

I. Prospects for Internet Availability and Usage in Developing Nations

The thrust of this paper is to assess the long-term economic and political impacts of widespread Internet use on specified, high-interest countries and regions. To lay a proper foundation, however, certain assumptions must be made and generalizations offered that will set the terms for the geographically specific projections. These factors fall into several categories, discussed at length in the sections that follow—

- Key assumptions and systemic factors relating to Internet availability and usage
- Modes of Internet usage foreseen
- Elements of trust, credit, and law that must be in place before electronic commerce (e-commerce) can develop
- Prospects for the availability of secure Internet communications
- The Internet as a tool for preserving the status quo.

A. Assumptions on Internet Availability

A number of assumptions underlie the prospective analysis that comprises the main body of this paper—

- This paper takes as a given the prospect for widespread popular access to the Internet in the countries of Africa, Asia, Eastern Europe, and Latin America that are under study. We do not predict the rate of this Internet penetration, such as what percentage of the population in a particular country will have Internet access by what date. Instead, our concern is the nature of the local-level economic and political effects that can be expected, at whatever time this Internet penetration does in fact occur.
- By “widespread” Internet access, we mean the point at which about half of a population has such access. This certainly does not mean that 50 percent of the population must each have their own, Internet-served, personal computer (PC). Computers — or other Internet user devices that are not PCs — can serve more than a single person. One device may be shared by members of a household, or by several households. A device may be available to many individuals when placed in a library, school, political office, farm cooperative, “cyber-café,” or other common facility.
- As important as “widespread” Internet availability will be, many significant effects of Internet access will come well *before* such a large proportion of a country’s population will be able to go online. At both the national and the local level, significant changes will probably begin to take place when only the first 5 or 10 percent of the population gains Internet access. This is largely because these Internet pioneers will naturally be among the leaders in a country’s economy, government, academy, or other major institutions.
- An important but unquantifiable factor in the growth of Internet availability is the trend toward “infinite” Internet capacity at “zero” cost. User devices and network services that are beyond the financial reach of most people in developing countries now will probably come within their reach as time passes. Simple linear extrapolations of Internet availability based on recent trends will probably be too pessimistic. The stultifying effect of high telecommunications costs will probably be the primary obstacle to rapid Internet growth in developing countries.
- The development of Internet connectivity alone will not be sufficient for the *full* ramifications of Internet access to be felt in the economic and political spheres. Certain infrastructure services must be available for the Internet to have its

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fullest effect, principally, reliable and economical electric power and telecommunications. For e-commerce to thrive to its fullest extent, there needs to be a functioning online payment system and a business environment characterized by trust and law.

- In the absence of fully satisfactory infrastructure services, payment systems, and legal frameworks, widespread Internet access can still have significant economic and political impact, even if its full potential remains unrealized. The greatly increased communication facilitated by the Internet will still promote economic growth and political activity to a marked extent, even if the environment in which it is operating is less than optimum.
- The prerequisite for literacy, especially in English, will become less important over time. Literacy is now virtually essential for Internet use today, and it will continue to be an important factor in the ability of a population to make full use of the Internet. Technology will reduce its criticality to some degree, however. Voice recognition and audio signal processing will continue to develop, and will probably make it possible for illiterate users to communicate effectively over the Internet. The further development of graphical interface technology will have a similar effect. Finally, the quality of automated language translation will continue to improve, reducing many language barriers.

B. Modes of Internet Usage

There are several ways in which the Internet can be used as a communications medium, and these modes will find a variety of applications and adaptations in developing countries. In view of the rapid advance of Internet technology, it is *likely* that these modes of usage will evolve significantly over the next two decades, new modes will probably be introduced, and perhaps some present usage modes will become obsolete.

Subject to that caveat, the following modes of Internet usage are now available in the developed world and are postulated to be the primary modes of usage that will be used in developing countries over the coming two decades. The key, basic attributes of each mode are noted briefly, as they would apply in developing countries.

- **Electronic mail (email)**

This is the basic mode of Internet communication, in which a single person, business, or other organizational entity composes and transmits a text message to another person or entity. A message can be sent simultaneously to multiple addressees. The sender can transmit at any time, and typically within a matter of minutes, the message will be waiting for the recipient(s) to receive and open it. In many systems, more complex data files can be attached to email messages and transmitted to the recipient. Basic literacy is required. Email may be encrypted for privacy. Several global email services are provided free to users, including Hotmail, Yahoo, Juno, and in many countries, AOL.

- **News groups and bulletin boards**

In this mode, an Internet site is established on which users post information, statements, or questions. Other users access the site; can read, copy, or print selected materials; and may post responses to questions or statements that have been posted by others. News groups are typically established to serve a universe defined by some affinity or common interest. Access can be worldwide, but many serve strictly local concerns. The news group server need not be geographically near its users; it can be located anywhere on the Internet. In many news groups, data files may be posted for downloading by others. Basic literacy is required. Users need not identify themselves. Encryption of news groups is theoretically possible, but all users would have to be privy to the key; encryption is rarely used. Typically, there is no cost to set up a news group once basic Internet service has been procured.

▪ **Chat rooms**

A chat room is a more dynamic form of news group. Many users can access the site simultaneously, interactively asking and answering questions, making and responding to statements. All users logged on to the site see all such interactions. As with news groups, chat rooms are organized to serve an affinity group, although anyone who knows the address can gain access unless blocked by the group's administrator. Users need not identify themselves. Literacy is required. Access can be established worldwide, but many chat rooms serve local concerns. Servers need not be local, but rather may be anywhere on the Internet. As with news groups, encryption is theoretically possible, but rarely if ever used. Typically, there is no cost to set up a chat room once basic Internet service is procured.

▪ **Web sites**

In their simplest form, web sites are static but readily updatable displays of text and graphics. New postings are under the control of the site's webmaster. Many users can access the site simultaneously, but in the simple case, users are passive readers rather than interactive discussants. Users do not identify themselves. Access can be established worldwide, but sites may serve only local concerns. Servers need not be local, but rather may be anywhere on the Internet. Web technology is developing rapidly, with vast advances over the simple form described above now the norm in the developed countries. State-of-the-art web sites typically feature complex graphics, video, continuous data updates, database access, commercial transaction support, and email communication with the site sponsor, with new features appearing daily. The resources and expertise required to manage a site that uses advanced technology are considerable, but such sites may be reached by anyone with Internet access. Web sites that wish to restrict access typically do so by requiring passwords for entry.

▪ **Other communications modes**

Additional modes of communication via the Internet are available at least in rudimentary form or are being developed, some of which no doubt will find ready application in developing countries. These presently include—

- Telephone-like voice communication, at low or no cost worldwide, either point-to-point or in conference mode
- Transmission of video camera images, either still, sequenced, or streamed to show continuous motion

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- The combination of the above technologies in video telephony or teleconferencing
- Audio streaming, permitting the one-way transmission of broadcast or recorded voice communications to an unlimited number of listeners
- Messaging and paging

C. Trust, Credit, and Law

As important as commercial trust, credit instruments, and contract or consumer law may be to e-commerce in the developed world, we must avoid mirror-imaging these standards and expectations when postulating the growth of e-commerce in developing countries.

Most of any commercial process involves the acquisition or exchange of information. The actual exchange of money for delivery of goods is only the final step in this informational process. Internet connectivity devoid of any provision for supporting financial transactions can still facilitate commercial activity: vendors can advertise goods for sale, shoppers can find information on price and availability of goods, terms can be negotiated, and arrangements for payment and delivery can be made. Consider the similarity to the telephone: only a fraction of the telephone traffic between businesses or between a business and the public involves actual transactions. Most traffic involves the exchange of information.

Thus, there need not be any provision for trust, credit, or law at all for widespread Internet availability still to have a profound beneficial effect on economic activity at the local level in developing countries.

As undeveloped as credit instruments and contract law may be in the countries and regions under study, nevertheless the Internet itself may be a vehicle for the introduction of certain advances in these areas.

A potentially significant development in this field is the advent of digital money. Today, the technology, associated banking infrastructure, and legalities are still embryonic, even in the developed countries. It is premature to project the ready availability of digital money in the developing world within the time horizon of this paper, but this is not to preclude unforeseen technological advances that bring it about sooner than expected. Even when (if) the use of digital money becomes relatively common, its use at the person-to-person or small business level would no doubt remain futuristic.

D. Prospects for Secure Communications

Another systemic factor that will play a role in Internet usage in the developing world is the increasing availability of technology—typically encryption—that can make communications unreadable by outside parties. Even today, strong encryption programs (PGP, for example¹) are universally available free or at low cost.

In commercial terms, the assurance of communications privacy will facilitate the use of Internet communications for business negotiations and other sensitive matters, but perhaps more important at the local level, it will keep government and entrenched interests from monitoring informal or underground economic activity.

In political terms, private communications among opposition, dissident, or rebellious political elements will complicate the monitoring task of governments, political police, and dominant political parties.

Encryption aside, the growing volume of Internet traffic in developing countries will have much the same effect on economic and political situations. Local authorities, much less entrenched local business interests, will have little ability to intercept and monitor even unencrypted Internet traffic, trying to identify those few messages that contain pertinent information. Except in extraordinary circumstances, capabilities for sophisticated cryptanalysis or even traffic analysis that might exist in national governments will not be applied to monitoring diffuse economic and political activity in the thousands of localities in each country.

¹ Free download is available through www.pgp.com

E. The Internet as a Tool for Preserving the Status Quo

As suggested in the foregoing sections, the Internet has vast potential for enabling people in the developing world to engage in freer local economic and political activity, with far-reaching implications at the macroeconomic and national political levels. This is by no means a one-way street, however. Entrenched economic and political interests will be able to use the Internet as a tool for maintaining their dominant positions, especially because they typically command greater resources and coercive authority.

The ways in which this phenomenon may be observed include the following—

- Disruption of communications through attacks on servers or virus introductions into sites considered to be undesirable
- Surreptitious interception and reading of communications; noting originators and recipients of encrypted communications
- Introduction of disinformation into newsgroups and chat rooms, including the appropriation of user identities to induce confusion or discord
- Blockage of access to sites considered to be undesirable
- Probably the most powerful, the potential to flood Internet news and information channels with material that reflects a government's position on issues.

In addition to these means of defending entrenched interests, local economic or political entities in many developing countries would face few restraints on the use of coercive measures, such as—

- Damaging or confiscating computers
- Forcing the shutdown of web sites
- Intimidating individuals known or suspected to be using the Internet in ways that threaten established economic or political interests.