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The Second Billion: The Internet Going Forward

By Ward Hanson

Introduction

The Internet recently passed a significant milestone – a billion users worldwide. The number of users represents phenomenal growth of a complicated high-technology service and provides a natural point for contemplating future growth and emerging Internet policy issues.

Despite this rapid growth, a pronounced global digital divide remains. There is a high correlation between Internet access penetration rate and economic development. This access disparity is closing. While applications and access quality continue to improve in all markets, there is a rapidly shrinking pool of potential Internet adopters in developed economies. Conversely, there is a huge pool of potential Internet users in the rest of the world. As these countries develop and stimulate adoption of the Net, the vast majority of new users are coming from these countries.

As the Internet spreads, it makes consumers better off and

helps businesses become more efficient. The lessons of the first billion users provide a useful starting point for gauging the benefits of the Internet for new users just now going online.

Two countries in particular, India and China, dominate the emerging second billion. Both are growing rapidly, along different paths, and using the Internet differently as well. A major impact on the Internet going forward is which of these emerging powerhouses exerts the most influence on Internet policy and governance. India, in particular, should be encouraged to expand its Internet policy involvement and activities.

Internet Access and Income

An income-based digital divide has been a policy concern since the earliest days of the Internet's commercialization. To the extent that the Internet is a complementary input to

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About The Author

Ward Hanson has spent the last ten years looking at the growth of the first billion Internet users and is excited about the second. He has published two texts on the business impact of the Internet, his most recent *Internet Marketing and Ecommerce* appearing in the Fall of 2006. Hanson received his Ph.D. in Economics from Stanford University, and has been on the faculty of the University of Chicago, Purdue University, and Stanford University Graduate School of Business prior to joining the Center for Research on Employment and Economic Growth at SIEPR, where he is also the Policy Forum Director.



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development, education, health care and other empowering uses, an income-based gap is problematic and magnifies differences between regions.

Figure 1 provides a snapshot of the unequal distribution of global Internet access.

The horizontal axis measures the size of a country as a percentage of the world's population. The vertical axis shows the percentage of a country online. Thus, the size of each rectangle corresponds to that country's fraction of the world's online population. On the far right of the graph are the high Internet penetration countries, such as the United States, the countries of Scandinavia and other high-income countries with high penetration rates. On the far left of the graph are countries with almost no Internet users. Several important realities shaping the Internet stand out in the figure.

- Using current technology, there exists an effective saturation level of approximately 80 percent of the population. New Zealand achieves the most in-depth market penetration, with about 78 percent of its population online. Seniors comprise the largest component of the difficult-to-convert population, with both a lack of exposure to computers or with physical and cognitive limitations.
- Many advanced economy countries are approaching this effective threshold of Internet penetration. The

area between the top of the bars corresponding to these countries and the line at 80 percent is relatively small.

- There is only a small band of transitional countries. Most countries have either very low penetration (less than 15 percent) or quite high penetration (more than 50 percent). While not quite a step function, only a small fraction of the world's population currently lives in a country with an intermediate level of Internet adoption.
- Despite their low penetration rates, China and India already contribute a sizable number of the world's online population (shown in the area of their rectangles). Only a few additional percent of Internet access will make China,

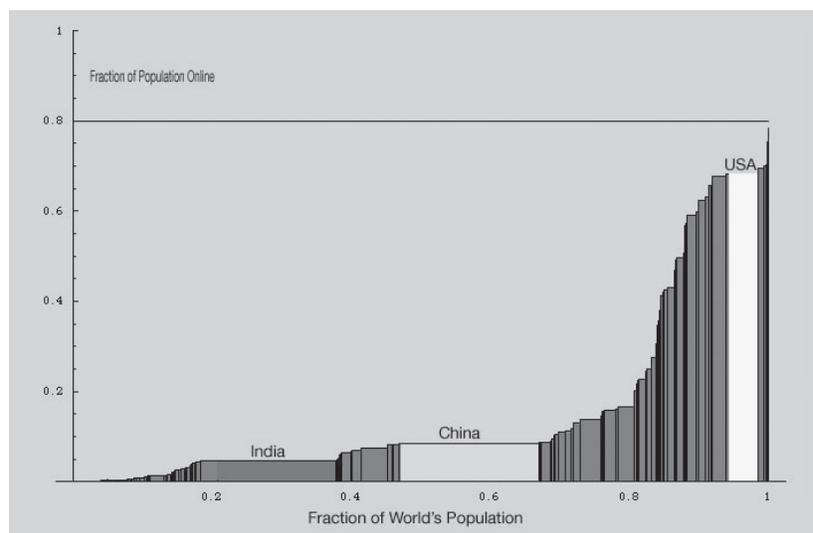
with its large population, surpass the United States as the country with the largest Internet population.

Figure 1 is reminiscent of a graph used to describe economic development more generally. In that setting, analysts sort countries by increasing per capita GDP and the vertical axis replaces Internet penetration with per capita GDP. The area of the rectangle then corresponds to national income. Rather than simply reproduce that figure, Figure 2 has a slight twist. It uses the same horizontal sequence of countries sorted by Internet penetration as in Figure 1, but the height of each bar is per capita GDP. If these variables – Internet usage and GDP – are closely aligned, then the graph should mimic Figure 1. If they are unrelated, the bars should

FIGURE 1

Internet Access by Country

(Sorted by increasing access penetration rates, with horizontal size indicting population)



rise and fall almost randomly.

While the correlation isn't perfect, the closeness of the pattern illustrates what more rigorous statistics demonstrate – a close connection between country per capita income and a country's Internet market penetration (in-depth consideration of other variables doesn't change this basic conclusion). The biggest discrepancies arise in small, resource-rich countries marked by a high degree of income inequality. For example, the very high spike at the left of Figure 2 is Equatorial Guinea, a country plagued by poverty despite its oil wealth.

While evidence is emerging of a feedback from the Internet to enhanced economic growth, the primary causal link runs from income to Net penetration. Rapid economic growth in China

and India is providing better infrastructure and inducing many more users from these economies to move online. This is especially true of China's coastal provinces and the major cities of India.

Figures 1 and 2 do not include the limited Internet access provided by mobile phones. Mobile phone adoption in many low-income countries runs far ahead of computer and Internet adoption, providing an intriguing but still limited alternative platform for Internet access. Part of this is technological. Current designs of cell phones do not provide a compelling and accessible Internet experience. Cellular networks also require substantial upgrades and investments to serve as an effective Internet access point. A more effective

strategy may be policies by governments and NGOs aimed at designing a low-cost yet rugged laptop capable of operating "off grid."

Lessons on Internet Usage

Discussions of the digital divide often stop at access and fail to appreciate that usage patterns *given* access follow a very different pattern. Once online, Internet usage actually provides equalizing consumption opportunities and can be consumed more heavily by lower-than higher-income individuals.

Consumer Uses

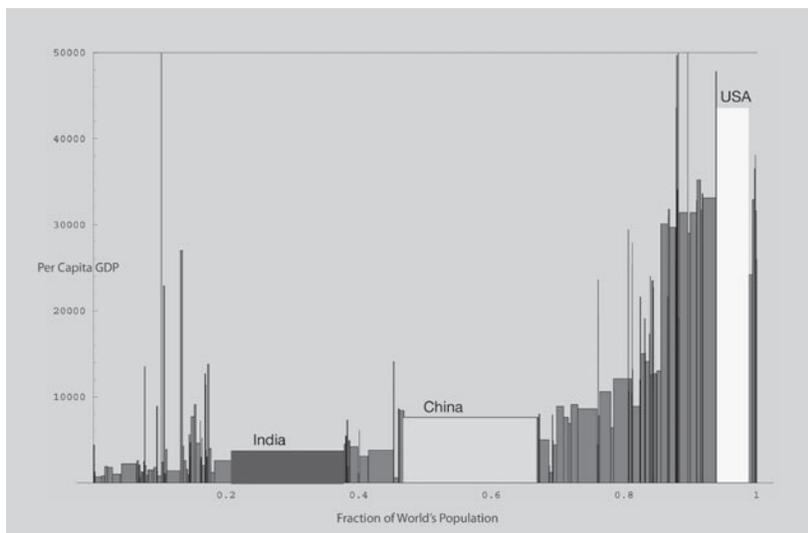
The foundation of the difference between access and usage is time. Following Gary Becker's pioneering studies, economists appreciate that the combined budget constraint of time and money limits consumer consumption. Thus, a movie at a theater requires money for a ticket (and popcorn of course), but also the time necessary to reach the theater and to watch the film. A movie watched at home on television or online saves the price of a ticket and concessions as well as the time traveling to and from the theater, but not the viewing time of the movie itself.

While money dominates many consumption activities, going online tilts heavily toward the time budget. In the United States, Goolsbee and Klenow (2006) find that online activities account for a much larger fraction (roughly 10 times) of discretionary time than discretionary income. If lower-income users have access, they

FIGURE 2

Per Capita GDP (PPP) by Country

(Sorted by increasing Internet access penetration rates, with horizontal size indicating population and vertical height per capita GDP)



face a lower opportunity cost of time and spend more time online.

The dual budget approach also helps explain why the Internet has diffused so rapidly and why a changing mix of Internet users is important. Historical studies demonstrate that *time-using* consumer durables (such as radio or television) diffuse much more rapidly than *time-saving* consumer durables (such as a vacuum cleaner or dishwasher). Despite their harried lives, consumers seem to find devices that raise the quality of their leisure time more motivating than those that add to their amount of leisure time.

The Internet has elements of both time using and time saving. Activities such as reading blogs, social networking

or viewing online content are primarily time using. In other settings, such as arranging travel or buying a book, the Internet is a time-saving input into shopping activities.

The most motivating uses of the Internet create demands to change the current system of Internet governance. Time-using activities have a substantial cultural component that links language and personal relationships to technology. This cultural connection puts strains on the current Internet governance practices, as local governments and businesses push for more local control.

Evolving Internet Governance

Internet governance rests on a complicated mixture of

national legal systems, business practices, cooperative standards committees such as the IETF, and technology capabilities. The two major sources of new Internet users, China and India, differ substantially in many of these factors. Ultimately, the complicated balance of negotiation and competition that governs the Internet cannot remain solely in the control of the pioneering Internet countries, but should reflect the Internet user base.

China, although it may change as a process of its development, has not shown political and governance reforms commensurate with its economic development. Despite India's lagging role in infrastructure and development, its practices and policies are much more compatible with the Internet's history and governing traditions.

Post-independence India maintains a strong tradition of freedom of speech and respect for civil liberties. Online activities by Chinese consumers are much less free. The Chinese consumer Internet is subject to substantial filtering (where content is blocked and inaccessible based on subject matter) and to user tracking (where activities of users are stored and monitored). Censorship of search engines leads to tensions, as do demands for records tracking the online activities of Chinese citizens. Conflicts between external Internet providers – such as Google and Yahoo – and the Chinese authorities are

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TABLE 1
Export Composition of China and India
Data Sources: World Bank, India Stat, China Statistical Yearbook

EXPORT COMPOSITION			
CHINA	2003	2004	2005
Primary	7%	6%	6%
Manufacturing	83%	84%	85%
Services	10%	10%	9%
INDIA	2003	2004	2005
Primary	15%	16%	17%
Manufacturing	53%	48%	45%
Services	32%	36%	38%



ongoing and difficult to resolve satisfactorily.

Business use of technology often leads and shapes its use in consumer markets. Businesses use the Internet to support their production and communication needs. Figure 1 shows an important underlying difference in these factors caused by the export trade of China and India. While manufacturing dominates Chinese exports (85 percent of the total in 2005), service exports account for a rising and much more important share for India (38 percent of the total in 2005).

The Internet in China is a backbone coordinating a global supply chain that relies on Chinese manufactured goods. A business-to-business communication infrastructure is vital to these supply chains' operations and is encouraged by Chinese authorities. It plays a crucial role in database capabilities, logistics monitoring and order tracking. The essential skills for many of these activities are database retrieval and data synchronization.

The Internet in India also plays a vital business-to-business role in the global economy, but one that emphasizes services more than manufacturing. Software development, call centers and even medical consulting services rely on advanced Internet telecommunications. The audio and video capabilities of a global services market are exactly those that support the most popular time-using consumer activities. India's tradition of freedom of

the press, lack of censorship, and respect for the diversity of languages and cultures reinforces these communications activities.

While China will provide the most new users over the next few years, the "Chinese system" of Internet use and regulation does not match global norms for individual usage of the Net as well as the "Indian system." While the first-best solution is a cessation of censorship and controls by restrictive governments worldwide, a pragmatic second-best solution is a preferential expansion of existing Internet regulatory bodies toward countries already embodying these practices.

Internet governance structures developed when the United States accounted for the majority of users. They do not fit as well when many users come from outside of these regions. Current Internet policy bodies should proactively reach out and reflect the emerging reality of the second billion.

The Internet is an underlying tool of globalization and productivity improvement. It is also increasingly the hub of local and global communication and culture. The truly "World Wide Web" nature of online activities will be promoted and encouraged by a governance structure that reflects its user base while maintaining the best features of the Internet developed during its earlier history.

Notes and Other Resources

Aspects of this policy brief appeared in a talk presented at the SIEPR and SCID co-sponsored conference *Kerala and the Global Economy*, April 3, 2007, Thiruvananthapuram, India, which will appear in a book of the same title, as well as a talk presented at the SCID co-sponsored conference *Issues for the Five-Year Plan: Reforming Chinese Policy*, April 2006, Beijing, China.

For Internet access and other country information, see *CIA World Factbook*, available at <https://www.cia.gov/cia/publications/factbook/>, data as of February 2007.

Gary Becker, (1965), "A Theory of the Allocation of Time," *Economic Journal*, Vol. 75, No. 299, pp. 493-508.

Sue Bowden and Avner Offer, (1994), "Household Appliances and the Use of Time: The United States and Britain since the 1920s," *Economic History Review*, Vol. XLVII, No. 4.

Austan Goolsbee and Peter Klenow, (2006), "Valuing Consumer Products by the Time Spent Using Them: An Application to the Internet," *SIEPR Discussion Paper No. 05-10*, January.

Ward Hanson and Kirithi Kalyanam, (2006), *Internet Marketing and Ecommerce*, Thomson, Mason.

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