

# NET VITALITY

Identifying the Top-Tier Global  
Broadband Internet Ecosystem Leaders



Stuart N. Brotman

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The  
Media<sup>®</sup>  
Institute

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# Table of Contents

Introduction .....	1
Executive Summary .....	3
I. A Global View of an Online Moment in Time .....	5
II. The Critical Continuing Importance of the Broadband Internet Ecosystem .....	7
III. Developing Policies with a Holistic View of the Broadband Internet Ecosystem .....	11
IV. Applying Analytic Principles of the Competitive Advantage of Nations to the Broadband Internet Ecosystem .....	13
V. Developing the Net Vitality Index .....	15
VI. The Net Vitality Index in Brief .....	17
VII. The Top-Tier Global Broadband Internet Leaders in the Net Vitality Index .....	27
VIII. Lessons from the Top-Tier Global Broadband Internet Leaders .....	49
Methodology Summary .....	53
About the Author .....	55
Acknowledgments .....	57

# Introduction

My several decades of work in communications policy, management consulting, and academia – as a professor and research scholar – all converge in this study. Launched in 2010, it has taken me to 18 countries, where I gained valuable insights on broadband development in Europe, the Middle East, Asia, and Oceania. My interactions with academics, entrepreneurs, technologists, business executives, and government policymakers and regulators have enriched my understanding well beyond the perceptions that many in the United States have about broadband Internet, often based on dated secondary sources or anecdotes gleaned from casual travel.

The broadband Internet ecosystem – applications and content, devices, and networks – clearly is the central principle upon which all current and future policy discussions need to

account for; anything less cannot help but be piecemeal. Without this essential holistic view, government policy initiatives may be quick fixes, but they also may create negative unintended consequences in the larger broadband Internet ecosystem at play.

By helping to create a constructive bridge between the research and policy communities around the world, I hope that this study helps to spur a new, more objective dialogue focused on how to sustain long-term Internet vibrancy, both in the United States and around the world. I'll continue to be a part of that conversation, of course, and invite many others to join with me in focusing on how best to leverage our national leadership in broadband Internet development so that the greater Net Vitality can be achieved at home and abroad.

# Executive Summary

This is the first-ever quantitative and qualitative composite analysis of the global broadband Internet ecosystem, viewed in a country comparative context. The broadband Internet ecosystem includes applications and content, devices, and networks. These essential elements drive each other in a virtuous cycle that is highly interdependent. If broadband networks are fast, reliable, and widely available, companies produce more powerful and more capable devices to connect to them. These new applications draw interest among various end users, bring new users online, and increase use among those who already subscribe to broadband services.

The continuing growth in the broadband Internet ecosystem reinforces the cycle; for example, encouraging service providers to boost the speed, functionality, and reach of the networks can spur innovation in applications and content and devices, as well. Consequently, any consideration of how to best shape the future of broadband Internet should account for the entire broadband Internet ecosystem, rather than individual elements.

Through timely and reliable data, we now are able to gauge broadly how well particular countries, including the United States, are performing in a global competitive environment. This analysis will help government policy formulation to be based on the necessary and more complex foundation that the broadband Internet ecosystem represents. It also underscores a potential serious disconnect between a desire to accelerate the Internet's usefulness to a range of users, and a response that looks to traditional regulatory tools as enablers.

The Net Vitality Index presented here is a composite of 52 separate broadband Internet ecosystem indices developed independently to evaluate individual countries on an “apples-to-apples”

basis. The development of this Index helps identify the top-tier global broadband Internet leaders – an elite grouping of five countries that distinguish themselves as pacesetters for future benchmarking and best practices analyses. These leaders, grouped in a leadership tier rather than rank ordered, are the United States, South Korea, Japan, the United Kingdom, and France.

Each country has unique distinguishing characteristics that have supported its broadband Internet leadership success, including geography, demographics, regulatory philosophy, and cultural values. While highlighting these distinctive elements in individual country profiles, it is clear that all of the top-tier global broadband leaders also have a common powerful driving force at play – innovation. When innovation is coupled with sustained investment, competition can thrive and the desired goal of promoting continuous Net Vitality can be achieved. Policy approaches that reflect this formulation seem to be particularly appropriate to promoting real Net Vitality.

The top-tier global broadband Internet leaders recognize that government has a critical role to play in shaping the goals of Net Vitality through forward-looking policymaking. Top-tier global broadband Internet leaders have taken varied regulatory approaches for one element of the broadband Internet ecosystem – broadband networks – but they have benefited the most when government is a catalyst and challenger. By encouraging companies to raise their aspirations, increase the pace of innovation and the scale of investments, and move to higher levels of competitive performance, governments of the five leading Net Vitality Index countries identified here have been able to capitalize best on the favorable attributes that each country has in place.

The Open Internet as a broadband Internet goal is worthwhile, but also too narrow as a foundation for Net Vitality. Rather, the Wide Open Internet is what the United States and other countries around the world should be trying to achieve. The Wide Open Internet encompasses the broader goal of an efficient ubiquitous broadband Internet ecosystem with virtually unlimited content and applications available without government restrictions. Users should be able to use the Internet at home, at work, and on the run through a range of devices accessing affordable high-speed wireline and wireless broadband networks.

The Wide Open Internet is not just a digital data transport path; instead, it is a critical digital engine for national economic, educational,

cultural, and social growth, with the broadband Internet ecosystem as its base. This distinction is worth underscoring as new government policies are crafted. These policies may hit the target but also may miss the mark because they do not focus on potential ecosystem impacts when policies are crafted with only one element in mind. A truly Wide Open Internet approach to policymaking would reflect this broader perspective.





















With continuing focus on the broadband Internet ecosystem, the idea of Net Vitality can be realized through a future-oriented policy process that capitalizes on the blazing speed of Internet time that has propelled us so far, so fast, and so impactfully.

# I. A Global View of an Online Moment in Time

Here is a snapshot of what the world currently experiences online – every minute of every day of every week throughout the year on the Internet. It is nothing less than mind boggling, and graphically reminds us how fast Internet time unfolds, growing faster as each new minute ticks away. It also suggests the challenges that lie ahead in ensuring a sufficiently robust broadband Internet ecosystem for the future – a vibrant digital environment that can be described as Net Vitality. The seamlessness of this ecosystem suggests that

regulatory approaches dating from the 19th century, such as mandated broadband Internet network common carriage, are unlikely to be effective means to support this ecosystem throughout the 21st century. The experience of top-tier global broadband Internet leaders demonstrates that new policy approaches, including necessary regulatory oversight, can be effectively designed with a fuller view of the interconnected elements of the broadband Internet ecosystem.

## Online in 60 Seconds

Source: Qmee.com		Year: 2014	
	540 Vines		2.66 million searches
	Over 5 million videos viewed		14 songs added
	293K statuses are updated		70 registered
	88K calls		15K songs downloaded
	1.1K photos are uploaded		1.8K posts
	433K tweets		571 new sites
	277K snaps		16.6K transactions
	25K items purchased		4.7 million posts
	120 new users		138.8 million (including spam)
	3.4K pins		67K photos uploaded

## II. The Critical Continuing Importance of the Broadband Internet Ecosystem

The role that broadband Internet plays in transforming American life continues to be expansive and profound. It was well articulated as current U.S. policy in the National Broadband Plan, mandated by law and released by the Federal Communications Commission in March 2010.

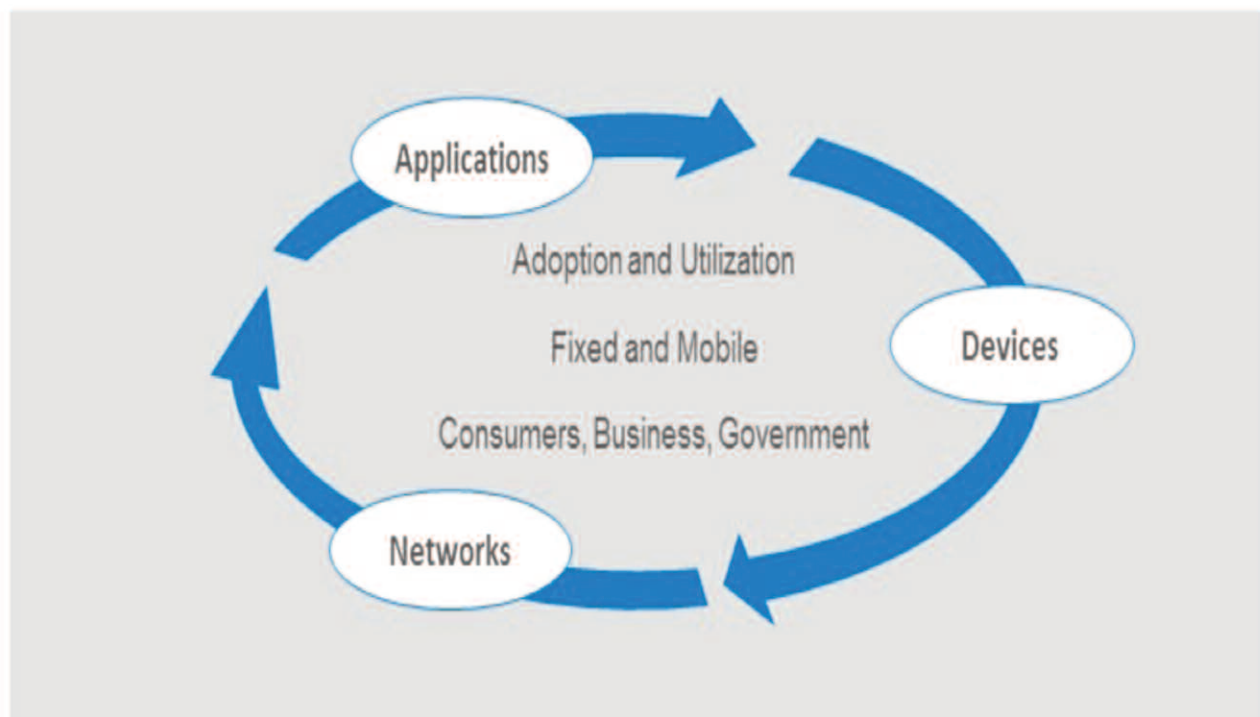
The Plan is firmly rooted in a critical understanding of ongoing forces that continue to shape what is commonly known now as the broadband Internet ecosystem. These equal pillars are the basis for the Internet's broad economic and social

benefits. Unlike their predecessors, who operated in only one sphere, today's Internet companies, such as Amazon, Apple, Google, and Microsoft, often are deeply involved in more than one pillar. This makes it difficult, if not impossible, to impose regulatory mandates on one element without creating unintended consequences for other elements of the broadband Internet ecosystem.

Below are descriptions of the three key elements that comprise the broadband Internet ecosystem, as set forth in the National Broadband Plan.

### The Broadband Internet Ecosystem

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## Applications and Content

The broadband Internet ecosystem includes applications and content: e-mail, search, news, maps, sales, and marketing applications used by businesses, user-generated video, and hundreds of thousands of more-specialized uses. Ultimately, the value of broadband is realized when it delivers useful applications and content to end-users.

Users benefit directly from the applications and content they access through broadband networks. Applications help people purchase products, search for jobs, interact with government agencies, and find information related to their health. Users also spend considerable time using broadband for banking, shopping, entertainment, social networking, and communication.

Broadband applications are helping businesses improve internal productivity and reach customers. Many businesses use at least basic applications, such as e-mail and a company website. There also is evidence that broadband applications may improve individual companies' productivity. Though gains vary drastically depending on the size and type of firm, as well as the breadth of implementation, broadband-based applications may allow faster product development cycles, access to new geographic markets, and more efficient business processes and allocation of resources.

Businesses also find it valuable to collect and aggregate information derived from the use of broadband applications. More sophisticated digital profiles of Internet users allow businesses to better understand user-buying patterns. This information also is useful for advertising or other purposes. Businesses are creating services tailored to individual consumers that improve their health, help them reduce their carbon footprint, track students' educational progress, and target appeals for charitable, social, and political causes.

Businesses often use broadband in ways that are fundamentally different from how consumers use it. For example, high-capacity broadband service often is used to connect private branch exchanges (PBXs) for business voice and local

area networks. These mission-critical uses require broadband service with business-grade performance and customer support levels.

Both consumers and businesses are turning to applications and content that use video. Video is rapidly becoming an important element of many applications, including desktop teleconference calls among family members and online training applications for businesses. User-generated video and entertainment – from sites such as YouTube and Hulu – are a large portion of the total video traffic over broadband connections, including at peak hours. Increasingly, video also is embedded in traditional websites, such as news sites, and in applications such as teleconferencing.

Video, television (TV), and broadband are converging in the home and on mobile handsets, too. Broadband-enabled video inevitably will grow as more smart innovative and user-friendly devices reach the home, allowing access to both traditional linear and Internet content via the TV.

Cloud computing – accessing applications from the Internet instead of one's own computer – also is growing as more companies migrate to hosted solutions. Software based in the cloud allows more small businesses and consumers to access applications that were once only available to large corporations with sophisticated information technology departments.

Applications run on devices that attach to the network and allow users to communicate: computers, smartphones, set-top boxes, e-book readers, sensors, PBXs, local area network routers, modems, and an ever-growing list of other devices. New devices mean new opportunities for applications and content, as well. Downloaded apps, whether free or purchased, now also represent the most utilized feature of the Internet, surpassing even the World Wide Web, which until recently was the most common form of Internet usage.

Despite the initial growth of the Internet through utilization of browsers that could access the World Wide Web, U.S. Internet users today now spend more time consuming digital content via smartphone and tablet apps than through Web

browsers — either on a smartphone or on a desktop or laptop PC. With 60 percent of media consumption now mobile, the average U.S. smartphone user now spends 89 percent of his or her time within an app, with only 11 percent using a Web browser, according to ComScore.

## Devices

Devices continue to grow in number and variety as more computers, mobile phones, and other electronic machines connect to the Internet. New devices also have repeatedly revolutionized the personal computer (PC) market in the past three decades. The mobile phone market also has seen robust innovation.

Countless other Internet-capable devices come to the market each year. Companies are building smart appliances that notify owners of maintenance issues over broadband networks and communicate with the electric grid to run at off-peak hours when prices are lowest. E-book readers deliver books almost instantly to consumers anytime and anywhere, often at lower prices than traditional editions. Devices monitor patients at home and wirelessly transmit data to doctors' offices, so medical problems can be identified before they become too serious.

Devices already are starting to communicate with each other, keeping humans out of the loop. Increasing machine-to-machine (M2M) interaction will occur over the network, particularly for mobile broadband. M2M communications are used in many industries, often to collect information from sensors deployed remotely. For example, devices tracking the heart rate or blood sugar level of patients with chronic conditions can transmit the information to a monitoring station that will trigger an alarm for a nurse or doctor where an abnormal pattern is detected. Networked sensors in a power plant can collect and transmit data on how generators are operating, to allow analysis by sophisticated predictive methods that will diagnose potential faults and schedule preventive maintenance automatically.

The emergence and adoption of new technologies such as radiofrequency identification and networked micro-electromechanical sensors, among others, will give rise to the "Internet of Things." Billions of objects will be able to carry and exchange information with humans and with other objects, becoming more useful and versatile. For example, the Internet of Things will create whole new classes of devices that connect to broadband, and has the potential to generate fundamentally different requirements on fixed and mobile broadband networks. They will require more IP addresses, create new traffic patterns that demand changes in Internet routing algorithms, and drive demand for more spectrum for wireless communications.

## Networks

Broadband networks can take multiple forms: wired or wireless, fixed or mobile, terrestrial or satellite. Different types of networks have different capabilities, benefits, and costs.

Network service providers are an important part of the American economy. The 10 largest U.S. telecom providers have cumulative capital investments of nearly \$250 billion during the past five years, for example. These investments have led to the deployment of multiple networks that today bring fixed and mobile broadband to end-users via landline telephone, cable television, satellite, and third-generation (3G) and fourth-generation (4G) mobile networks. Both telephone and cable companies continue to upgrade their networks to offer higher speeds and greater capacities, and to compete against each other vigorously for customer market share.

Improved spectral efficiencies and significantly lower network latencies are some of the features of 4G networks that lead to a better mobile broadband experience. The extent to which the effect of these advances are reflected in users' experiences will depend on a variety of factors, including the total amount of spectrum dedicated to mobile broadband and the availability of high-speed backhaul connections from cellular sites.

Recognizing the roles played by different elements of the broadband Internet ecosystem is very important for evaluating broadband adoption patterns. For example, some individuals just do not consider broadband to be valuable or relevant, in part because they are simply not accustomed to using computers. Additionally, consumers who do not find existing applications and devices attractive are unlikely to subscribe to broadband Internet services until more applications are developed that suit their needs. In formulating policies to encourage the adoption and affordability of broadband Internet services, government policymakers in the United States and elsewhere need to consider not only the number and characteristics of existing and future providers, but also how these marketplace dynamics impact the goals they seek to achieve.

Wireless may be a very attractive alternative for consumers who greatly value mobility and for consumers who do not place much value on the highest possible network speeds. It also appears to offer the most promising prospect for additional competition in areas where user density or other factors are likely to limit the construction of additional broadband wireline infrastructure.

Wireless services have at least two advantages that may make them viable and effective broadband Internet network providers for many consumers. First, the sunk costs associated with deploying these networks are far less than those for wireline facilities, because they do not require a dedicated connection to the customer. Second, wireless services can be marketed as “one-stop” services that meet residential as well as mobile broadband needs, whereas wireline broadband connections cannot offer mobility. Globally, in 2014, mobile Internet access overtook fixed Internet

access, with this trend to continue for the foreseeable future as developing countries opt to expand their broadband capabilities through mobile wireless rather than fixed wired technologies.

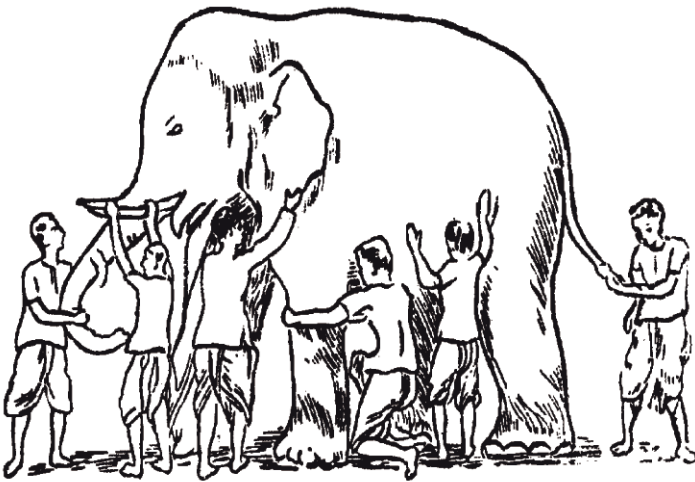
The concept of broadband Internet network effects represents the value of being connected so that value increases as more people and businesses choose to adopt broadband Internet networks and use applications and devices that broadband Internet networks support. Several factors contribute to their decisions. These include whether they can afford a connection, whether they are comfortable with digital technology, whether the Internet provides them with desired information and entertainment, and whether they can afford a connection at home or work.

In short, applications and content, devices, and networks are the essential elements of the broadband Internet ecosystem. They drive each other in a virtuous cycle that is highly interdependent. If broadband networks are fast, reliable, and widely available, companies produce more powerful and more capable devices to connect to them. These devices, in turn, encourage innovators and entrepreneurs to develop exciting applications and content. These new applications draw interest among various end-users, bring new users online, and increase use among those who already subscribe to broadband services. This continuing growth in the broadband Internet ecosystem reinforces the cycle, encouraging service providers to boost the speed, functionality, and reach of their networks. Any consideration of how to best shape the future of broadband Internet thus should account for the entire broadband Internet ecosystem, rather than individual elements.

### III. Developing Policies with a Holistic View of The Broadband Internet Ecosystem

An ancient parable is worth retelling since it illustrates that many who refer to broadband are not taking the necessary holistic view of a broadband Internet ecosystem.

A long time ago in the valley of the Brahmaputra River in India there lived six men. All had been blind since birth. One day they began to argue. The object of their dispute was the elephant. Since each was blind, none had



ever seen that mighty beast of whom so many tales are told. They decided to go and seek out an elephant.

With a guide, they set out early one morning in single file along the forest track. It was not long before they came to a forest clearing where a huge tame elephant was standing. The six blind men became quite excited; at last, they would satisfy their minds. They began to take turns to investigate the elephant's shape and form.

As all six men were blind, none of them could see the whole elephant and approached the huge animal from different directions.

The first man cried out, "It is as sure as I am wise that this elephant is like a great mud wall baked hard in the sun."

The second man exclaimed with a cry of dawning recognition, "I can tell you what shape this elephant is—he is exactly like a spear."

The others smiled in disbelief.

"Do you not see," said the third man—"this elephant is very much like a rope."

"I thought as much," the fourth man declared excitedly. "This elephant much resembles a serpent."

"Good gracious," the fifth man called out, "even a blind man can see what shape the elephant resembles most. Why he's mightily like a fan."

At last, it was the turn of the sixth fellow, who proclaimed, "This sturdy pillar feels exactly like the trunk of a great areca palm tree."

Their curiosity satisfied, they all linked hands and followed the guide back to the village. Each had felt the elephant for himself and knew that he was right. For depending on how the elephant is seen, each blind man was partly right, though all were in the wrong.

The current broadband policymaking process in the United States should not follow the moral of this fable, nor is it destined to do so.

As FCC Chairman Tom Wheeler recently noted: "Our challenge—and by 'our' I mean both industry and government—is to do everything in our power to ensure that the United States has the world's most dynamic and competitive broadband Internet ecosystem with a virtuous cycle of new investment, new innovations and new services. It is a lofty goal. But I have no doubt this is achievable. This is the country that invented the

Internet! The future starts here in the United States of America.”

The broadband Internet ecosystem writ large is not particular only to the United States, of course. All nations that have or will be developing broadband as a central engine of economic, social, and cultural prosperity will rely on the same broadband Internet ecosystem elements – applications and content, devices, and networks. The same forces of supply and demand also will be applicable as economic realities.

The challenges we face at home are based upon a common set of technologies and protocols that all other countries are confronting, as well. Through timely and reliable data, we now are able to gauge how well particular countries are performing in broadband Internet ecosystem development, viewed in a global competitive context. This analysis will help government policy formulation to be based on the necessary and more complex foundation that the broadband Internet ecosystem represents.

In adopting durable future-oriented policies that promote the entire broadband Internet ecosystem, government policymakers must take a more holistic view of that ecosystem. A continuing focus on it is the best route to establish principles that sustain and deepen Internet development for the future – a truly Wide Open Internet. The fundamental policy challenge ahead is not how to develop long-term solutions to short-term problems that may arise in one part of the broadband Internet ecosystem. Rather, the focus should be on how the United States develops the best business and government environment to promote Net Vitality. The nation will be watching, and so will the rest of the world. Dozens of developing countries are seeking workable models to create a balance among applications and content, devices, and networks. Such a balance is crucial to developing a level of innovation and investment that helps these countries create their own Net Vitality environments.

## IV. Applying Analytic Principles of the Competitive Advantage of Nations to the Broadband Internet Ecosystem

As Professor Michael E. Porter of Harvard Business School noted in his seminal *Harvard Business Review* article, “The Competitive Advantage of Nations” (1990):

“A nation’s competitiveness depends on its industry to innovate and upgrade. In a world of increasingly global competition, nations have become more, not less important. As the basis of competition has shifted more and more to the creation and assimilation of knowledge, the role of the nation has grown.”

Today’s broadband-enabled world – a truly global Internet ecosystem comprised of the intricate relationship among applications and content, devices, and networks – also is a living laboratory for creating the competitive advantage of nations in the 21st century.

The broadband Internet ecosystem of each country depends upon consistent innovation that leads nations to pursue ever-more sophisticated sources of competitive advantage.

The attributes that will be presented here in the Net Vitality Index reflect the national environment factors in which companies are born and learn to compete. They also are essential ingredients for achieving international competitive success. Each country must assess the availability of resources and skills necessary for competitive advantage in Internet development and the directions in which they deploy these resources and skills. Perhaps most important are the internal and external pressures on companies to innovate and invest.

Put simply, creating a national environment that creates meaningful incentives for companies to innovate and invest represents the surest pathway

to competitive advantage and to the upgrading of these advantages over time. It is the surest pathway to Net Vitality, too.

The benefits of innovation and investment are felt profoundly at home first. As Michael Porter notes: “Nations gain competitive advantage in industries where the composition and character of the home market usually has a disproportionate effect on how companies perceive, interpret, and respond to buyer needs. A nation’s companies gain competitive advantage if domestic buyers are the world’s most sophisticated and demanding buyers for a product or service.” This places the United States in a very favorable position when viewed in a global context that compares national broadband Internet development.

Another major factor supporting national competitive advantage is the presence of related and supporting industries that are nationally competitive. The close working relationship among related and supporting industries in the broadband Internet ecosystem creates these innovation and upgrading advantages. Having devices that take advantage of faster-speed broadband networks, or applications that are optimized for new devices, illustrates the leveraging effect that various parts of the broadband Internet ecosystem have on each other. These relationships shorten lines of communication, enhance the constant flow of information, and promote an ongoing exchange of ideas and innovations. In other words, evaluating broadband Internet ecosystems based on robustness is a useful way to determine a country’s standing as a top-tier global broadband leader.

## V. Developing the Net Vitality Index

Much of recent scholarly research in the field of broadband development has taken a limited approach to analyzing the broadband Internet ecosystem, such as by focusing on several performance metrics that represent only one of its important aspects – broadband networks (and often even more narrowly, on fixed broadband networks for residential users). Comparisons of fixed broadband deployment to these users (although not including actual adoption data), broadband network speeds (whether actual or merely advertised), and broadband pricing (regardless of discounts that may be offered through bundling of telephony and video services into a “triple play”) have been advanced by some policy advocates as the critical points of comparison to evaluate broadband Internet development. Based on these analyses, the policy discussion in the United States and many other countries around the world has become too narrowly focused on raising these metrics nationally.

This comparative analytic approach is flawed at many levels. First, although it might compare countries, which is the most useful unit of analysis, it often does so by mixing and matching data that measure different things (actual vs. advertised broadband network speeds, for example). This can skew upward the perception that some countries are substantially out-performing other countries. The time frames for these comparisons also may reflect data that are five or more years old – a generation ago in Internet time.

Comparisons of this type also typically result in numerical rankings, which is a popular yet deceptive way to illustrate how far ahead or far behind a particular country might be in broadband network development on a global comparative basis. Meaningful distinctions among countries with virtually comparable broadband network metrics

also are difficult to assess solely through a numerical ranking system.

Other analytic approaches, to their credit, have reflected a fuller set of measures that capture a more complete and accurate picture of the broadband Internet ecosystem. But virtually all of them usually don’t compare countries on an “apples-to-apples” basis. Instead, the comparative lens creates a softer focus on regions, with the United States and European Union (EU) often articulated as the points of comparison (even though, as a threshold matter, one represents a single nation and the other is a regional alliance representing 28 individual nations).

So the task in this study has been to assemble more timely, reliable, and comprehensive data reflecting the broadband Internet ecosystem, along with relevant macroeconomic forces that help shape it. It represents the first-ever quantitative and qualitative composite analysis of broadband development that utilizes country comparisons of the entire broadband Internet ecosystem.

All data utilized in developing the Net Vitality Index were published on a non-proprietary basis within the past five years. Whenever possible, the most recent version of a particular index was used rather than an older predecessor. The sources chosen were those with a high degree of global recognition; these include the International Telecommunication Union, the United Nations, the World Economic Forum, the World Intellectual Property Organization, the World Wide Web Foundation, A.T. Kearney, Boston Consulting Group, Economist Intelligence Unit, and Gartner.

An initial top tier of global broadband leaders now has been identified for future benchmarking. It represents a group of five countries that stand apart as the most significant global leaders

in broadband Internet development – the United States, South Korea, Japan, the United Kingdom, and France. Countries are not presented in rank order, however, since this has not been established. Additionally, given that some countries may not achieve a ranking in a particular index, the end result is not intended to represent a precise mathematical calculation that itself may be reduced to yet another numerical ranking.

Further segmentation into lower tiers of all countries would be useful over time. This study's

available resources, including necessary sets of timely and reliable data, were not available to complete such a comprehensive task. Future iterations of the Net Vitality Index may produce other tiers that then can be compared to each other, which can yield additional insights.

The development of appropriate tools by policymakers that are focused on how their respective countries over time will maintain or aspire to the leadership level of these top-tier global broadband Internet countries would be beneficial, as well.

## **VI. The Net Vitality Index in Brief**



The Net Vitality Index  
In Brief

# The Net Vitality Index

## APPLICATIONS

### Access to Information

Source: World Wide Web Foundation

Year: 2013

# Of Countries: 81





- |  |   |  |
|--|---|--|
| 1:  United States | 5:  South Korea    | 7:  Japan |
| 2:  France        | 7:  United Kingdom |  |

### Empowerment

Source: Global Web Index

Year: 2014

# Of Countries: 86

- |   |   |   |
|---|---|---|
| 1:  United Kingdom | 7:  France       | 21:  Japan |
| 2:  United States  | 11:  South Korea |   |

### Net Freedom

Source: Freedom House

Year: 2013

# Of Countries: 60

- |  |   |   |
|--|---|---|
| 4:  United States | 7:  Japan            | 20:  South Korea |
| 6:  France       | 10:  United Kingdom |   |

### E-Government Leaders

Source: United Nations E-Government Survey

Year: 2014

# Of Countries: 10

- |  |  |   |
|--|--|---|
| 1:  South Korea | 6:  Japan         | 8:  United Kingdom |
| 4:  France      | 7:  United States |   |

### E-Participation Leaders

Source: United Nations E-Government Survey

Year: 2014

# Of Countries: 10

- |  |   |  |
|--|---|--|
| 4:  South Korea | 5:  Japan          | 9:  United States |
| 4:  France      | 6:  United Kingdom |  |

### Global Retail E-Commerce Index

Source: A.T. Kearney

Year: 2013

# Of Countries: 30

- |  |   |   |
|--|---|---|
| 2:  Japan         | 4:  United Kingdom | 7:  France |
| 3:  United States | 5:  South Korea    |   |

# The Net Vitality Index

## APPLICATIONS

### E-Friction Information Indices

Source: Boston Consulting Group

Year: 2014

# Of Countries: 65

2:  United States	19:  France	54:  South Korea
13:  United Kingdom	38:  Japan	

### Social Network Penetration

Source: Global Web Index

Year: 2014

# Of Countries: 23



3:  United Kingdom	5:  South Korea	10:  Japan
4:  United States	9:  France	

### Top 10 Free Apps in the Amazon App Store

Source: Distimo, Amazon

Year: 2013

# Of Countries: 4

1:  United States	N/A = South Korea, Japan, United Kingdom
2:  France	

### Top 10 Free Apps in the Apple App Store

Source: Distimo, Apple

Year: 2013

# Of Countries: 4




1:  United States	2:  United Kingdom	N/A = South Korea, Japan
2:  France		

### Top 10 Free Apps on Google Play

Source: Distimo, Google

Year: 2013

# Of Countries: 4

1:  United States	2:  United Kingdom	N/A = South Korea, France
2:  Japan		

# The Net Vitality Index

## DEVICES

### Top Personal Computer Operating Systems

Source: w3counter.com

Year: 2014

# Of Countries: 2



Windows 7



Windows XP



Mac OS X



Android 4



iOS 7

### Top Web Browsers

Source: w3counter.com

Year: 2014

# Of Countries: 1



Chrome 37



Firefox 32



Chrome 36



Safari 7



Internet Explorer 11

### Worldwide Smartphone to End Users by Operating System

Source: Gartner

Year: 2014

# Of Countries: 2



Android



Microsoft



iOS



Blackberry

### Worldwide Smartphone Sales to End Users by Volume

Source: Gartner

Year: 2014

# Of Countries: 3



Samsung

Huawei

Lenovo



Apple



LG Electronics

### Smartphone Penetration

Source: Our Mobile Planet

Year: 2013

# Of Countries: 15

2:



South Korea

13:



United States

N/A = South Korea, Japan

9:



United Kingdom

# The Net Vitality Index

## NETWORKS

### Global Cybersecurity Index

Source: ABI Research

Year: 2014

# Of Countries: 192

1:  United States	5:  South Korea	N/A = France
5:  Japan	5:  United Kingdom	

### Network Readiness

Source: International Telecommunication Union

Year: 2014

# Of Countries: 148

1:  United States	6:  South Korea	8:  France
3:  United Kingdom	7:  Japan	

### Investment in Telecommunications

Source: International Telecommunication Union

Year: 2010

# Of Countries: 45

1:  United States	6:  France	N/A = United Kingdom
3:  Japan	12:  South Korea	

### Investment in Telecom as a Percentage of GDP

Source: International Telecommunication Union

Year: 2010

# Of Countries: 45

1:  United States	6:  Japan	8:  United Kingdom
3:  France	7:  South Korea	

### Cyber Power: Technology Infrastructure

Source: Economist Intelligence Unit

Year: 2011

# Of Countries: 19

1:  United Kingdom	6:  South Korea	9:  Japan
2:  United States	7:  France	

### Average Fixed Broadband Connection Speed

Source: Akamai Technologies

Year: 2014

# Of Countries: 54


1:  South Korea	11:  United States	27:  France
4:  Japan	14:  United Kingdom	

### Percentage of Population With Fixed Broadband Connection Above 10 Mbps

Source: Akamai Technologies

Year: 2014

# Of Countries: 54

1:  South Korea	6:  United States	27:  France
2:  Japan	13:  United Kingdom	

# The Net Vitality Index

## NETWORKS

### Lowest Broadband Prices Worldwide

Source: International Telecommunication Union Year: 2012






# Of Countries: 161

4:  United States	6:  Japan	38:  South Korea
6:  United Kingdom	18:  France	

### Prices for Fixed Broadband Service (*Lowest to Highest*)

Source: International Telecommunication Union Year: 2012

# Of Countries: 8

1:  United States	3:  Japan	5:  France
2:  United Kingdom	4:  South Korea	

### Prices for Standard Mobile Broadband Service (*Lowest to Highest*)

Source: International Telecommunication Union Year: 2012

# Of Countries: 8




1:  South Korea	5:  United States	8:  United Kingdom
3:  Japan	7:  France	

### Available Wi-Fi Locations

Source: Statista

Year: 2013

# Of Countries: 10

1:  South Korea	3:  United States	8:  Japan
2:  United Kingdom	5:  France	

### 4G LTE Penetration

Source: Juniper Networks

Year: 2013

# Of Countries: 10


1:  South Korea	3:  United States	N/A = France
2:  Japan	7:  United Kingdom	

### Unique IPv4 Addresses

Source: Akamai Technologies

Year: 2014

# Of Countries: 54

1:  United States	6:  United Kingdom	8:  South Korea
4:  Japan	7:  France	

### IPv6 Support

Source: ipv6-test.com

Year: 2014

# Of Countries: 25

2:  South Korea	25:  France	N/A = Japan, United Kingdom
6:  United States		

# The Net Vitality Index


## MACROECONOMIC FACTORS

### Global Innovation

Source: Cornell University, INSEAD and WIPO

Year: 2014

# Of Countries: 143

3:  United Kingdom	9:  South Korea	26:  France
6:  United States	23:  Japan	

### Global Competitiveness

Source: World Economic Forum

Year: 2014

# Of Countries: 148

3:  United States	9:  United Kingdom	26:  South Korea
6:  Japan	23:  France	

### Global Competitiveness Index: Efficiency Enhancers

Source: World Economic Forum

Year: 2014

# Of Countries: 148

1:  United States	7:  Japan	25:  South Korea
4:  United Kingdom	19:  France	

### Global Competitiveness Index: Innovation & Sophistication Enhancers

Source: World Economic Forum

Year: 2014

# Of Countries: 148

2:  Japan	8:  United Kingdom	22:  South Korea
5:  United States	19:  France	

### Leading Global Cities

Source: A.T. Kearney

Year: 2014

# Of Countries: 13

1:  United States	8:  United Kingdom	22:  South Korea
3:  Japan	19:  France	

### Internet Economy as a Percentage of GDP

Source: Boston Consulting Group

Year: 2012

# Of Countries: 19

1:  United States	4:  Japan	10:  France
2:  South Korea	5:  United Kingdom	

# The Net Vitality Index

## MACROECONOMIC FACTORS

### Internet Foundations: Human Capital, Financial Capital, Infrastructure & Business Environment

Source: McKinsey &amp; Company

Year: 2012

# Of Countries: 13






- |  |   |  |
|--|---|--|
| 1:  United States | 5:  United Kingdom | 8:  South Korea |
| 3:  Japan         | 7:  France         |  |

### Internet Leadership: Supply Factors

Source: McKinsey &amp; Company

Year: 2012

# Of Countries: 13

- |   |  |   |
|---|--|---|
| 1:  United States  | 5:  Japan       | 8:  France |
| 3:  United Kingdom | 7:  South Korea |   |

### E-Friction: Infrastructure

Source: Boston Consulting Group

Year: 2014

# Of Countries: 65

- |   |   |   |
|---|---|---|
| 7:  United States | 13:  United Kingdom | 25:  France |
| 11:  South Korea | 17:  Japan         |   |

### Top 250 Internet-Related Firms

Source: McKinsey &amp; Company

Year: 2011

# Of Countries: 39

- |  |   |   |
|--|---|---|
| 1:  United States | 3:  France         |  South Korea |
| 2:  Japan         | 4:  United Kingdom |   |

### The World's Top Digital Start-Ups

Source: SAI Business Insider

Year: 2011

# Of Countries: 9

- |  |  |                          |
|--|--|--------------------------|
| 1:  United States | 19:  United Kingdom | N/A = South Korea, Japan |
| 3:  France        |  |                          |

### Highest Value Digital Start-Ups

Source: Policy Exchange

Year: 2012

# Of Countries: 10

- |   |   |                          |
|---|---|--------------------------|
| 1:  United States  | 5:  France | N/A = South Korea, Japan |
| 2:  United Kingdom |   |                          |

# The Net Vitality Index




## MACROECONOMIC FACTORS

### Top Digital Start-Up Centers

Source: Startup Compass

Year: 2011

# Of Countries: 2012

- |  |   |                          |
|--|---|--------------------------|
| 1:  United States | 5:  United Kingdom | N/A = South Korea, Japan |
| 3:  France        |   |                          |

### Cyber Power: Economic and Social Context

Source: Economist Intelligence Unit

Year: 2011

# Of Countries: 19


- |  |   |   |
|--|---|---|
| 1:  United States | 5:  United Kingdom | 9:  France |
| 2:  Japan         | 6:  South Korea    |   |

### Cyber Power: Industry Application

Source: Economist Intelligence Unit

Year: 2011

# Of Countries: 19

- |  |  |   |
|--|--|---|
| 2:  South Korea    | 5:  United Kingdom | 9:  Japan |
| 3:  United States | 7:  France        |   |

### Cyber Power: Legal and Regulatory Framework

Source: Economist Intelligence Unit

Year: 2011

# Of Countries: 19

- |   |   |  |
|---|---|--|
| 2:  United States  | 4:  France | 9:  South Korea |
| 2:  United Kingdom | 5:  Japan  |  |

### Innovation Driven Economies

Source: Connectivity Scorecard

Year: 2012-2013

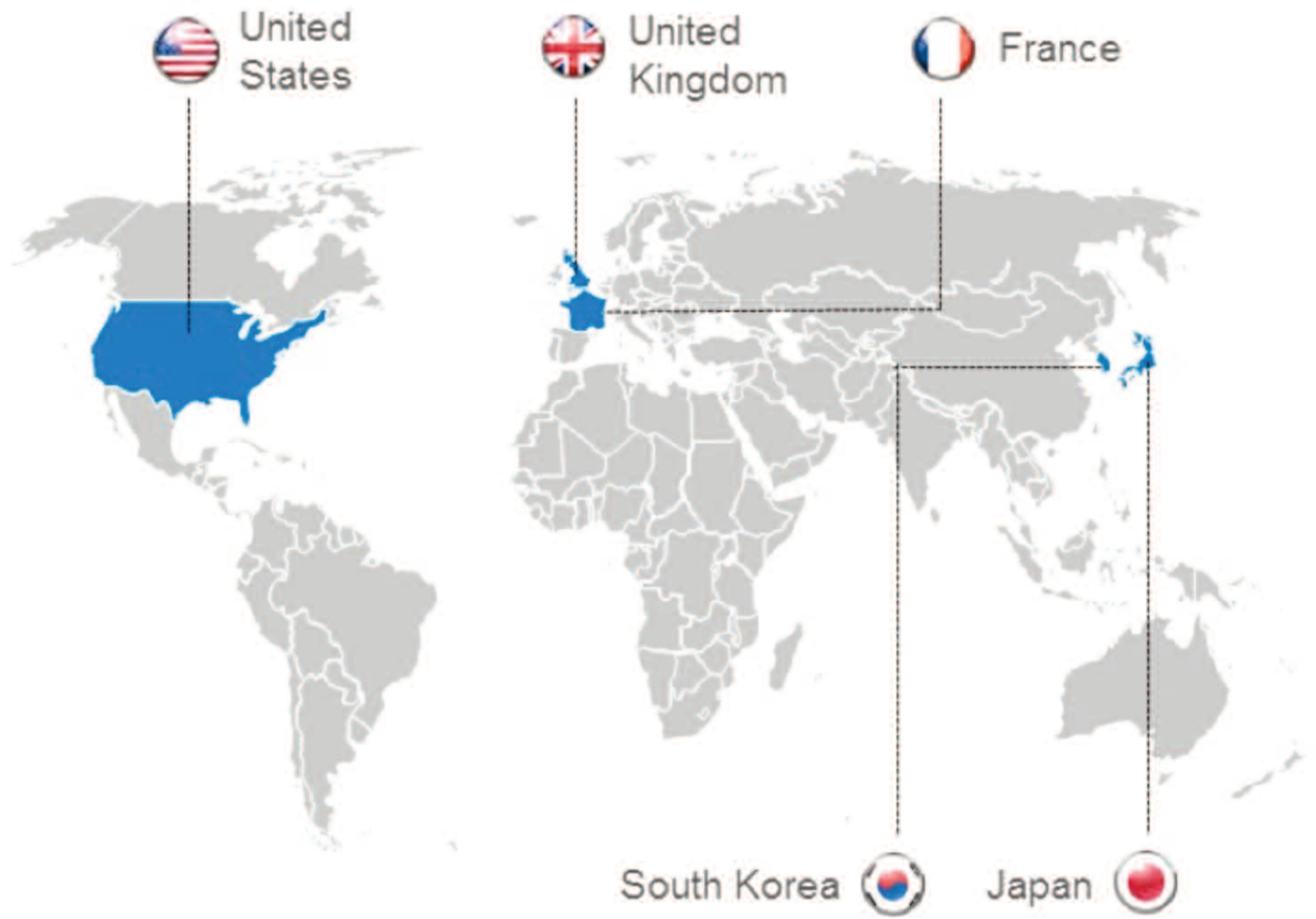
# Of Countries: 26

- |   |  |   |
|---|--|---|
| 3:  United States  | 13:  Japan  | 16:  South Korea |
| 6:  United Kingdom | 14:  France |   |

## **VII. The Top-Tier Global Broadband Internet Leaders in the Net Vitality Index**



Top-Tier Global Broadband  
Internet Leaders  
In The Net Vitality Index



# United States



Applications	Rank
Access to Information	1
Empowerment	2
Net Freedom	4
E-Government Leaders	7
E-Participation Leaders	9
Global Retail E-Commerce Leaders	3
E-Friction: Information	2
Social Media Penetration	4
Top 10 Free Apps in the Amazon App Store	1
Top 10 Free Apps in the Apple Store	1
Top 10 Free Apps on Google Play	1
Top 10 Publishers – Free Apps in the Amazon App Store	1
Top 10 Publishers – Free Apps in the Apple App Store	1
Top 10 Publishers – Free Apps on Google Play	1
Top 10 Publishers – Paid Apps in the Amazon App Store	1
Top 10 Publishers – Paid Apps in the Apple App Store	1
Top 10 Publishers – Paid Apps on Google Play	1
<b>Devices</b>	
Top Personal Computer Operating Systems	1
Top Web Browsers	1
Worldwide Smartphone to End Users by Operating System	1
Worldwide Smartphone Sales to End Users by Volume	2
Smartphone Penetration	13
<b>Networks</b>	
Investment in Telecommunications	1
Investment in Telecomm as a Percentage of GDP	3
Cyber Power: Technology Infrastructure	2
Average Fixed Broadband Connection Speed	11
Percentage of Population with Fixed Broadband Connection Speed above 10 Mbps	6
Lowest Broadband Prices Worldwide	4

# United States



Networks (Cont.)	Rank
Prices for Fixed Broadband Service	8
Prices for Standard Mobile Broadband Service	4
Available Wi-Fi Locations	3
4G LTE Penetration	3
Unique IPv4 Addresses	1
IPv6 Support	6
<b>Macroeconomic Factors</b>	
Global Innovation	6
Global Competitiveness	3
Innovation-Driven Economies	3
Global Competitiveness Index: Efficiency Enhancers	1
Global Competitiveness Index: Innovation and Sophistication Factors	5
Leading Global Cities	1
Internet Economy as a Percentage of GDP	5
Internet Foundations: Human Capital, Financial Capital, Infrastructure and Business Environment	1
Internet Leadership: Supply Factors	1
E-Friction Infrastructure	7
Top 250 Internet-Related Firms	1
The World's Top Digital Start-Ups	1
Highest Value Digital Start-Ups	1
Top Digital Start-Up Centers	1
Cyber Power Economic and Social Context	1
Cyber Power Industry Applications	3
Cyber Power Legal and Regulatory Framework	2
Innovation Driven Economies	3

In 1971, the FCC determined that computer-based services offered over telecommunications facilities should not be subject to common carrier regulation. In so ruling, the Commission set forth the necessary unregulated landscape for the growth and development of the Internet that has created today's broadband Internet ecosystem.

In subsequent years, the FCC acted in numerous ways to ensure that the Internet's incredible network of networks continued to develop unregulated. Equally important, the Commission has ensured universal access to the ubiquitous telecommunications network on which the Internet relies to reach hundreds of millions of users across America. More recently, it has expanded traditional universal service subsidy programs to emphasize broadband Internet networks rather than narrow-band telephony.

Since the mid-1970s, data processing services were "unregulated" from the outset, permitting the data industry to develop innovative services exempt from the numerous common carrier requirements of Title II of the Communications Act. Additionally, common carriers were permitted to enter and compete in the data market, but with safeguards in place to ensure that competing data providers had nondiscriminatory access to the underlying communications components of their service offerings.

In its *Computer II* proceeding (1980), the FCC focused on the need to develop a workable categorical definition of both regulated telecommunications services and unregulated data services. The result was the creation of the categories of "basic" and "enhanced" services. The Commission defined the term "basic services," which referred to common carrier telecommunications offerings, such as telephone service, as a common carrier offering of a pure "transmission capacity for the movement of information." The Commission defined "enhanced services" as "[s]ervices, offered over common carrier transmission facilities used in interstate communications, which employ computer-processing applications that act on the format, content, code, protocol, or similar aspects of the subscriber's transmitted information; provide the

subscriber additional, different, or restructured information; or involve subscriber interaction with stored information."

*Computer II* saw the Commission reiterating its commitment to regulating only the common carrier "basic" transmission service offerings while continuing to exempt enhanced services from common carrier regulation. The FCC continued to require common carriers that offered enhanced services to provide those services through a separate affiliate, based on continuing concerns about potential discrimination and cross-subsidization.

The *Computer III* proceeding (1986) saw the replacement of the separate affiliate requirements for common carriers offering data services with a model of nonstructural safeguards, such as accounting safeguards, which permitted common carriers to offer enhanced services on an integrated basis (*i.e.*, within a regulated telephone company). Even as the Commission eschewed the separate affiliate model for common data service offerings in favor of nonstructural safeguards, the fundamental *Computer I* principle of nonregulation of data services remained intact.

Additionally, the FCC continued to require common carriers to unbundle their basic service offerings from their enhanced service offerings. The Commission also maintained the requirement on common carriers to make basic services available to competing enhanced service providers at tariffed rates. For the Commission, the main purpose of *Computer III* was to establish a deregulatory means of ensuring that common carriers and non-common carriers alike could compete fairly in the market for data services.

The practical effect of the Commission's decision not to regulate data processing services has been historic. Early Internet pioneers utilized data processing services over telecommunications facilities to inter-network computers across great distances. The use of the common TCP/IP protocol permitted the transmission across telephone lines of data from end users on virtually any computer network.

In the 1980s, the Internet primarily was an educational and research tool used for electronic mail, file transfers, and newsgroups. In the 1990s, the Internet would explode with the development of the World Wide Web and the first Web browsers. The global connection of disparate networks over the Internet, most connected via telecommunications lines, and increasingly over cable networks and wireless technologies, has made that explosive growth possible. The FCC's early recognition that regulation of data services as common carrier offerings would inhibit flexibility in the development and deployment of these already-competitive services was a crucial component of that growth.

Perhaps the most important contribution to the success of the Internet that the FCC has made has been its consistent treatment of IP-based services as unregulated information services. When innovative new Internet Protocol (IP) communications services first entered the marketplace, the Commission already had firmly established its deregulatory approach. The FCC did not seek to apply legacy Title II regulations to the Internet as it developed and flourished – the first e-mail programs in the 1970s, interactive newsgroups in the 1980s, and the World Wide Web in the 1990s all grew up over the nation's telephone lines free from regulation. Traditional regulatory structures were designed to fit services in existence at the time of enactment. New technologies, while perhaps similar in appearance or in functionality, were not stuffed into what may be ill-fitting regulatory categories.

The Commission established longstanding recognition that broadband Internet access is an information service without a severable telecommunications service component. In turn, this view has been a key stimulant of broadband network investment in recent years.

In 1998, then-FCC Chairman William Kennard indicated that the FCC would take a "hands-off deregulatory approach to the broadband market." He pledged "vigilant restraint" against regulating cable broadband as a Title II common carrier service. The FCC, under Chairman Kennard's leadership, recognized that "classifying Internet

access services as telecommunications services could have significant consequences for the global development of the Internet." He recognized "the unique qualities of the Internet" and indicated that the Commission would "not presume that legacy regulatory frameworks are appropriately applied to it."

On a bipartisan basis, the FCC continued to account for these unique qualities of the Internet in 2002, 2005, 2006, and 2007, cumulatively classifying cable broadband, digital subscriber line telephone broadband, powerline broadband, and wireless broadband as information services – all not subject to Title II common carrier regulation.

The resulting innovation and investment that flowed from these decisions has been dramatic. To date, Internet service providers (ISPs) have made \$1.3 trillion of capital investments in broadband networks in the United States. For example, in the 2006-2013 timeframe, when the information services classification of the Internet was in place, ISPs invested \$555 billion in broadband network capital expenditures (even accounting for the financial crisis of 2009). And between 2011 and 2013 (the last full year with data available), the vast majority of all U.S. broadband Internet ecosystem investments (84 percent) have been made by broadband Internet network providers.

The Commission has allowed market forces to work over a long time arc without interference from inappropriate regulation. It also has avoided regulation based solely on speculation of a potential future problem. Oversight by the FCC, however, has been crucial to ensure that market forces do not fail or are otherwise unfairly manipulated by inappropriate behavior by entities with market power. On balance, until recently, the Commission's approach has been minimalist, only taking those steps that are directly necessary to solve the problem. Traditional methods of regulatory intervention are available, and now are being pursued by the FCC, but they may not be necessary. Rather than imposing obligations on an entire industry, for example, the Commission historically sought solutions that addressed the specific problems posed by a particular bottleneck.

The United States model for broadband Internet development also favors entrepreneurs and private enterprise coupled with direct and indirect financial support by government, primarily through early-stage incubation. For example, the Internet originated as a collaboration of government agencies and universities under the auspices of the Defense Advanced Research Projects Agency (DARPA), a branch of the U.S. Defense Department.

High-technology areas for Internet venture incubation, such as Silicon Valley, underscore a largely private orientation to broadband Internet development in the United States. Among the factors contributing to this success are:

- Favorable rules of the game: laws, regulations, and conventions for securities, research and development, taxes, accounting, corporate governance, bankruptcy, immigration, and development designed to support entrepreneurship and risk taking;
- Knowledge intensity: a critical mass of ideas for new products, services, markets, and business models;
- A high quality and mobile work force: talented, educated, and motivated people seeking to make a home in a particular region fueled by Internet-driven economic growth;
- A results-oriented meritocracy: talent and ability accrue rewards without regard to race, ethnicity, and age;
- A climate that rewards risk-taking and tolerates failure, but also makes it possible for entrepreneurs who have experienced failure to regroup and try again;
- An open business environment: knowledge resulting from the frequent formal and informal interactions among people with similar interests and objectives; business networking and relationships matter as much as technological innovations;
- Universities and research initiatives that interact with industry: major research universities foster exchanges among academics and entrepreneurs;
- Collaboration among business, government, and nonprofit organizations: universities, trade associations, service organizations, and companies all collaborate and network with an eye toward a successful future; and
- A specialized business infrastructure: access to specialists needed for broadband Internet business and economic development, including consultants, lawyers, venture capitalists, and executive recruiters.

This Internet incubation process has achieved great success, in part due to largely underemphasized types of governmental involvement and a consistent approach to minimal regulatory intervention.

## South Korea



Applications	Rank
Access to Information	2
Empowerment	11
Net Freedom	20
E-Government Leaders	1
E-Participation Leaders	2
Global Retail E-Commerce Leaders	5
E-Friction: Information	54
Social Network Penetration	5
<b>Devices</b>	
Worldwide Smartphone Sales to End Users by Volume	2
Smartphone Penetration	2
<b>Networks</b>	
Investment in Telecommunications	12
Investment in Telecomm as a Percentage of GDP	1
Cyber Power: Technology Infrastructure	6
Average Fixed Broadband Connection Speed	1
Percentage of Population with Fixed Broadband Connection Speed above 10 Mbps	1
Lowest Broadband Prices Worldwide	38
Prices for Fixed Broadband	5
Prices for Standard Mobile Broadband Service	8

## South Korea



Networks (Cont.)	Rank
Available Wi-Fi Locations	1
4G LTE Penetration	1
Unique IPv4 Addresses	8
IPv6 Support	2
<b>Macroeconomic Factors</b>	
Global Innovation	16
Global Competitiveness	26
Innovation-Driven Economies	16
Global Competitiveness Index: Efficiency Enhancers	25
Global Competitiveness Index: Innovation and Sophistication Factors	22
Leading Global Cities	4
Internet Economy as a Percentage of GDP	2
Internet Foundations: Human Capital, Financial Capital, Infrastructure and Business Environment	7
Internet Leadership: Supply Factors	8
E-Friction Infrastructure	11
Top 250 Internet-Related Firms	10
Cyber Power: Economic and Social Context	6
Cyber Power: Industry Applications	2
Cyber Power: Legal and Regulatory Framework	9
Innovation Driven Economies	16

South Korea has a high urban density enabling more people to be served by fewer broadband network installations. It also has a larger percentage of technology early adopters keen on accessing services that provide faster, better, smarter, cheaper, and more convenient solutions to existing requirements, coupled with a willingness to use technologies to serve new needs and desires. There, the push of broadband was met early on with an equally aggressive demand-pull.

The South Korean government recognized that several types of initiatives and financial inducements would be necessary, including:

- Efforts by regulatory authorities to encourage infrastructure investment by incumbents and market entrants;
- Regulatory parity among operators with an eye toward promoting facilities-based competition, but also market entry by operators who might need to access some facilities of the incumbent;
- Direct underwriting, loans, favorable tax treatment, and other types of financial support for construction of new high-capacity backbone digital, broadband networks;
- Financial support for research, development, and technology-demonstration projects;
- Subsidies for purchase of personal computers by low-income citizens;
- Promoting digital literacy including the ability to use information technologies for interacting with government and for acquiring information, communications, and entertainment services; and
- Supporting e-government, education, e-commerce, e-healthcare, and other types of Internet-mediated services.

Since the financial crisis in 1997, the South Korean government not only has invested in the IT industry, but also has promoted further investment in it. The government also deployed a variety of

promotion policies to boost Internet use among the population. These include Internet literacy programs targeted at “housewives,” the elderly, military personnel, farmers, and excluded social sectors such as low-income families, people with disabilities, and even prisoners. For example, the government established the “Ten Million People Internet Education” project in 2000, by which 10 million people attended a variety of digital instruction programs by the end of a two-year period.

While setting up programs for computer and Internet literacy, the Korean Ministry of Communication and Information identified “housewives” as its main target (defined as married females not in employment). Government subsidies were granted to private Internet training institutes allowing them to offer Internet courses at an affordable price.

The program for housewives is considered a success partly because a housewife has actual purchasing power in running a household in South Korea. Policymakers thought that without housewives’ commitment to the Internet, its diffusion among households in general could be stifled.

Additionally, under the Cyber Building Certificate system, the government housing authority issues a certificate to a building with high-speed telecommunications capacity. The government sets standards on domestic and business premises with three levels and grants the certificates to qualified buildings. This certification gives builders a motivation to enhance the broadband access platform of apartments and buildings they are constructing, as most residents want to live in high-capacity cyber apartments. The certification program also provides builders with a means for differentiating their products, which is a useful feature in so highly competitive a market as residential leased apartments. Cyber Building Certificates have worked particularly well in the South Korean housing market because apartments account for half of the total housing.

Internet PC Bahngs (meaning “room” in Korean) are similar to Internet cafes in other countries. The PC Bahng is perhaps a unique Korean

phenomenon in terms of its popularity. It can be described as a business model in which constant access to the Internet is open to the public through leased lines.

PC Bahngs are equipped with high-speed leased lines and multimedia computers, and offer high-speed access to the Internet at less than one dollar per hour. At first, online games brought young people to Internet PC Bahngs to enjoy the games at high speeds and low prices. PC Bahngs then evolved as places for Internet use among the population across age, region, and income to send e-mails, chat, and search information at any time of the day or night.

PC Bahngs played an important role in generating the nationwide Internet boom. Most importantly, many Korean users first were exposed to high-speed broadband Internet access in PC Bahngs. They became so accustomed to using high-speed services that they were not able to return to dial-up methods. This important factor made high-speed Internet network access a norm among Korean residents.

In South Korea, online games also acted as a “killer app” – an application that forces or urges users to buy or adopt the platform on which the application is running.

Timing was critical for Internet diffusion in Korea. At the end of 1997, the financial crisis hit the Korean economy. In the following years, Koreans suffered unprecedented rates of unemployment and bankruptcies. This crisis forced the Korean economy to restructure itself.

Since 1998, thousands of new Internet companies have started in South Korea. The government has encouraged Internet ventures by offering tax benefits and low-rate loans. Coupled with telecommunications deregulation, new Internet startups coincided with the deployment of broadband network infrastructure.

The South Korean broadband development history also shows that if the demand for high bandwidth Internet access can be matched by cultural expectations, such as the Korean emphasis on education and knowledge, then diffusion can be rapid. Fast Internet diffusion and usage in Korea shows the importance of culture in the diffusion of technology.

Yet despite widespread use of the Internet via broadband network access, the Internet boom remains a largely urban phenomenon in Korea. For example, the provision of high-speed Internet access is concentrated in metropolitan areas. Large parts of the country and its population remain excluded from the benefits that the Internet offers.

# Japan



Applications	Rank
Access to Information	7
Empowerment	21
Net Freedom	7
E-Government Leaders	6
E-Participation Leaders	5
Global Retail E-Commerce Leaders	2
E-Friction: Information	38
Social Network Penetration	10
Top 10 Free Apps on Google Play	2
Top 10 Publishers – Free Apps in the Apple App Store	3
Top 10 Publishers – Free Apps on Google Play	3
<b>Networks</b>	
Investment in Telecommunications	3
Investment in Telecomm as a Percentage of GDP	4
Cyber Power: Technology Infrastructure	9
Average Fixed Broadband Connection Speed	2
Percentage of Population with Fixed Broadband Connection Speed above 10 Mbps	2
Lowest Broadband Prices Worldwide	6
Prices for Fixed Broadband Service	6

# Japan



Networks (Cont.)	Rank
Prices for Standard Mobile Broadband Service	6
Available Wi-Fi Locations	8
4G LTE Penetration	2
Unique IPv4 Addresses	4
<b>Macroeconomic Factors</b>	
Global Innovation	21
Global Competitiveness	6
Innovation-Driven Economies	13
Global Competitiveness Index: Efficiency Enhancers	7
Global Competitiveness Index: Innovation and Sophistication Factors	2
Leading Global Cities	2
Internet Economy as a Percentage of GDP	4
Internet Foundations: Human Capital, Financial Capital, Infrastructure and Business Environment	5
Internet Leadership: Supply Factors	3
E-Friction Infrastructure	17
Top 250 Internet-Related Firms	2
Cyber Power: Economic and Social Context	2
Cyber Power: Industry Applications	9
Cyber Power: Legal and Regulatory Framework	5
Innovation Driven Economies	13

Japan's broadband Internet growth is a result, in part, of favorable geographic and socioeconomic factors. Consistent and effective government stewardship over an extended period of time also has played an important role.

The Japanese government developed its ICT strategy in tandem with liberalization and privatization initiatives that reshaped the telecommunications sector and fostered competitive alternatives to the incumbent carrier, NTT. Beginning in 2010, the Basic Law on the formulation of an advanced information and telecommunications network strategy established a national goal of "creating a society based on highly advanced telecommunications networks, [reducing] gaps in opportunities to access information and communications technology, and the ability to use such technology."

The ICT Strategy Headquarters, set up within the Cabinet, then refined an "e-Japan" strategy for the establishment of a society based on advanced telecommunications networks. Additionally, the Japanese government considered broadband development in the larger context of promoting digital literacy.

Japan's ICT development, with an emphasis on broadband, also was focused on "the societal and economic challenges that Japan is facing, due to an aging population and increased international competition from China and South Korea."

Japan combines regulatory policies promoting competition and cooperation, additional spectrum for wireless broadband services, and subsidization of terrestrial and satellite broadband backbone networks with an emphasis on reaching unserved rural localities.

To realize a ubiquitous and universal broadband networked society, the Japanese government

determined that "[i]n disadvantaged areas, such as underpopulated regions where private-sector-driven telecommunications infrastructure development is slow to progress, the government especially will support local governments to develop the infrastructure depending on regional characteristics. Furthermore, to effectively eliminate areas with zero broadband connections, including underpopulated regions, and to realize a broadband environment even when in motion, it is important to promote the realization of wireless broadband, such as mobile communication systems with transmission speeds comparable to optical fibers. Therefore, it is necessary to promote radio utilization fit for the digital age by implementing new radio utilization systems." Among the specific measures that the government formulated to address this policy aim was accelerating the increase in mobile phone coverage areas.

The Japanese government also significantly deregulated price and tariff regulations where facilities-based competition exists. Additionally, Japan continues to fund a universal service program that subsidizes basic services and supports fiber deployment by local municipal governments.

Key drivers for successful broadband network deployment in Japan have included:

- A clear articulation of a middle- and long-term vision by the government;
- Demand-pull market expansion in light of widespread interest in digital content;
- Unmetered services, or high downloading allotments; and
- Aggressive low pricing by market entrants.

# United Kingdom



Applications	Rank
Access to Information	6
Empowerment	1
Net Freedom	10
E-Government Leaders	8
E-Participation Leaders	6
Global Retail E-Commerce Leaders	4
E-Friction: Information	13
Social Network Penetration	3
Top 10 Free Apps in the Apple Store	2
Top 10 Free Apps on Google Play	2
Top 10 Publishers – Free Apps in the Apple App Store	2
Top 10 Publishers – Paid Apps in the Amazon App Store	2
Top 10 Publishers – Paid Apps on Google Play	2
<b>Devices</b>	
Smartphone Penetration	9
<b>Networks</b>	
Investment in Telecomm as a Percentage of GDP	2
Cyber Power: Technology Infrastructure	1
Average Fixed Broadband Connection Speed	14
Percentage of Population with Fixed Broadband Connection Speed above 10 Mbps	13
Lowest Broadband Prices Worldwide	6
Prices for Fixed Broadband Service	7
Prices for Standard Mobile Broadband Service	1
Available Wi-Fi Locations	2

# United Kingdom



Networks (Cont.)	Rank
4G LTE Penetration	7
Unique IPv4 Addresses	6
4G LTE Penetration	7
Unique IPv4 Addresses	6
<b>Ecosystem</b>	
Global Innovation	2
Global Competitiveness	9
Innovation-Driven Economies	6
Global Competitiveness Index: Efficiency Enhancers	4
Global Competitiveness Index: Innovation and Sophistication Factors	8
Leading Global Cities	4
Internet Economy as a Percentage of GDP	1
Internet Foundations: Human Capital, Financial Capital, Infrastructure and Business Environment	3
Internet Leadership: Supply Factors	5
E-Friction Infrastructure	13
Top 250 Internet-Related Firms	4
The World's Top Digital Start-Ups	5
Highest Value Digital Start-Ups	2
Cyber Power: Economic and Social Context	5
Cyber Power: Industry Applications	5
Cyber Power: Legal and Regulatory Framework	2
Innovation Driven Economies	6

Policy initiatives established in the UK government conceptually blend public and private initiatives. Ofcom, the national regulator, recognizes that “[r]egulation must support investment by the private sector, while at the same time promoting competition wherever there are potential barriers to competitive delivery of services.”

Ofcom has articulated the following guidelines for supporting private investment:

- Provide a clear, consistent, and transparent regulatory regime;
- Ensure any regulation takes account of the uncertainty and risk in investment;
- Provide flexibility in trialing and piloting to help develop and test new technologies, commercial relationships, and services;
- Support experimentation by all organizations on how to deploy or run these services, including new entrants, the public sector, and community broadband projects; and
- Reduce barriers to entry wherever possible, such as through a strategy of spectrum release, liberalization, and trading, enabling the market to launch new wireless services when the time is right, including those that may compete in the delivery of next-generation access services.

In 2009, the UK government released its *Digital Britain* report, aiming to:

- Complement and assist the private sector in delivering the effective modern communications infrastructure, built on new digital technologies;
- Enable Britain to be a global center for the creative industries in the digital age, delivering an even wider range of quality content, including public service content, within a clear and fair legal framework;
- Ensure that people have the capabilities and skills to flourish in the digital economy, and that all can participate in digital society; and

- Have government continue to modernize and improve its service to the taxpayer through digital procurement and the digital delivery of public services.

The *Digital Britain* report combined a number of initiatives that collectively sought to achieve five objectives:

- Modernizing and upgrading the wired, wireless, and broadcasting infrastructure;
- Providing a favorable climate for investment and innovation in digital content, applications, and services;
- Securing a range of high-quality public service content, particularly in news;
- Developing the nation’s digital skills at all levels; and
- Securing universal access to broadband, increasing its take-up, and using broadband to deliver more public services more effectively and efficiently.

The UK has a robust wireless telecommunications marketplace generated in part by pre-pay services, market entry by virtual mobile network operators’ services, and the rollout of 3G wireless networks capable of providing an expanded array of services. Unlike the United States, where most carriers emphasize a single business model that bundles wireless handset sales with a two-year service commitment, the UK wireless marketplace has diverse segments, including an active market for low-price, pre-paid service. The widespread availability of smartphones and diverse software applications, which run on such handsets, also has contributed to the demand for mobile broadband services.

The UK government described its approach to broadband Internet development with a long time horizon. “We are at an inflection point in technology, in capability and in demand. Those countries and governments that strategically push forward their digital communications sector will gain substantial and long-lasting competitive advantage.”

The government supports a greater reach for public sector intervention, but calibrated not to preempt or foreclose private investment. Perhaps this explains why it established an initial low 2 Mbps broadband network access threshold. Government

intervention is intended to compensate for market failure and insufficient private investment to ensure a national threshold broadband access rate, recognizing that private ventures will offer urban residents and corporate users far higher bit rates.

# France



Applications	Rank
Access to Information	2
Empowerment	7
Net Freedom	6
E-Government Leaders	4
E-Participation Leaders	4
Global Retail E-Commerce Leaders	7
E-Friction: Information	19
Social Network Penetration	9
Top 10 Free Apps in the Amazon App Store	2
Top 10 Free Apps in the Apple Store	2
Top 10 Publishers – Free Apps in the Apple App Store	3
Top 10 Publishers – Free Apps on Google Play	2
Top 10 Publishers – Paid Apps in the Amazon App Store	2
Top 10 Publishers – Paid Apps in the Apple App Store	2
Top 10 Publishers – Paid Apps on Google Play	2
Networks	
Investment in Telecommunications	6
Investment in Telecomm as a Percentage of GDP	8
Cyber Power: Technology Infrastructure	7
Average Fixed Broadband Connection Speed	27
Percentage of Population with Fixed Broadband Connection Speed above 10 Mbps	27
Lowest Broadband Prices Worldwide	18
Prices for Fixed Broadband Service	4

# France



Networks (Cont.)	Rank
Prices for Standard Mobile Broadband Service	2
Available Wi-Fi Locations	5
Unique IPv4 Addresses	7
IPv6 Support	25
<b>Macroeconomic Factors</b>	
Global Innovation	22
Global Competitiveness	23
Innovation-Driven Economies	14
Global Competitiveness Index: Efficiency Enhancers	19
Global Competitiveness Index: Innovation and Sophistication Factors	19
Leading Global Cities	4
Internet Economy as a Percentage of GDP	11
Internet Foundations: Human Capital, Financial Capital, Infrastructure and Business Environment	8
Internet Leadership: Supply Factors	7
E-Friction Infrastructure	25
Top 250 Internet-Related Firms	4
The World's Top Digital Start-Ups	5
Highest Value Digital Start-Ups	5
Top Digital Start-Up Centers	7
Cyber Power: Economic and Social Context	9
Cyber Power: Industry Applications	7
Cyber Power: Legal and Regulatory Framework	4
Innovation Driven Economies	14

France has pursued broadband Internet development by balancing a long-standing indigenous concept of public service with the need to promote privatization of the telecommunications sector. The government of France frames broadband Internet development in the context of both ensuring equal treatment of all citizens and an obligation of the state to ensure accessibility, affordability, and continuity of service. In practice, this means that the French government considers it necessary and appropriate to intervene when the private sector and the marketplace fail to achieve social goals, such as universal service.

The French government and telecommunications firms recognized the importance of information access early, well before most nations. The government-owned Poste, Telephone et Telecommunications (PTT) launched the Minitel videotext service in 1982, offering a variety of information and e-commerce services, years before Internet-mediated options became available. The business model for Minitel called for the free distribution of terminals with the expectation that subscribers would generate higher monthly revenues for the carrier through premium service fees.

France also successfully privatized France Telecom, the dominant service provider, while simultaneously ensuring that residents had access to essential services even when anticipated competition failed to deliver them. By law, France has a funding mechanism for promoting universal service through subsidies funneled to any service provider that qualifies for universal service subsidies.

The *Digital France 2012* plan outlines an ambitious collection of 154 actions leading to ubiquitous access to the technologies supporting the digital economy. The plan has three major components: (1) ensuring ubiquitous Internet access; (2) completing conversion to digital broadcast television; and (3) narrowing the digital divide.

The *Digital France* plan expanded available wireless bandwidth available for Internet access by reallocating 72 MHz of bandwidth made available in the transition from analog to digital television. In order to better understand how telecommunications, audiovisual services, software, information technology, and online services stimulate both broadband network demand and supply, the French government also held numerous workshops with an eye toward hearing from individuals and groups how they would use broadband technologies.

The *Digital France* plan also included an ongoing government role designed to stimulate both supply and demand for digital services. A substantial source of funding for these endeavors came from the Caisse des Depots, a public sector financial institution that performs public interest missions on behalf of France's central, regional, and local governments.

The *Digital France* plan sought to achieve four digital economy goals: (1) enabling all French citizens to enjoy access to digital networks and services; (2) developing the production and supply of digital content; (3) expanding and diversifying digital applications and services in businesses, administrations, and households; and (4) modernizing national governance of the digital economy. These initiatives included enhancing the creation and dissemination of indigenous content; promoting digital rights management and privacy; developing the video gaming and software sectors; strengthening consumer trust and confidence in e-commerce applications; integrating digital technologies in education, e-government and healthcare; and promoting research and development in the ICT domain.

The French wireless broadband marketplace also offers an increasingly competitive alternative to fixed services with readily available 3G access throughout much of the nation.

## VIII. Lessons from the Top-Tier Global Broadband Internet Leaders

What makes the top-tier global broadband Internet leaders so outstanding? It's useful to note, as Professor Michael Porter has, that their "competitive advantage is created and sustained through a highly localized process. Differences in national values, culture, economic structures, institutions, and histories all contribute to their competitive success. There are striking differences in the patterns of competitiveness in every country. No nation can or will be competitive in every, or even in most industries."

As illustrated in the individual country profiles, a significant set of indigenous factors contribute to, or deter, progress in individual countries, regardless of what affirmative steps are taken. A number of localized characteristics favor broadband development independent of concerted actions. For example, geography and demographics can make development tasks easier or harder as a function of nation size, population density, per capita income, percentage of high-rise housing, and size of households.

Geographically small nations with little rugged terrain and high incomes are better positioned to achieve ubiquitous broadband network access on a timely and efficient basis, perhaps even without having to create a sizeable fund for subsidizing service to rural and low-income residents. Additionally, with a population skewed to youthful, urban apartment dwellers, telecommunications carriers can more easily deploy services and achieve comparatively higher penetration rates than what carriers in other nations would achieve.

Consequently, although comparative analysis is worthwhile as an analytic tool, it also has its practical limits. The context of broadband Internet ecosystem development in a particular country

often is unique to that country's physical, economic, political, cultural, and social environment. Attempting to generalize from even the best countries is unlikely to yield meaningful policy outcomes, and this study, unlike others, is careful not to develop generalized inferences that are based on a specific top-tier global broadband Internet leader's particular circumstances.

The five global broadband leaders of the Net Vitality Index, however, have a powerful common driving force – innovation. Innovation is the result of unusual effort. "Once a company achieves competitive advantage through innovation," according to Professor Porter, "it can sustain it only through relentless improvement. Competitors will eventually and inevitably overtake any company that stops improving and innovating." This powerful lesson of the centrality of innovation is directly applicable to the desired goal of promoting continuous Net Vitality. Innovation makes competition thrive. Innovation must come first.

The goals of national institutions and both individual and corporate values also help contribute to national competitive advantage. Each of the five Net Vitality Index countries that comprise the top tier of global broadband Internet leaders attaches significant prestige to its role in Information and Communication Technologies (ICT) generally, and to the Internet specifically. Consequently, these countries guide the flow of capital and human resources to enhance this positioning, which in turn directly affects the competitive performance of companies that comprise the broadband Internet ecosystem. Although it may be difficult at times to determine cause and effect, it is clear that these top-tier global broadband Internet leaders have made

the attainment of international Internet success a priority. In doing so, the Internet sector also is more prestigious for those within the country seeking education, investment, or employment.

The top-tier global broadband Internet ecosystem leaders' strategies, viewed as a whole, also have included a range of government roles, such as:

- Developing a vision and strategy;
- Promoting digital literacy, *i.e.*, the ability to use digital technologies to pursue information, communications, and entertainment interests;
- Investing in infrastructure, aggregating demand, and serving as an anchor tenant;
- Fostering facilities-based competition;
- Creating incentives for private investment;
- Offering electronic government activities, including healthcare, education, access to information, and licensing;
- Promoting universal services through subsidies and grants; and
- Revising and reforming governmental safeguards to promote a high level of trust, security, privacy, and consumer protection in ICT services, including e-commerce.

Successful incubation appears to require government involvement, albeit with a light hand that stimulates and rewards investment, reduces regulatory underbrush, and promotes global marketplace attractiveness.

The top-tier global broadband Internet leaders clearly recognize that government has a critical role to play in shaping the goals of Net Vitality through forward-looking policymaking. This has included various mechanisms to regulate competition.

The global broadband Internet leaders exemplify an ability to set a course that favors competitive time over political time. This policy preference reflects an understanding that it often takes at least a decade, if not more, for an industry

to create competitive advantage. This is because it takes years to upgrade human skills, invest in products and processes, build interdependent clusters (*e.g.*, the broadband Internet ecosystem), and penetrate foreign markets.

As fast as Internet growth has been in recent years, it still is in the process of building up competitive advantage on a national basis. Developing a regulatory regime too early may be well intentioned, even politically palatable. But it also poses a real potential barrier to the United States and other top-tier global broadband Internet leaders as they continue to build up their own competitive advantages.

Synchronizing the competitive time for companies, which represents a long time arc, with the shorter political time represented by two- and four-year election cycles, is a policy challenge that all the broadband global Internet leaders are facing. The top-tier global broadband Internet leaders understand the importance of a long-term view, and in varying degrees, have exhibited greater patience than the political system may be advocating at a particular moment in time. As Michael Porter has commented: "Policies that unconsciously undermine innovation and dynamism represents the most common and most profound error" in government policymaking. The top-tier global broadband leaders would be well advised to pay greater attention to this concern as they attempt to balance the interests of competitive and political time.

Such approaches reflect an understanding that companies in the broadband Internet ecosystem benefit from domestic rivals, who create pressure on them to innovate dynamically and to improve. Additionally, unlike rivalries with foreign firms, domestic rivalries often extend well beyond pure economic or business competition. They compete for market share, but also are in constant competition for people, technical superiority, and even a more ephemeral achievement – "bragging rights." Regulation of domestic competition, though well intended, thus may be conceived too narrowly when considered as a means to promote national competitive advantage in the larger global context.

Domestic rivalry also pressures these domestic companies to explore expansion into global markets, taking advantage of economies of scale that can capture greater efficiency and higher profitability outside the home country.

Top-tier global broadband Internet leaders have benefited most when government is a catalyst and challenger. By encouraging companies to raise their aspirations and move to higher levels of competitive performance, governments of the five leading Net Vitality Index countries have been able to capitalize best on the favorable attributes that each country has in place.

Japan and South Korea are useful countries to explore in greater detail for how they have played an effective broadband Internet ecosystem catalytic role in their respective countries. They also have demonstrated sufficient agility to shift the government's role to reflect the progress of their

economies. They have made mistakes, as well, particularly by attempting to manage industry structure and yielding to political pressure to put in place protectionist measures that are not market based.

It is not enough to set the policy bar to achieve an Open Internet. As a fuller understanding of the broadband Internet ecosystem reveals, the goal should be a Wide Open Internet, within each country and around the world. The idea of Net Vitality should become an important element of the policy discussion in the United States and elsewhere, further supporting the innovation and investment that has brought us so far to date.

Innovation and investment promise even greater impact for all users as the speed of Internet time continues apace. They are the most important building blocks for government policymakers to take into account if Net Vitality is to maximize the full broadband Internet ecosystem in the future.

# Methodology Summary

The Net Vitality Index (NVI) is a measure of inclusion by high-reputation organizations in Internet policy and economics. Index components were selected based upon their historical reputation and contribution to Internet affairs. Using basic content analysis, countries received a single point if they were recognized in an NVI contributing component variable. The method acknowledges the possibility of some countries receiving multiple mentions in some lists that would convey a sense of magnitude.

Country or country affiliation is attributable in all components. Some components, however, allow for countries to be mentioned only a single time (*i.e.*, where the variable is the country), while others allow for multiple mentions (*e.g.*, home country of top operating systems), creating the potential for unintended weighting. Therefore, magnitude is acknowledged but not captured by the index.

The component scores were then tallied on a country-by-country basis, with the top five countries by tally identified as top-tier broadband Internet ecosystem leaders. It also should be noted that while some individual index components may be influenced by geographic or population size, this does not seem to be a significant factor in the overall analysis.

Due to variation in the component data sources, the NVI used United Nations state member nations as a master list, resulting in some

omissions, as in the cases of Taiwan and Libya, and merging as occurred with Hong Kong and China.

Notably, Germany and Canada were not identified as top-tier broadband Internet leaders. A review of the data sets shows that Germany's broadband Internet ecosystem is relatively weak on application and content-related metrics, while Canada's ecosystem demonstrates similar weakness along network metrics. These countries are otherwise at parity with the five top-tier countries that have been identified, and may warrant moving into the top tier in other analyses.

Some component variables originate from the same organization and in some cases represent the same selection of countries. Moreover, the four categories are not equally weighted, which reflects the author's expert judgment regarding the importance of these factors contributing to overall Net Vitality. Subsequent research based on this initial Net Vitality Index may reflect different weighting of the four categories or different weighting of individual indices. It also may reflect updated data and additional indices, as well as other analytic methods for determining a full range of leadership tier levels. These possibilities suggest that rich research avenues can and should be explored on a regular basis. For now, the development of the initial baseline composite Net Vitality Index is intended to improve the necessary dialogue between the research community and government policymakers, both in the United States and around the world.

## About the Author

Stuart N. Brotman has extensive experience as a global executive, management consultant, international communications and media lawyer, university educator, and government policymaker.

He serves as a faculty member at Harvard Law School, where he teaches Entertainment and Media Law. He also is a faculty member in the Law School's Institute for Global Law and Policy, and an Executive Education Program faculty member at Harvard Business School. At Stanford Law School, he serves as an annual visiting lecturer in entertainment and media law as part of a Harvard-Stanford faculty exchange program that he co-directs.

At Harvard Law School, he was the first person ever appointed to teach telecommunications and served as its first Research Fellow in Entertainment and Media Law. He also served as the first concurrent fellow in digital media at Harvard and MIT, at the Berkman Center for Internet and Society and the Program on Comparative Media Studies, respectively.

Brotman also is a Nonresident Senior Fellow in the Governance Studies Program of the Center for Technology Innovation at The Brookings Institution in Washington, D.C.

He served two terms as an appointed member of the U.S. Department of State Advisory Committee on International Communications and Information Policy (ACICIP). Brotman is an appointed Arbitrator and Mediator of the World Intellectual Property Organization (WIPO) in Geneva, Switzerland, among a group of 1,500 neutrals from 70 countries. He also serves on The Media Institute's Global Internet Freedom Advisory Council.

During the 2012-13 academic year, he served as the inaugural Professor of Communication in

Residence at Northwestern University in Qatar. He also was appointed as an Honorary Visiting Fellow at the Jindal Global Law School in India, and as a Visiting Scholar at the Salzburg Global Seminar Academy on Media and Global Change.

Brotman also served as the Fulbright-Nokia Distinguished Chair in Information and Communications Technologies on the Faculty of Social Sciences, Department of Social Research/Media and Communication Studies, at the University of Helsinki.

During the Carter Administration, Brotman served as Special Assistant to the president's principal communications policy adviser and as Chief of Staff at the National Telecommunications and Information Administration (NTIA).

Brotman is the first Telecommunications Fellow of the Eisenhower Fellowships program, which included residence in Budapest, Hungary, during the tenth anniversary of telecommunications privatization. He also served as an Information Technology Fellow in the International Communications Studies program at The Center for Strategic and International Studies in Washington, D.C., as an Academic Fellow at Tel Aviv University's Jaffee Center for Strategic Studies, and as a Research Visitor at the University of Melbourne Law School's Centre for Media & Communications Law.

He previously taught at The Fletcher School of Law and Diplomacy, Tufts University, where he also served as a Senior Fellow at The Fletcher School's Edward R. Murrow Center of Public Diplomacy and International Communications, and as an adviser to Fletcher's Program on International Information and Communication.

As a Senior Fellow of The Annenberg Washington Program in Communications

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Brotman served three terms as Chairman of the International Communications Committee, Section of International Law and Practice, American Bar Association. He also is the former Co-Chairman of the American Bar Association's International Legal Education Committee.

Brotman has written more than 300 articles and reviews on business, technology, policy, history, negotiation, law, regulation, and international trade that have appeared in scholarly and professional publications, including *Broadcasting*, *Business Week*, *Cable Communications Magazine*, *Communications Week*, *Electronic Media*, *Emmy*, *Forbes*, *The Hill*, *Journal of Communications*, *Multichannel News*, *The National Law Journal*, *Network World*, *Satellite Communications*, *Technology Review*, and *Telecommunications*; in law

reviews published at Berkeley, Boston University, Hastings, Michigan, and UCLA; and in *The Boston Globe*, *Chicago Tribune*, *The Christian Science Monitor*, *Des Moines Register*, *The Indianapolis Star*, *The Journal of Commerce*, *The New York Times*, *U.S. News & World Report*, and *The Washington Post*.

He is the editor of *The Telecommunications Deregulation Sourcebook*, a popular reference volume covering the broadcasting, cable television, and telephone industries; *Telephone Company and Cable Television Competition*, a pioneering anthology dealing with technical, economic, and regulatory aspects of broadband networks; and the author of *Broadcasters Can Negotiate Anything*, a best-selling management education book for radio and television executives. He also is the author of *Communications Law and Practice*, the leading comprehensive treatise covering domestic and international common carrier and electronic mass media regulation, now in its 37th edition.

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Stuart N. Brotman

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In 2014, the Institute created the Global Internet Freedom (GIF) Program to serve as a forceful advocate for global free speech online. The program is guided by the belief that the Internet should be an open and interoperable platform, largely free from government intrusion, where information can be shared freely. The GIF Advisory Council is chaired by former FCC commissioner Robert M. McDowell, and is comprised of distinguished advocates of a free and open global Internet. Among its members is Prof. Stuart N. Brotman, the author of this study.

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