

Perspective

Karim Sabbagh
Roman Friedrich
Bahjat El-Darwiche
Milind Singh

The Booz & Co. logo is displayed in a bold, black, sans-serif font. It is positioned in the upper left corner of a photograph. The photograph shows a close-up of a cable-stayed bridge's arch against a clear blue sky. The arch is a light tan color, and several cables fan out from it. A thick black horizontal line runs across the middle of the image, partially obscuring the logo and the bridge structure.

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Enabling Sustainable
Digital Highways

*Strategies for Next-
Generation Broadband*

Contact Information

Beirut

Gabriel Chahine

Partner
+961-1-985-655
gabriel.chahine@booz.com

Bahjat El-Darwiche

Partner
+961-1-985-655
bahjat.eldarwiche@booz.com

Berlin

Steffen Leistner

Partner
+49-30-88705-888
steffen.leistner@booz.com

Dubai

Karim Sabbagh

Partner
+971-4-390-0260
karim.sabbagh@booz.com

Düsseldorf

Stefan Eikermann

Partner
+49-211-3890-110
stefan.eikermann@booz.com

Christian Fongern

Partner
+49-211-3890-270
christian.fongern@booz.com

Roman Friedrich

Partner
+49-211-3890-165
roman.friedrich@booz.com

Thomas Künstner

Partner
+49-211-3890-143
thomas.kuenstner@booz.com

Michael Peterson

Partner
+49-211-3890-140
michael.peterson@booz.com

Peter Weichsel

Partner
+49-211-3890-231
peter.weichsel@booz.com

Greater China

Dr. Edward Tse

Senior Partner
+86-10-6563-8300
+852-3650-6100
+86-21-2327-9800
edward.tse@booz.com

Houston

George Appling

Partner
+1-713-650-4143
george.appling@booz.com

Kenny Kurtzman

Partner
+1-713-650-4175
kenny.kurtzman@booz.com

Madrid

Jose Arias

Partner
+34-91-411-5121
jose.arias@booz.com

Melbourne

Simon Gillies

Partner
+61-3-9221-1903
simon.gillies@booz.com

Milan

Luigi Pugliese

Partner
+39-02-72-50-93-03
luigi.pugliese@booz.com

Munich

Gregor Harter

Partner
+49-89-54525-554
gregor.harter@booz.com

Martin Reitenspiess

Partner
+49-89-54525-522
martin.reitenspiess@booz.com

Gregor Vogelsang

Partner
+49-89-54525-590
gregor.vogelsang@booz.com

New Delhi

Ashish Sharma

Principal
+91-98999-78128
sharma.ashish@booz.com

Paris

Pierre Péladeau

Partner
+33-1-44-34-3074
pierre.peladeau@booz.com

São Paulo

Ivan de Souza

Senior Partner
+55-11-5501-6368
ivan.de.souza@booz.com

Tokyo

Paul Duerloo

Partner
+81-3-6757-8615
paul.duerloo@booz.com

Vienna

Klaus Hölbling

Partner
+43-1-518-22-907
klaus.hoelbling@booz.com

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EXECUTIVE SUMMARY

High-speed broadband access facilitates a number of pivotal socioeconomic services and activities, including education, health, trade, and innovation. Broadband has transformed interactions among businesses, consumers, and governments. In recent years, the extensive influence of increased access to high-speed broadband on economic development and social networks has become evident to both the public and private sector. The creation of national broadband networks is crucial to sustainable economic development and social progress—not only in emerging economies, but in developed ones as well.

Despite the widespread recognition of broadband's benefits, most of world's households today lack access to an adequate broadband connection. Legacy policies, regulations, and business models are limiting the ability of the public and private sectors to make the timely and adequate investment in necessary infrastructure to ensure universal access.

In order to break this investment gridlock—and pave the way for universal broadband access—governments and private-sector operators both need to make fundamental changes in their mind-sets and business models. Broadband must move to the top of national strategic agendas. Policymakers ought to consider balancing their goal of protecting consumers with providing for an efficient industry structure that entices investment in national networks. Operators

must adopt new business models to account for transformative shifts in the industry's structure.

The timing is critical. The faster a country moves to provide national broadband access, the swifter it can gain or improve its standing in the global economy. For operators, the pace of transformation will determine whether they can benefit from first-mover advantage and reap the benefits of government support.

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KEY HIGHLIGHTS

- Broadband facilitates innovation, entrepreneurship, and productivity. Countries with 80 percent broadband penetration are more than twice as innovative as countries with 40 percent penetration. Increasing broadband penetration by 10 percent translated into a 1.5 percent increase in the country's labor productivity—a vital competitive advantage.
- Despite widespread recognition of broadband's significant socioeconomic impact, more than 75 percent of the world's households are not connected to a broadband network. As a result, while governments focus on bridging the digital divide, another chasm is forming, separating nations that have access to ultra-high-speed broadband connections from those that don't.
- Three key inhibitors are preventing governments and the private sector from collaborating to ensure adequate investments in national broadband infrastructure: the sheer magnitude of these investments, revenue prospects, and regulatory uncertainty.
- The public and private sectors need to consider new paradigms in order to ensure the future viability of the sector, break the investment gridlock, and open the door for investment in national broadband networks. Governments must consider broadband a national imperative and be proactive in securing universal broadband. Operators need to deploy new business models to diffuse investment risk.

A NEW GLOBAL IMPERATIVE

Julius Genachowski, chairman of the U.S. Federal Communications Commission, aptly described the relevance of broadband, a vital asset with an impact that extends far beyond the telecommunications sector: “Broadband is the great infrastructure challenge of our generation. It is to us what railroads, electricity, highways, and telephones were to previous generations—a platform for commerce, for democratic engagement, and for helping address major national challenges.”¹ Nationwide access to electricity and highways was a central focus of public policy in the 20th century. This century, timely, universal, and affordable access to

broadband is emerging worldwide as a vital consideration for governments and the private sector. The creation of national broadband networks is crucial to sustainable economic development and social progress, in developed as well as emerging economies, and thus must move to the top of national strategic agendas.

Despite the pervasive recognition of broadband's benefits, a substantial majority of the world's households today lack access to an adequate connection. The sector's adherence to legacy policies, regulations, and business models is limiting timely and sufficient investment in necessary infrastructure. Governments and private-sector operators must prepare to accept a fundamentally new set of principles and business models. Their acceptance will be imperative to breaking the deadlock that inhibits investment and secure access to broadband.



THE BROADBAND DIVIDEND

Since the beginning of this decade, broadband has exerted a profound influence on society. It has fundamentally transformed the way businesses, consumers, and governments operate. Just as countries with a young population benefit from a so-called demographic dividend, countries with higher broadband penetration have reaped rich broadband dividends across economic and social activities. For a society to realize the full potential of this asset, its broadband deployment has to be universal and affordable. It has to enable high-speed access, and it must happen in a timely manner.

Universality and affordability are vital to ensure that broadband is

inclusive and can be used as a tool for public service, particularly in health, education, employment, and social integration. Governments have traditionally been unable to effectively serve rural and underprivileged communities, where public services are most needed. Widespread broadband deployment has proven to be a key transformation tool to address that issue and effect change in those communities. Broadband has enabled governments across the world to offer remote diagnostics through e-health, bring quality education to underprivileged communities, widen employment opportunities, and provide more citizens with an opportunity to influence policy (*see Exhibit 1*).

Exhibit 1
Public Services and Social Inclusion through Broadband

	Description	Example Initiatives
Improved Healthcare	Telemedicine offers the opportunity to bridge the gap between healthcare services in rural and urban areas	A tele-pathology system developed in Japan allows pathologists using high-definition video and remote-controlled microscopes to examine tissue samples from patients living in rural areas
Better Education	E-learning and online video tutorials can be a powerful tool to improve educational services in rural areas	South Korea developed the Education Broadcast Service (EBS) to help children in rural areas better prepare for a national aptitude test through access to free video tutorials
Employment Opportunities	High-speed broadband enables tele-working in rural areas and creates rural entrepreneurs	The U.S. government is active in promoting tele-working for the federal government in order to promote employment in rural areas as well as reduce traffic congestion
Access to Government Services	Broadband allows residents and businesses in rural areas to have access to e-government services	The Rural eGov project of the European Union aims to study the needs of small- and medium-sized enterprises (SMEs) in rural areas for governmental and public services and offer policy recommendations to EU governments

Source: Booz & Company

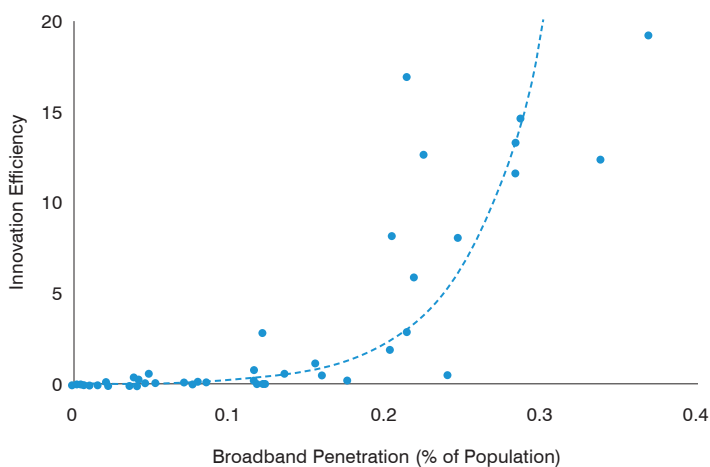
Broadband's performance is also a fundamental component of its effectiveness in transforming the way individuals and corporations cooperate and create. Broadband facilitates innovation and entrepreneurship. Booz & Company analyzed a group of 50 countries and found that countries with the highest broadband penetration as a percentage of Internet penetration had much higher

innovation efficiency than countries in the bottom tier of the broadband-to-Internet ratio (see Exhibit 2). Countries with a higher proportion of broadband-to-Internet connections see greater innovation. Broadband stokes innovation and it does so exponentially—countries with 80 percent broadband penetration are more than twice as innovative as countries with 40 percent penetration.

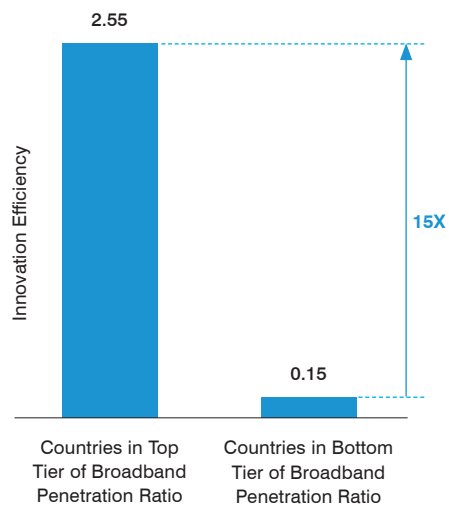
Timeliness in deploying broadband yields further substantial benefits for countries. A Booz & Company analysis indicated that countries that perennially ranked in the top tier of broadband penetration recorded twice the rate of GDP growth of countries that consistently ranked in the bottom tier of broadband penetration (see Exhibit 3). Additionally, boosting broadband penetration by 10 percent

Exhibit 2
Broadband's Impact on Innovation

INNOVATION EFFICIENCY¹ VS. PENETRATION



INNOVATION EFFICIENCY, TOP AND BOTTOM DECILES²



¹ Innovation efficiency is defined as the number of patents per million divided by the EIU Innovation input/enabler score for the country
² Countries are grouped into deciles of broadband/Internet penetration levels, and averages per decile are used.
 Source: Economist Intelligence Unit, "A New Ranking of the World's Most Innovative Countries," April 2009; International Telecommunications Union, World Telecommunications/ICT Indicator Database 2009; Booz & Company analysis

THE RISK TO LONG-TERM SECTOR SUSTAINABILITY

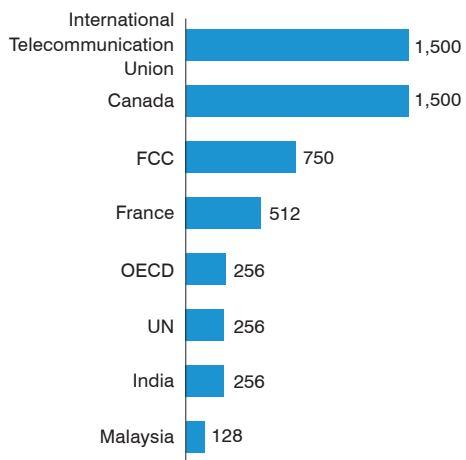
Despite widespread recognition of broadband's significant socioeconomic impact, more than 75 percent of the world's households are not connected to a broadband network. Even developed economies in Western Europe and North America have managed to provide broadband access to only two-thirds of their population. Despite the efforts of governments and the private sector, the broadband digital divide persists as a significant challenge to inclusive and sustainable development, especially in emerging economies.

While governments focus on closing the digital divide, the chasm that separates nations with access to ultra-high-speed broadband connections from those without is opening.

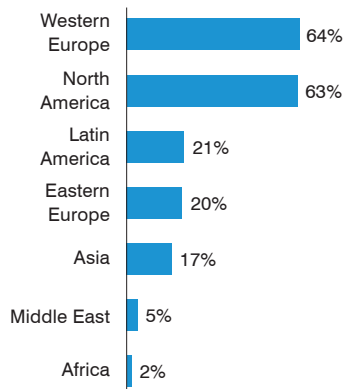
Businesses and consumers are seeking advanced, next-generation applications such as cloud computing and virtual world experiences and they need ultra-high-speed broadband connections. Consumers are clamoring for speeds at least 10 times faster than those currently offered in order to use those next-generation applications. In the future, even faster connections will be needed for the next wave of advanced services and applications, increasing significantly the investment required and hence the challenge of building a national broadband network. In providing faster services, the track record of even the most developed markets falls short. Only seven economies have ultra-high-speed broadband penetration that is 10 percent or higher (*see Exhibit 4*).

Exhibit 4
Speed and Penetration Levels, by Country

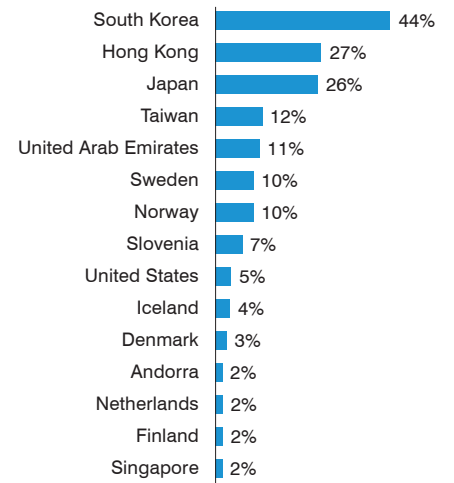
BROADBAND SPEED DEFINITION (KBPS)



FIRST-GENERATION BROADBAND PENETRATION, Q4 2008 (% OF HOUSEHOLDS)



NEXT-GENERATION BROADBAND PENETRATION (FTTH/B), Q4 2008 (% OF HOUSEHOLDS)



Source: Informa, World Broadband Information Service database, 2008; FTTH Council, global rankings, 2008; Booz & Company analysis

Because there is such a long way to go to make broadband a universally available asset, all stakeholders will need to collaborate and solve crucial issues. Three inhibitors are preventing governments and the private sector from collaborating to ensure adequate investments in national broadband

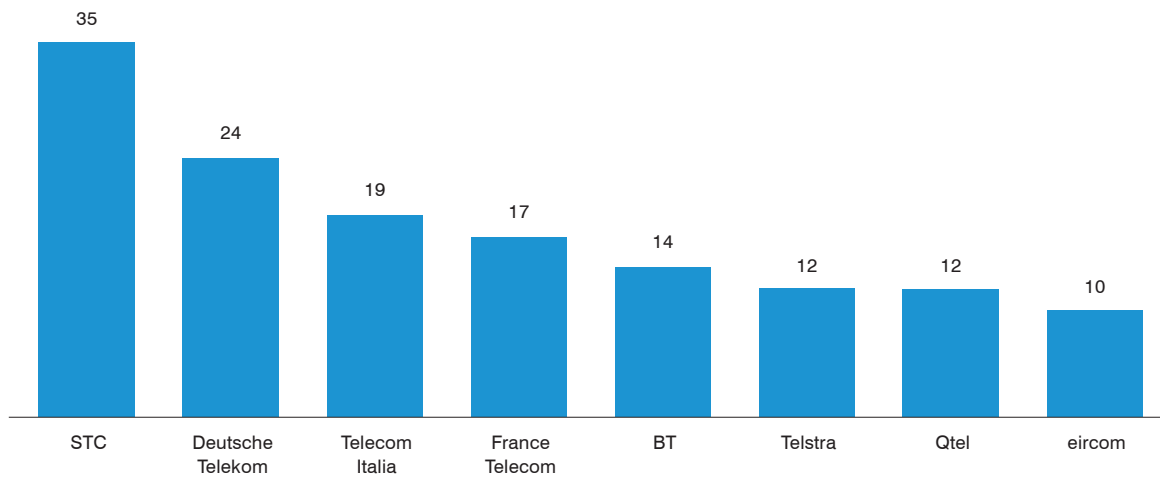
infrastructure: the sheer magnitude of these investments, revenue prospects, and regulatory uncertainty.

Investments in national broadband infrastructure are significant, front-loaded, and irreversible (*see Exhibit 5*). As a result, investors are cautious,

tempted to hold back on investments until they have sufficient clarity about their ability to make an adequate return on their investments. Uncertainty surrounding future broadband revenue streams and regulatory obligations are making it difficult for operators to gauge the level of investment risk.

Exhibit 5
Broadband Infrastructure Requires a Substantial Investment

NUMBER OF YEARS TO DEPLOY NEXT-GENERATION NATIONAL BROADBAND NETWORK INFRASTRUCTURE, BASED ON CURRENT SPEND¹



¹Next-generation national broadband network capital expenditure is calculated based on the number of households in each country and the cost of passing a household. The analysis assumes an average cost of US\$1,500 per household and a CapEx/revenue ratio of 10 percent.
Source: 2008 company annual reports; Booz & Company analysis

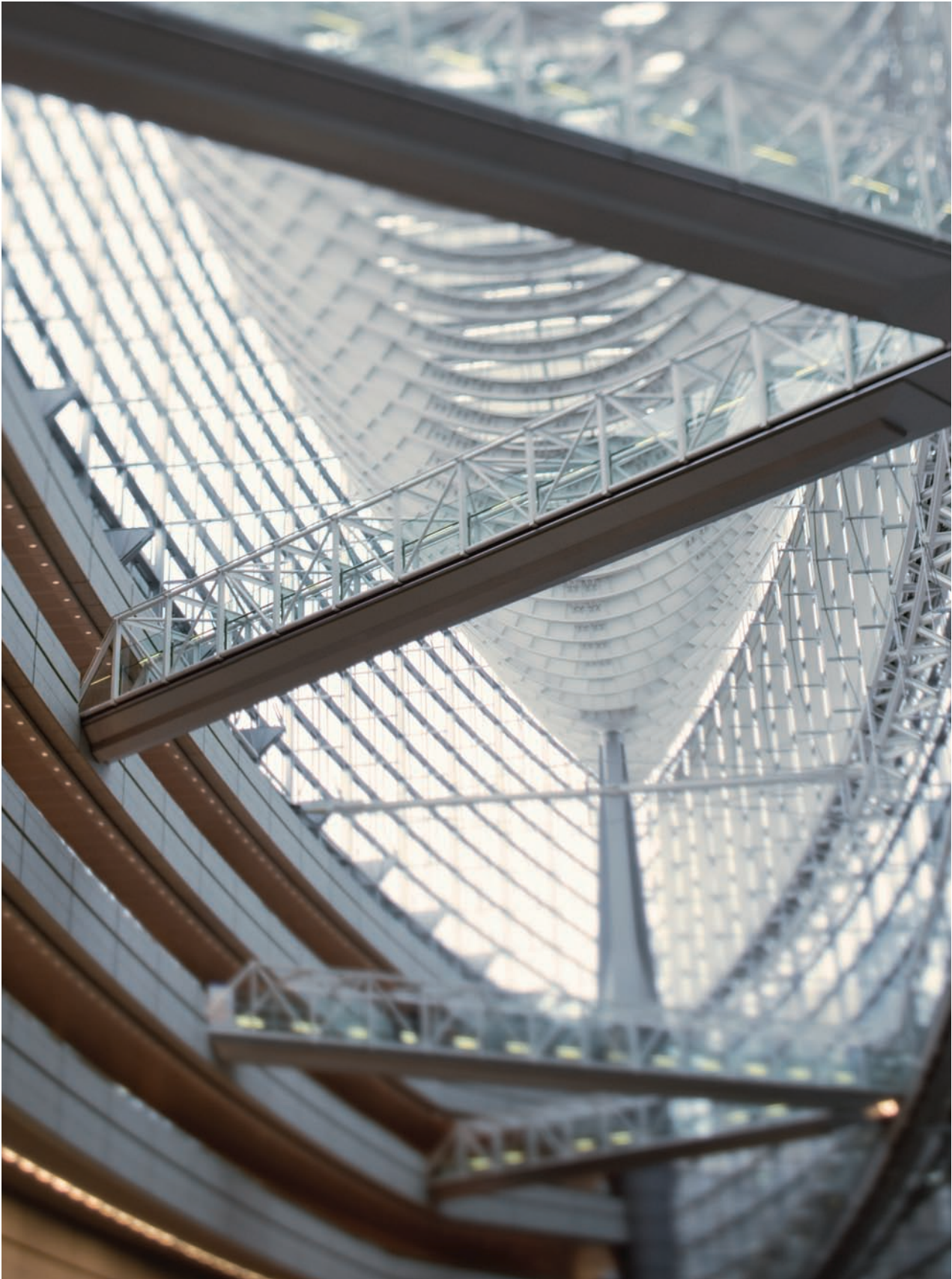
The emergence of powerful application and service providers is another critical factor driving uncertainties around future broadband revenue streams for investors. These providers compete with operators for telecommunications service revenues and stand to profit from broadband—yet they do not have to build the network. This growing competition between operators and application providers marks a fundamental disruption to the sector’s prevalent revenue model, in which operators typically capture the bulk of the revenues generated by the access connection.

Finally, regulators have not established a clear framework targeted

at broadband networks. The infrastructure-sharing models mandated by legacy networks may not be replicable for next-generation broadband. Regulatory authorities have developed a number of tools based on existing technical architecture: these tools include interconnect pricing controls based on per-minute rates and infrastructure-sharing mandates such as local loop unbundling derived from legacy copper-based network architectures. Furthermore, as the distinction between traditional service providers (i.e., operators) and application providers (such as Skype and Google) blurs, regulators need to develop new tools to regulate application providers, which

neither are licensed nor have specific service obligations imposed on them in terms of access and quality. Until regulators define a new regulatory regime, operators will lack confidence in their ability to monetize their investments in national broadband infrastructure, further dampening interest.

The three inhibitors collectively are preventing adequate investments in the sector. This heightens the risk of a downward spiral in which the sector, devoid of long-term investments, stagnates in the short term, resulting in reduced innovation for the economy and endangering the sector’s long-term sustainability.



A FUNDAMENTALLY NEW APPROACH

In order to break the gridlock that has stalled investment and ensure the future viability of the sector, governments and operators need to consider a new paradigm characterized by three attributes.

Broadband: A National Imperative

Broadband must be recognized as a national imperative, not simply a telecommunications industry mandate. To date, most governments have considered broadband an important telecommunications service with revenue potential for the information and communications technology (ICT) sector, and have regulated the business from that perspective. However, given the economic and social benefits that broadband offers, it must be considered a national imperative—and driven accordingly. Governments must elevate broadband from merely another regulatory concern to a top issue on the national strategic agenda. This outlook on broadband will prompt policymakers to take a long-term view and develop consensus among all stakeholders, removing myopic short-term revenue and profitability pressures.

Some countries have already taken giant strides in recognizing broadband as an essential service. France's high-

est court declared in June 2009 that broadband is a human right, cementing its role as a national strategic issue. Finland did the same in October 2009 by making broadband a legal right.

A Proactive Public Sector

The public sector needs to be proactive in securing universal broadband. Because national broadband networks have significant socioeconomic benefits, governments have a vested interest in their creation. Rolling out infrastructure at the national level, however, may not be the best fit for operators' strategies. Therefore, governments need to play an active role in the sector's development, despite the fact that this represents a significant shift away from the long-standing trend toward government disengagement and privatization.

Just as public-private partnerships (PPPs) have become the norm in the development of vital energy and transportation infrastructure, effective PPPs are needed as a model for the telecommunications sector in developing national broadband networks. Governments have several options to consider in establishing successful PPPs: subsidizing infrastructure, providing tax concessions to private operators, or triggering demand for broadband

services. The ideal PPP model for any country hinges on the dynamics of the broadband ecosystem in that country.

New Business Models That Spread Investment Risk

New business models are imperative to spread investment risk. Under the traditional model of broadband access delivery, an end-to-end integrated telecommunications provider offered broadband services over its own infrastructure. The telecommunications provider invested across the value chain with attractive medium-term return prospects, despite market uncertainties and regulatory obligations. That vertically integrated model, however, may not be sustainable in the long term. It could fail to align the risks associated with large-scale infrastructure investments in a highly uncertain regulatory environment with traditionally expected returns. It also inhibits operators from pursuing new revenue opportunities in high-risk application and content ventures. An alternative new horizontal business model approach, which separates the

layers of traditional service delivery and establishes three different plays, would allow risk to be more appropriately tied to rewards and ensure investment sustainability (see Exhibit 6).

The top layer would have a number of “ServiceCos” operating in an extremely competitive and lightly regulated market consisting of multiple application and content providers. ServiceCo businesses would compete on their ability to develop deep market and customer understanding, deploy advanced marketing techniques, and innovate continuously.

Businesses in the middle layer, “ActiveCos,” would lease infrastructure from “PassiveCo,” the infrastructure business, and add intelligent elements to provide differentiated services to both application providers and end users. ActiveCos would compete on their ability to provide high-quality network and enablement services to application and content providers as well as end users. These businesses would operate in a competitive

market, with regulations on service levels, quality, and pricing.

PassiveCo would focus on deploying passive infrastructure across the country, leveraging economies of scale and functioning like an infrastructure utility business—similar to gas and water utilities. PassiveCo is likely to be a natural monopoly and would be heavily regulated.

Adopting horizontal business models yields significant benefits for the stakeholders. It enables traditional operators to reduce regulatory risks in the bottom layer, which incentivizes investment in infrastructure for the long term in return for low-risk, utility-like returns. Horizontal business models also broaden operators’ return prospects in the top two layers by allowing them to compete in areas with higher risk profiles but potentially higher returns. Policymakers benefit from increased private-sector investments, accelerated broadband infrastructure deployment, greater innovation in applications and content, and further socioeconomic contributions from the sector.

Exhibit 6
Horizontal Business Models

	TYPICAL ELEMENTS	PROPORTION OF INVESTMENT	INTENSITY OF COMPETITION	TYPICAL PAYBACK PERIOD
ServiceCo	Applications and content	5%	High	1–2 years
ActiveCo	Switches	25%	Medium	5–7 years
PassiveCo	Ducts and fiber	70%	Low	12–15 years

Source: Booz & Company

“A new business model approach, which separates the layers of traditional service delivery, would allow risk to be more appropriately tied to rewards and ensure investment sustainability.”

THE LEGACY MIND-SET CHALLENGE

To adapt to this new paradigm and spur the creation of national broadband networks, all stakeholders need to adapt their current thinking and accommodate essential changes in policy, regulations, and business models (see Exhibit 7).

Shifting the Government Mind-set

For decades, the global trend has been to minimize the role of government

in the telecommunications sector. Governments typically have migrated from owning incumbent networks to investing passively in them and finally to simply regulating them. As telecommunications regulators, governments have primarily focused on competition, which has been introduced as a mechanism to ensure market efficiency. Effective competition has indeed been a crucial enabler of rapid telecommunications growth in the past decade.

Exhibit 7
Stakeholders and Their New Roles

Governments	Focus	Telecom	----->	ICT
	Role	Oversight	----->	Facilitation
	Philosophy	Open competition	----->	Sector sustainability
Operators	Focus	Access	----->	Enablement
	Business model	Integrated	----->	Modular
	Philosophy	Defensive	----->	Proactive

Source: Booz & Company

However, to address the three inhibitors to investment in national broadband, governments need to rethink their role and consider taking the bold steps necessary to facilitate investments and ensure the sector's long-term sustainability. Governments have played a major role in the development of vital infrastructure sectors—roads, bridges, and power plants. Policymakers now need to explore mechanisms to foster the development of national digital highways.

Governments created most telecommunications regulatory authorities based on the principle that

the consumer had to be protected from the monopolistic activities of incumbent operators. For the past two decades, most regulatory authorities have pursued the singular strategy of preserving customer welfare by introducing competition in the various telecommunications markets—including mobile, fixed, Internet, broadband, and international. In cases where it was apparent that operators were too dominant to allow effective competition, policymakers established a range of regulatory measures to ensure competition efficacy and consumer welfare. These encompass breaking up incumbents

(such as AT&T in the United States), ordering functional separation (BT in the United Kingdom), and mandating shared infrastructure (local loop unbundling across Europe).

A single-minded regulatory focus on introducing competition will not suffice to generate the magnitude of investment necessary to create national broadband networks. Instead, governments must seek a more balanced approach to regulation that ensures consumer welfare while simultaneously guarding the sector's efficiency and long-term sustainability.

Shifting the Operator Mind-set

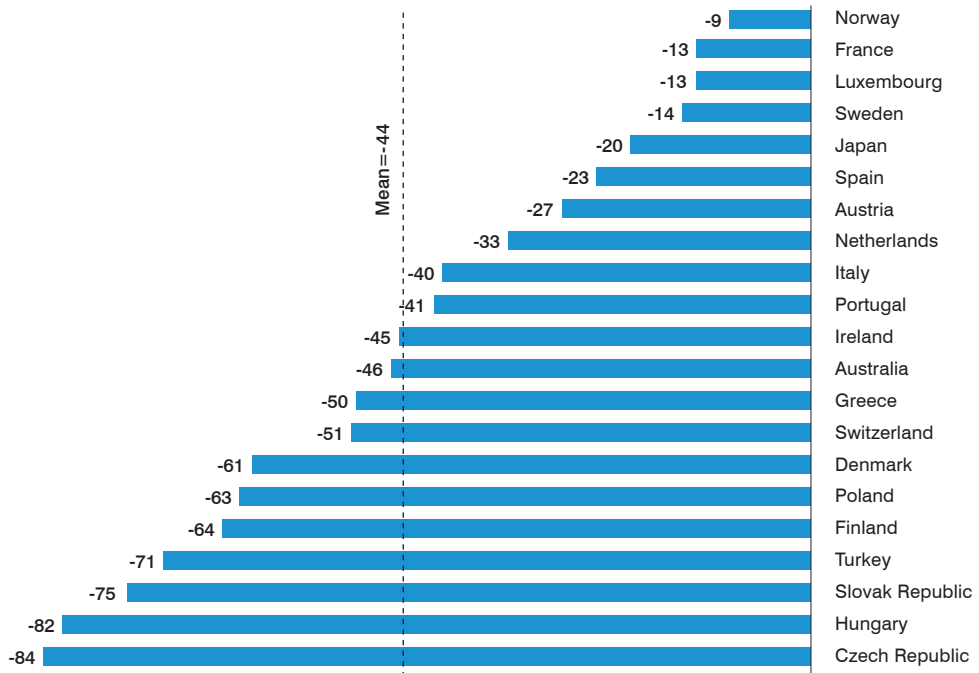
For operators, broadband revenues based on access charges have undergone a rapid decline (*see Exhibit 8*). Relying solely on these revenues will neither support the magnitude of investments needed in national broadband infrastructure nor provide operators with sustainable growth opportunities in the future. Operators need to diversify their revenue streams by seeking scale in their provision of access services and capturing a larger share of application and content providers' revenues.

Additionally, traditional vertically integrated models, which emphasize infrastructure expansion and management, impair operators' ability to compete in the new market structure by promoting a focus on these areas to the exclusion of others. Success in changing markets requires operators to alter their business and operating models from vertical integration to horizontal plays. Operators need to focus on building scale and cost efficiency in the utility-like infrastructure layer and offering reliability and affordability in the service layer, while competing on innovation and speed in the application layer.

Finally, operators need to be proactive in both adopting the new horizontal approach and engaging the government on suitable implementation approaches. Traditionally, operators have viewed regulatory initiatives with suspicion, because in the past regulatory moves have in some cases depressed incumbents' returns. Operators need to engage regulators to accelerate national broadband infrastructure deployment because this not only increases the potential market for operators but also provides the basis for sector sustainability.

Exhibit 8
Revenues from Access Charges Are Declining

PERCENT CHANGE, 2005-08



Source: Booz & Company

IMPERATIVES FOR THE PUBLIC SECTOR

In order to broaden access to broadband service, governments need to consider adopting three immediate imperatives: establish a national broadband policy, create a regulatory environment that supports operators' horizontal business models, and facilitate investments in the sector.

Establish a National Broadband Policy

As a necessary first step to enabling universal broadband access, governments need to establish a consistent, coherent, and shared national broadband vision, embedded in a national broadband policy. This policy not only must put forth a national aim for the speed and coverage of the broadband infrastructure, but also provide guidance on how regulators, operators, and application and content providers will work together in achieving that aim.

Several countries have already defined or are in the process of establishing a national broadband policy, with their different goals highlighting the varying levels of aspiration and government involvement. For instance, the United Kingdom's national broadband policy, Digital Britain, aims for every household to have a 2-megabyte-per-second (Mbps) connection by 2012, supported by a long-term tax on broad-

band connections; Singapore is aiming for 100 Mbps for each household by 2015, supported by an immediate direct grant to the market.

Establishing a national broadband policy should involve an open dialogue with industry participants. This must include an objective assessment of the demand for broadband infrastructure: how widespread and immediate is the demand? To return to the Digital Britain example, the policy was established through an open consultation process. The Digital Britain Summit, a face-to-face, day-long meeting for principal stakeholders, was followed by a series of "unconferences"—online forums that allowed the public to weigh in.

Once established, a common policy will serve as an important tool to continue the dialogue with industry stakeholders and ensure that everyone remains aligned on goals. Governments intent on building national broadband infrastructures need to undertake this dialogue immediately.

Create a Regulatory Environment That Supports Horizontal Business Models

Existing regulatory frameworks emphasize competition via a series of mandates for vertically integrated

incumbents. As the industry moves away from vertically integrated models to horizontal ones, regulatory tools need to be adapted and new ones developed to ensure consumer welfare and effective competition.

Regulators need to encourage the move toward horizontal business models by adapting existing regulatory regimes, especially at the infrastructure and service layers. Incumbent operators should be incen-

tivized to open their network infrastructure, to put their knowledge and existing assets to the best use, and to keep the cost of national broadband infrastructure under control. At the same time, regulators could impose stringent sharing and ownership restrictions on infrastructure players, ensuring fair and equal access to all providers upstream. Regulators must also assess the need to grant exclusivities in the infrastructure layer, as competition at that level affects the

ability of these entities to generate an adequate return on their investment.

Singapore's government, in establishing the horizontal model, licensed a new infrastructure player, accepting that it would become a natural monopoly. At the same time, the government mandated universal deployment by 2015 and banned effective control of the infrastructure provider by companies in the upper layer. SingTel, the incumbent, was allowed to be a part



of the consortium that will operate the infrastructure player, as it committed to place all its passive infrastructure assets in a separate trust and to divest these completely by 2011.

Facilitate Investments in the Sector

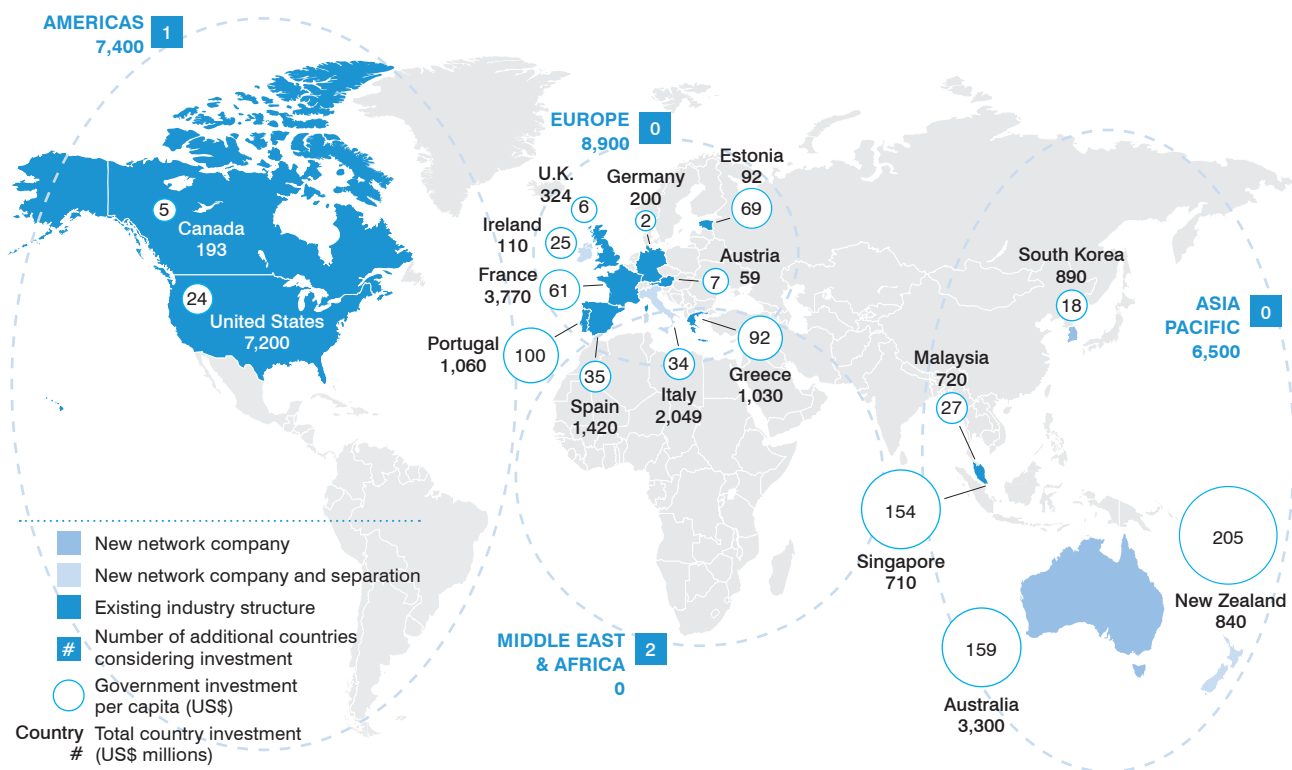
Some governments recently have reversed past privatization efforts and have invested in the telecommunications sector, recognizing the significant benefits and national competitive advantages derived from broadband. These investments have ranged from

direct investment in broadband companies, as in Australia, and grants to private-sector players as in Singapore, to end-user subsidies, as in South Korea and Japan. In all, governments around the world have committed recently to investing more than US\$20 billion in broadband network development (*see Exhibit 9*).

Governments, in concert with the private sector, need to evaluate their role and the magnitude of investment required in the sector, while identifying the right investment mechanism.

Governments should also help stimulate demand for broadband services. The Korean government, for example, has done so by establishing education centers to train housewives to use the Internet. Egypt has launched a successful IT club initiative that provides fully equipped computer labs and broadband access at schools, clubs, youth centers, and universities. Governments can also stimulate demand by ensuring that all public-service provisioning be handled over broadband networks.

Exhibit 9
Governments Are Committing to Broadband Investment



Source: Booz & Company

“Governments should establish a national broadband policy, create a regulatory environment that supports operators’ horizontal business models, and facilitate investments in the sector.”

THE ROLE OF THE PRIVATE SECTOR

In anticipation of policy and regulatory changes, private-sector operators need to take three proactive, immediate steps to better position themselves. Operators must open their infrastructure business, start building capabilities for double-sided business models, and capture further returns by sharpening their focus on application innovation.

Adopt Open Infrastructure Plays

Operators have in the past resisted attempts by regulators to separate the infrastructure layer from the others, driven by concerns regarding loss of synergies and marketing power. However, the situation facing the sector today is different: the long-term sustainability of the sector is at risk unless vital investments in national broadband infrastructure are secured in a timely manner. Operators, facing a decline in their traditional revenue bases, are unable to capitalize on growth opportunities provided by broadband, because on their own they do not have the incentive to undertake long-term investments under existing regulatory regimes.

If operators proactively evolve toward a horizontal model and adopt a more open approach to sharing infrastruc-

ture, up to considering separation if needed, they can reap significant benefits while strengthening the sector's future sustainability. These measures relax the regulatory obligations that have been imposed on operators by their current vertically integrated operating model. They reduce operators' costs for infrastructure deployment by allowing operators to share those costs with the government or with other private players. Finally, they enhance returns on infrastructure investment, driven by higher asset utilization and efficiency as well as the higher premium allotted to infrastructure companies by the investment community.

The separation undertaken by operators such as Openreach in the United Kingdom and Chorus in New Zealand helped reduce the regulatory pressure on the incumbents that own them. Governments in Australia, Greece, Malaysia, and Singapore have demonstrated their willingness to enter into PPPs with infrastructure players, and Canada, Japan, and Korea have provided incentives and tax subsidies to such players.

By cooperating with their governments and even proactively steering

them in the direction of infrastructure plays, operators stand to reap considerable benefits. SingTel, for instance, worked closely with the Singapore government to establish a new horizontal model in the sector, bidding as a part of a winning consortium to operate the infrastructure entity. In doing so, SingTel monetized its existing passive assets, which would otherwise have been rendered redundant by the new infrastructure entity; it also benefited significantly from a subsidy of \$750 million in govern-

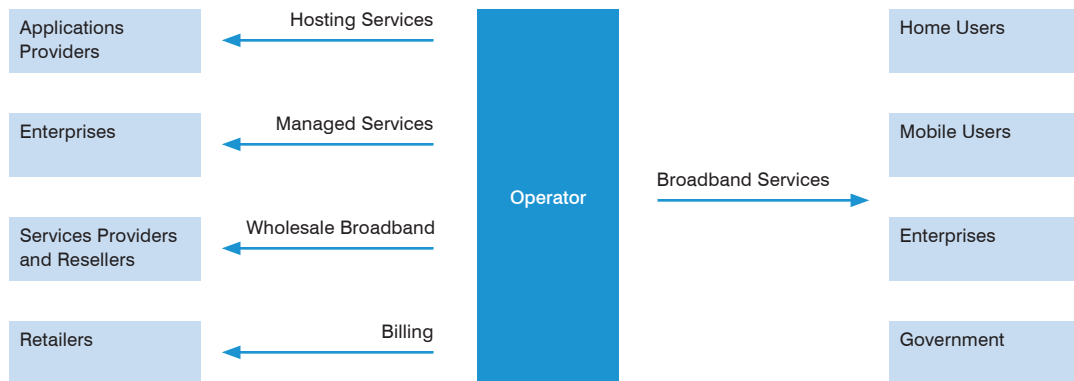
mental grants, which is accelerating the creation of the universal broadband market and hence providing new growth opportunities for SingTel in the retail market. Similarly, BT acted quickly to accept the mechanisms to separate its infrastructure into a different business, Openreach, a move that ensured regulatory goodwill and led to reduced retail regulation. Telstra (in Australia), on the other hand, was reluctant to consider infrastructure separation, and may face a stricter regulatory environment as a result.

Pursue Double-sided Business Models

Having opened the infrastructure layer, operators need to pursue growth opportunities outside of providing end-user access services. Building double-sided business models will allow operators to augment service revenues by selling enabling services to numerous application and service providers. Such enabling services could include hosting services, managed services, and transaction support services (*see Exhibit 10*).

Exhibit 10
Operators Should Leverage Their Assets to Pursue Growth Opportunities

DOUBLE-SIDED BUSINESS MODEL



Source: C. Barraclough, K. McMahon, and A. Harrowell, "The 2-Sided Telecoms Market Opportunity: Realizing Growth from the 'Platform Play,'" March 2008; Booz & Company analysis

Operators would need to leverage the assets and capabilities they built over the years of providing telecommunications services to end users. These include network management skills, ongoing financial relationships with clients, and the ability to operate large IT and network systems. Taking advantage of these assets would enable operators to pursue new growth opportunities in providing wholesale services, enabling transactional support to application providers (billing and location services), and providing managed and hosted services to enterprises and application providers.

Proactive operators are already testing double-sided business models. For example, the Spanish multinational Telefónica is building a cloud-computing service intended to host enterprise data and services while continuing to provide telecommunications services to its subscriber base. Recently, United Arab Emirates-based

Etisalat announced a cloud service that allows companies to deploy IT services on a pay-per-use basis.

Sharpen Focus on Application Innovation

Finally, having opened the infrastructure layer and built a double-sided business model, operators need to enhance their ability to innovate in and extract value from the application and content layer, which is likely to be the fastest-growing layer in a multilayer market. Competition in this layer would be intense and dominated by current application giants such as Google, Yahoo, and Facebook, all of which have high brand recognition and a larger user base than most national operators.

Operators need to undertake an objective and pragmatic assessment of their capabilities in this space and focus on niche areas where they

are likely to succeed. For example, operators can take advantage of their ability to influence consumers' device and equipment purchases, as well as their ability to develop scalable and reliable services, to compete in niche markets such as Internet Protocol television (IPTV), smart homes, and location-based advertising services. Emerging technologies such as telemetry and embedded radio-frequency identification (RFID) could provide lucrative opportunities for operators, as these technologies require deep network understanding combined with smart customer insights—an area where operators are best positioned to compete.

Success in the application space would be contingent on an operator's ability to invest smartly, establish focused business units, and leverage its existing scale, as seen in the relatively successful efforts of the British multinational Vodafone, the French Orange, and Telefónica.

CONCLUSION

Winston Churchill once said that if you build a present only in the image of the past, you will miss out entirely on the great challenges of the future.² As governments and private-sector operators strive to ensure universal and affordable broadband service, these words ring true, heralding the profound shift that is required to enable these digital highways of the future.

Sustainable societies, in which all citizens have a voice, must provide the means for everyone's voices to be heard—and increasingly, those means are digital. As such, broadband is no longer a telecommunications sector issue that industry leaders should solve. Its relevance has transcended the industry and its impact reaches deeply into socioeconomic issues. Broadband thus mandates attention from policymakers and regulators as well as from the telecommunications industry. This is not an easy task for any of them. Ensuring broadband access requires radical shifts in thinking, shedding decades-old business models, changes in regulatory policy, and bold moves by government to spur development.

For all stakeholders, time is of the essence—and not only because consumers want faster service. The quicker a country can provide comprehensive access to broadband, the quicker that country can reap a variety of economic benefits. It is important that governments and the private sector realize that access for all is paramount. Broadband is so vital that those nations that do not offer high-speed access to their populations will have a serious disadvantage in the global economy. This is true for all economies—developed as well as emerging nations. For developed nations, broadband is critical to accelerating economic recovery, creating business opportunities, and reinforcing competitiveness. For emerging economies, broadband does all that and more, accelerating inclusion in the global economy by democratizing business, culture, health, and education.

Government and industry leaders will need to demonstrate their foresight in this regard to maintain their competitiveness with global peers. Doing so will require them to fundamentally change the way they think about broadband access.

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Endnotes

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About the Authors

Bahjat El-Darwiche is a partner with Booz & Company in Beirut. He specializes in communications, media, and technology and has led engagements in the areas of telecom-sector liberalization and growth strategy development, policy making and regulatory management, business development and strategic investments, corporate and business planning, and privatization and restructuring.

Roman Friedrich is a Booz & Company partner based in Düsseldorf and Stockholm. He leads the firm's communications, media and technology practice in Europe, and specializes in the strategic transformation of fixed-line and mobile communications, technology-based transformation, and sales and marketing in the communications, media, and technology industries.

Karim Sabbagh is a partner with Booz & Company in Dubai and Riyadh. He leads the firm's communications, media, and technology global practice. He specializes in sector-level development strategies, institutional and regulatory reforms, large-scale privatization programs, and strategy-based transformations focused on strategic planning, partnerships and alliances, marketing, and business process redesign.

Milind Singh is a senior associate with Booz & Company in Dubai. He specializes in sector policy and development strategy for the telecommunications industry.

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