BROADBAND IN THE UNITED STATES AND EUROPE – WHAT WENT WRONG AND WHAT ARE THE LESSONS FOR ASIA?

John S. Fischer
Randolph L. Tom
Ming Louie
Dynasty Capital Services (*www.dynastycap.com*)
United States

Abstract

In recent years, governments in the United States and Europe have advocated a policy of increasing the general level of competition to promote a policy of affordable and widespread broadband access. To date, this policy has in many respects been a conspicuous failure, as it has led to a dramatic fall in the value of telecom assets while at the same time failing to deliver reasonably priced broadband access to large segments of the population. This paper analyzes what went wrong in the United States and Europe and presents a number of policy-level recommendations that will result in more effective competition in the broadband sector, more efficient channeling of investment capital and accelerated deployment of reasonably priced broadband access.

1. Introduction

The 1990s was a period of unbridled optimism about the future of the telecommunications sector. As national telecom markets were liberalized, scores of new entrants emerged as if from thin air, promising to bring a plethora of advanced services to business and residential users. Analysts confidently forecast that traffic volumes, driven by Internet usage, would double every 100 days, creating an almost limitless demand for capacity. Investors swarmed to fund the ambitions of telecom firms, which in turn ran up debts of some $1 trillion.

The promise of broadband access was at the center of the telecom frenzy, driving projections at all levels of the industry. Many new operators based their business plans on the provision of high-speed local access to end-users in direct competition with incumbent telcos. Cable operators and established telcos projected significant new revenue streams from their own broadband subscribers. In turn, carriers such as WorldCom and Global Crossing counted on broadband to fuel an insatiable demand for bandwidth on their fiber optic backbone networks. In the mobile sector, European mobile operators spent an eye-popping $100 billion just to acquire licenses to build 3G networks that will deliver broadband services to mobile terminals.

In actuality, broadband access in both the United States and Europe has developed far more slowly than was predicted only a few years ago. In the wake of the bursting of the Internet and telecom bubbles, scores of companies that had promised to build the broadband future - from relatively small national local and regional players to global

behemoths - went bankrupt or disappeared completely. These events have led many to ask whether all the hype about broadband was just that: pure hype.

The story is not over yet, however. Despite the disappointing record in the United States and Europe, all parties are in agreement about the long-term importance of widespread, reasonably priced broadband access:

- ***Governments*** see broadband as a catalyst for economic growth generally and the key enabler for the development of e-commerce and the Information Society in particular.
- ***Established operators*** look to broadband as a source of new revenues from both end-users and other local operators.
- ***Emerging providers*** view broadband as the vital element needed to offer a full range of novel services to customers.
- ***Consumers*** see broadband as the long-promised means of receiving high-speed Internet access and multimedia services.
- ***Enterprises*** regard high-speed VPNs and Voice over IP as a means to streamline corporate networks and increase corporate efficiency.

To realize this potential, though, players at all levels of the industry must be prepared to study and learn from the American and European experience and adapt their approaches accordingly. This is especially true for regulators and operators in Asia, where Internet usage is surging and broadband is seen as a key driver of future economic development.

The remainder of this paper focuses on the lessons that can be drawn from the broadband experience in America and Western Europe. We will seek to identify some of the key mistakes that were made and suggest alternative approaches aimed at achieving the following objectives in Asia:

- Stimulating the expeditious and widespread rollout of broadband services;
- Channeling available investment capital in an efficient manner; and
- Creating a balanced competitive environment that fosters the provision of advanced services at reasonable prices while still allowing operators to realize sensible financial returns.

2. Broadband in the United States and Europe -- overview

Over the last decade, regulatory authorities in the United States and Western Europe embarked on ambitious programs to liberalize their telecommunications markets. In America, the Telecommunications Act of 1996 was enacted with the purpose of throwing the telecom market open to competition. During the 1990s, the European Commission implemented a number of Directives which liberalized one aspect of the telecom sector after another, with voice telephony opened up to competition in 1998. In both cases, the philosophy underlying the liberalization process was that increasing the overall level of competition – i.e., encouraging more players to enter the marketplace to

compete with the established operators – would bring about a broad range of benefits for consumers, including lower prices, increased customer choice and a broad array of advanced services.

The liberalization process unleashed a torrent of technical innovation, especially in the area of broadband local access. The two leading broadband access technologies to emerge are cable modems (which transmit data over the fiber optic and coaxial cables used to transmit television programming) and Digital Subscriber Line ("DSL") connections (which use special hardware to turn existing copper telephones lines into high-speed data links). Together, cable modems and DSL lines account for the vast majority of current broadband connections. Other technologies that have been deployed to provide broadband access include direct satellite broadcast services, fixed wireless services and end-to-end fiber connections.

Liberalization in the United States and Europe also succeeded in expanding the range of competitors, at least in the short term. The late 1990s saw the emergence of scores of companies promising to provide broadband access. These included cable television companies, which started to upgrade their networks to offer cable modem service; incumbent telecom operators, which began to implement DSL in the "last mile" of their networks; and a wide variety of other local operators which planned to take advantage of local loop unbundling to offer DSL service by piggybacking off the access networks of the incumbent telcos.

Despite the wave of new competitors entering the market, the actual take-up of broadband services has not lived up to the optimistic predictions of a few years ago. Figure 1 summarizes the situation in the United States and several major European countries at the end of 2001.

Broadband and Internet penetration – Year-end 2001				
	France	Germany	Britain	USA
Total households	24.8 mln	37.7 mln	25.7 mln	105.0 mln
Internet households	4.5 mln	10.3 mln	8.8 mln	63.0 mln
Broadband subscribers	0.5 mln	1.0 mln	0.2 mln	12.8 mln
Internet penetration	18%	27%	34%	57%
Broadband penetration of all households	2%	3%	1%	12%
Broadband penetration of Internet households	8%	9%	2%	20%
Figure 1. Source: GartnerG2 and FCC				

As can be seen, Europe lags significantly behind the United States in terms of broadband penetration, with only a small portion of the population using a broadband connection. Moreover, broadband penetration levels in the major Europe countries are expected to stay in the single digits for some time to come.

The fact that Europe lags behind the America is by no means a positive reflection on the experience in America, where broadband usage has fallen far short of expectations. Nothing illustrates this point more clearly than the fact that at the end of 2001, some 40% of Korean households had broadband access, more than three times the level in America.

The following section of this paper describes what went wrong with the deployment of broadband in the United States and Europe.

3. Broadband history

3.1 United States

The enactment of the Telecommunications Act of 1996 was supposed to lead to a competitive free-for-all that would offer consumers lower prices, more innovative services and, most importantly, widespread broadband access. In the late 1990s, some 300 telecom upstarts were founded to take advantage of the liberalized environment created by the Telecom Act. Many of the newcomers, such as Covad Communications, NorthPoint Communications and Rhythms NetConnections, focused on the provision of broadband access using DSL technology.

More than six years later, the US telecom industry is a mess. In the rush to build out a plethora of new networks based on questionable business plans, telecom companies boosted capital spending by some 25% per year from 1996 to 2000. During the same period, they generated about $40 billion in negative free cash flow. This was not a problem so long as Wall Street and investors were willing to keep throwing money at telecom investments. When the music stopped in early 2000, though, the collapse was swift and dramatic. According to some analysts, nearly 80% of the newcomers that entered the market have already failed, including many of the upstarts that had promised to bring broadband to the masses. A wave of consolidation is now sweeping across the telecom sector.

It is clear that the Telecom Act has fallen far short of its ambitious goals in many important areas. Local telecom markets remain almost total monopolies, with rivals to the Baby Bells controlling less than 10% of local phone connections. The sudden collapse of WorldCom has led to serious concerns about the health of the US long-distance and Internet backbone markets. Perhaps the biggest disappointment, however, is that broadband remains a distant dream for the vast majority of Americans.

At the end of September 2002, a total of 15.6 million Americans had signed up for broadband service, representing a penetration rate of 14.8% of all US households. Broadband cable connections outnumber DSL connections by a ratio of almost 2 to1.

Recent statistics point to several troubling (and inter-related) trends in America.

First, ***the number of broadband competitors has fallen significantly***. Some 46% of DSL providers went bankrupt or were acquired during 2001, a trend which has undoubtedly continued in 2002. A combination of questionable business plans, lack of available capital and obstreperous Baby Bell behavior proved especially deadly for the new DSL providers.

Moreover, it does not appear that the competitive landscape will improve in the near future. The potential for increased competition in the cable sector was dealt a severe blow in early 2002 when the Federal Communications Commission ruled that cable companies need not share their access lines with competing internet service providers. The FCC is currently considering a proposal to classify telephone-based broadband access as an information service rather than a telecommunications service, a move that would free the Bells from a broad range of open-access requirements. Continuing regulatory obstacles, coupled with capital markets that are still more or less closed to new telecom investment, make it unlikely that competition in the broadband sector will increase anytime soon.

Second, ***broadband prices have risen steadily***, climbing to their highest levels on record this year. Between June 2001 and June 2002, broadband cable prices rose 15% (from an average of $39.40 per month to $45.31), while basic DSL prices grew by 7% (from an average of $47.84 to $51.36). Of course, this is exactly the opposite of what liberalization was supposed to accomplish. Perhaps the most serious evidence of the Telecom Act's failure to achieve its objectives is the fact that America now has among the highest broadband prices in the industrialized world; the prices cited above compare to average monthly broadband charges of about $28 in Japan and $25 in Korea.

Many analysts project that broadband usage will not surge until monthly charges drop to around $30. Broadband operators could clearly sign up more subscribers if they cut prices, but they are under little pressure to do so. In an environment of diminished effective competition, American cable companies have opted to enjoy operating margins of 35% to 45% on their cable modem services rather than bring on a wave of new customers by cutting prices. DSL operators, on the other hand, have lower profit margins, making it unlikely that they will lower prices. At the same time, US regulatory authorities have taken a hands-off approach to broadband deployment and pricing.

Decreased competition and higher prices have led directly to the third distressing trend in the American broadband market: ***adoption rates have declined markedly*** over the past three years. While the number of broadband subscribers continues to grow, the rate at which they are signing up has fallen dramatically, due largely to price sensitivity among would-be users. As a result, analysts now predict that for the foreseeable future, broadband growth in America will be moderate and steady (in contrast to the explosive growth predicted a few years ago).

This trend is illustrated in Figure 2, which shows that quarter-on-quarter broadband subscriber growth has fallen from nearly 40% in the first quarter of 2000 to just 15% in the third quarter of 2002.

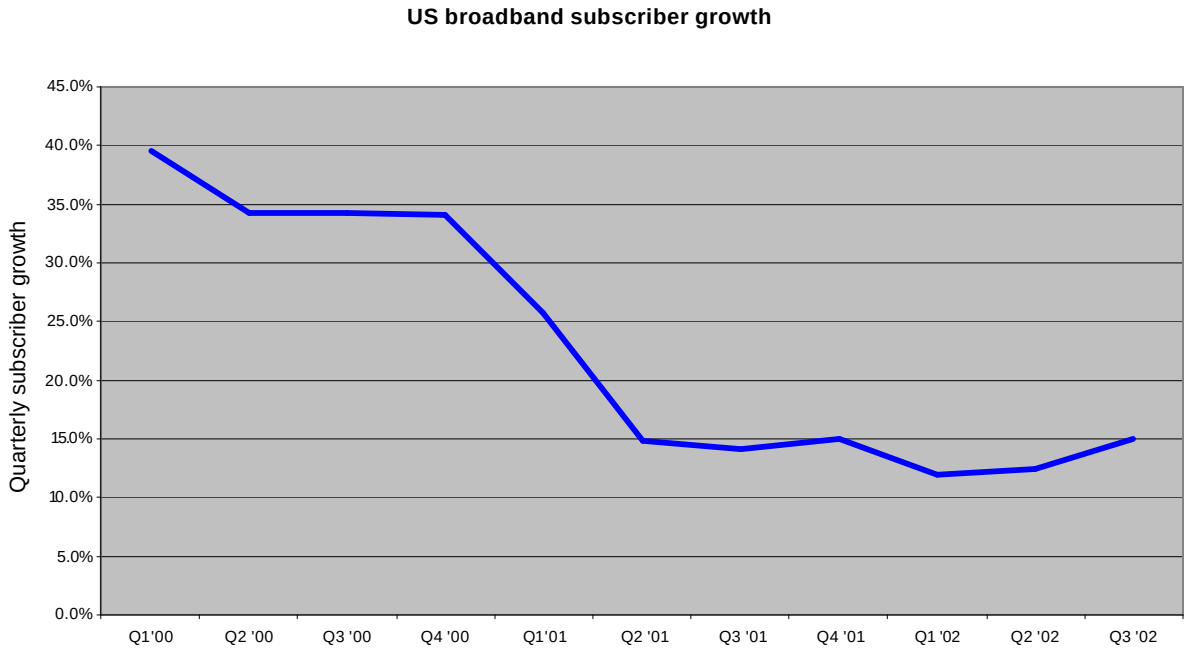

Figure 2. Source: ARS, Inc.; Leichtman Research Group

Other problems afflicting the US broadband market include:

- ***Incumbent behavior and regulatory weakness.*** While new entrant operators certainly must bear their share of the blame for pushing unrealistic business models, their job was not made any easier by Bell tactics. The economics of local access communications are stacked against newcomers, and the Bells have skillfully done everything in their power to make life more difficult for their competitors. This problem has been exacerbated by the inability or unwillingness of regulators to do more than slap the wrist of the Bells for actions that are arguably anti-competitive. This year, some state regulators have started to apply the Telecom Act more aggressively by cutting the wholesale rates that the Bells are allowed to charge their rivals. However, this comes to late for the many new entrants that are now out of business or drastically down-sized as a result of bankruptcy reorganizations.
- ***Slow deployment***. With huge debt burdens and battered share prices (and with many of their former competitors now out of business), cable companies and the Bells have drastically cut capital spending for broadband deployment. Total 2002 capital spending by cable operators and the Bells is forecast to fall by 45% from last year. This problem is especially acute for the 20% to 25% of the US population that lives in areas that are not economically feasible for broadband providers to cover.
- ***Lack of content***. Broadband providers are still struggling to identify “must have” broadband-specific applications. Moreover, the price sensitivity of consumers is heightened by the lack of good content. Service providers and

media companies are working to develop new broadband content; types of applications that will benefit most from broadband access include:

- PayTV, films on demand and other entertainment content;
- Media sharing (e.g., mp3 downloads, software downloads and online games);
- Broadband services for the teleworker; and
- Applications that take advantage of broadband's "always on" capabilities, such as instant messaging, online chat and newsgroup participation.

3.2 Europe

While broadband deployment has experienced numerous problems in the United States, the situation in Europe is arguably even worse. During the last decade, the Europe telecommunications has also been comprehensively liberalized. Among the 15 countries in the European Union, this process was driven by the European Commission, which implemented a series of Directives, binding on all Member States, that introduced competition at all levels of the telecom sector. These directives have been implemented on a national level in each Member State (with varying degrees of effectiveness).

The results of liberalization in Europe are in many ways similar to the outcome in the US. On the plus side, competition has increased dramatically with the arrival of scores of new entrants, particularly in the long distance market. For example, for long distance and international calls there is now a choice of more than five alternative operators in 12 Member States. This in turn has driven down retail prices for long distance and international calls (long distance tariffs fell by 45% between 1998 and 2001). Meanwhile, Internet usage has grown quickly, to the point where some 36% of the European Union's population is connected to the Internet (compared to 42% in the United States).

These positives are offset by some significant negatives. As in America, the local access market in Europe remains a de facto monopoly, with incumbent national operators still controlling around 90% of all local access lines. At the same time, many upstart operators have failed in recent years in a collapse that mirrored the turbulence in the US telecom sector. With many upstarts bankrupt or otherwise out of business, the pace of industry consolidation is increasing.

Perhaps most significantly, the liberalization of the European telecom sector has done little to foster the development of broadband access. Despite the high emphasis placed by the European Commission on the deployment of broadband, by year-end 2001 only 2% of EU households had a broadband connection, one-sixth the level of the United States (and one-twentieth the level of Korea). Many analysts are skeptical that broadband take-up in Europe will accelerate anytime soon – for example, GartnerG2 predicts that only 10% of households in France and Germany will have broadband access by 2006 (this is only about two-thirds the current penetration level in America).

The factors influencing the failure of broadband in Europe are both similar to and different from the US. As in the US, there is a lack of compelling broadband content, creating a kind of “chicken and egg” problem, with consumers unwilling to adopt broadband until sufficient content is available and content providers/operators not prepared to devote resources to the development of broadband-specific content until there exists a critical mass of broadband subscribers.

In addition, broadband prices are too high in Europe. In general, monthly broadband charges in Europe are on approximately the same level as in the United States (that is to say about €50, or more than 75% higher than in Japan or Korea). As in America, high subscription prices in Europe are a significant inhibitor to broadband uptake: a recent GartnerG2 study found that to achieve widespread broadband adoption in Europe, the price needs to fall to less than €30.

The importance of broadband pricing is dramatically illustrated by the recent experience in the United Kingdom. At the beginning of this year, only 1% of British households had broadband connections. Broadband uptake has exploded since Febraury, when BT Wholesale cut its rates by 40%, allowing ISPs to offer more affordable packages to consumers. ISPs offering DSL access now charge approximately £26 ($39) per month for broadband access (still not particularly cheap). These price cuts have been followed by Britain’s cable operators. In October, the British telecom regulator, Oftel, announced that broadband connections had passed the one million mark, which means that overall broadband penetration has ***qualrupled in less than one year***, to about 4% of all households. The result of these price cuts is that Britain is easily Europe’s fastest-growing broadband market.

A number of unique factors have contributed to the slow adoption of broadband in Europe. These include:

- ***Underdeveloped cable infrastructure***. In the US, some 96% of all households are passed by a cable TV network, greatly facilitating the rollout of cable modem service (and enhancing the level of competition). The situation is quite different in Europe, where cable penetration varies enormously from country to country. On average, 61% of all EU households are passed by a cable TV network. The passage rate varies from 100% in Belgium to 94% in the Netherlands, 70% in Germany, 60% in the UK, 39% in France and only 1% in Italy. Largely as a result of this disparity, the ratio of cable modem to DSL connections is only 1.4 to 1 in Europe, compared to 1.8 to 1 in the United States. The lack of cable TV infrastructure has important consequences, as it not only limits the potential supply of broadband access, but also lowers the overall level of competition, leading to higher broadband prices.
- ***Failure of local loop unbundling***. As in the United States, incumbent telcos in Europe have used every trick in the book to block the deployment of competing DSL services using incumbent infrastructure. This situation has been exacerbated by the disappointing implementation of local loop

unbundling, which theoretically became mandatory in the European Union as from January 2001. However, actual implementation of local loop unbundling has proceeded very slowly -- in a study published in February 2002, the European Competitive Telecommunications Association revealed that less than 0.01% of European incumbents' lines had been unbundled to new entrants and that just 3% of DSL lines in operation were provided by new entrants over unbundled local loops. Recently, the European Commission found that overall implementation of the local loop unbundling regulation was "not satisfactory," pointing to a variety of practical difficulties, including poor supervision of cost accounting systems, slow dispute resolution procedures, co-location difficulties and the tendency of incumbent operators to take advantage of their size by "sitting out the current financial situation." Moreover, the Commission has placed a high priority on accelerating the unbundling process, and has urged national regulators to take a proactive stance by more hands-on monitoring, the setting of binding deadlines and the imposition of credible financial penalties on incumbents not complying with the unbundling requirements.

- ***Barriers to Internet usage***. The vast majority of European Internet users do not benefit from flat rate or unmetered dial-up Internet usage. As a result, their bill grows with every additional minute they spend online. Many analysts regard increased narrowband access as a gateway to broadband usage. Until flat rate narrowband access becomes the norm in Europe, overall Internet usage will be unnecessarily limited, which in turn will constrain the migration of narrowband users to broadband access.
- ***3G distraction***. Many European governments, in order to swell their coffers at an opportune moment, decided to award 3G mobile licenses pursuant to auctions. A number of these procedures (which took place prior to the bursting of the telecom bubble) got completely out of hand, with the result that European mobile operators (many of which are affiliated with incumbent landline operators) spent over $100 billion just to acquire their 3G licenses. At least that much again will be required to pay for the build-out of 3G networks. With 3G rollout in Europe delayed due to numerous technical problems and market acceptance questions, it is now uniformly agreed that Europe's mobile operators massively overpaid for their 3G licenses. This is clearly confirmed by the fact that a number of 3G licenses have been relinquished in recent months in an attempt by mobile operators to cut their losses. The enormous 3G financial burdens assumed by the mobile operators continue to weigh heavily on them and their landline affiliates, distracting attention and financial resources from the task of broadband deployment.

4. The lessons for Asia

For governments and operators in Asia, ensuring the expeditious rollout of reasonably priced broadband access is an issue of paramount strategic importance, one that will have a clear and significant impact on national growth rates during the 21st century.

Internet usage continues to surge in Asia, with analysts projecting that Asia will overtake America as the world's largest Internet market within two years. Dataquest predicts that by the end of 2003, Asia will have 183.3 million Internet subscribers, compared to 162.8 million in the United States. Within Asia, China (with an online population of 56.6 million) has already surpassed Japan (with 51.3 million Internet users) as the country with the world's second largest at-home Internet population.

The Chinese government in particular has decided to position China as a world leader in broadband adoption. The government has set a target of 200 million Internet users by 2005, of which 30% to 40% should have broadband access. At the end of 2001, China had some 500,000 broadband subscribers; by the end of this year, that number is projected to grow to 2.9 million.

Given the significance placed on broadband deployment by governments throughout Asia, it behooves Asian players to study and learn from the history of broadband in the West. Among the key lessons that can be drawn from the broadband experience in the United States and Europe are the following:

- ***Avoid promoting competition for the sole purpose of creating more competition***. One of the main lessons learned in the US and Europe is that the telecom business (including broadband access) is not like most other businesses. The costs of market entry are huge, requiring access to massive amounts of capital. Incumbent telcos, with their pervasive and hard to duplicate local access networks, have a unique advantage over new market entrants, an advantage that is easy for the incumbents to exploit, legitimately or otherwise. Given the exceptional nature of this market, regulators should be careful to avoid the trap of trying to increase competition solely for its own sake. We have seen what this leads to: the proliferation of numerous, inadequately capitalized competitors that do not have the resources or staying power to present serious long-term competition to the incumbent. Regulators should rather focus their energy on promoting ***more effective broadband competition***, even if that means a market with a smaller number of operators. Moreover, it is preferable to promote a well-regulated market with a small number of financially and operationally strong players than a market with numerous weak operators fighting a doomed battle against an entrenched behemoth.
- ***Oligopoly is not (necessarily) a bad word.*** A corollary of the first point is that regulators should not shy away from the creation of well-conceived, carefully regulated oligopolies. In this regard, it should be remembered that regulated monopolies and oligopolies are actually quite good a building big, ubiquitous networks such as the phone system. Industries such as telegraphs, phones and cable TV networks have grown and thrived in such an environment, so long as an effective government referee was present to ensure, among other things, that the regulated entities achieve specified coverage and quality of service levels while still earning sensible (but not exorbitant) financial returns.

- ***Keep competition alive.*** With this in mind, regulators should resist the temptation to allow the pendulum to swing back too far in favor of incumbent operators, concentrating too much power in their hands and placing them in a position to raise prices and stifle the development of new services and technologies. The incumbents must be kept on their toes, and the best way to do this is for regulators to develop and aggressively administer regulatory schemes that promote the emergence of ***intense competition among a limited number of viable and aggressive providers***.
- ***Regulators must be equipped and prepared to use their power effectively***. From the foregoing, it is abundantly clear that national regulators have a critical role to play in ensuring the efficient rollout and operation of reasonably priced broadband services. In this regard, there is a need for clearly defined decision-making powers on the part of regulators, as well as streamlined operating procedures and effective sanctions to control the incumbents' behavior. Moreover, if tougher financial penalties fail to do the job, regulators may have to turn to more radical alternatives. One possibility mentioned is "structural separation" -- forcing incumbents to split into separate retail and wholesale operations. Regulators must be prepared to act proactively and resolve disputes rapidly. In addition, measures should be put in place to discourage excessive delaying measures and appeals by incumbents. Finally, given the highly complex tasks to be carried out by regulators, they must take care to ensure that they possess adequate human, technical and financial resources to deal efficiently with the matters arising before them.
- ***Do not underestimate the government's power to accelerate broadband deployment***. Given the strategic advantages of widespread broadband access, governments should carefully consider the role they can play in accelerating broadband deployment. For example, Korea spent over $7.5 billion over five years to help encourage broadband implementation. Korean government officials estimate that this investment has increased the country's growth rate by around 1% per annum – not a bad return. Such initiatives can be funded in various ways (for example, by levying a small monthly surcharge on monthly phone bills). If conceived wisely and implemented in a way that also spurs the development of effective broadband competition, such programs can deliver substantial long-term economic benefits. In addition, governments should consider the broader consequences of decisions that are not directly related to broadband. For example, we have seen that European governments' eagerness to generate the maximum possible license fees for 3G licenses has had the unintended consequence of retarding the deployment of broadband.
- ***Innovation, content partnerships and technology are crucial***. Operators must continue to focus on innovation and on remaining at the leading edge of technology in order to win and maintain a critical "first mover's advantage." Among other things, this means placing major emphasis on accessing and delivering content that is best delivered over broadband connections (which in turn may require strategic alliances with national and international content

providers). Technological innovation can also play a major role in accelerating broadband deployment and stimulating competition, especially where existing infrastructure is inadequate or nonexistent. In this regard, we believe that 802.11 and other fixed wireless technologies have the potential to serve as a major catalyst for broadband uptake in the future.

- ***Don't forget to take into account national differences***. Unfortunately, there is no "one size fits all" solution to these issues, as each national market has its own unique characteristics as a result of history, culture, the level of economic development, the availability of cable TV and infrastructure, etc. In applying the aforementioned suggestions for the creation of a healthy broadband market, such characteristics ought to be taken into account.

5. Conclusion

Based on our experience with broadband around the world, we strongly believe that Asian governments and operators should not be discouraged by broadband's relative lack of success in the United States and Europe. Rather, they should seize on the experience in those countries and seek to apply the lessons learned in a way that is relevant to each country's national context. This is a complicated process that requires expert insight into the interrelationship of all relevant technical, commercial, regulatory and cultural factors. Following this path, however, will allow Asian countries efficiently and expeditiously to realize the benefits resulting from the widespread rollout of reasonably priced broadband access.