CHAPTER 1

INTRODUCTION

In 1969, the experimental ARPANET being developed by the U.S. Department of Defense consisted of four host computers all located in the United States. England and Norway were added in the early 1970s. In 1980, 213 host computers in approximately a half dozen NATO countries were connected. By 1989, less than a half dozen years after the ARPANET migrated out of the Department of Defense and essentially became the Internet, connectivity jumped to roughly 20 countries and 100,000 host computers.

During the 1990s, annual worldwide growth of both hosts and users has often been in the neighborhood of 100 percent, and much higher in some countries. The millionth host was connected in 1992. Today there are about 200 countries with full TCP/IP connectivity, and a few others with lesser forms.

This has arguably been one of the most rapid and extensive diffusions of advanced technology in history. Given its present and potential technological features and uses, it was inevitable that the Internet itself, or as a surrogate for similar wide area networks, has become the object and locus of a great deal of attention, speculation, and conflict. Furthermore, the forms and extent of the absorption of the Internet are viewed by some as a barometer for a nation's level of freedom and democracy, its commercial energy, its desire to become part of the increasingly interconnected new world order and its empowerment therein, and its vulnerabilities.

The Internet has become fertile ground for commentators and visionaries with fertile imaginations. It will do much to bring about world peace and harmony; or it will greatly expand global commerce; or it will be the locus of forms of information warfare from which nobody who is anybody can be safe; or it will bring about the end of the sovereign state. All this, and much more, is said to be here or on the way via the Internet.

But so far little of this has happened. And the Internet is still far less widespread than the telephone or television or radio. It is in fact less widespread, in spite of some awesome growth rates, than many people assume or believe. And its spread and use has been very non-uniform. Today, it may just barely be the case that more of the Internet is finally outside of the U.S. than inside. And much of what there is in many countries is concentrated in one or at most a very small number of major cities, although this is starting to change.

The goals of the Global Diffusion of the Internet Project are: (1) to provide a modest, useful, detailed framework for describing the diffusion and absorption of the Internet to, and within, many diverse countries that goes well beyond simply counting hosts; and (2) to provide some explanation of how the present capacity came about and how it is evolving. The unit of analysis is the nation-state, and particular attention is being given to policy issues and government roles that arise with regard to the spread and control of the Internet around the world. So far, the Internet is hardly making the nation state obsolete, but is in fact the source of many additional agenda items for governments to consider.

The Project is proceeding by developing a framework for analysis in parallel with an inductive study of a fair number of countries and regions. The two efforts are intended to be

complementary: the analytic framework is used for each new country or regional study, and each new country or regional study is used to further test and refine the framework.

The first major report of the Project, entitled *An Initial Inductive Study*, was completed in March of 1998.[1] An initial framework was presented, based on one that was developed for national studies over a wider set of information technology topics.[2] A set of variables was defined that provided an overall six-dimensional description of the status of the Internet in a country, and that could also conveniently represent how this status changed over time. Each of the variables is intended to describe an important, somewhat intuitive, and measurable feature of the presence of the Internet in a country. The six variables chosen were: per capita pervasiveness, geographic dispersion, sectoral absorption, connectivity infrastructure, organizational infrastructure, and sophistication of use. A more loosely defined set of determinants was also put forward with the intent of using these to explain how the national Internet status came to be, and how and why it is changing.

The remaining chapters of the *Initial Inductive Study* formed a first effort to assess the diffusion and absorption of the Internet in a wide variety of countries around the world. Particular attention was given to issues and policy decisions that proved important along the way for bringing each country to its present status. The country choices were meant to be varied enough to broadly test the applicability and usefulness of the analytic framework, and to illustrate a wide range of issues of concern to the governments of these nations. The countries covered were: Bosnia, Cuba, Finland, China, and a regional group of the nine countries of the Persian Gulf and the Arabian Peninsula (Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates, and Yemen). They collectively represented a wide spectrum of geography, demography, cultures, political systems, and economies. There are also some similarities so that we could make comparisons, e.g., between communist countries or geographical neighbors. We weighted our choices with emphasis on countries whose governments would be more likely than most to have serious problems with the spread of the Internet. Finland, perhaps the most wired country in the world, was included to exercise the framework at the far end of an extremely hospitable country for the Internet.

The current report takes up the Internet in the world's two most populous countries, India and China. We start with a short chapter that reviews the analytic framework, now slightly modified as a result of what we learned doing the national studies in both reports. We continue with a long initial study of the Internet in India. The Net is not as far along in India as many people might expect, especially given the high profile of that country's software export industry. However, there are strong indications that the Internet in India may be in for significantly better times ahead. In the chapter that follows India, China is studied for a second time, partly because any initial study of such a large and complex country would be incomplete, and partly because of some important changes and advances that have taken place there over the last year. The China study in this report has been written so that it is not necessary to read the earlier one as a prerequisite,

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[1] Seymour E. Goodman, Grey E. Burkhart, William A. Foster, Laurence I. Press, Zixiang (Alex) Tan, Jonathan Woodard, *The Global Diffusion of the Internet Project: An Initial Inductive Study* (Fairfax, VA: The MOSAIC Group, March 1998).

[2] Peter Wolcott, Seymour Goodman, Grey Burkhart, *The Information Technology Capability of Nations: A Framework for Analysis*, MOSAIC Group Report (January 1997).

although there is little explicit overlap between the two, and the first is recommended for its content to readers with a particular interest in the People's Republic.

The final chapter contains an explicit comparison of Internet development between the world's largest democracy and the world's largest communist country. In both countries, as in many others, Internet connectivity started as modest academic and research-related endeavors, during 1989 in India and 1993 in China. In spite of the earlier Indian start, at the present time China has more than twice the number of hosts, over three times the number of users, and has overtaken India in almost every other dimension as well. However, if some major new Indian initiatives are effectively implemented, the growing gap between the two countries may start to close.

Not surprisingly, governments in all of the countries considered in both studies take notice of the Internet in greater or lesser ways depending on their capabilities and the interests of different constituents both inside and outside of government. In most countries, there is no single governmental or societal view of the Internet and what to do about it. It is perceived to be everything from a source of revenue to a threat to the regime, or as demanding a necessary role for government to defend against Internet-enabled assaults undermining national or cultural values. In almost every case—Iraq being the exception—all of the governments in the countries studied so far have come to grips with mixed views and constituencies, and have accepted, and often ended up promoting, the presence of the Internet, although in most instances with considerable caution and control.

It should not be surprising that the United States has a prominent place in the hearts and minds and pocketbooks of all of the countries considered in both studies. The United States is often the primary outside source of technology or services, the ultimate place to make money, the source of all kinds of hopes and undesirable ideas, and a threat in more ways than any other country. In short, the United States provides many of the best and worst examples, depending on where one sits elsewhere in the world.

Global Diffusion Bibliography

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