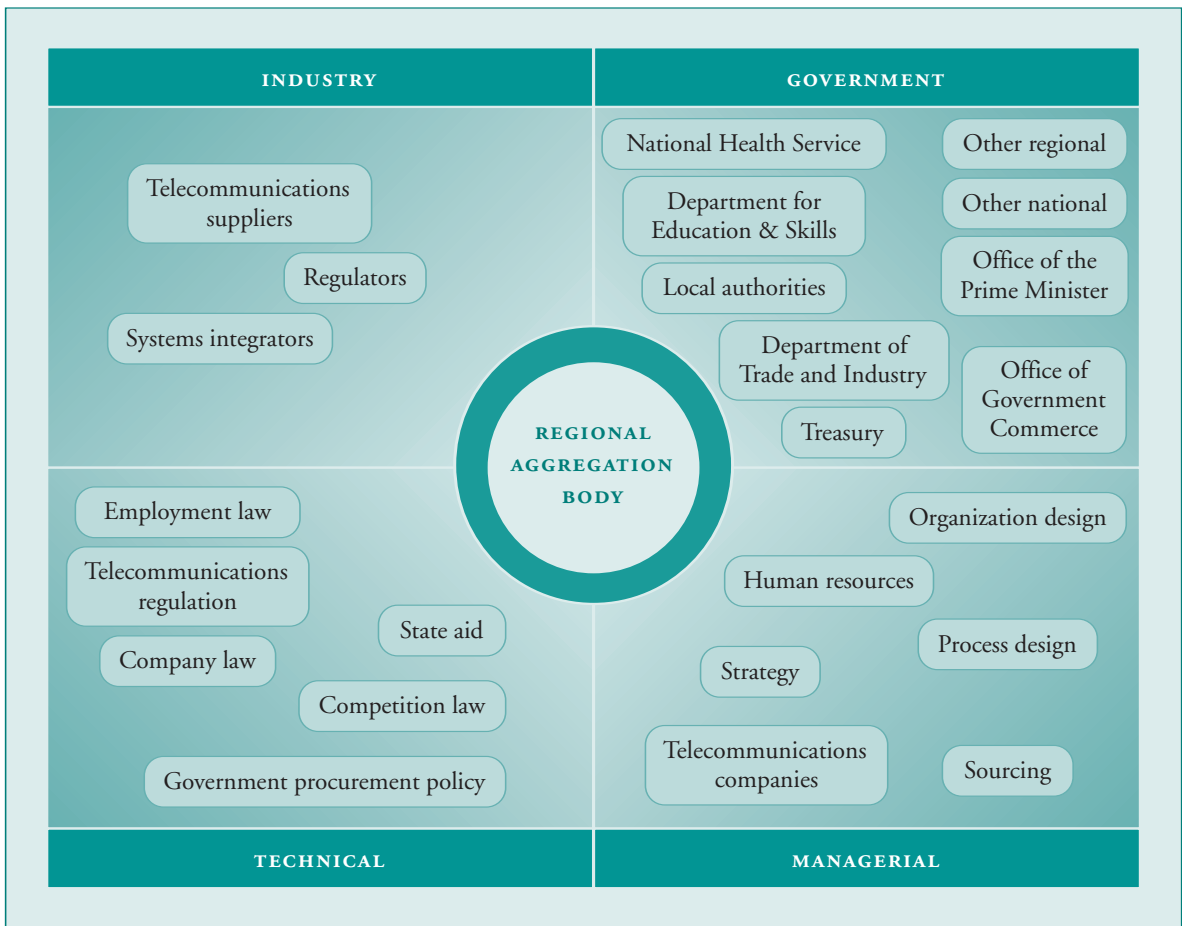
The U.K. government’s initiative is a good example of the challenge of working with multiple stakeholders—including various ministries, regional organizations and industry groups—to coordinate plans and align objectives to meet a common goal (see figure 4). Initial regional analyses show that aggregating demand is likely to increase broadband availability to households from the current 67 percent to 94 percent. In terms of economic gains,

preliminary examinations of one anchor customer’s current and planned spend show that on a national basis aggregation can shave 35 to 45 percent off broadband connectivity costs.

Three key roles

To deliver the projected benefits, the RABs must act as “intelligent clients” on behalf of the public sector and fulfill three key roles: aggregator, solution developer and procurer (see figure 5 on page 8).

Figure 4: Multiple stakeholders and skills



Source: A.T. Kearney

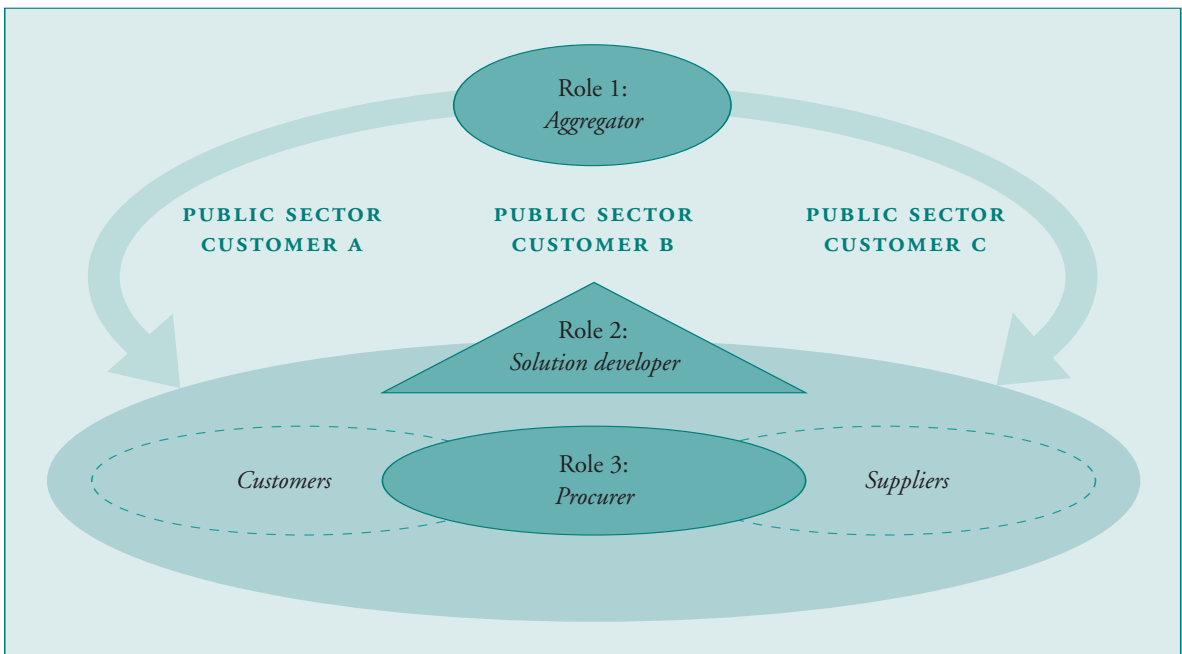
In its role as aggregator, the RAB works with regional public-sector customers to assess their requirements and aggregate their demand. The RAB has sufficient in-house knowledge of the demand curves in each region to determine demand requirements and to maximize value and availability when necessary. For example, when demand from a specific public-service body is not enough to attain the next level of discounts or availability, the RAB can find additional demand from other public-service bodies.

As solution developers, RABs deliver against their strategic objectives. In assessing demand, for instance, the RAB has sufficient in-house technical knowledge of network design and operations to prepare tenders that will influence

solution providers to not only deliver value, but also increase availability. The RAB also ensures that the selection is made on the basis of availability.

Finally, in the procurer role, the RAB uses its purchasing knowledge and expertise to choose among the available routes to market. The choices include using national-government procurement framework contracts, the renegotiation of existing contracts, and initiating new tendering processes. In addition, the RAB implements procurement processes on behalf of the public-service bodies and is responsible for managing customers, suppliers and contracts. The RABs also select telecommunications suppliers on the framework contracts with the goal

Figure 5: The RAB's roles as the "intelligent client"



Source: A. T. Kearney

of extracting maximum value from regional competition and reducing the cost of entry so that more suppliers can compete for government business.

In developing this strategy, those on the U.K. broadband aggregation project regularly consulted with members of the government's key advisory body, the Broadband Stakeholder Group. The United Kingdom's choice of a collaborative, creative, multi-stakeholder approach to the expansion of its broadband network presents an interesting option for governments that want to develop their broadband infrastructures in cost-effective ways (*see sidebar: The Economic Impact of Broadband*).

**THE TELECOM PERSPECTIVE:
SECURING THE FUTURE**

A key issue for telecommunications companies is how best to seize the opportunities government

intervention offers. In an industry that has weathered its share of ups and downs—mostly downs in recent years—increased government intervention in deploying broadband infrastructure may bring short-term relief. In fact, government intervention could have a significant impact on the future fortunes of the telecommunications sector.

Companies that recognize these opportunities will partner with governments to ensure that intervention takes into account the commercial realities of the sector. The more astute telecom players will align closely with governments, working with them to devise tailored solutions to help meet broadband objectives, while simultaneously ensuring their own competitive and financial viability.

Yet achieving effective partnerships with governments will require more than technological insight. It will require best-in-class business

The Economic Impact of Broadband

The township of South Dundas located in Ontario, Canada, invested US\$568,000 in 2000 to build a fiber optic network. Its goal was to provide broadband connectivity to the community and promote local economic development. Between June 2001 and April 2003, the township of 11,000 realized several economic benefits from its fiber network, including 63 new jobs, roughly US\$2 million in commercial and industry expansion, and US\$106,000 in increased revenues and decreased costs.

Additionally, 19 of 38 businesses with broadband access to the internet experienced job growth. This number includes 24 organizations using the fiber network, 13 of which experienced job growth. Ten of 27 businesses with dial-up access to the internet experienced job growth, and one out of 18 businesses with no internet access experienced job growth.

Forecasts of the wider economic impact of the broadband network estimate a US\$20 million increase in GDP for Dundas County and a

further US\$6 million increase for the rest of Ontario. The predictions are also for an increase in employment (207 person years of employment for Dundas County and 64 for the rest of Ontario), a US\$2.5 million increase in provincial tax revenues and US\$3.4 million increase in federal tax revenues.

Although South Dundas is a small example, its success in providing broadband connectivity suggests the economic promise of broadband for suburban and rural areas worldwide.

Case study based on findings in "Economic Impact of the South Dundas Township Fibre Network" UK Department of Trade and Industry (June 27, 2003), conducted by Strategic Networks Group, Ontario, Canada.

development, the ability to develop innovative ideas, and a talent for recognizing and exploiting complementary opportunities.

Applying best-in-class business development

Given the opportunity to deploy broadband infrastructure nationally, companies in the telecommunications industry will want to employ best practices in marketing and account services. Old marketing frameworks are unlikely to win over public-sector business.

Partly because of the scale of government operations, most telecommunications service providers currently take a decentralized approach to dealing with the public sector. Although it is possible to meet individual departmental needs in this fashion, it is not possible to meet the broader needs of governments. Companies that lack a holistic understanding of governmental agendas cannot effectively meet the requirements. The vast agendas for broadband infrastructure deployment will require flexible, comprehensive approaches rather than product- or technology-based models.

Given these issues, telecom players will want to adopt best practices in strategic account management and consultative selling. The skills they use in dealing with private-sector companies should be transferred to relationships with public bodies. This will ensure that telecommunications providers are positioned as partners, rather than mere service or product suppliers. It will also guarantee that intervention solutions not only meet a government's objectives but importantly, are competitive and financially viable.

Focusing on innovation

Innovation is a key factor in working with governments. To speed the rollout of afford-

able broadband across their markets, telecom companies will need to develop innovative, commercially viable approaches to alternative technologies and networks. Innovation should extend to developing new funding strategies, which may, as mentioned earlier, involve the public sector. These strategies should also consider traditional sources of funding and supply-chain links as well as issues relating to competitive and national barriers.

Innovation will be key in developing and using new broadband-delivery technologies. Currently, the most popular technologies for obtaining high-speed communications are fiber optics, cable modems, digital subscriber lines, and wireless and satellite systems. Telecom companies must be able to structure an intelligent combination of these technologies, depending on both demand and geographic spread.

Telecom companies must also develop innovative solutions based on firm economics. For example, it is more economical to use fiber, or a leased wavelength on a fiber, than to use a digital microwave radio link—the reasoning being that as demand for bandwidth increases with more users, it costs less to increase capacity on fiber than on a microwave radio link. Fiber is not always an economical solution, but in this case it would be the preferred remedy with regard to future demand and capacity requirements.

Other examples of innovative solutions come from a broadband aggregation initiative in a large European country. The country has seen three significant new developments: a flexible internet protocol core with a range of fixed-line and wireless access technologies (from a national telecommunications supplier), an innovative approach to unbundling the local loop, and

In an industry that has weathered its share of ups and downs—mostly downs in recent years—increased government intervention in broadband may bring short-term relief.

a flexible-bandwidth Ethernet product called “liquid bandwidth” (from a mid-size carrier). Of particular interest is the last item. Liquid bandwidth extends the concept of permitted burst rates commonly found with higher value ATM (asynchronous transfer mode) products. A customer commits to a specific bandwidth, but is permitted to exceed that limit for a certain period of time. Essentially, it allows additional bandwidth on demand for higher-speed Ethernet connections. This offering is an example of service providers recognizing the changing needs of customers, and investing in flexible solutions to meet those needs.

Identifying complementary opportunities

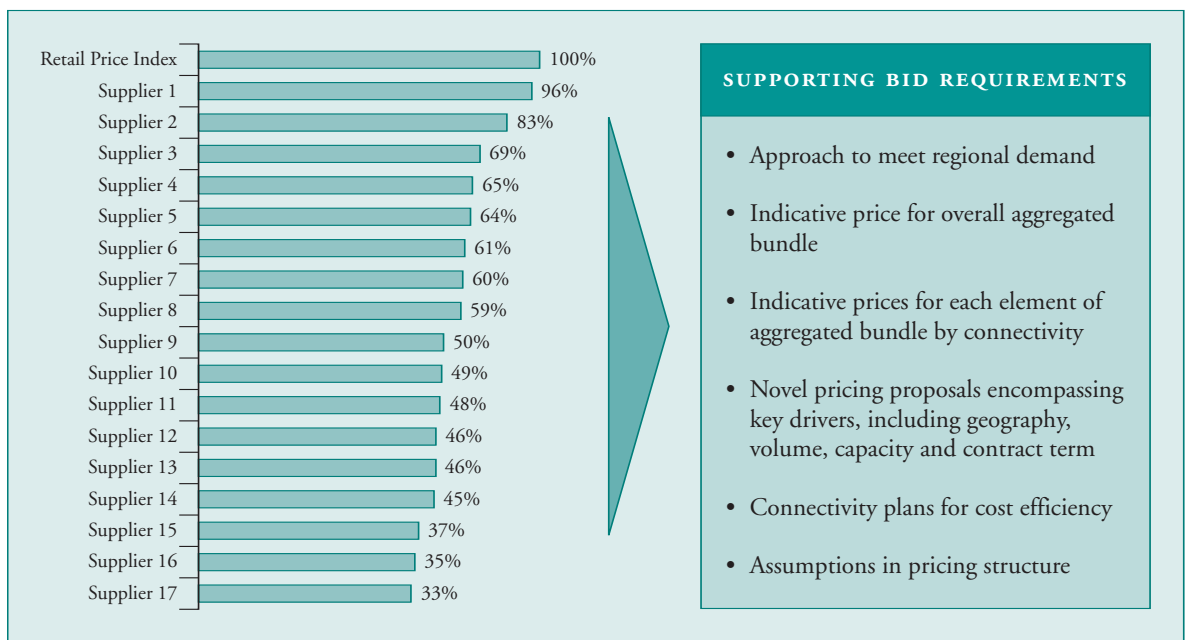
Finally, and perhaps most important, govern-

ment intervention holds the potential to accelerate the upgrade and deployment of national broadband. As such, telecommunications industry players will enjoy new growth opportunities earlier than expected.

The secret to identifying and securing these opportunities lies in the risk appetite of telecommunications firms. When the public sector buys broadband in bulk, it will be an attractive proposition because of the sheer size of the business and the low cost of capital associated with funding government receivables. Telecom players must recognize these benefits and be aggressive in their approaches to network design, deployment and pricing.

As an example, a European government recently issued an invitation to tender from 17

Figure 6: Pricing distribution in a sample region



Source: A.T. Kearney

telecom suppliers with a presence across the country. All bidders had to submit a price bid for an example bundle in a small sub-region of the country. The bidders received postcode-level information for more than 1,000 sites within the sub-region, and an overview of the site requirements. All sites were required to have synchronous, dedicated (“uncontended”) connections of variable bandwidth, which was clearly specified.

When the bids arrived, the range of prices offered was staggering: The lowest price was 33 percent of the market benchmark (*see figure 6*). Most of the offers were built on varying technical solutions; however, all met the end-user requirements in terms of bandwidth, service level requirements, and terms and conditions.

This example illustrates how identifying the complementary opportunity created through government intervention can open up competition, enabling suppliers to capture significant opportunities and growth through intelligent network design.

AGENDA FOR GOVERNMENTS

A large-scale program such as broadband deployment requires a great deal of planning, political commitment and the ability to manage numerous stakeholders. Additionally, it entails a certain amount of collaboration. Until now, the public sector would not have been able to jointly procure broadband services and connectivity for several reasons:

- Few mechanisms to support such initiatives
- Discrete departmental or agency funding, both in nature and timing of the funding
- Lack of either fiscal or efficiency incentives to encourage cross-agency procurement
- Cultural and political inertia

- Operational and financial risks associated with joint-procurement activities

The following steps will help ensure the success of a large-scale transformation project.

Create a compelling argument

Every broadband initiative must begin with a clear, fact-based, logical argument. The argument requires a solution that is clearly linked to a policy objective, and a solid business case that highlights the project costs and benefits as well as any perceived risks.

For example, the policy objective for the United Kingdom was to “to have the most extensive and competitive broadband market in the G7 by 2005.” The argument: Public sector aggregation of broadband demand will create sufficient incentives to attract suppliers in building out the core network, thus benefiting the United Kingdom. Using financial modeling, the business case proved that this approach would save taxpayers’ money and pose fewer risks than a more direct method of intervention.

Align policy objectives and needs of key stakeholders

Different ministries and stakeholders will have different objectives in every large-scale broadband initiative. The goal is to search for common ground and understand the drivers and objectives of each stakeholder. Finding common ground will require an experienced, multidisciplinary team and strong program management. The key for aligning policy objectives with the needs of stakeholders is collaboration—settling on objectives that have a measurable impact on a particular government department and can also deliver wider social benefits to the public.

Government intervention holds the potential to accelerate the upgrade and deployment of national broadband.

Engage high-level political support and leadership

Successful national projects require significant leadership and political support, at least at the ministerial levels. For example, in Portugal, the prime minister's office has shown strong interest in broadband policy initiatives and has assisted in areas where political roadblocks posed a threat to the project's success.

High-level political support is particularly relevant for countries that choose to follow the United Kingdom's broadband lead—the U.K. model works best in strong, centrally directed governments. In market-driven economies, where public institutions are more or less autonomous from central government, a high level of political support is less necessary because it is less effective.

Further, engaging high-level political support may not be enough in most liberal democracies around the world. Getting ministerial support for an initiative is one thing, forcing public authorities that are not statutorily obliged to buy in to them is another. Therefore, large-scale initiatives, like broadband deployment, should be built from the bottom up as much as from

the top down. Indeed, as was learned in the United Kingdom, the more initiatives that are driven from the top down without simultaneously driving from the bottom up, the more problems are stored for the implementation.

Ensure managerial and technical leadership

Solid managerial and technical leadership is another key to success. Those who manage a broadband deployment must have a wide range of skills and expertise to cover diverse and complex aspects ranging from legal issues—state-aid, competition and employment law being prime examples—to supplier economics and procurement strategy. They must have the skills to recognize and address technology developments, departmental politics and stakeholder management, as well as to undertake recruitment. Participants must have hands-on knowledge of organization and process design, governance, and the ability to manage programs and performance. Finally, the entire team must be able to grasp the key issues of the project, and devise a flexible solution without compromising the core policy objectives.

Conclusion

No one is ignoring the economic and social promise of ubiquitous broadband access. Given the significant differences in broadband availability in urban and rural areas, it is clear that governments need to carefully define their role in addressing how to optimally close this “digital divide.” As the broadband initiative in the United Kingdom shows, intervention need not come at a huge cost to the taxpayer—it can even attract additional investment from the telecommunications industry.

For the telecommunications industry, it will be increasingly important to recognize that a variety of opportunities will arise from government intervention. Astute players will work closely with governments, collaborating to devise tailored solutions that help governments meet their broadband objectives while also ensuring carriers’ long-term competitive and financial viability.

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