Executive Summary

Will the Internet Close the Gap?

The Internet is one of the most significant and dynamic applications to emerge from the communications industry this century. It took the telephone system 74 years to amass 50 million users, the World Wide Web (WWW), on the other hand, has taken only 4 years to do the same. The rate of growth and change has been so furious that organizations, both public and private, find themselves at a loss as to how to cope with the adaptations the Internet demands, as well as how to capitalize upon the opportunities it may present. No other industry in the world can boast the kind of opportunities the Internet industry has offered to thousands of individuals, having created a tremendous amount of wealth in a very short amount of time. The Internet is reshaping society and commerce – and as the Internet is premised on connectivity to communications networks, it is the single most important driver behind the networking revolution taking place today.

The implications of the Internet revolution on developing countries are profound. It is both an opportunity and a threat. The Internet presents the opportunity to leapfrog communications into a new level, a level that goes beyond voice communications and incorporates entirely new applications and services. It presents the opportunity to enhance social and economic conditions through this higher level of communications, thus presenting the potential for convergence in the social and economic status of nations around the world. On the other extreme, however, is the threat that the Internet revolution results in an increased gap in the communications infrastructure and that this gap could inevitably hinder the pace of social and economic development vis-à-vis the developed world. Thus resulting in world where the global economic order diverges further.

In order to ascertain the magnitude of the existing and potential communications infrastructure gap, Pyramid Research has developed a set of indicators that provide a comparable measure of the communications infrastructure level, investments, revenues and traffic flows in 60 of the major developing and developed country markets of the world. The following is a discussion of the coming Internet revolution, a framework for its analysis, and the impending communications infrastructure gap that emerges and its implications.

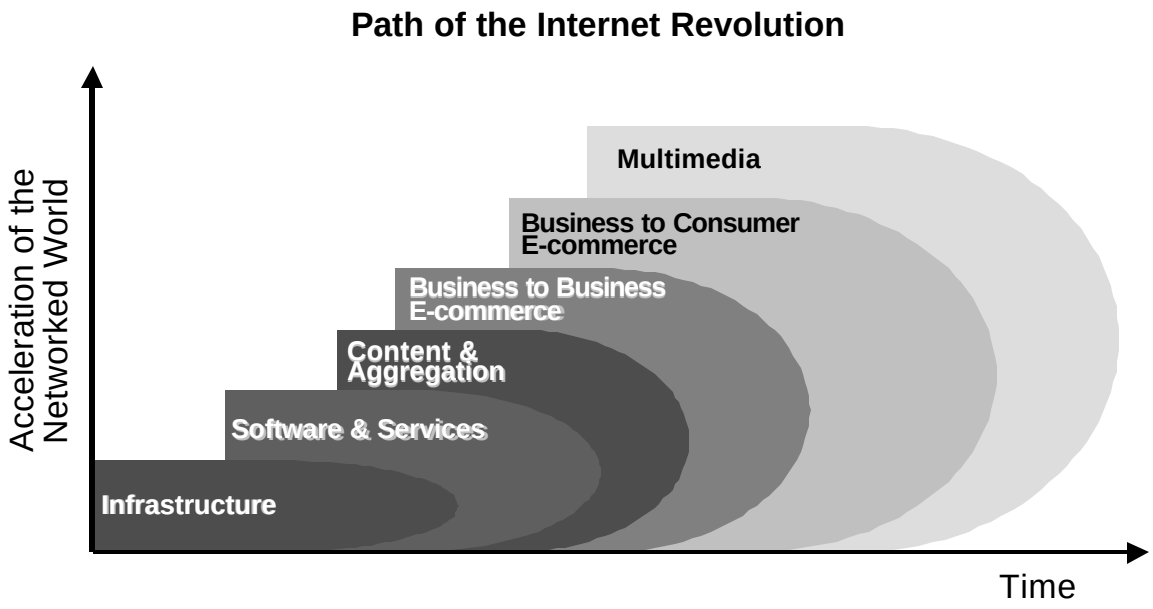
The Coming Revolution

As illustrated in **Exhibit 1**, communications markets will move through a series of steps to reach the next and subsequent stages of the Internet revolution:

- The first step requires a foundation of adequate infrastructure. This is the initial step to accelerate the pace of Internet diffusion and the growth of a networked economy. Those markets that have not established a critical momentum in the most basic stage of establishing infrastructure will not only forego the lost opportunity of basic connectivity, but will also forego the follow-on and magnifying effects of subsequent stages spurred by the Internet.
- Once connectivity reaches critical mass--the utility creation begins. First software enables a broad range of users. For example, the WWW opened the Internet to an entirely new population with its feature rich and user-friendly interfaces.
- The next phase in utility creation is the development of content including local language content and information aggregation that organizes the vast amounts of information available over the Internet.
- The next phase of utility creation is the business to business e-commerce. In this phase, business economic models shift, new distribution channels are created and productivity is redefined.
- In the next stage of utility creation, business to consumer e-commerce, the revolutionary impact of the Internet sets in as all processes alter. Education, health care, retail, paying bills, paying taxes etc all change.
- Phase six of the revolution is further utility creation via multimedia applications. While this phase continues the notion of utility creation, this stands to be one of the most significant phases as its paves the way for an entirely new age of interactive communications. Certainly, the possibilities of what may emerge remain to be seen as no country is fully in this stage. However, what emerges will create tremendous opportunities for many institutions and individuals. Over the next five years, the availability of affordable broadband access in the United States, for example, will pave the way for

entry into the multimedia phase and provide the world with a first glimpse of what the Internet may really have in store for the world.

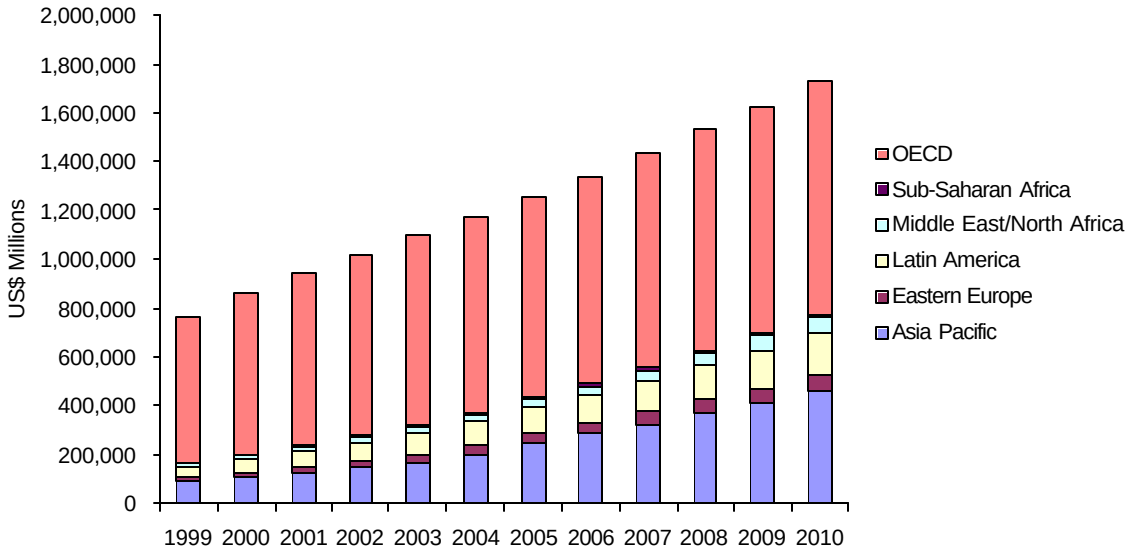
Exhibit 1: The Path through the Internet Revolution



Source: Pyramid Research

The importance of broadband access must not be underestimated. Without access speeds in excess of 128 Kbps (or even higher), the functionality of the Internet rests primarily on information exchange through electronic mail. Even WWW surfing can be a frustrating experience when analog modems slower than 56 Kbps are used. Broadband access enables a multimedia experience where sophisticated visual elements can be incorporated to improve the visual appeal of the WWW. More important however is that it improves the functionality of the Internet, allowing for real-time interactive communications, faster data exchange rates (larger files can now be transferred more efficiently) and the ability to build entirely new service concepts and applications. Concurrent with the emergence of new applications is the strengthening of existing applications. Online retail, for example, will benefit from faster and more efficient transactions that bolster customer satisfaction and the propensity for customers to consume. Remote office and telecommuting are further examples of concepts that are strengthened by broadband access

Exhibit 2: Communications Revenues, 1999 – 2010



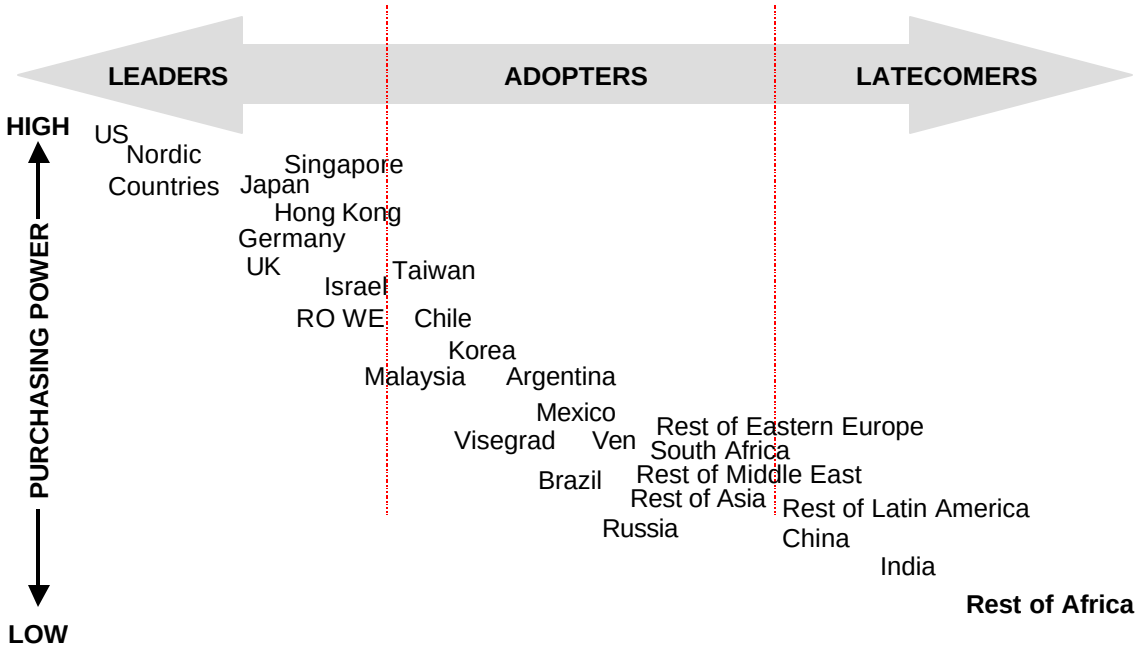
Source: Pyramid Research

The Internet revolution is therefore invoking tremendous investments into the national information infrastructure. In the 60 countries examined for this project, investment in incremental infrastructure over the next decade is expected to reach US$ 1.5 trillion. By 2010, over 700 million Internet accounts, 1.3 billion mobile phone subscribers, and nearly 1.5 billion main lines in service are expected in these markets. Communications revenues will explode to over US$ 1.7 trillion in 2010, a result of the sector entering many more facets of daily commerce and society (**Exhibit 2**).

Examining the Gap: Haves and Have-Nots?

While it is easy to romanticize the prospects of the Internet and foresee it as a panacea to developing country ailments, the realty is that tremendous disparities exist in terms of the status of the network and Internet revolutions. Despite impressive growth and investment figures in the global information infrastructure indicators, the most telling variables is the national information infrastructure levels in these countries. The indicator levels, as they stand today and as they are expected to be decade from now (a standard measure of infrastructure penetration per 100 population is used), provide a definitive measure of the gap between the developing and developing worlds. These gaps provides insights into the ability of nations to participate in the Internet revolution, as well as the risk of being excluded. Ultimately, these disparities may result in some markets falling behind. Some countries stand at the cusp of the revolution, eagerly awaiting the ramifications of having entered the multimedia phase. However, most, if not all, of the poorest nations in the world remain stranded in the infrastructure phase. Without basic connectivity, which is a problem that has plagued developing countries throughout the second half of this century, one can not participate in a communications revolution.

Exhibit 3: The Haves and Have-Nots

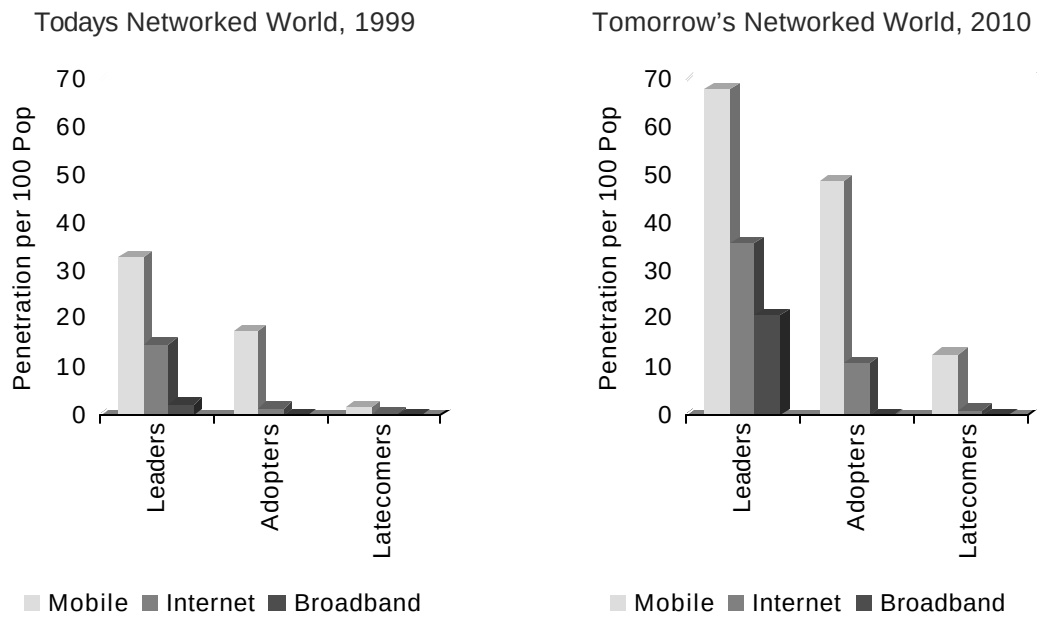


Source: Pyramid Resarch

The 60 markets studied in this project are segmented into three categories, *Leaders*, *Adopters* and *Latecomers*. The countries in each of these groups face different levels of potential, different opportunities and different risks as they make their way along the path to the Internet revolution.

- The Leaders are set to embark upon the multimedia phase of the Internet revolution, having the requisite characteristics for entry.
- The Adopters are those countries with the possibility of unleashing the Internet revolution within the next three to five years. These are countries encompassing a range of connectivity levels that is, at a minimum, sufficient to support progression to the utility creation phases of the Internet revolution.
- The final group, the Latecomers, is in a perilous situation and without serious intervention they stand to be left behind. This group is severely hindered by a tremendous lack of basic communications infrastructure.

Exhibit 4: The Networked World Today and Tomorrow



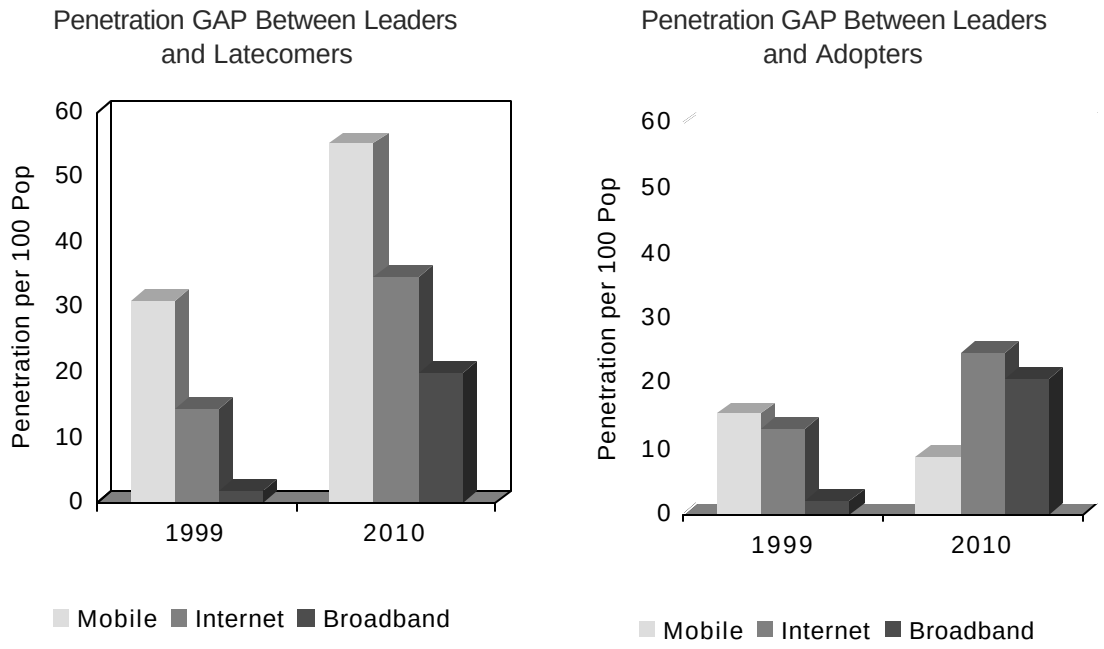
Source: Pyramid Research

The penetration gap of mobile, Internet, and broadband access accounts varies substantially between the three categories. Naturally, Leaders exhibit the highest penetration levels in all areas of communications, from mobile telephony to the Internet and broadband access accounts. In addition to communications penetration, Leaders are characterized by high literacy rates, high income levels and generally easy access to financial capital markets. This results in a low incremental cost to participate in the Internet revolution and the inherent ability to move swiftly to and through earlier phases of it. These countries can and are already capitalizing upon the accelerated velocity of development the Internet brings.

At the other end of the spectrum are the Latecomers. These countries are characterized by low penetration levels, moderate literacy rates, low income levels and economic and social conditions that discourage ready availability of financial capital. The result is a relatively high incremental cost to participate in the Internet revolution, as factored in the costs is the cost of connectivity itself. These countries are impeded from participating in the Internet revolution, and thus are unable to capitalize upon the accelerated velocity of development it can bring with it. Until the connectivity issue is, at least, first addressed, the prospects for these countries remain weak.

The result of these disparities will be a divergence in communications penetration levels in the near and medium term. As shown in **Exhibit 5**, the penetration gaps between Leaders and the other groups are expected to widen over the medium term. At a most basic level, this is due to the accelerated pace of the Leaders, while the Adopters and Latecomers, for the most part, remain impeded by their connectivity problems and the fact that their efforts are likely to remain focused on addressing this first.

Exhibit 5: The Penetration Gap between Leaders, Adopters and Latecomers, 1999 and 2010



Source: Pyramid Research

There are several universal factors that contribute to the divergence of these measures, a few of which include:

Mobile

Of the three measures, mobile markets offer the greatest hope for connectivity level convergence in the medium term. In fact, the gap between Adopters and Leaders is expected to shrink over the next decade as a result of maturing markets in the Leader countries and continued strong growth in the Adopter countries. The key variables affecting growth of this sector in the developing markets are:

- Relatively high levels of competition that promote lower prices and entry costs (cost, nonetheless, remains a barrier due to low income levels).
- Emergence of prepaid and calling party pay services which enable true mass market penetration of the mobile network.
- Improved quality and geographic coverage (as well as lower prices) that make mobile phones a viable alternative to fixed lines (which in many countries may take years to acquire).
- A confirmed utility for and thus need for basic voice connectivity.

What is unique about the mobile markets is that is often much more competitive than the basic services market. While it remains premium priced, the level of service innovation, customer service and price reductions competition has encouraged has lead to a level of dynamism that has far outpaced the activity in the fixed line sector. Coupled with the utility of mobility, its immediate availability, as well as the social status it brings, mobile phone utility is increasing so rapidly that it is on a trajectory to become the preferred medium for basic voice communications over fixed lines. As such, mobile phone growth has been consistently strong in almost all markets, developing or developed. Venezuela provides a good example of this scenario manifesting itself in the real world. Despite a lingering recession, mobile phone growth has reached record levels in the last two years, while fixed line growth has waned. Within a year or two, mobile phone penetration is fully expected to exceed main line penetration. In Paraguay mobile phone penetration

exceeded main line penetration this year. Other countries that may soon follow include Guatemala and Mexico, one of the larger and more significant markets in the region.

Internet

The growth of Internet accounts in developing countries, on the other hand, is not expected to converge with the Leaders in the medium term. While growth is strong, it is strong across all three groups. Adopters and Latecomers therefore do not benefit from slower growth in maturing Leader markets. Rather, Adopters and Latecomers are actually impeded by factors unique to their market situations, including:

- Even though the price of personal computers may drop below US$ 500, this amount would still remain a significant cost barrier to individuals in developing countries.
- Poor awareness and knowledge of technology related products. Tied to this are lower literacy rates, another prerequisite for Internet connectivity.
- Low levels of basic connectivity, severely limiting the physical means with which to connect to the Internet.
- Low levels of complementary infrastructure to support Internet enterprises, including weak postal and financial systems (necessary for e-commerce).
- Low utility, due to the lack of local language sites as well as sites with content designed for local users.
- Lack of knowledge and understanding of Internet business models (limiting local entrepreneurial activity within the market space).
- A relatively high cost of service. This is expected to encourage multiple user accounts and a greater reliance upon community access centers (such as Internet Cafes). It does not, therefore, necessarily impede the potential audience within a market.

There are, however, key growth drivers contributing to an expanding Internet market in developing countries. One of the primary factors identified by many market players is that the Internet is a low cost alternative to international voice communications. To the price sensitive firms and individuals in developing countries, this is a powerful value proposition. The other, more basic, benefits offered by the Internet, such as the access to various information sources and services, should become increasingly important as the Internet propagates further in the developing world. Many firms will also find the benefit of a low cost advertising and distribution medium in the Internet a very appealing feature. It may substantially lower the cost of entry to certain enterprises and business endeavors, a strong benefit to resource constrained firms.

Broadband Access

Of the three measures presented, broadband access presents the greatest risk of this divergence. The reasons for the divergence are as follows:

- The business case in developing countries remains unproven. As the service is a higher tier offering, typically priced at a premium, the initial target market in most of the poorer countries may be too small to support and spur private sector interest.
- High incremental costs to enable broadband will discourage investments. Carriers, with limited financial resources, will seek to provide basic connectivity first.
- Broadband technologies introduce a new layer of complexity to network design and implementation that carriers in developing countries are often not aware of and therefore may be reluctant to explore.

As a result of these factors, few carriers in the developing world have concrete plans for broadband access technology deployment today. The few that are considering it are expected to deploy these technologies only on a limited basis to serve, in the beginning, business consumers. ADSL service, for example, which is largely a residential solution in the United States, is being used as an alternative to leased lines in developing countries. The fewer that have deployed these technologies have met with little success. Take for example CATV Internet efforts in Ecuador. The lack of a large addressable market as well as the

limited functionality of the Internet within a local context has lead to very slow subscriber uptake and thus minimal revenue growth.

The risk of the divergence in broadband access is that it can perpetuate and exacerbate the gap between developing and developed countries. The increasing availability of broadband access in the developed world will take these markets to the next phase of the Internet revolution, where the pace of change and magnitude of the economic and social opportunities created only become greater. With poor prospects for broadband access in the near term, a similar opportunity does not exist for developing countries. Therefore the pace of change and the economic opportunities afforded to developing nations will not equal that which will be afforded to the developed world. This is the risk of divergence and what is at risk is more than just the networking revolution. Ultimately, it is the entire opportunity of participation and benefit from the "Internet Economy".

Recommendations

What then must Adopters and Latecomers do? Despite the grim near and medium term picture, hope remains for both the Adopter and Latecomer countries. At the most basic level, countries must emphasize three priorities:

Connectivity is the Goal

- A critical precursor to the Internet revolution is basic connectivity--regardless of technology. It is next to impossible to envision markets with less than 5% voice penetration leapfrogging into Internet connectivity. As alternative Internet access devices and new applications are developed, basic connectivity will become even more important.

Competition is the Vehicle

- Experience shows time and again, competition leads to greater investment, decreased prices, subscriber growth and new technology development. The challenge is to successfully initiate and regulate competition. Effective competition requires political will, credible and autonomous regulatory bodies, and effective policies on interconnection, frequency and finally close monitoring and action against anti-competitive behavior by the incumbent.

Education is the Enabler

- The Internet has higher social entry barriers than voice. It requires literacy and IT technology knowledge at a minimum. As enduring a development paradigm it may be, it has become all the more important to educate businesses and individuals, particularly in the areas of communications technology. This should be a top priority for any government aspiring to be a significant participant in the Internet revolution and "Knowledge-Based" economy it will perpetuate.

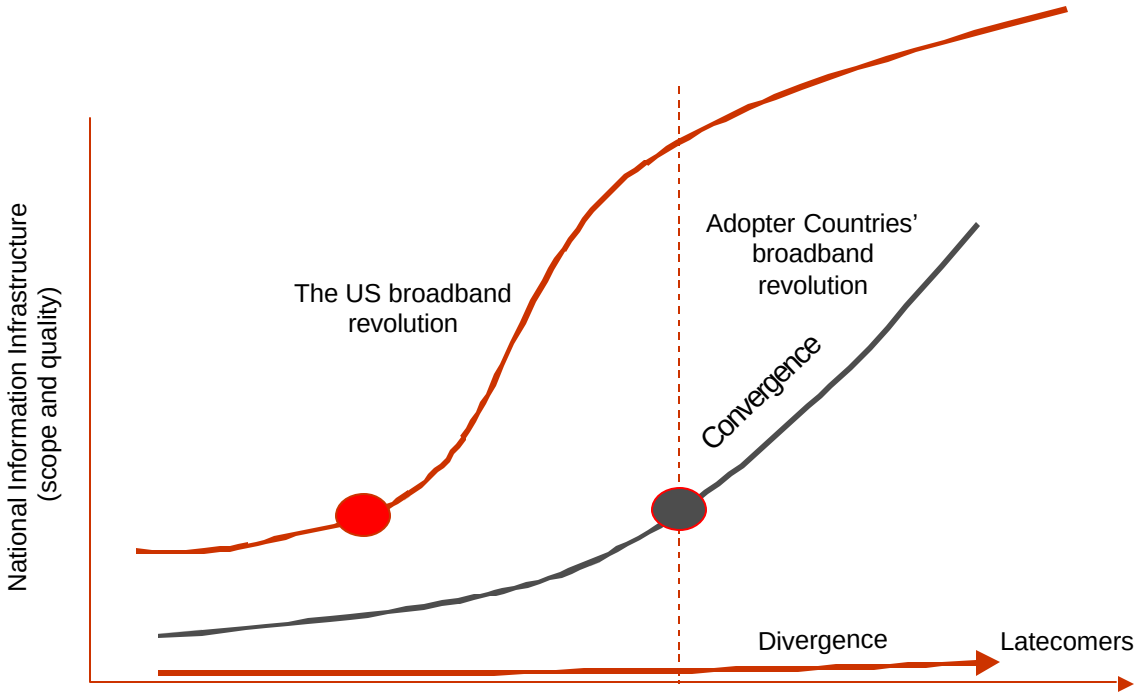
Adopters

For Adopters, the key is entrance into the multimedia phase as this allows for participation in the most dynamic phase of the Internet revolution. Entry also paves the way for convergence with the developed world. This happens as progression through the multimedia phase is accelerated by the fact that the second group of entrants into this phase are likely to benefit from the lessons learned by the first group of entrants (the United States, for example). The priority therefore lies in efforts that allow Adopters to build the foundations necessary for entry into the multimedia phase (**Exhibit 6**). In this regard, affordable and ubiquitous broadband access is one of the key priorities.

Latecomers

Latecomers, on the other hand, face the fundamental challenge of basic connectivity. As a first step towards participation in the revolution, this barrier must be prioritized and overcome as soon as possible. Overcoming this challenge will lead to the opportunity for accelerated progression through the following utility creation phases in the revolution. At least, up until the multimedia phase, where additional (broadband) infrastructure would then need to be deployed.

Exhibit 6: The Promise and Peril of the Internet



Source: Pyramid Research

Conclusion

Over the next decade, Pyramid Research expects divergence to take place between many developed and developing countries. While some developing countries may have the opportunity to begin a path of convergence, most will be hampered by the reality of severe social and economic constraints, low connectivity and regulatory and competitive environments that hinder participation in the Internet revolution. To this end, it is important that policy makers act now and determine the appropriate priorities for their countries. The goal is to hasten the period with which a country can embark upon a convergent path. Inaction today will only prolong the period of divergence.