

D I S S E R T A T I O N

RAND

*Communication and
Democracy*

*Coincident Revolutions and the
Emergent Dictator's Dilemma*

Christopher R. Kedzie

RAND Graduate School

The RAND Graduate School dissertation series reproduces dissertations that have been approved by the student's dissertation committee.

RAND is a nonprofit institution that helps improve public policy through research and analysis. RAND's publications do not necessarily reflect the opinions or policies of its research sponsors.

© Copyright 1997 RAND

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 1997 by RAND
1700 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1333 H St., N.W., Washington, D.C. 20005-4707
RAND URL: <http://www.rand.org/>

To order RAND documents or to obtain additional information, contact Distribution Services: Telephone: (310) 451-7002; Fax: (310) 451-6915; Internet: order@rand.org

To my father, **Dr. Robert W. Kedzie**,
for his love and his love of learning.

PREFACE

This research explores fundamental relationships at the nexus of the information revolution and international affairs. Networked communications and political democracy are the central foci of theoretical and empirical analyses. A strong correlation between these two concepts would appear to offer new policy options for promoting democracy worldwide.

Initial research was supported by a grant from the Markle Foundation. Project AIR FORCE, the National Defense Research Institute, RAND's Center for Information Revolution and Analysis and RAND's Department for Defense Technology and Policy each contributed additional funding toward the completion of this work.

This document has been accepted by the RAND Graduate School in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Public Policy Analysis.

A brief mention of pronouns is also in order. When the person to whom a third person singular pronoun refers is hypothetical, collective or of an unspecified gender, this dissertation uses a gender-neutral pronoun, "E." This new pronoun is particularly useful in the case of "the Dictator" who has often been male, but E has not been exclusively male in the past nor will E necessarily be male in the future. A more thorough discussion explaining the rationale and declination of this pronoun can be found in Kedzie (1995b).

CONTENTS

Preface.....	iii
Figures.....	vii
Tables.....	ix
Abstract.....	xi
Acknowledgments.....	xiii
1. Introduction	
Coincident Revolutions.....	1
2. The Case of the Soviet Union	
The Dictator's Dilemma.....	6
The Role of Information	6
Iron Fist or Invisible Hand	11
Counter-Examples	18
3. Qualitative Comparisons	
A Brave New World or New World Order?.....	21
Bad, Good or Indifferent	21
Comparing Communication Technologies	24
Mode	25
Content	29
Boundaries	32
Costs	34
Speed	36
4. Quantitative Analyses	
The Empty Corner.....	38
Methodology	38
Causality Caveats and Clarifications	39
Logic of the Test Sequence	40
Data	41
Democracy	41
Interconnectivity	44
Economic Development and Education	47
Human Development and Health	47
Ethnicity and Culture	47
Population	49
Test Results	49
Univariate Analysis	49
Multivariate Regression Analysis	52
Regional Analysis	55
Longitudinal Time Analysis	57
Multiple Endogeneity Analysis	71
Comparative Media Analysis	74

5. Implications for Policy	
Communicating Democracy.....	80
What is Known	80
What is Unknowable	82
What to Do	84
Appendix	
A. Data	93
Bibliography.....	97

FIGURES

2.1.	Communication Participants.....	14
3.1.	Schematic Modes of Communication.....	27
4.1.	Democracy Rating.....	50
4.2.	Interconnectivity Scores.....	50
4.3.	Democracy and Interconnectivity.....	51
4.4.	Regional Regressions and Scatterplots.....	56
4.5.	Interconnectivity and Democratic Change in "Not Free" Countries	60
4.6.	Interconnectivity and Democratic Change in the Former USSR.....	63
4.7.	Interconnectivity and Democratic Change in Former Yugoslavia...	64
4.8.	Interconnectivity and Democratic Change in "Not Free" Latin America	65
4.9.	Interconnectivity and Democratic Change in "Not Free" Eastern Europe	66
4.10.	Interconnectivity and Democratic Change in "Partially Free" Countries	68
4.11.	Interconnectivity and Democratic Change in "Free" Countries...	69
4.12.	Interconnectivity and Democratic Change Worldwide.....	70

TABLES

3.1. Comparison of Communications Media.....	25
4.1. Matrix Showing First Order Correlations.....	52
4.2. Regression Models.....	53
4.3. Media Comparison Regression Results.....	76

ABSTRACT

Protecting and expanding democracy around the globe is a perennial national security interest for the United States. A standard vehicle for democratization has been economic development. The two are linked in a scholarly tradition and conventional wisdom, the dominant strain of which has held that development leads to democracy. The demise of the Soviet antagonist and rise of nascent democratic institutions across Eurasia, however, have challenged fundamental assumptions relating economic development with democracy. A third factor which stimulates both democratization and economic growth, namely access to information, could be consistent with the historically strong statistical correlation between democracy and development and might also help explain some of the recent unprecedented political changes. Politicians and pundits have postulated this relationship, yet to date, the evidence has been solely anecdotal. This study addresses the relationship between democracy and the new communication media by applying theory and data analysis to the task.

The circumstances surrounding the demise of totalitarian social control in the former Soviet Union are examined through a new theoretical framework. These historic events elucidate a conflicting set of options confronting autocratic governments: economic development or authoritarian order. Because new communication technologies enable modes of communication that were never before feasible, it may now be virtually impossible for any country to maintain an open economy for expansion while remaining closed to democratic ideas. Comparative analyses distinguish communications media along several key dimensions to illuminate the relative effects of technological advancements in promoting democracy. The recent innovations in new communication media markedly stand out from previous technologies in fundamental ways that tend to bias political outcomes in favor of greater societal openness and freedoms.

Quantitative analyses empirically probe the hypothesized relationship between democracy and electronic communication networks

from several statistical perspectives. The conclusion from these tests, repeated without exception throughout the analyses, is that one cannot reject a hypothesis that democracy and networked communication are positively correlated. Likewise, if leading democracies such as the United States seek to influence democratic development effectively and efficiently, they cannot disregard a critical role for the new communications technologies.

ACKNOWLEDGMENTS

Useful ideas, presumably like victories, will find a hundred fathers.¹ It is my hope that many people, more than the few I can extol with my gratitude below, will feel some paternity to the ideas developed in this dissertation. While I, alone, am the responsible single parent for any remaining inadequacies of the analysis and discussion, I would like to offer heartfelt thanks to the whole RAND village that helped raise this child.

Considerable acknowledgment and appreciation is devoted specifically to the godfathers of this work, my distinguished and helpful dissertation committee. Charles Wolf, Jr. Dean of the RAND Graduate School and committee chairman, was inspirational in his enthusiasm and enlightening in his insightfulness. Steve Bankes, Senior Computer Scientist who has been cogitating on these issues for a long time, shared valuable eureka's regarding both content and presentation. Dan Relles, Senior Statistician with a wealth of experience analyzing large and complex data sets, provided critical guidance to ensure that the statistics were accurate and honest. Several people arranged indispensable financial support that allowed me to concentrate on this research. My initial thanks are to Bob Anderson who was the initial moral and financial investor in this project. For supplemental support, I am similarly indebted to Chris Bowie, Dean Wilkening and John Tedstrom. Tremendous thanks is also extended to Bryan Gabbard who organized a funding consortium with essential backing from Kevin O'Connell and Paul Davis. The institutional sponsors included the Markle Foundation, Project AIR FORCE, the National Defense Research Institute, RAND's Center for Information Revolution and Analysis and RAND's Department for Defense Technology and Policy.

Additionally, numerous RAND colleagues offered much appreciated comments and critiques on various aspects of this dissertation

¹ The well known aphorism, "As always, victory finds a hundred fathers but defeat is an orphan," is attributed to the diary of Count Galeazzo Ciano.

throughout all of the stages toward its completion. Specifically, I would like to express gratitude to David Ronfeldt, Norm Shapiro, Carl Builder, Tora Bikson, Steve Garber, Lionel Galway, Sandra Berry and again to Bob Anderson. I must also thank Dan Jones individually, for he sat through almost every seminar and briefing associated with this dissertation twice (both the final dry run and the real thing), in addition to reading and reacting to almost every paper that this project produced. Regular policy sessions with him and John Anderson proved to be particularly fruitful. Laurie Rennie continues to be very helpful in myriad ways and I continue to be very thankful to her. Beyond RAND's corridors designed to maximize the probability of a chance encounter, I am exceptionally grateful to Bob O'Neill opening up to me the hallowed spires and great intellectual resources of Oxford for the final rewrite; to Larry Press for the "dictator's dilemma" appellation among other concrete and conceptual contributions; to Harry Rowen for his thoughtful feedback, and to Frank Fukuyama's telecom discussion group with whom I was able to use these new communication capabilities to test out and refine propositions relative to their use.

Above all, the most important father to this study is my own father who was here for the beginning but couldn't be here to see it completed. This work is dedicated to him, to whom I am eternally grateful. Especially through the hard times, I thank my mother and sister, Jeannine, for providing and for needing comfort.

Sasha wasn't around when this study began, but she made me a father in the process. I'm glad that she is here now and there is nothing in my life, related to this dissertation or not, for which I am more grateful. I would like to be able to thank my family also for having made this effort easier, but to do so would not be honest. Truthfully, they made it harder. Many of the long work hours would have been much more joyfully spent with my ebullient daughter and my loving wife, Irishka. Nevertheless, they were and are my primary source of motivation, to strive to make at least a small contribution toward democracy and peace in this, their world.

1. INTRODUCTION

Coincident Revolutions

Protecting and expanding democracy around the globe is a perennial national security interest for the United States. For five decades, strategic defense of democracy world-wide was discharged largely under the policy of "containment," preventing the spread of communism. Political cataclysms at the end of the last decade disturbed the foundation for these policies while creating new opportunities. Redressing doctrine for the new era, President Clinton substituted "engagement and enlargement" for "containment." He underscored the national imperative for supporting democracy with the realization that, "All of America's strategic interests--from promoting prosperity at home to checking global threats abroad before they threaten our territory--are served by enlarging the community of democratic and free market nations" (Clinton, 1994c: 31). The record of Clinton's administration in this regard, however, is rather mixed. Significantly, as Thomas Carothers has noted, "the actual levers available to the United States to foster democracy abroad are really quite few" (Carothers, 1995: 21). The objective of this study is to explore whether and how information revolution technologies can increase the number and enhance the efficacy of policy levers--beyond the current selection of military interventions, economic policies and diplomatic reprimands--to secure and extend recent gains in democracy around the world.

Until now, development and democracy (and ultimately peace) have been linked through a scholarly tradition and conventional wisdom. The dominant strain has held that development leads to democracy (and, in turn, democracy leads to peace). The study of factors that influence democracy extends as far back as ancient Greece. Aristotle is often credited as the first to postulate an important link between participatory government and economic well-being. In modern times, Seymour Martin Lipset wrote the seminal work, in 1959, positing "social requisites" to democracy. He used statistical analyses to show a significant correlation between democracy and economic development and

he claimed that the latter was "related causally" to the former (1959: 83). Conclusively determining causality is not possible and many scholars and practitioners have argued alternative and potentially contradictory hypotheses such as: democracy precedes development (Olson, 1993), or economic development facilitates the pursuit of social values other than democracy, like security or health.

The demise of the Soviet antagonist, however, and rise of nascent democratic institutions across Eurasia have challenged fundamental assumptions relating economic development with democracy. An alternative model is necessary to describe the interplay between democracy and international economic development. A third factor which stimulates both democratization and economic growth, namely access to information, could be consistent with the historically strong statistical correlation between democracy and development and might also help explain some of the recent unprecedented political changes.

Coincident revolutions at the end of the 1980s--breakouts of democracy around the globe and breakthroughs in the communication and information technologies--inspire the notion that democracy and information flows might be positively correlated. Politicians and pundits have postulated this relationship, yet to date, the evidence has been solely anecdotal. This study addresses the relationship between democracy and the new communication media by applying theory and data analysis to the task. Its objective is to better appreciate the connections and interactions and thereby present an argument advocating greater attention to the potential of communication technologies in policies designed to promote democracy. As with earlier analytic efforts, causal certainty from nonrandomized observational data are not possible. Presumptions about causality can be acquired from data analysis and subsequent programmatic validation and testing can strengthen these presumptions. Thus, the author hopes that the results of this research will motivate programmatic efforts that enlist new telecommunication capabilities in the cause to promote democracy globally.

This study begins with theoretical analyses in Section 2 that examine key circumstances surrounding the demise of totalitarian social

control in the former Soviet Union. Exploring the role of revolutionary telecommunications in political transformation behind the iron curtain is a particularly appropriate starting point of this research for two salient reasons. First, the Soviet empire was thought to be the nearest earthly incarnation of the Orwellian nightmare that postulated an inimical relationship between democracy and communication technologies. Second, the ascent of democratic aspirations in the Newly Independent States leveled serious challenges to mainstream development-before-democracy theories. In addition, the divergence of the fifteen different political routes taken up from a common starting point at the dissolution of the USSR offers something of an approximation of a controlled experiment for later empirical analysis. These historic events elucidate a conflicting set of options confronting autocratic governments: economic development or authoritarian order. It may now be virtually impossible for any country to grow its economy while remaining closed to democratic ideas.

For new telecommunication technologies to create this dilemma for dictators, these technologies must differ from the preceding technologies that were often thought to be tools by which totalitarian rulers maintained an iron grip on society. Comparative analyses in Section 3 distinguish communications media along several key dimensions to illuminate the relative effects of technological advancements in promoting democracy. Recent innovations in communication markedly differ from previous technologies in fundamental ways that relatively favor sovereign individuals over sovereign governments. These comparisons facilitate appreciation not only of a specific medium but also of significant aspects of the various technologies that tend to bias political outcomes in favor of greater societal openness and freedoms.

The hypotheses that emerge from the qualitative investigations are testable analytically. Quantitative analyses in Section 4 empirically probe the relationship between democracy and electronic communication networks from several statistical perspectives. Regression models predict democracy as a function of its traditional correlates such as economic development, education, population, ethnicity, in addition to

the prevalence of several communication technologies. These data are examined using a variety of statistical techniques including univariate analyses, ordinary least squares multiple linear regression, two-stage least squares regressions (2SLS) with simultaneous equations, cross-sectional analyses for 1993 (the first year for which comprehensive data are available) and finally longitudinal analyses that include the time dimension.

The outcome of these tests, repeated without exception throughout the analyses, is that one cannot reject a hypothesis that democracy and networked communication are positively correlated. If leading democracies like the United States seek to influence democratic development effectively and efficiently, they ought not disregard the role of telecommunications. Policy implications of this result are addressed in Section 5 in addition to a number of policy options. Proactive democracies encounter a spectrum of reasonable policy responses. The minimum policy implication is that the effects of new information and communication technologies in achieving national security objectives should be better understood.

A search for appropriate trans-national communication policy instruments ought to be high on the list of future research agendas. Established free market democracies should be able to exploit the growth-versus-control dilemma that now confronts dictators and pivots on information and communication. Among the possible initiatives, democracies can:

- 1) Identify an institutional home to which they delegate the responsibility for international connectivity policies.
- 2) Support international networking by providing expertise, equipment or connectivity internationally.
- 3) Emphasize the global benefits of networking by increasing the perceived economic value of being on-line.
- 4) Lower and eliminate barriers that prevent foreign access to useful information.

- 5) Reconsider organizational incentives of potential recipients with regards to expanding or restricting communication when targeting foreign aid.
- 6) Elevate attention to information and communication programs when formulating policy in spheres with an international component, from national security to humanitarian assistance.

At the highest end of the spectrum, policies involving international communication should be accorded a priority competitive with, or exceeding, that accorded international economic development programs and even certain national security initiatives such as those for the engagement and enlargement of democracy world-wide.

2. THE CASE OF THE SOVIET UNION

The Dictator's Dilemma

Totalitarian societies face a dilemma: either they try to stifle these [information and communication] technologies and thereby fall further behind in the new industrial revolution, or else they permit these technologies and see their totalitarian control inevitably eroded. In fact, they do not have a choice, because they will never be able entirely to block the tide of technological advance.

George Shultz, 1985

Secretary of State George Shultz penned these prophetic words on international affairs while Konstantin Chernenko was briefly the Soviet leader. Not long after Shultz's article was published in *Foreign Affairs*, Mikhail Gorbachev assumed the mantle of leadership of the Communist Party and the Soviet Union and then became Shultz's most illustrious pupil. This section examines the role of information in the case of the Soviet Union's demise, much as Shultz predicted. A theory of communication emerges that describes the "Dictator's Dilemma." When testing the external validity with prominent and potentially contradictory examples, the theory proves robust.

THE ROLE OF INFORMATION

Proselytizing his *Foreign Affairs* thesis, the U.S. Secretary of State held a continuing "'information age' classroom in the Kremlin" in preparation for presidential summits. Shultz claimed in his memoirs that these tutoring sessions had a "profound impact" on Gorbachev. Recalling meetings in Moscow before the 1985 Geneva summit, Shultz wrote:

I then talked about the information age. . . . "Society is beginning to reorganize itself in profound ways. Closed and compartmented societies cannot take advantage of the information age. People must be free to express themselves, move around, emigrate and travel if they want to, challenge accepted ways without fear. Otherwise they can't take advantage of the opportunities available. The Soviet economy will have to be radically changed to adapt to the new era." Far from being offended, Gorbachev lighted up, "You should take over the planning office here in Moscow, become the new

head of Gosplan [the Soviet ministry charged with economic planning], because you have more ideas than they have." (591)

Gorbachev did seem to have learned the lessons well. Three years later, speaking before the General Assembly of the United Nations, he announced,

The newest techniques of communications, mass information and transport have made the world more visible and more tangible to everyone. International communication is easier now than ever before. Nowadays, it is virtually impossible for any society to be "closed." (1988)

Within another three years, as a result of Gorbachev's bid to save the Soviet economy by loosening the reins on information, his closed country disintegrated and with it the president's own job.²

The demise of the Soviet Union is a particularly telling story in the play between information technologies and political regimes for two fundamental reasons. First, the USSR nearly manifested a sinister synthesis of Orwellian and Huxleyan horrors. In Huxley's words, "The Soviet system combines elements of 1984 with elements that are prophetic of what went on among the higher castes in *Brave New World*" (1958: 5).

Second, leading democratic theorists were at a loss to explain the ascent of democratic aspirations and institutions after the collapse of the Soviet empire. Samuel Huntington of Harvard University had predicted in 1984 that "The substantial power of anti-democratic governments (particularly the Soviet Union) ... suggest[s] that, with few exceptions, the limits of democratic development in the world may well have been reached" (Huntington, 1984: 218). Furthermore, the realization that democratic aspirations were rising while Soviet economic performance was falling contradicted the widely held development-before-democracy theories that had underpinned U.S. foreign assistance policies since the Marshall Plan. Some early studies, not only of Europe, were also supportive of these policies. In the case of southern Asia, for example, Charles Wolf, Jr., analyzed India and found,

² Additional perspectives on the role of information in the demise of the Soviet Union are available in Skolnikoff (1993, pp. 93-102) and Shane (1994).

tentatively, that economic development reduced the vulnerability to political extremism, which would have been inimical to the evolution of democracy (1960). Thus, a prevailing justification for economic aid was that "democracy would be an organic outgrowth of development" (Muravchuk, 1991: 182).

The theoretical foundation for the belief subordinating democracy to wealth hailed back to ancient Greece and Aristotle. The statistical analysis of democracy's correlates began with Seymour Martin Lipset. He confirmed a significant correlation between democracy and development and argued that the latter was a necessary condition for the former (Lipset, 1959). Yet he and other proponents had to concede that

the emergence of multi-party electoral systems in Africa and the ex-Communist states of Eastern Europe and the Soviet Union in the late 1980's and early 1990's will sharply reduce the relationships [between economic development and democracy]... Many extremely poor countries are now much freer than before (Lipset, Seong and Torres, 1993: 170).

The cresting of democracy's "third wave"³ in the countries of Eurasia with mal-developed economies is inexplicable without an alternative theory.

The seed of democracy that grew to crack the foundation of the Soviet monolith blew in from a different wind. Politicians, analysts and journalists have all pointed to information currents for having turned political weathervanes. In doing so, these people helped validate the prognosis for "closed societies" that Gorbachev had proffered at the U.N. The General Secretary of the Communist Party was more right than he must have wished or imagined. World leaders corroborated Gorbachev's prediction from their own geopolitical perspectives. Israel's Foreign Minister, Shimon Peres, for example observed that

Communism fell without the participation of the Russian army, for or against; it fell without having a new political party against the Communists—if at all, it was done by the

³ The "third wave" designation is credited to Samuel Huntington in his book with the same title (1991b).

Communists; it fell without the intervention of the United States, Europe, China or anybody else.... Authoritarian governments became weak the minute they could no longer blind their people or control information (1994).

Further concurrence came from the policy analysis community. RAND analysts Carl Builder and Steve Bankes argued that

[T]he communist bloc failed, not primarily or even fundamentally because of its centrally controlled economic policies or its excessive military burdens, but because its closed societies were too long denied the fruits of the information revolution that was developing elsewhere over the last 40 years (1990: 15).

Journalists agreed too. The Moscow Bureau Chief for the *Baltimore Sun*, Scott Shane, provided substantial and specific evidence in his book *Dismantling Utopia: How Information Ended the Soviet Union*. Ultimately, Shane concluded that the August coup which catalyzed the ultimate dissolution of the USSR was

a revolution driven by information that the coup was designed to halt; information that had undermined ideology, exposed the bureaucracy, and shattered the Soviet family of nations. But it was also the liberating power of information that doomed the coup to failure--both the information that over five years had changed people's views of the world, and the information that now fueled the resistance with up to the minute reports. People were better informed than ever before about the past consequences of totalitarianism, helping them better understand now what was at stake (1994: 261).

Information revolution technologies armed those who would resist the coup and political oppression. Thus equipped, opposition forces became viable for the first time in the seven decades of the reign of the Soviet. S. Frederick Starr was among the first to observe that modern "horizontal" communication technologies, as opposed to the "top-down vertical" systems instituted by Lenin and Stalin, were already eroding Soviet control (1988). Electronic mail networks are quintessentially horizontal and Russia's first privately owned and operated network, Relcom, came online in early in 1989 (Press, 1992). Relcom (short for "reliable communication") was implemented specifically to support commercial activity otherwise stultified by the intentionally

constrained Soviet telecommunications infrastructure. Supported by its own user fees, this network has blossomed to hundreds of thousands of users. This entrepreneurial networking initiative was well within the letter and spirit of Gorbachev's *glasnost* campaign, allowing and encouraging information to be unbound for the purpose of revitalizing the Soviet economy. Although economic conditions necessitated its invention, Relcom proved to be a powerful social weapon against centralized power. During the attempted coup in 1991, for example, Relcom played an important role gathering and disseminating information. Recalling the tense moments, Relcom's president remarked how well the system had answered the call to serve the Russian citizenry:

When the putsch took place in August, over those three days we transmitted over the territory of the former Soviet Union about 46,000 pieces of news. We were in constant communication with Europe and America.... We were very much afraid at the time since all other channels were closed (Soldatov, 1994).

A foreign eyewitness effusively lauded electronic mail networks that "had proved worthy of the appellation, 'revolutionary tools.' During the crisis they had provided information around the world, but especially in the Soviet Union when all other forms of communication had been blocked." He gushed further, "I will not be surprised if the bronzed figure representing the proletariat will not be holding a rifle in his outstretched arm, but a printout, and a computer on his lap" (Valauskas, 1992: 47). Glasnet, another major Russian electronic network, was established specifically to support the emergent civil society. Justifiably, in light of these events, Glasnet's executive director expressed his view that "telecommunications can do more for Russian democracy than any other factor." (Voronov, 1994)

Detractors might argue, however, that the weight of the recent democratic reform in the Soviet Union was borne predominantly by conventional, not the new, media. Certainly, conventional media were consequential. Shane described, at length, the positive influence of television and the printed media. Differences between the conventional and the new communication technologies and their political effects are addressed in Section 3. It is, nevertheless, useful to recognize here

that the likely biases would tend to underestimate the impact due to electronic networks relative to traditional media for two reasons. First, state control over information must be airtight to be effective. It was Orwell's fear that "if all records told the same tale--then lies passed into history and became truth" (Huber, 1994). Of course, the whole balloon bursts from one small pin prick. The non-destroyed newspaper clipping that Orwell's protagonist, Winston Smith, discovered in *Nineteen Eighty-Four* could have been such a pin. Similarly, the Soviets were unable to seal their borders from electronic pricks. The international flow of e-mail messages strengthened the conventional media, which could no longer be deprived of outside sources for information. Thus, while ostensible democratizing effects might be apparent on TV screens and newsprint, the "but for" may be a less visible under-girding of robust and reliable electronic networks.⁴ Second, the democratizing influence of electronic networks can extend beyond the countries in which they are prevalent. The demonstration effect can be powerful in international affairs. The political transformation of the Soviet Union, at least partially fueled by the new information technologies, clearly influenced the rest of Eastern and Central Europe and arguably emboldened lesser connected countries in other regions of the world, such as Africa, to experiment with more democratic rule.

IRON FIST OR INVISIBLE HAND

But, to paraphrase Lenin, what was Gorbachev to have done? Is it possible for authoritarian governments to capitalize on economic growth while preserving social control?

If it were ever possible in the long run, prospects are diminishing for a potentate to hold on to both power and prosperity. Globalization

⁴ An institutional example of new media supporting conventional media as an operating principle is that of Internews, a non-governmental organization active in the former Soviet Union, that exploits email to strengthen the traditional news media. More information on Internews is available at <http://red.path.net:80/internews/>. In a more *ad hoc* venue, this author gave the first interview for Slovakian Radio Free Europe that was conducted entirely on-line. Even the audio portions were digitally recorded and transmitted over the Internet.

of the economy has created a premium on information flows while technological advancements in telecommunications enhance the political and social potential of these flows. The dictator may be stuck with a stark choice between securing the rewards of either the invisible hand or the iron fist, market success or social control. The mutually exclusivity of the options pivots on information and communication media. These guide the hand yet weaken the fist. Thus Gorbachev's Soviet Union was scissored between the cutting blades of the globalized economy and personalized media. Had President Gorbachev attempted to maintain strict control over information flows, the Soviet economy would have been sliced even thinner. When he reluctantly relinquished some control over communication, the country itself was cut into pieces.

Gorbachev's predicament exemplifies the "Dictator's Dilemma," how to benefit from the global economy without relinquishing domestic control.⁵ The Soviet president's problem may have been insoluble but it is certainly not unique. From Saudi Arabia to Singapore, rulers are puzzling the same paradox. In the Kingdom of Saud,

The Saudis have always wanted the latest technological innovations, but the freewheeling communications possible on the Net are a different story. The authorities worry that they will lose their tight grip on political dialogue and public mores. But business executives argue that they need access to the latest information to build a competitive society (Ambah, 1995: 40).

And in the Singaporean city state,

Officials have a vision of the average citizen sitting in his high-rise flat, doing almost everything from banking to shopping to paying taxes and clearing shipments through customs--all at the touch of a computer key. But though new technology can speed up economic transactions, it makes debate about the country's future harder to control (Economist, 1995b: 38).

The technology of communication has changed and with it, corresponding political biases have shifted. In a broader historical

⁵ The author is grateful to Larry Press for the appellation "dictator's dilemma" which emerged from private discussions on these issues.

context, advancements in the means of communication have profoundly influenced characteristics within and interactions between societies since the time when language was invented. Writing created permanence; the printing press widened distribution; the telegraph conquered distance; the telephone facilitated interactivity; and television mastered visual images. Now, asynchronous electronic telecommunication networks likewise represent another fundamental, substantial, and discontinuous improvement in the ability to communicate. Modern communication innovations differ from previous technologies in fundamental ways that relatively favor sovereign individuals over sovereign governments. (Wriston, 1993). "If we look for historical precedents for this diffusion of power through information away from the elites, the Renaissance comes to mind" (Builder, 1993: 159).

The graphic in Figure 2.1 is helpful in understanding how the dictator's dilemma is a result of advances in communication technologies. The orthogonal axes represent fundamental characteristics of all communications media: Who is able to communicate with whom? Broadcast media, like television, reach large audiences but the ability to broadcast is greatly limited by economic, political and technological constraints. Interactive media, like telephones, can approach universal access, but the number of recipients per message is rarely more than one. Influence increases as more people get the word and autonomy increases with the percentage of the society that can originate and share its own ideas. The dictator's task, to maximize influence while limiting autonomy, used to be easier when technological improvements in telecommunications moved generally in linear paths along the horizontal or vertical axes. The optimal position, from the dictator's perspective, would be in the bottom right-hand corner where everybody receives all of the leader's dictates and none from anyone else. The Jeffersonian democratic ideal resides toward the top right-hand corner where ideas compete in a marketplace comprising many message originators and many recipients. "We the people" implies a public that can communicate with itself. This diagram shares important similarities with the schema proposed by Robert Dahl in his theory of polyarchies.

Dahl's concept of "inclusive hegemonies" exists in the bottom right-hand corner and "polyarchies" in the top right-hand corner.⁶

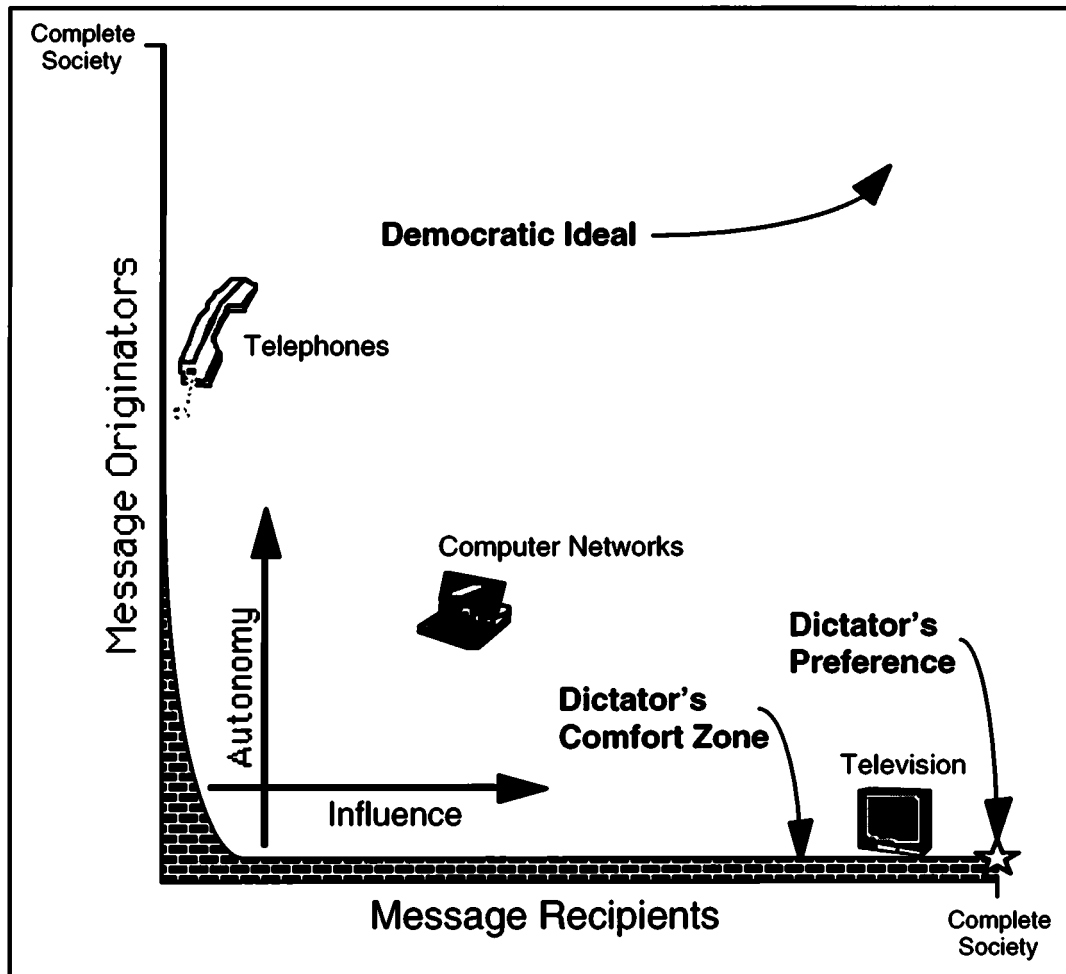


Figure 2.1-Communication Participants

Since traditional broadcast media are located closest to the dictator's optimum they are almost certain to be employed as a powerful political weapon. Along with Soviet Russia, Nazi Germany provides a notorious example. The Nazi Minister for Armaments, Albert Speer,

⁶ The theory is presented in Dahl (1971). See specifically page 7. The ordinate, liberalization (public contestation), relies on the ability to originate messages and the abscissa, inclusiveness (participation), corresponds with the notion of message receipt.

explained at his Nuremberg trial the Führer's penchant for mass communication technologies, "Through technical devices like the radio and the loudspeaker, eighty million people were deprived of independent thought. It was thereby possible to subject them to the will of one man" (Huxley, 1958: 43). Fortunately, perhaps, the Third Reich passed before television became widely available for wholesale exploitation. This device, a precursor to George Orwell's "telescreen" in 1984 bade even more ominous tidings. With gloomy foreboding, Orwell warned that "the machine itself may be the enemy" (Huber, 1994: 33).

Near the vertical axis in Figure 2.1 and parallel to it, increases indicate expanding accessibility of interactive communication. Technological innovations in this direction progress along with economic development. In an insightful study on the emergence of the various organizational structures by which humans order their affairs, David Ronfeldt of RAND has observed that from the beginning, "The rise of the market form, and of the huge, far flung enterprises it engendered, is associated with the development and spread of electric and electronic devices, notably the telegraph, telephone and radio" (1993: 45). Telephony advanced and in the early 1960s, A. Jipp discovered a highly correlated relationship between telephone density that became known as the Jipp curve.⁷ Two decades later, the International Telecommunications Union asserted a causal connection in its oft-cited Maitland Commission report, *The Missing Link*. This report reasoned:

The absence of a system which enables timely information to be sent and received engenders a sense of isolation and frustration, and so raises a barrier between different sections of the population. This cannot but undermine the process of development.

and concluded:

It is our considered view that henceforward no development programme of any country should be regarded as balanced, properly integrated or likely to be effective unless it includes a full and appropriate role for telecommunications, and accords a corresponding priority to the improvement and expansion of telecommunications (Maitland, 1984: 8-11).

⁷ The relationship is first presented in Jipp (1963).

This report was followed by other studies which "showed that telecommunications have a multiplier impact on economic development" (Hills, 1993: 24).

Thus, a dictator who eschews interactive communications perhaps does so only at the peril of healthy economic growth. However, E can confine telephone instruments within manageable limits and provide other safeguards to allay threats that otherwise might exist outside Es zone of comfort. Fortunately for E, the technological restriction of one recipient per message dampens the relative ability to influence widely and to organize an opposition force using this communication medium. Additional precautions are also available. Beyond wiretapping, the Soviets, for instance, limited the number of international telephone lines, segregated telephone systems so they couldn't communicate with each other and suppressed telephone directories (Pool, 1983b: 6).

Successful dictators have appreciated the differences in the values and threats of various telecommunication technologies. Broadcasts can be politically profitable while interactivity is likely to be dangerous. As one scholar noted,

It is no coincidence that where civil and political rights have been denied, although the technologies of a centralized broadcasting system used for propaganda have been well developed, residential telecommunications have remained undeveloped (Hills, 1993: 21).

This distinction between communication technologies that both academics and autocrats recognize is not a new idea. Attempts to conceptualize the difference dates back several decades to when the telephone was still young.

Starting in the 1920's, a contrast was sometimes drawn between mass media (such as broadcasting), which had a tendency to impose authoritative and uniform thinking on society, and the effects of the telephone which lent itself to the spontaneous interaction of individuals (Pool, 1983b: 86).

What is radically new, however, is that the region in the direction toward the democratic ideal between the axes on Figure 2.1 is no longer

vacant of any telecommunication medium. Electronic networks are the first technology to reach substantially beyond both axes simultaneously, outside of the dictator's comfort zone and into the heart of the diagram. The upshot, as Gorbachev learned, is that while new communication technologies may be enticing as they afford new economic opportunities to rulers who seek to capitalize on global integration, at the same time these technologies may offer political opportunities to alternative power sources who seek to oppose authoritarian control. Computer networks enhance the free association that contributes to democracy with the politically combustible mixture of both autonomy and influence. Everyone who is on the network can both originate and receive messages. By no action of Es own, the dictator has lost the unilateral ability to determine optimal levels of broadcast capacity and interactive capacity independently. With the new media, each implies the other.

Furthermore, the center's exclusive role as provider or inhibitor of information and communication is diminished, especially in the cross-border context. Neither the autonomy nor the influence of electronic networks is constrained by national boundaries. Conversely, broadcasts can be jammed, albeit at great expense, to which the eighty-nine transmitters manned by one hundred technicians on the Byelorussian border stand in silent testimony (Shane, 1994: 61). International telephone services, arranged upon the basis of bilateral agreements between national Post, Telephone and Telegraph ministries (PTTs) can be constricted easily at the central bottlenecks. Such arrangements enabled the former Soviet Union--a country of nearly 300 million people--to restrict the number of international lines to dozens, never more than those on which the Soviet internal security agency could eavesdrop. Nazi Germany constricted international contact by levying high taxes (Pool, 1983b: 86). Controlling abundant electronic computer networks in the future will be both technically more difficult and economically more costly. Hong Kong made an early attempt to exercise authority over the net. An observing journalist described its inevitable heavy-handedness as "trying to catch a speeder by closing down the highway" (Farley, 1995: H2).

COUNTER-EXAMPLES

Actual evidence of a democratizing effect of the new information and communication technologies has been almost exclusively anecdotal. This opens a door for skeptics who can and do offer their own anecdotes that seem to contradict. The Iranian revolution of 1979 is often hailed as a prominent counter-example (Goodman and Green, 1992: 22). In a revolutionary use of the latest personal communication technology, Ayatollah Khomeini distributed his electrifying messages via audio cassette tapes, extensively copied and played over the telephone lines. He successfully instigated a largely illiterate public to revolt against the despotic Shah.⁸ Now video cassettes with such titles as "Soldiers of Allah" boost the arsenal of the Islamic fundamentalists attempting to export their revolution worldwide. Disappointingly, sixteen years after the Shah's communication-technology-assisted overthrow, the regime in Iran remains woefully distant from anything that resembles a democracy.

Figure 2.1 is helpful to interpret the Iranian case. Considered within this framework, the result is no longer anomalous. Non-democracy appears as certainly a plausible if not a likely outcome. The Ayatollah's ingenious use of tape-recorded messages, when plotted on the graph, would lie only a hair vertically above television, outside the Shah's comfort zone but far from the democratic ideal. The cassette technology enabled another voice to influence a large audience, but as uni-directional and dependent on extensive religious hierarchies for distribution, a minimal increase in autonomy would not appreciably democratize Iranian society.

The current Iranian leadership now faced with new networking technologies, however, confronts the same dilemma as other autocratic regimes. Middle Eastern scholar Majid Tehranian, writing about Iran, repeated the common refrain,

On the one hand, global communication has made the task of development easier by providing rapid and efficient access to sources of information on science, technology, and markets.

⁸ Fuller accounts of the Ayatollah's revolution and use of personal electronic media can be found in Tehranian (1979) and Ganley (1992, pp. 13-24).

On the other hand, it has made the control of human behavior that much more difficult for the centralized and mobilized states focused on strict moral codes and national development goals (1995: 153).

The Tiananmen Square fax machines are another prominent example, to which doubters point, of the new communication technologies failing to live up to their democratizing promise. Eugene Skolnikoff of MIT recognized a facilitating role that information technologies played in the Eastern European democratic revolutions. But, his next breath revealed disappointment that, "In another 1989 revolution, however, in China, they played an equally important role but with the opposite outcome" (1993: 97).

Again, Figure 2.1 is instructive. Fax machine would reside not far to the left of telephones, a technological improvement to expand influence, to be sure, but perhaps not sufficiently far from the zone where the dictator's counter-measures would be effective. Networked communications reside much farther to the left on the graph which suggests that the game is not yet up in the Middle Kingdom. In fact, considering the relatively late introduction of the Internet, the game is really just beginning. Although the Chinese uprising was among the first times that a computer network was used "extensively and for multiple purposes by political dissidents" (Ganley, 1991: 10) The networking dissidents were almost exclusively in the United States because the Chinese in China did not have more than the barest minimal access, less than 5 nodes in the entire country, until at least 1992 (Landweber, 1994). The political ante was raised in 1996 with the official, yet wary, embrace of the Internet. Already the strains caused by these hard choices are beginning to surface. In one particularly troubling recent example, the government decreed that all economic data provided by foreign news services must be approved and supervised by the official New China News Agency, thus threatening to undermine confidence and foreign investment on which the Chinese economy depends. President Jiang Zemin acknowledged that China was in a fix, but made his choice plain, "We cannot sacrifice culture and ideology for a short period of

economic development" (Mufson, 1996: 1). Jiang's proclamation was simply a succinct Chinese formulation of the dictator's dilemma.

Although *prima facie* counter-examples, neither the Iranian nor the Chinese cases challenge the validity of a theorized role of information and communication technology in supporting democratic change. The Russian case upholds the theory and cases of other countries and in other parts of the world are further supportive. Few of these other experiences in which opposition groups were empowered through electronic networks are as well known as the Russians'. In Czechoslovakia, for instance,

Back in '89, Czech students were trying to coordinate the uprising across the nation and ... were running a telecom angle.... The Czech secret police were far too stupid and primitive to keep up with digital telecommunications, so the student-radical modem network was relatively secure from bugging and taps.... By mid-December, the Civic Forum was in power (Sterling, 1995: 102).

Another example hails from Mexico in the Western hemisphere. Independent of where they live, "30m people of the world can read instantaneously the communiqués issued from the jungles of Chiapas by Mexico's Zapatista rebels" (Economist, 1995a: 13). Numerous other cases notwithstanding, the irony is profound that the American President was broadcasting to the Russian public from what had been the Soviet television headquarters in Moscow when Bill Clinton observed, "Revolutions [in] information and communication and technology and production, all these things make democracy more likely" (Clinton, 1994a).

3. QUALITATIVE COMPARISONS **A Brave New World or New World Order?**

In the field of mass communication as in almost every other field of enterprise, technological progress has hurt the Little Man and helped the Big Man.

Aldous Huxley, 1958

As we now know, 1983 would not bring *Nineteen Eighty-Four*; it brought *glasnost* instead. By the end of the 1980s, it was not democratic dominoes that had tumbled, but the Berlin Wall followed by statues of comrade Lenin. Imposing as they were, these monuments gave substance to Huxley's gloomy vision until the flow of information eroded the foundations on which these structures stood and thus exposed more optimistic prospects.

This section explores why the worst fears did not come to pass. Distinguishing among communication technologies reveals that not all necessarily facilitate the consolidation of power as Huxley among others postulated. Nor is the political influence of technology uniformly neutral as others have surmised. Some technologies tend to favor decentralization and the key is reciprocity. Several communication technologies are compared relative to five fundamental dimensions: mode of communication, message content, inherent boundaries, cost and speed. Electronic networks stand clearly apart with characteristics most conducive to the kind of communication that associates with democracy.

BAD, GOOD OR INDIFFERENT

The succession of the Third Reich by the Soviet Empire as the global pariah fueled the worst of these fears that communication technologies were tools for totalitarians. Both regimes were adept at manipulating the public by manipulating information. In the 1960s, while the superpowers struggled for control of the planet and jostled with the technology that threatened to annihilate it, the means to collect and disseminate information were widely regarded as ill-boding implements which strengthened "Big Brother's" malevolent grip on society. Even in the West, from Vietnam to Watergate, evidence impugned

technological progress which, arguably, governments had maliciously co-opted for weapon technologies and wiretaps. A man on the moon also meant a spy in the sky. A year before Neil Armstrong planted his famous footprint on the moon, Zbigniew Brzezinski shared Huxley's pessimism.

[T]he capacity to assert social and political control over the individual will vastly increase. It will soon be possible to assert almost continuous surveillance over every citizen and to maintain up-to-date, complete files, containing even most personal information about the health or personal behavior of the citizen in addition to more customary data. These files will be subject to instantaneous retrieval by the authorities (1971: 163).

Current statistical evidence supports Gorbachev's more optimistic hypothesis that "it is virtually impossible for any society to be 'closed.'" However, this does not necessarily contradict the troubling predictions of a generation earlier. Communication technologies that were new in the 1950s and 60s differ markedly from those available today, and in fundamental ways.

Optimism and pessimism regarding the effect of communication technology on the nature of government have cycled with the wheel of invention. The prevailing attitude regarding communications technologies at beginning of this century may have been closer to that of Gorbachev at the end than to that of Huxley in the middle. The innovative communications technology of growing consequence in the early 1900s was the telephone. A key figure in the development of the American telephone and one of the prominent spokesmen of the day, General John J. Carty, expected the device to ring in a utopian age. In his anonymous column called "The Prophet's Corner" in the journal *Electrical Engineering*, he envisioned a time when

[W]e will build up a world telephone system making necessary to all peoples the use of a common language, or a common understanding of languages, which will join all the people of the earth into one brotherhood (Pool, 1983a: 89).

An alternative view of communication technologies suggests that, rather than leading to either a brighter or a dimmer future, they might not lead anywhere. The effect of these technologies may be

indeterminate. After having watched several of the Newly Independent States besmirch their newly won freedom with malicious nationalism and internecine violence, Shane concluded that

Despite our wishful thinking, technology remains a maddeningly neutral tool, as it has been since man discovered that fire could preserve life or destroy it. The Soviet television tower at Ostankino could broadcast with equal efficiency the numbing speeches of Brezhnev or the electrifying iconoclasm of *Vzglyad*⁹ (1994: 282).

Even Aldous Huxley was wont to succumb to ambivalence.

Mass communication, in a word, is neither good nor bad; it is simply a force and, like any other force, it can be used either well or ill. Used in one way, the press, the radio and the cinema are indispensable to the survival of democracy. Used in another way, they are among the most powerful weapons in the dictator's armory (1958: 39).

Painting all communication technologies with one brush fails to account for salient differences between them. To be fair, today's communication technologies, which arguably entail unprecedented potential for supporting democracy, did not exist when Huxley wrote. Nevertheless, arguments that communication technologies are neutral may be valid, but only when considering the technologies in the aggregate. Specific communication technologies, given their ease of exploitation by certain political entities over others, tend to confer relative political advantage. For example, Shane recognized that *Vzglyad* and its cousin programs were able to broadcast only at the pleasure of the Brezhnev's government and that of his successors. Television was primarily a tool of the ruling elite, not the democratic movement. This is pointedly clear from his anecdote of the Moscow kindergartner who replied, when asked to define the word "coup" a few days after the failed attempt in 1991, "That's when they show all the same thing at the same time on all channels." (1994: 255)

"Soft technological-determinism" is the term that distinguished communications scholar, Ithiel de Sola Pool, used to understand and

⁹ *Vzglyad* which means "Glance," is a popular Russian exposé television program.

characterize the effects of centuries of changing communication technologies.

Freedom is fostered when the means of communication are dispersed, decentralized, and made easily available, as are printing presses or microcomputers. Central control is more likely when the means of communication are concentrated, monopolized and scarce, as are great networks¹⁰ (1983: 5).

COMPARING COMMUNICATION TECHNOLOGIES

The key is reciprocity. To the extent that the inherent characteristics of a communication technology enable others to respond readily and easily via the same medium and to the same audience, that particular technology can facilitate the aspirations of those who would seek to bring about democratic change. To the extent that characteristics of a technology inhibit reciprocity, these aspirations can be more easily frustrated. Pool enumerated several dimensions by which technologies can be identified as facilitating or inhibiting democracy. Pool's list included economic, geographic and system architecture considerations. Relative to these dimensions and to a few others, it is helpful to compare and distinguish the democratizing potential of the most common communication technologies.

Table 3.1, displays the qualitative results of these comparisons and illustrates striking differences. The unit of analysis is a subjective measure of each technology's capacity to support an "ordinary" individual who would receive and respond to a specific message of interest originating in another country in a distant region of the world. Darker shading indicates greater capacity for reciprocity in each of the five major categories. The objective of the chart is contrast, not precision. Thus, while the particular shade of individual cells may be arguable, e-mail unequivocally stands apart from its predecessors as being more conducive to reciprocity in communication.

¹⁰ It is important to recognize that the word "network" as Pool used it here refers to large physical networks, such as those in broadcasting, and not to virtual electronic networks as the term is used throughout this dissertation.

Table 3.1
Comparison of Communications Media

	Communication Mode			Message Content		Boundaries (freedom from)		Cost (low)		Speed (high)
	Uni-Directional	Bi-Directional	Multi-Directional	Images	Data	State Institutions	Geography	Equipment	Transmission	Speed
Newspapers										
Postal Mail										
Telegraph										
Radio										
Telephone										
Television										
Facsimile										
Email										

Mode

Technological innovation in communication has historically improved the flow of information in one of two measures, distance and area. These two dimensions also correspond to the axis of Figure 2.1. The telegraph and telephone stretched the distance across which individuals could exchange messages. Radio and television widened the area of message transmission. The conquest over distance has improved the capability of discourse--defined here as bi-directional communication--intrinsic to functioning free market operations and treaty negotiations between authorities of sovereign states. The conquest over area has improved the capacity for information dissemination--uni-directional communication--by which hierarchical institutions maintain control over rank-and-file members and societal leaders influence their constituencies.¹¹ Before the information revolution, the distinction between discourse and dissemination appeared to be inviolable. The telephone, for instance, has been largely as ineffective for

¹¹ For a more thorough presentation of the means and efficiencies of markets, institutions and networks, see Ronfeldt (1993).

disseminating information on a large scale as has the television for engaging in discourse.^{12,13}

Recalling Figure 2.1, the pursuit of democracy summons the capabilities of both discourse and dissemination but also demands something qualitatively different. Conceptually, democratic processes rely on discourse for compromise, but closed one-to-one deal-making can impair the confidence necessary for consensus building. A politically aware electorate requires mechanisms for information dissemination, but a limited number of "ones" controlling the one-to-many broadcasts can undermine the free flow of information. Public debate--multi-directional communication--is a democracy-enabling synergy of discourse and dissemination. The essence of multi-directional communication is that all people who receive information via a certain channel can participate equally within the complete and identical context of the discussion. Indeed, the expressed goal for the Internet's predecessor, the ARPANET, was that "It should effectively allow the illusion that those in communication with one another are all within the same soundproofed room" (Baran, 1964: 1).

Another term commonly used to describe multi-directional communication has been "many-to-many" to distinguish this mode from broadcast, which is labeled one-to-many, and from telephony, which can be thought of as many one-to-ones. However, the number-to-number terminology risks misinterpretation. The connotation of "many" in one-to-many can be the billion or so people around the globe who watch soccer's World Cup. Although the electronic newsletter *China News*

¹² A "Pleasure Telephone" to be used as a mass media device providing news, music and information was attempted in Budapest around the turn of the century and in Newark before the First World War. Both experiments proved unsuccessful primarily because the cost was too high and the medium did not lend itself to advertising (Pool 1983a: 82).

¹³ "Interactive Television" is not "discourse" in the usual sense of the term. Although information flows in two directions, the information content is greatly restricted to selecting predetermined menu items as opposed to free exchange of ideas. Nor do radio and television talk shows qualify as "discourse." A limited number of host-selected participants address their one-shot on-the-air question or comment to the show hosts. The medium does not allow for continuing give-and-take among participants.

Digest boasts of 35,000 subscribers (Tempest, 1995: H/2), many-to-many in the World Cup scale would be impossibly unwieldy. More importantly, quantifying the number of participants misses the most critical aspect of multi-directional communication. Independent of how many people are involved—even if there are only three, e-mail technology creates a different dynamic and thus can be expected to have differing social and political outcomes. Figure 3.1, below, provides a schematic diagram of the three modes of communication in the cross-border context.

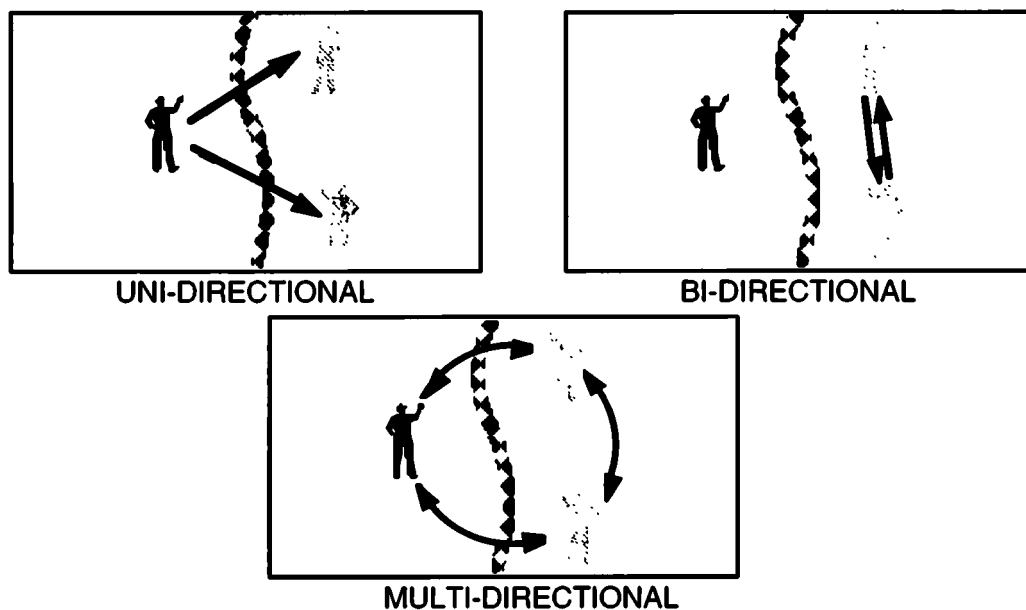


Figure 3.1-Schematic Modes of Communication

It is interesting to note that the First Amendment to the United States Constitution specifically addresses each of these three modes as fundamental to the practice of democracy: the right to *petition the government* pertains to the bi-directional nature of discourse, particularly between the citizen and the state; *freedom of the press* provides for unfettered uni-directional dissemination of information; the *right to assemble* preserves the multi-directional quality of public debate.

In successful public debate, each participant is able to hear and be heard. Additionally, each participant may refrain from immediate expression while retaining the opportunity to subsequently exercise this right and capability. Democracy archetypes, the amphitheater of ancient Greece or the town meeting of colonial New England, offer appropriate metaphors. There is no comparable meeting place in democratizing nation states. Neither telephone discourse nor television dissemination provides adequate technological support. Computer networks alone successfully blend these capabilities into virtual town halls.¹⁴

Pool foresaw the confluence of communication technologies even before computer networks had proliferated.

[C]onvergence of modes is blurring the lines between media, even between point-to-point communications, such as the post, telephone, and telegraph, and mass communications, such as the press, radio, and television. A single physical means—be it wires, cables or airwaves—may carry services that in the past were provided in separate ways. Conversely, a service that was provided in the past by any one medium—be it broadcasting, the press, or telephony—can now be provided in several different physical ways. So the one-to-one relationship that used to exist between a medium and its use is eroding (Pool, 1993b: 23).

Pool's focus is on the media of transmission, that microwaves would be used for both telephone and radio, for instance. The empowering reality, however, may be a bit more subtle. Another important convergence is materializing within a terminal device. A computer can be used to achieve the ends of both a telephone and a television, thus achieving multi-directionality. The medium of transmission may be optical fiber, satellite link, coaxial cable, twisted copper wires, or more likely some combination (completely transparent to participants). The closest approximation to multi-directional communication among the conventional technologies is perhaps a conference call with all its

¹⁴ The store and forward capability of facsimile machines presaged the combination of discourse and dissemination in one device. However, there is no respond-to-all capability. Additionally, the reliance on images prohibits effective message manipulation and is likely to cause degradation in the integrity of the message with repeated sendings particularly in the developing world where the phone lines are very noisy.

obvious timing, geographic and size limitations. Historical examples might be short-wave and citizen's band radio, which never had staying power in the mainstream. Computer terminals are the first widely used telecommunications devices able to support multi-directional democracy-minded public debate, as was witnessed, for example, in Russia.

From this perspective, as before, the Ayatollah Khomeini's extensive use of audiocassettes in his non-democratic Iranian revolution of 1979 is again revealed as a false counter-example. Khomeini's cassettes did not allow for reciprocal exchange and are therefore more closely analogous to uni-directional radio than to multi-directional e-mail networks. Networks are also precisely what Shane overlooks in his claim that "Information demonstrated an awesome capacity for destruction of the existing order-but no equivalent capacity for creation" (1994: 280). His oversight is not uncommon. Theodore Roszak wrote, in *The Cult of Information*,

the computer lends itself all too conveniently to the subversion of democratic values.... A few of these [applications], like the networking capacity and educational possibilities of the microcomputer, have been seized upon by the hopeful democratic spirits like the guerrilla hackers; but such minimal and marginal uses of the computer are simply dwarfed into insignificance by its predominant applications (1986, 180).

Roszak's book was published in 1986, when the exponential growth of networks was still barely noticeable. Similarly, according to Peter Huber in *Orwell's Revenge: The 1984 Palimpsest*, missing the reciprocal capacity of networking in telescreen technology was "Orwell's biggest mistake" (1994: 223).

Content

An apparent dichotomy of communication technologies also exists in message content: images versus structured data. The difference between the two can be conceived as the difference between a melody and a musical score, a graph and the plotted data, a speech and the written text, an atomic particle trace and its mathematical model. Traditionally, people are most comfortable communicating through images, visual, aural, tactile or olfactory. Images can evoke powerful

emotions, potentially in greater proportion than the information alone absent the images might arouse. This is the phenomenon behind the "CNN effect" altering national priorities. Images can leave long lasting impressions like songs that linger in the mind or scents that summon forgotten memories. Images can communicate efficiently for a "picture is worth a thousand words." In contrast, structured data are often opaque to an average observer, like a page of numbers or a stream of computer bits. Yet, structured data offers other advantages. It is malleable and machine-readable; it can be retrieved, filtered, ordered and altered and then re-transmitted in ways that are not possible with images.

Alexander Graham Bell engaged the contentious images-versus-data debate a century ago hawking his vision of a widespread telephone system overseas in England. He claimed,

All other telegraph machines produce signals which require to be translated by experts, and such instruments are therefore extremely limited in their application, but the telephone actually speaks, and for this reason it can be utilized for nearly every purpose for which speech is employed (Fagen, 1975: 21).

Today's fans of the fax echo the telephone inventor's initial excitement now that visual images can also be transmitted across telephone lines.

Detractors, such as Nicholas Negroponte, however, lament the fact that information received by fax is neither manipulable nor reusable. Exemplifying this shortcoming, the fax itself can be resent but successive degradation in its quality is irreversible because the essence of the transmission is only dark spots and light spots, not letters and numbers.

The fax is a step backward because it does not contain "structured data," but rather an image of text that is no more computer-readable than this page of *Wired* [a magazine] (unless you are reading it on America On-line [an e-mail service]). Even though the fax was delivered as bits before it is rendered as an image on paper, those bits have no symbolic value (Negroponte, 1994: 134).

Confronted with exponentially increasing information flows, the ability to manipulate and filter messages becomes critical to produce order instead of overload.

Only in the context of electronic mail does this distinction between images and structured data become immaterial and the choice between them prove unnecessary. This is another result of convergence. While radio, telephone and television can play the music, and posted mail, newspapers and faxes can display the notes, computers can do both. "[A]s the world's information becomes digitized, those packets can carry every thing that humans can perceive and machines can process--voice, high fidelity sound, text, high resolution color graphics, computer programs, data, full motion video" (Rheingold, 1993: 74). Electronic messages can be both appreciated as images and manipulated as data.¹⁵

Arousing images have long been used to incite political change. During the Cold War, in the name of democracy, radio and television waves were modulated with America's message and consigned to breach the Iron Curtain. More recently, President Clinton responded to criticism that he had betrayed the democratic movement in China with a proposal to "tell freedom's story to the people of China. We will launch Radio Free Asia, increase the Voice of America radio broadcasts to China and inaugurate a weekly VOA television program to report on developments" (1994b: B5). To these ends, information revolution technologies can be more effective, combining images with structured data, thus creating a multiplier effect. The democratic message becomes replicable, adaptable and redirectable, almost effortlessly. The medium also provides for accountability and permanence of messages. The messages themselves are tractable to analysis and verification. These are all capabilities which weaken a dictator's iron hand.

¹⁵ The union of images with information is the source of profound advancement in society according to some scholars. Paraphrasing Derek J. de Solla Price, Karl W. Deutsch writes, "Western Science, and its offshoots, modern science, it has persuasively been argued, have derived from the marriage, in Hellenistic times, of the visual imagination of classical Greek science with the computational skills of the Babylonians; and the ever renewed union of new feats of visualization with computations that ever since has accompanied the development of mathematics, and of all the sciences" (Deutsch, 1963: 23).

Boundaries

Geography bounds conventional communications physically as do state institutions functionally. Post office addresses and telephone numbers are specific to certain locations. Forwarding offers some limited freedom, likewise for certain innovations such as cellular telephones, remotely accessible answering machines, voice mail and beepers. Mass media, by design, can cover large swaths of the earth, but conventional publishing and broadcasting sites are hardly mobile. Transistor radios, video cameras, video cassette recorders and portable satellite dishes have all shown significant improvements, but none compares in geographic independence with the seamlessness of global electronic computer networks. Discarding the need for geographic proximity, or even awareness of it, certain applications such as the World Wide Web and Gopher deliver information which makes the location or even country of origin completely transparent and irrelevant to the networker. Natural and human-designated boundaries dissolve.

Distinguishing itself from an ordinary postal mailbox, an e-mail box can be accessible to its owner from anywhere on the earth via another networked computer. Such geographic independence is particularly liberating for itinerant individuals who cross borders often pursuing an international agenda. While circumnavigating the planet three times, writer Carl Malamud, described continuous correspondences in his "technical travelogue" (Malamud, 1993). The author of this dissertation regularly accessed his own account in Tashkent, Uzbekistan from cities throughout Central Asia and other parts of the former Soviet Union. Erratic itineraries did not disrupt daily communications because worldwide colleagues could simply send messages to an unchanging e-mail address while remaining blissfully oblivious to the tribulations of traveling in Eurasia.

Functional bottlenecks of traditional communication technologies allow ruling elites of nation-states to exercise and reinforce central authority. "The only contact between self-contained national [telecommunication] systems was through the conjoint provision of international services arranged upon the basis of bilateral operation agreements between the PTTs [Post, Telephone and Telegraph]" (Genschel

and Werle, 1993: 207). As previously noted, this type of institutional structure enables dictatorial regimes, like the former Soviet Union, to constrain the number of international connections and maintain control over cross-border dialogue.

In contrast, electronic networks were designed as "distributed" and "adaptive." The underlying architecture of the ARPANET, precursor to the Internet, was conceived at RAND specifically to protect the integrity of military command and control structures in the case of an attack against the United States (Baran, 1964). Its architecture was such that it "would have no central authority. Furthermore, it would be designed from the beginning to operate while in tatters" (Sterling, 1993). Peter Lewis, journalist for the *New York Times*, extolled the virtues of distributed communication to protect dissident writers. He wrote "because information travels in 'packets' of data that are typically scattered and reassembled at the receiving site, it is much harder to intercept or trace messages." Along with individual writers, local opposition groups and international non-governmental organizations are learning how to use new communication technologies to circumvent borders. Among numerous examples he could have cited, Lewis quoted Gara LaMarche, associate director of the Human Rights Watch, who recognized that "The notion of using the Internet to transcend international boundaries that have been used to suppress information is a visionary one" (Lewis, 1994: E18).

In addition, not only are the new information technologies harder for authoritarian regimes to control, but even if they could exercise control, doing so would require such drastic measures that a regime might be forced to choose between undesired political liberalization or disastrous economic consequences (Builder, 1993: 163). Whereas the ensuing trials of two formerly powerful presidents in economically successful South Korea exemplify the former, neighboring North Korea's continued isolation and predicted starvation is an enduring example of the latter.

Costs

The information revolution is rightly described also as a devolution. Once the high-cost advanced technologies were accessible only to the political and media elite, precluding any glint of egalitarian reciprocity. Decades of innovation and technological trickle-down eventually handed over Prometheus's torch from the governments to the people. Bearing the fire of information and communication, private individuals are now economically able to illuminate the workings of governments, enlighten fellow citizens and brighten a path toward democracy.

Distributed networks dispersed centers of control, and silicon chips, the raw material of which is sand, shrank the marginal costs of information and communication. As if technology has switched allegiances, the dissemination, collection and interpretation of information is no longer the exclusive prerogative of rich governments. The satellite pictures of Chernobyl on the front pages of newspapers around the world which compelled the Soviet Union to recant its deceitful initial damage assessments were the work of a privately owned French satellite, SPOT (Wriston, 1989: 70). A private videotape of police brutality against Rodney King impugned state institutions in the U.S. Integrated circuits and PCs locate as much computer processing power on desks in private homes as had been in some government research labs. Although the fabrication facilities are still quite expensive, miniaturized marginal costs and economies of scale in the production of microchips and integrated circuits have made personal computers, personal copiers, personal fax machines and even personal satellite reception dishes available to the general public at reasonable prices.

Both fixed and marginal costs of communication are plummeting. New generation equipment prices are lower than that of their predecessors by several orders of magnitude. Satellite dishes, for example, decreased in price from \$250,000 to \$500 and video cassette recorders from \$30,000 to \$300 (Ganley, 1991: 6). The capital expenditure for an individual to start sending messages overseas varies tremendously by medium. A PC and modem for e-mail, which now cost in the hundreds of dollars—compared to thousands of dollars in the recent past—are somewhere in the vast

middle, yet nearer to the cost of an airmail stamp than to a television studio.

While the face value of postage stamps continue to rise, the cost per message of media has dropped dramatically in real terms. "In New York City 1896, phone service cost \$20 a month, compared to the average worker's income of \$38.50 a month" (Pool, 1983a: 22). International calls are still expensive relative to domestic calls. The standard tariff to Russia from the United States is \$2.27 per minute, for instance, compared to \$0.28 for a coast-to-coast domestic call within the United States.¹⁶ In the United States, as in much of the developed world, international calling is considered an "enhanced" service, the price of which is artificially high to subsidize the universal "basic" service on the local exchange. Competition in the international realm is likely to erode such pricing policies and the contrived barrier between domestic and international telephone connections (Bruce, et al., 1986: 2).

For several decades now, the ability of anyone on the planet to communicate with anyone else was technically but not practically feasible. An earth-shrinking breakthrough of computer networks is the reduction in per-message cost. The price of an electronic message entered into the network via a local phone call is independent of the destination (and often free to the user), whether across the street or across the ocean. Under these tariff systems, e-mail compares in cost quite favorably to phone or fax for international communication. Yet, as already noted, these prices historically have been distorted. In the United States, the price of dialing internationally has been inflated while messaging on the Internet has been federally subsidized. This observation should not be overstated, however, for three reasons. First, the Internet subsidy is less than often assumed. Jeffrey MacKie-Mason and Hal Varian at the University of Michigan calculated the average subsidy in the United States at less than \$20 per year per host and less than \$2 per year per user (MacKie-Mason and Varian, 1993: 5). That would pay for only a single one-minute phone call to Moscow.

¹⁶ These representative prices were quoted by Sprint, Inc. in April 1986.

Second, the marginal cost of a message across the electronic networks is vanishingly small. "If the network is not saturated the incremental cost of sending additional packets is essentially zero"¹⁷ (MacKie-Mason and Varian, 1993: 5). Third, these particular market distortions are not present in many developing countries where the marginal benefits of enhanced interconnectivity may be greatest. The asking price for a reliable phone connection to the United States from Uzbekistan, for instance, was \$7 in the summer of 1993. An e-mail message equivalent to one typed page cost \$0.15 via Relcom. Furthermore, across "dirty" telephone lines common in developing countries, on which the need to shout to be heard is not exceptional, error correction protocols ensure the integrity of the e-mail message. The comparative cost of a fax must often be doubled or tripled for repeat calls in order to obtain enough legible segments to constitute a complete document.

Total programmatic cost comparisons are also illuminating. In 1993, the National Science Foundation (NSF) was spending at a rate of \$18.5 million per year for a clientele estimated at 10 million users (MacKie-Mason and Varian, 1993: 4). In the same year, the Board for International Broadcasting granted more than 10 times that amount, \$218 million, to Radio Free Europe/Radio Liberty (RFE/RL) (the model for Radio Free Asia) for private broadcasting activities.¹⁸ In China, for the President's proposal to have a comparable effect per dollar of expenditure as has been demonstrated on the Internet, it would have to reach more than 100 million (one in ten) Chinese citizens--and be interactive.

Speed

Time and distance warp in the information revolution. As if a domestic version of Einstein's Theory of Relativity is being demonstrated in homes, schools and offices, travel between two points is

¹⁷ MacKie-Mason and Varian argue that when the networks are not congested, the marginal costs of transporting additional packets along the medium are negligible. The primary costs that concern them are the delays during congestion at the bottleneck routers.

¹⁸ The figures are available in the *United States Budget for Fiscal Year 1995*, p. 861.

no longer measured in hours or miles. Electronic messages travel at light speed, 186,000 miles per second. The only technologies that rival e-mail as a versatile message carrier, post offices and courier services, cannot carry current information. The former is notorious for anachronistic slowness. A posted letter to Russia may still spend two months or more en route—if it reaches its destination at all. Expensive express delivery services still require days or at least a night and ignore large patches of the populated planet. At the other end of the timeliness spectrum, radio and television commonly broadcast live. However, instantaneous does not imply spontaneous. If the intended audience is not notified in advance and tuned in at the right moment, the broadcast message may be lost into the cosmos. Telephones and facsimile machines operate in real time for a narrow bandwidth. Yet, even telephone messages are often delayed to obtain an available international line or for someone to be available to pick up the receiver in a distant time zone. Answering machines and programmable VCRs are limited *ad hoc* "store and forward" solutions. Email combines the speed of satellite links with the patience of delivery boys who wait by the door until the message is picked up. For the first time ever, any human being can engage in near-real time communication with any other human being anywhere.¹⁹

¹⁹ The author is indebted to RAND colleague Jeff Rothenberg for observing that real time communication between human beings anywhere may only be a temporary historical anomaly. Once humans begin to venture off the planet, vast distances measured in light-minutes or light-hours will again introduce technologically unavoidable transmission delays. The capability for instantaneous and spontaneous communication may exist only for a century or two.

4. QUANTITATIVE ANALYSES **The Empty Corner**

The implication of the statistical data ... concerning democracy, and the relationships between democracy, economic development, and political legitimacy, is that there are aspects of total social systems which exist, can be stated in theoretical terms, can be compared with similar aspects of other systems, and, at the same time, are derivable from empirical data which can be checked (or questioned) by other researchers.

Seymour Martin Lipset, 1959

Theoretical and qualitative analyses suggest testable hypotheses relating democracy with technological communication capabilities. Whereas anecdotal evidence has borne the weight of claims emanating on both sides of the debate until now, this study seeks to further enhance understanding of the relationship by examining empirical evidence. This section engages quantitative evaluation. The methodology, including epistemological caveats with regard to causality, are discussed first. Then the data are defined and subsequently explored from several different statistical vantage points. In all cases, the results show electronic network interconnectivity to be a substantial and statistically significant predictor of democracy. Various causal suppositions are also tested. The evidence does not support any alternative to the causal link leading from interconnectivity to democracy.

METHODOLOGY

Regression analysis has proven to be useful in the social sciences, as well as the physical sciences, as a means to interpret data and gain critical insight into the relationships between key variables. Specifically, starting with Lipset, studies of democracy's correlates have relied extensively on the tools of linear regression. Likewise, motivated by both the inherent utility of the method and by the desire for intellectual continuity and comparative compatibility, this investigation also turns to regression techniques. Democracy ratings for all the countries of the world are regressed against democracy's

traditional correlates drawn from historical data comprising a nonrandomized observational study.

Causality Caveats and Clarifications

Before engaging the statistical analysis, it is important to consider what these tests can and cannot do relative to the objectives of the quantitative section of this research. Negative test results can certainly refute proposed hypotheses, but positive results are rather more ambiguous. Causality, while implicitly central to this dissertation, cannot be proved explicitly in nonrandomized observational studies. Causality cannot be proven conclusively without well controlled experimentation that is rarely, if ever, possible in international affairs. In fact, a prominent statistician claims to have never come across a case in the social sciences in which regression equations succeeded in discovering causal relationships (Freedman, 1994). The objective of the data analysis here is decidedly more modest. The goal is to strengthen, as warranted, a policy argument. Data analyses reveal the extent to which the data can support or deny a given argument to promote certain types of policy actions. The action argument, itself, is developed elsewhere. In a world of uncertainty, an "action argument" can be, and sometimes should be, or even must be, compelling in the policy realm without definitive inferential justification (Hodges, 1995).

Therefore, the fact that causality cannot be rigorously proven does not tarnish the conclusions of this research. However, it does not follow from this statement that the concept of causality is irrelevant to this work. On the contrary, the degree to which the data analyses can bolster the action argument is a function of the degree to which alternative causal explanations are addressed, tested and assigned due credence. Thus, the following references to causality are expressed in a presumptive sense as appropriate to the task at hand rather than in the sense of a formal proof.

When testing the correlates of democracy one can ask either: What causes democracy? or What are the relative effects on democracy of various candidate causes? As suggested above, answering the former

question is a formidable endeavor, more than this study is prepared to undertake. To address the latter question, the focal issue is "*prima facie* causal effect" defined as the algebraic difference in expected values between measured outcomes with and without the specific intervention (Holland, 1986). The *prima facie* causal effect corresponds with the action argument. While contingent on certain plausible models, it is more tractable to empirical analysis and is more useful to the policymaker when evaluating available policy options.

Logic of the Test Sequence

The various statistical perspectives in this section are chosen specifically to investigate dominant causal premises, especially those that rival the thesis that new communication technologies have an important contributory role in democratic development. Furthermore, the research design employs a variety of models and functional forms for the main exogenous variable, electronic network interconnectivity. In this way, conclusions have the broadest validity and do not rely on any particular model or functional form which would be undoubtedly subject to dispute.

Cross-sectional univariate analyses confirm a strong correlation between levels of democracy and of network interconnectivity, both in an absolute sense and relative to democracy's other traditional correlates. Since the strong correlation could conceivably be a result of excluded variable biases, the inclusion of additional correlates in multivariate regressions analyses tests this hypotheses. Alternatively, regional effects could underlie the strong correlation. Categorical analyses control for potential regional influences. Time has a unique role in the consideration of causality. Longitudinal analyses introduce the time dimension to ensure the cross-sectional results are not a circumstantial artifact, but rather an outcome consistent with systematic change. The correlation of interest is strong not only on absolute levels. Relative changes in the level of democracy over a ten year period also strongly correlate with changes in the level of network interconnectivity.

Correlations are silent on questions related to causal direction. There are significant reasons to believe that democracy influences interconnectivity, in addition to the reverse. The strong correlation could result from either as the driving force. Systems of simultaneous equations involving more than one endogenous variable can be helpful to compare the relative effects. These analyses additionally include economic development as a third endogenous variable since it is a leading candidate for a compounding factor that affects both democracy and electronic communication networks simultaneously. Finally, the potential effects of collinearities between economic development and communication technologies are further tested by including other telecommunications media in the analyses. The single causal arrow that consistently withstands hypothesis testing is that which points from interconnectivity toward democracy.

DATA

Democracy

Democracy is an abstract concept difficult to quantify. Assigning each country a single number to represent the relative level of democracy is rife with pitfalls. First, democracy is a subjective quality and therefore liable to interpretive biases. Second, countries are complex systems. A nominally democratic country may have decidedly non-democratic organizations and practices and vice versa. Third, democracy is multi-dimensional. Flattening and compressing democracy into a single scalar inexorably oversimplifies and truncates important descriptive information. The inherent problems associated with developing a useful and robust measure for democracy have come to command substantial attention in academic circles.²⁰

Despite the theoretical obstacles, a practical consensus has been achieved in several key aspects of a viable democracy metric. Face validity of operational definitions of democracy consistently call for the inclusion of two or three interdependent elements. (i) Political

²⁰ Many of the measurement and statistical difficulties are addressed in considerable depth by Inkeles (1990) and Dahl (1971).

Rights. These refer to the institutions and procedures by which citizens are assured the capability to freely participate in selecting policymakers and influencing policy decisions. (ii) Civil Liberties. These refer the guarantees of freedom for acts of political participation and in daily life. The former guarantees safeguard rights such as free speech that may conflict with official state positions and the latter protect people from the likes of slavery and torture. (iii) Institutionalized Checks and Balances. These refer primarily to constraints on the exercise of executive power. Citizens of a democracy not only select their leaders but also retain the capacity to institutionally limit the leaders' power (Jaggers and Gurr, 1995).

Relative democracy rankings by independent authorities based on differing criteria agree quite broadly. Concurrence suggests that, although the concept of democracy may be difficult to describe explicitly, it is nonetheless well understood intuitively (at least by Western analysts).

[D]emocracy is a distinctive and highly coherent syndrome of characteristics such that anyone measuring only a few of the salient characteristics will classify nations in much the same way as will another analyst who also measured only a few qualities but uses a different set of characteristics, so long as both have selected their indicators from the same larger pool of valid measures. Far from being like the elephant confronting the blind sages, democracy is more like a ball of wax. (Inkeles, 1990: 5).

General conformity in ordinal rankings among different rating schemes confers validity on these constructs for democracy.

One of the leading published sources of democracy measurements is Freedom House's *Comparative Survey of Freedom*. Freedom House scores are often employed in scholarly research to evaluate the correlates to democracy.²¹ In accordance with this increasingly common academic practice, the metric for democracy in the following statistical analyses is derived from Freedom House data, specifically from the 1993/1994

²¹ For several examples see, the World Bank (1991), Starr (1991), Helliwell (1992), Lipset, Seong and Torres (1993), Muller and Seligson (1994), Boone (1994), and Rowen (1995).

report. A brief overview of the Freedom House survey and methodology is provided below.

Freedom House conducts a pair of annual world-wide surveys on political rights and civil liberties. Scores are assessed relative to checklists of questions. The checklist for political rights includes nine questions such as: "Is the head of state and/or head of government or other chief authority elected through free and fair election?" and "Are the voters able to endow their freely elected representatives with real power?" The checklist for civil rights includes thirteen questions such as: "Are there free and independent media, literature and other cultural expressions?" and "Are there free businesses or cooperatives?" and "Is there freedom from extreme government indifference and corruption?" With both objective and subjective assessments, each checklist item per country is assigned from 0 to 4 raw points relative to the degree the question can be answered affirmatively. The maximum raw score for political rights is 36 and for civil liberties is 52. In each survey, the range of possible scores is divided into seven nearly equal categories. At the end of each year, Freedom House reports a rating from 1 to 7 for every country, from the greatest freedom to the least, respectively. Since both political rights and civil liberties are recognized as fundamental elements of democracy, and since not surprisingly both are highly correlated, the single dependent democracy variable in this study is the average between these two measures. This scale is then inverted and normalized to 100 for intuitive convenience. The result of these cosmetic conversions is a metric with 13 discrete values, the maximum democracy rating is 100 (instead of 1) and the minimum is 0 (instead of 7).²²

A recent study correlated eight leading indicators of democracy including both scores from both Freedom House surveys. All concurred to a great extent. The correlation coefficient between the Freedom House dataset and the others ranged from 0.79 to 0.93, thus supporting its validity as a construct for democracy (Jagers and Gurr, 1995). It is worth mentioning, however, that generally agreeing measurements for

²² For similar precedents, see Rowen (1995) or Muller and Seligson (1994)

absolute levels of democracy do not necessarily mitigate difficulties in measuring relative changes in democracy.

Interconnectivity

The main exogenous variable of interest in this study, the prevalence of information revolution technologies, might seem to be easier to quantify than the endogenous democracy variable because the latter involves keeping track of tangible equipment. Yet, construct validity with this variable is no less problematic. Some difficulties are definitional, others practical. As communication technologies increasingly overlap, recalling Ithiel de Sola Pool's "convergence of modes" (1983b: 23), the question of what ought to be included as an information revolution technology becomes non-trivial to answer. Computers can send faxes, audio and video; radio waves and television cables can transmit e-mail messages.

This study focuses specifically on electronic mail because it is the technology that enables people to discourse across borders in ways that have never been possible. The term given to the metric to be used here is "interconnectivity."²³ Of the numerous e-mail networks, four are globally dominant: Internet, BITNET, UUCP and FidoNet. Record keeping has not been consistent, regular or accurate across the networks. The best available and most comprehensive data are for the numbers of nodes, which therefore constitute the basic unit of measure for interconnectivity in this report. Nodes themselves, however, are not equal, even within the same network. A node may consist of a single computer and user or an entire organization with many of both. The Matrix Information Directory Service (MIDS) tracks and maintains historic data on the size of these networks aggregated by country. The first year for which comprehensive data are available is 1993. These data were compiled by MIDS in October 1993. By this time, there was already wide self-selected variation in the levels of connectivity.

The numerical value of a country's interconnectivity variable derived from these aggregated data are calculated in three different

²³ "Interconnectivity" is a term popularized by Larry Landweber for his measures of the proliferation of global email networks.

ways throughout this study. Each is described below in the reverse order to which they will be encountered in this report. All three formulations are per capita measures that give equivalent weight to each of the four networks. For comparison among telecommunications media, since televisions, telephones and computer network nodes all have similarly large positively skewed distributions, the interconnectivity metric in this case is the logarithmic transformation of the algebraic sum of the network nodes. The discontinuity at zero of the log transformation of the interconnectivity variable is problematic because the node count in 1993 was identically zero in approximately a third of the countries. Therefore an additional binary variable is paired with the log transformation of the interconnectivity variable, to indicate the existence, or not, of electronic mail networks in each country.

The second transformation is the square root of the sum of the nodes on all four networks. This transformation preserves some of the magnitude effects without the discontinuity at the origin. Thus, every country's level of interconnectivity can be described with just one variable. This transformation is useful to describe the change in connectivity over time in the longitudinal analysis. An actual physical significance of the square root transformation is difficult to conceptualize, however.

The first form of the interconnectivity variable to be encountered is a bit more computationally intensive than the other two. The data are transformed to yield a linear metric rating of countries according to their relative extent of interconnectivity. By network, countries are ranked and scored with a number from 0 to 4. The 0 is assigned to all countries with no nodes in a particular network. The numbers 1 through 4 are assigned by quartile. The lowest quartile countries with one or more nodes in a particular network receive a score of 1. The highest quartile countries receive a score of 4. The sum of the four scores determines the level of interconnectivity on a scale from 0 to 16. The resulting scale is a useful metric to evaluate the correlation between electronic mail network interconnectivity and democracy.

In each of the three functional forms, the equal weights are justifiable because the ability to exchange e-mail is relatively generic

capability. However, assumed equivalence does introduce some theoretic difficulties. Despite the universal similarity in supporting e-mail, the networks are not necessarily comparable in other respects. For instance, the Internet, with specialized services such as the World Wide Web and remote log on, has more functional capacity than the others. Therefore, in each functional form perverse results are theoretically possible. For example, a country with relatively fewer nodes and thus a lower interconnectivity score could potentially have more communications capability than a country with relatively more nodes if a higher percentage of the former's nodes were Internet nodes.

In practice this is not likely to occur, and the analysis shows none of the potential degradation of this variable. There are several reasons why this theoretic possibility is not a practical problem. First, e-mail, not necessarily the other services, offers the specific capability that is hypothesized to have dynamic implications for democratization: multi-directional discourse across borders in a timely and inexpensive manner, unbounded by geographic and institutional constraints. Second, interconnectivity evolves. Less capable systems are similarly less expensive and easier to implement, so initially they are more prevalent. Improvements ultimately incorporate Internet capabilities. Thus, a general progression emerges in the enhancement of interconnectivity that this scale approximates. Furthermore, to the extent that interconnectivity as a predictor for democracy is measured imprecisely, the effect is reduced statistical significance of the predictor. Thus the conclusions would still be sound from the resulting *a fortiori* analysis.

The use of more than one functional form of the main exogenous variable offers two advantages in this research. Most obvious, perhaps, is that the researcher can choose the form best suited to each particular statistical test. Additionally, the independence of test results from any particular functional form further strengthens the validity of comprehensive conclusions.

Economic Development and Education

Economic development, reported here as per capita GDP (and abbreviated simply as GDP), is measured as purchasing power parity. Education is commonly paired with economic development as a predictor of democracy.²⁴ Direct causality is easy to imagine. An educated public is likely to be both more aware of political events and more capable of intervening to influence them. Indirectly, education conceivably enhances democracy by contributing to economic growth. The average number of years of schooling across the entire population is considered to be the best measure of education for analyses such as these (Rowen, 1995: 57).

Human Development and Health

Human development and health indicators also are correlated often with democracy. Most prevalent in the literature are infant mortality rates and life expectancies.²⁵ A causal argument could be posed that as citizens become more assured of their own well-being, they have more incentive and wherewithal to demand civil rights and political liberties. Although these two measures, infant mortality and life expectancy, are highly (and negatively) correlated, forward causality seems more plausible in terms of the latter.²⁶

Ethnicity and Culture

Cultural and ethnic factors also may have certain roles in democratization. Some have argued, for example, that "Homogeneous national entities may be more likely to evolve into peaceable democracies than states rent by harsh linguistic and cultural antagonisms" (Gottlieb, 1994: 101). The measure of ethnic homogeneity employed in this study is the percentage of the population that constitutes the largest ethnic group in a nation.²⁷

²⁴ For examples see Lipset (1959), Helliwell (1992), Lipset, Seong and Torres (1993), and Rowen (1995).

²⁵ For examples, see the World Bank (1991) and Boone (1994).

²⁶ United Nations Development Programme (1993) provided all the economic, education and health data which are used in these analyses.

²⁷ These data are published in the Central Intelligence Agency *World Fact Book* (1994). In a few cases, mostly in Northern Europe and

In multivariate analyses, cultural differences across countries are potentially more important than the internal cultural mix. Debates continue as to whether certain cultures or civilizations are favorably disposed or fundamentally disinclined to embrace democratic principles.²⁸ In either case, it is not difficult to believe that cultural aspects influence the characterization of the political regimes and the appreciation of personal liberties. To account for these effects, the data set includes binary variables that indicate the culture with which each country most closely identifies. Demarcation between cultures can never be exact. Inexorably, the classification of some countries into any of the regional categories may be arguable.

Six regional categories were defined that incorporated elements of geography, history and religion: Africa, Asia, Eurasia, Latin America, Middle East, and Western Europe. Western Europe includes countries that are not on the continent but which have a dominant Western European heritage: United States, Canada, Australia and New Zealand. Israel also is included in the Western European category. The Middle East category is predominantly Muslim, includes the Islamic North African states and extends from Morocco to Pakistan. Africa is defined in fairly obvious geographic terms including South Africa, minus the northern states grouped into the Middle East. Asia includes the Confucian countries and the Pacific Islands, plus India and Japan, minus North Korea. Latin America stretches from Mexico through Argentina including all the Caribbean except Cuba. Cuba and North Korea, plus Albania and the splinter states of Yugoslavia, in addition to the members of the former Warsaw Pact countries, are all grouped in the Eurasian category.

Cultural influences may also shape the ways in which various people utilize communication technologies. Therefore, some of the regression models that follow include interaction terms that are the products of the binary regional variables and the interconnectivity scores. The

Africa, these data were not available. Where applicable, the percentage of largest religious affiliation substituted for the missing data.

²⁸ For characteristic arguments from both sides of the debate, see Huntington (1993) and Schifter (1994).

resulting regression coefficients on this term describe region specific correlations between democracy and networked communication technologies.

Population

Population completes this list of independent variables. Presumably, the size of a country can influence the type and effectiveness of governance. James Madison addresses the issues and effects of country size and population on democracy in the Federalist Paper Number 10 (48). This is also the focus of recent analytic research at the National Bureau for Economic Research (Alesina and Spoloare, 1995). Furthermore, very small countries may be anomalous. Therefore, data only for countries whose populations exceeded 1,000,000 (and for which data are available) in 1993 are included in this study.²⁹ Above this threshold minimum, country populations have a skewed distribution that spans more than three orders of magnitude. Population, therefore, is best included as an independent variable in this study in its logarithmic transformation.

TEST RESULTS

Univariate Analysis

Visual evidence of a correlation between democracy and interconnectivity is provocative. Figure 4.1 shows Freedom House democracy ratings for all the countries of the world. Darker shading indicate higher levels of democracy.

²⁹ Data were either missing or relative to inconsistent entities for many of the new countries resulting from the recent breakups of Czechoslovakia and Yugoslavia. Therefore excluded from this study are Slovakia, the Czech Republic, Bosnia-Herzegovina, and in some cases Croatia, Slovenia and greater Serbia (called Yugoslavia.) Additionally, critical missing data precluded the inclusion of Taiwan.

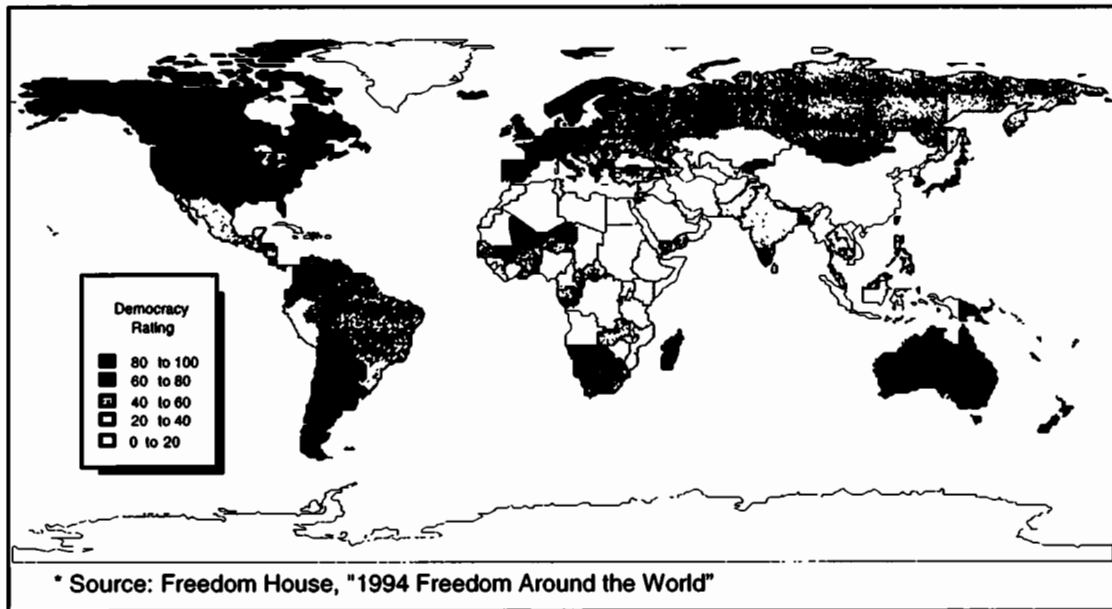


Figure 4.1-Democracy Rating

Figure 4.2 is a comparable world projection denoting prevalence of major worldwide e-mail exchanging computer networks.

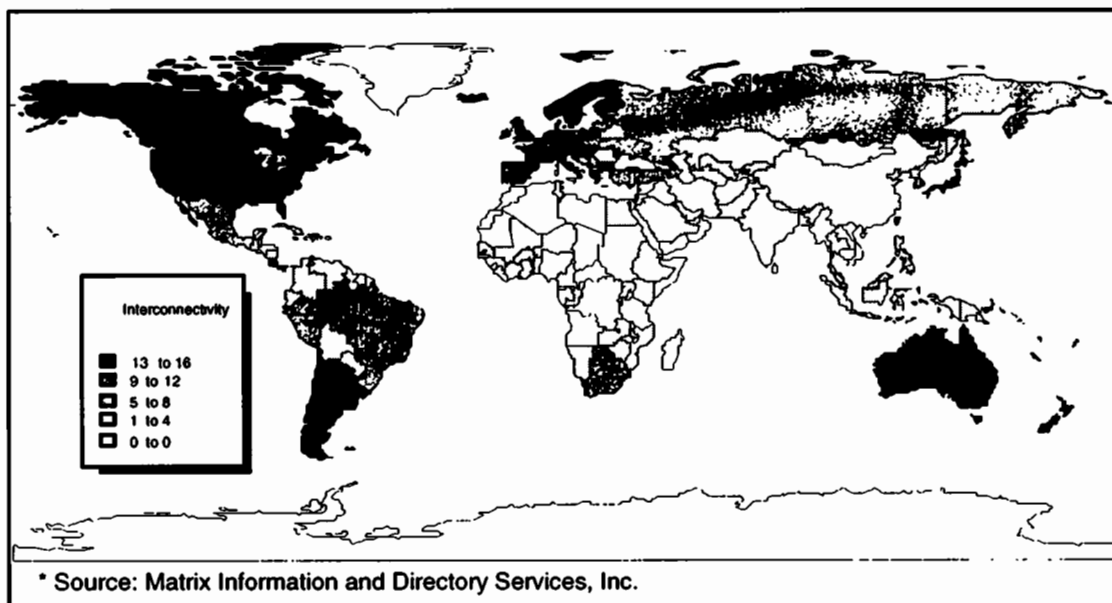


Figure 4.2-Interconnectivity Scores

Darker shading indicates a greater level of interconnectivity. Corresponding regions of dark and light on every continent reveal striking similarities between the two charts. The pattern similarity suggests a correlation between democracy and electronic network interconnectivity and inspires more rigorous further examination.

The scatterplot with an accompanying regression line in Figure 4.3 displays this relationship graphically and the following correlation matrix in Table 4.1, numerically.

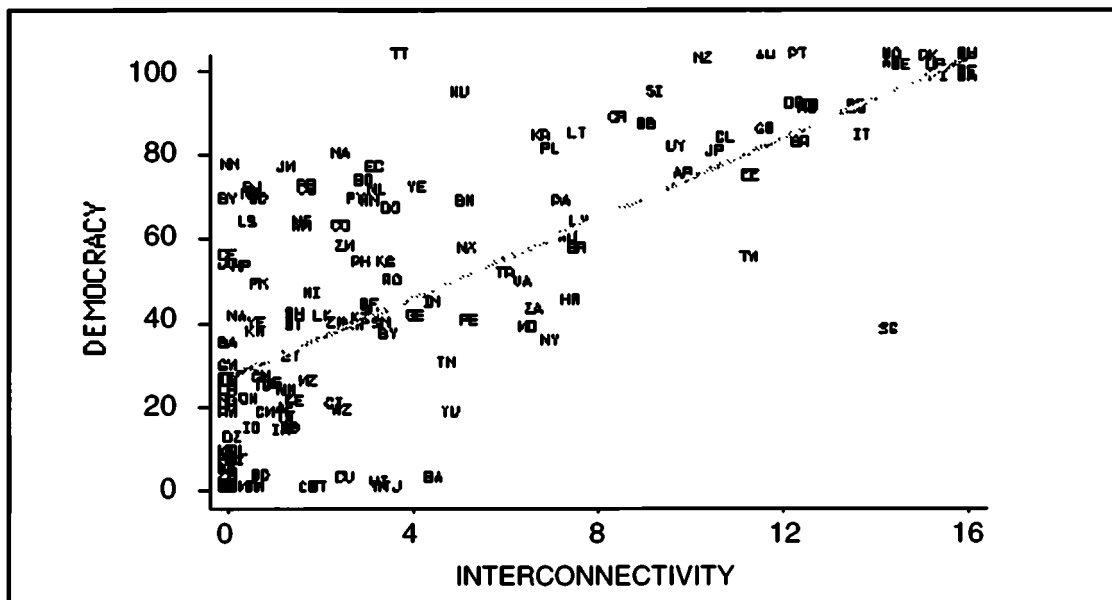


Figure 4.3-Democracy and Interconnectivity

The correlation matrix exhibits a surprisingly powerful correlation between interconnectivity and democracy. The correlation coefficient on interconnectivity is not only large, it is substantially larger than that of any other traditional predictors of democracy in this first order analysis. The coefficient on per capita GDP, which has often been considered the most important of democracy's correlates, is more than 20 percent smaller.

Table 4.1
Matrix Showing First Order Correlations

	Democracy	Interconn	Schooling	GDP	Life Expect	Ethnicity	Log(Pop)
Democracy	1.00						
Interconnectivity	0.73	1.00					
Schooling	0.67	0.82	1.00				
Per Capita GDP	0.57	0.84	0.79	1.00			
Life Expectancy	0.53	0.71	0.87	0.71	1.00		
Ethnicity	0.27	0.26	0.35	0.23	0.42	1.00	
Log(Population)	-0.09	0.07	0.10	0.05	0.07	0.11	1.00

* Sources: Freedom House, "1994 Freedom Around the World" (Democracy), Matrix Information and Directory Services, Inc. (Interconnectivity), United Nations Development Program (Per Capita GDP, Life Expectancy, Schooling), CIA World Fact Book (Ethnicity), World Telecommunication Development Report (Population)

Multivariate Regression Analysis

In large complex systems such as international politics, simple relationships can rarely tell the whole story. Multiple linear regression can be a powerful technique to provide insight into the complicated interactions. As with other techniques, the answers are often influenced by the ways in which the questions are asked. In other words, regression results can be model specific. Therefore, versions of several models offer various perspectives that can be integrated to form a comprehensive understanding of the interactions. Ultimately, the multiple linear regressions in this research provide further evidence that this correlation cannot be dismissed. Regression results of six representative and most informative models are shown in Table 4.2. Models I and II show the resulting statistical output of ordinary least squares (OLS) regressions. Model I is an inclusive model involving six predictors.

It is immediately apparent that interconnectivity emerges again as the dominant correlate. *The level of certainty that interconnectivity is a valid predictor for democracy is greater than 99.9 percent, higher than that for any other potential predictor.* Furthermore, the coefficient on interconnectivity is large. A single point increase on the interconnectivity scale corresponds to an increase of 5 points in democracy rating.

The correlation of GDP with democracy in this model is also statistically significant although at a lower level. It is important to

Table 4.2
Regression Models³⁰

LHS Variable	MODEL								
	I	II	III	IV	V		VI		
	DEM	DEM	DEM	DEM	DEM	INT	DEM	INT	GDP
N	136	141	136	141	136		136		
Adj. R-square	0.583	0.536	0.643	0.588	0.583	0.832	0.472	0.833	0.597
Constant	61.7** (3.21)	36.1*** (8.58)	35.59 (1.41)	85.40* (2.13)	61.5** (3.19)	-1.14* (-1.68)	35.9* (1.91)	-1.3 (-1.56)	1407 (1.34)
Democracy						0.0103 (0.53)		0.0126 (0.59)	-30.5 (-0.71)
Interconnectivity	4.43*** (5.81)	5.57*** (7.99)			4.72** (3.06)		8.82*** (4.02)		1478*** (7.69)
GDP	-0.0014* (-2.09)	-0.0008 (-1.25)	-0.0006 (-0.64)	0.0003 (0.37)	-0.0015 (-1.65)		-0.0034* (-1.89)	0.00009 (0.37)	
Log(Population)	-4.21** (-3.07)	-3.48** (-2.48)	-3.73** (-2.71)	-2.98* (-2.08)	-4.21** (-3.07)		-4.09** (-2.64)		
Ave. School Yrs.	4.81** (3.48)		4.81** (3.17)		4.61** (2.78)				-288 (-1.15)
Life Expectancy	-0.076* (-2.02)		-0.35 (-0.74)		-0.75* (-1.98)		-0.129 (-0.38)		
Ethnicity	0.13 (1.59)		0.18* (2.17)		0.13 (1.58)		0.12 (1.28)		
Literacy						0.034** (3.23)		0.033** (3.08)	
Telephones						0.22*** (9.45)		0.19** (2.38)	
Africa			0.11 (0.013)	-53.06 (-1.32)	t-statistics are in parentheses *** = Significance at the 0.1 percent level ** = Significance at the 1 percent level * = Significance at the 10 percent level				
Asia			-dropped-	-44.98 (-1.11)					
Eurasia			-19.22* (-1.77)	-59.82 (-1.47)					
Latin America			15.1 (1.47)	-29.92 (-0.73)					
Middle East			-17.00* (-1.83)	-62.83 (-1.55)					
West Europe			30.98 (0.80)	-dropped-					
INT*Africa			7.02** (3.34)	7.15*** (3.41)					
INT*Asia			1.93 (1.25)	2.22 (1.40)					
INT*Eurasia			3.87** (2.97)	4.93*** (3.69)					
INT*Latin America			1.98 (1.36)	3.24* (2.15)					
INT*Middle East			3.87 (1.50)	2.63 (0.98)					
INT*West Europe			0.72 (0.25)	0.98 (0.33)					

³⁰ "INT*" indicates an interaction term as the product of the interconnectivity variable and the categorical region variable.

note, however, that the sign is negative. This result could support arguments of some scholars, as well as apologists for the Pinochet and Lee Kuan Yew economic development theories, that democracy is not costless.³¹ All else being equal, such as education, interconnectivity and population, greater economic development might be available only at the expense of democratization. Alternatively, a sufficient standard of living may serve to deflect popular demands for more political power. Another possibility may be that the relationship between economic development is not linear as assumed in the regression model. Perhaps there is a simple minimum threshold; or perhaps there is an "N" shaped progression in democratic and economic development (Lipset et al., 1993); or perhaps there is some other more complicated relationship.

Years of schooling and life expectancy also show statistical significance. In the case of the latter, the negative sign is more difficult to explain although this is the weakest of the significant predictors. The coefficient on population is also significant, but the size of a country's population, largely inaccessible to foreign intervention, offers scarcely few policy recommendations (except perhaps to shine a glimmer of hope on the fractious states of Yugoslavia and the former Soviet Union that potentially may have a more democratic future than their larger predecessors.)

Model II contains a more parsimonious model retaining only GDP, the log of population and the interconnectivity variable. These fewer variables continue to explain more than 50 percent of the variation in democracy for 141 countries. After excluding three predictors, the small drop in adjusted- R^2 (0.047) underlines the relative importance of interconnectivity. Alternatively, when retaining those three variables and excluding interconnectivity, the goodness of fit measure decreases by more than twice as much. In other words, interconnectivity alone may be more important for predicting democracy level than these three independent variables combined.

The possible effects of multicollinearity also deserve attention. The correlation matrix in Table 4.1 indicates high correlations between

³¹ For more discussion on the potentially negative economic consequences of democratization, see Shin (1994) or Rothstein (1991).

many of the independent variables, particularly those of specific interest to this investigation: GDP, interconnectivity, and schooling. Collinearities between independent variables will tend to reduce the efficiency of predictors, but without bias. Reduced efficiency means that the reported statistical significance may be less than the actual because the standard errors will be excessively large. The absence of bias means that the estimated coefficients will be neither systematically higher nor lower than their "true" values. Correcting for the multicollinearity could result in an increase in the number of statistically significant predictors and further strengthen statistical inferences relative to those variables such as interconnectivity that are already significant. On the other hand, the effect of GDP might be unduly understated since some statistical significance is sacrificed to interconnectivity and to the other included variables with which GDP is collinear. The magnitude of the coefficient on GDP is, nevertheless, quite small and is presumably reported without bias in the inclusive Model I. Furthermore, comparing Models I and II, the coefficients do not vary much with the consecutive inclusion or exclusion of the other independent variables.

Regional Analysis

Models III and IV, with the addition of the regional interaction terms, are analogous to I and II, respectively. These next two models show that the positive correlation of interconnectivity with democracy is consistent across and within regional boundaries. *In all the regions the coefficient is positive. In half of the regions, the coefficient is substantial and statistically significant.*

In Africa, the coefficient on the interaction term is the highest, and the t-statistics correspond to a 1 percent level of significance or better. In Eurasia, the results are similar with a t-statistic also indicating 1 percent as the lowest significance level. The coefficient is also substantial for Latin America with a 10 percent significance level on model IV. The regression lines that accompany the six scatterplots in Figure 4.4 approximate these multivariate regression results for visual comparison. Western Europe shows the most paltry

correlation. In this region, the high interconnectivity levels do not vary much and the high democracy ratings move even less.

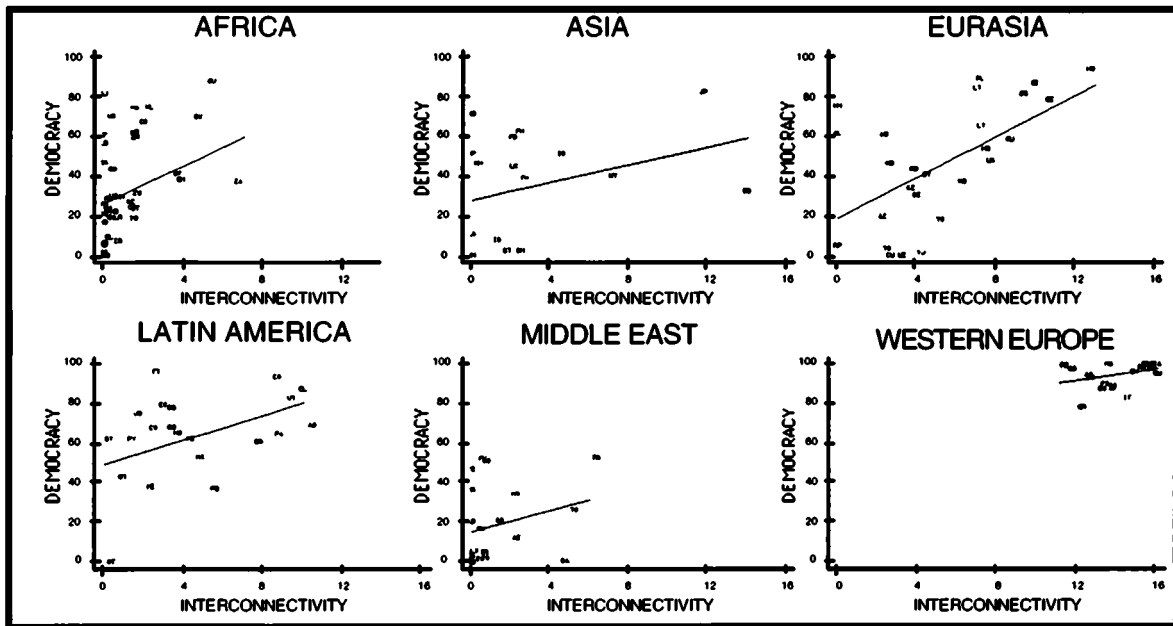


Figure 4.4-Regional Regressions and Scatterplots

It is clear that the correlation is most pronounced in those regions undergoing dramatic political transformation. This fact is important when thinking about the direction of causality. If the correlation were positive only where the establishment of democracy has long preceded the information revolution, for example in the stable Western democracies, one might be able to argue that the latter could possibly have strengthened the former but certainly one would not be able to contend that the latter caused the former. The evidence shows otherwise, however, that the relationship is weakest in regions characterized by mature democracies and strongest in regions that are cultivating nascent democracies. While the nominal purpose of these regional tests is to account for cultural influences, an important result emphasizes the time dimension, albeit indirectly through the regional variable. Instead of correlating democracy and interconnectivity in their levels, a more direct approach would be to examine the correlation between these two variables with respect to recent changes.

Longitudinal Time Analysis

In the wake of the coincident revolutions, cross-sectional investigations reveal a strong correlation between democracy and interconnectivity. These one-moment-in-time pictures cannot show which countries took part in the recent democratic revolution nor whether or not these same countries were participants in the information revolution. The salient question that the cross-sectional regressions fail to answer is how much did democracy change in countries that increased interconnectivity? Addressing this question requires temporal comparisons, the data for which, unfortunately, is largely nonexistent.

International interconnectivity data was not recorded until electronic networks were already a global phenomenon. By the time Larry Landweber began his landmark surveys in 1991, almost 100 countries and territories were already connected. It was also not until 1991 that the Internet started sampling and recording country data. Nevertheless, there was an earlier date on which interconnectivity levels are known almost exactly: in the early 1980s when electronic networking was still an American experiment almost exclusively within the research community of the United States. At the end of 1983, for instance, the level of interconnectivity for almost every country, other than the U.S. was identically zero.³² In that year, FidoNet was invented and BITNET ("Because It's Time NETwork") was still in its early stages of domestic development. The European version of BITNET, EARN (European Academic and Research Network) was also established in 1983. In the following year, the British and Japanese implemented their own national versions of the Internet, JANET (Joint Academic Research Network) and JUNET (Japanese Unix Network) respectively. In 1983, the total number of American Internet hosts was still less than one thousand, but prepared to leap three orders of magnitude to more than one million ten years latter (Hobbes, 1996). This decade, from 1983 to 1993, although somewhat arbitrarily defined also brackets the major surge in the number of democratic states at the end of the 1980s.

³² The first international connections to the ARPANET were England and Norway in 1973 but even in these countries, interconnectivity was very close to nil until after 1983 (Hobbes).

The dependent variable in the following tests is defined as the change in democracy over the period from 1983 to 1993. To compute this difference across the decade, democracy data are extracted, as before, from the Freedom House surveys and then the democracy values for 1983/84 are subtracted from the 1993/94 values. Countries which appeared after 1983 assume the value of the of the predecessor state. Namely these are the republics of the former Soviet Union and the splinter states of Yugoslavia.³³ States that merged take the value of the dominant partner, that is West Germany and North Yemen.

Possible values for the change in democracy over the decade are structurally truncated at both ends of the scale because the democracy scale is finite. In other words, if a country with the lowest democracy rating were to become less free, the value for the change would nevertheless be zero. The reasoning and value are the same if a country with the highest democracy rating were to become more free. It is, thus, apparent that comparison between values of the dependent variable can be valid only when the initial conditions are similar. Therefore, the following analysis is segmented into three groups of countries according to the Freedom House classification of countries in 1983/84: Not Free (defined by a democracy rating below 33), Partially Free (between 33 and 67) and Free (above 67).

Values of the independent interconnectivity variable can likewise be expressed in terms of change since the initial condition is universally zero in all countries except the United States. The change in interconnectivity is everywhere non-negative yet spans several orders of magnitude. Therefore, to show most clearly and represent most faithfully the relative relationships between changes in democracy and gains in interconnectivity, the latter is transformed as the square root of the number of networks per million population. The previous metric, a partially limited rank order in discrete levels from 0 to 16, mutes the magnitude effects that are important here. A natural log

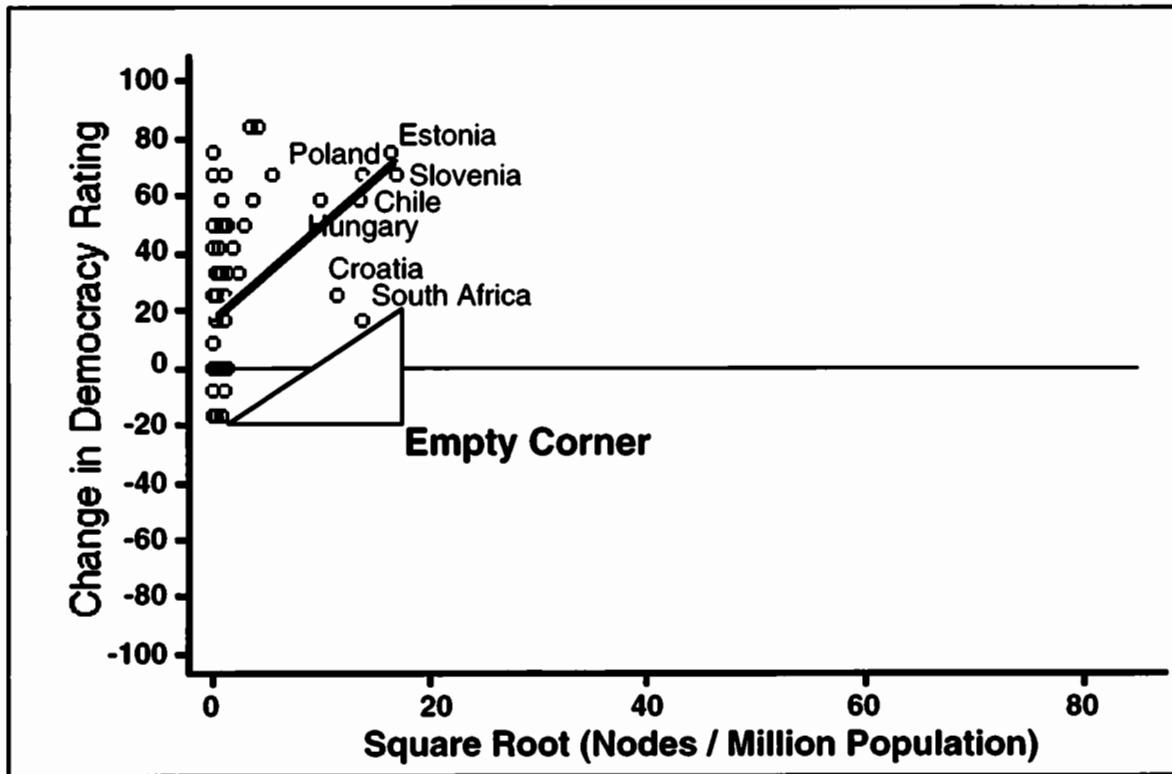
³³ As mentioned earlier, missing or inconsistent data entries precluded the inclusion of the Czech and Slovak Republics along with Bosnia-Herzegovina in these analyses. Additionally, Namibia, which did not become an independent country until March 1990, is now also among the exclusions.

transformation, which will be used later, necessitates an undesirable separate treatment of the important data where there is identically zero network connectivity. A disadvantage of the square root transformation is that there is no ready physical interpretation or explanation. However, since the purpose of this study is neither to seek the "right" functional form nor to advocate any particular functional form, consistent results using various transformations can suggest that a strong correlation is evidence of an important relationship that exists between the dependent and independent variables rather than simply a statistical accident contingent on a certain functional form.

"Not Free" in '83

Among the three groups, the countries in the "Not Free" segment are of greatest analytic interest, both from a theoretic and from a policy perspective. The theory suggests that an increase in connectivity is likely to be accompanied by an increase in democracy. These "Not Free" countries have the most room for democratic improvement. The "Not Free" countries are also those for which policy initiatives to support democracy can have the most dramatic impacts. While the need for programs to encourage democratic development in these countries is pressing, the success of such programs, historically, has been most elusive, otherwise they would have moved out of this bottom category. Additionally, this segment contains a majority of countries, more than double the number of either "Partially Free" or "Free" countries.

A finding of no correlation between the changes in democracy and interconnectivity in these least democratic countries would cast substantial doubt on the underlying basis of the correlations noted earlier. However, a strong correlation, consistent with all previous results, is apparent from the following scatterplot and corresponding regression line in Figure 4.5. Interconnectivity proves to be a statistically significant predictor of the change in democracy for the "Not Free" group at a level of confidence of more than 99.9%.



**Figure 4.5-Interconnectivity and Democratic Change
in "Not Free" Countries**

The empty corner at the bottom right of the data are perhaps more intriguing than the regression line. *There is not a single case of even a moderate increase in the level of interconnectivity that is not also accompanied by at least a moderate increase in the level of democracy.* Conversely, cater-cornered, there are numerous cases of minimally or non-connected countries becoming more democratic. The latter occurrence is expected, just as many countries became stable democracies decades or even centuries before the information revolution. This is not to say, however, that connectivity may not have had an important impact even in these states that remained relatively less connected. The demonstration and neighborhood effects emanating from more connected states may have powerfully affected political reforms throughout their sphere of influence. Conjecture notwithstanding, the dispersion of data in the top right corner does prove that electronic interconnectivity is not a necessary condition for democratization.

Sufficiency, on the other hand, is not so easily discounted in the absence of data to the contrary. The two countries closest to the edge of the "Empty Corner" are extreme cases; Croatia was at war in 1993 and South Africa suffers a bifurcated society consisting of a connected minority and a large unconnected majority. Even under these trying circumstances, both of these countries reported respectable democratic gains. Perhaps as these countries become more "normal" the "Empty Corner" will expand further.

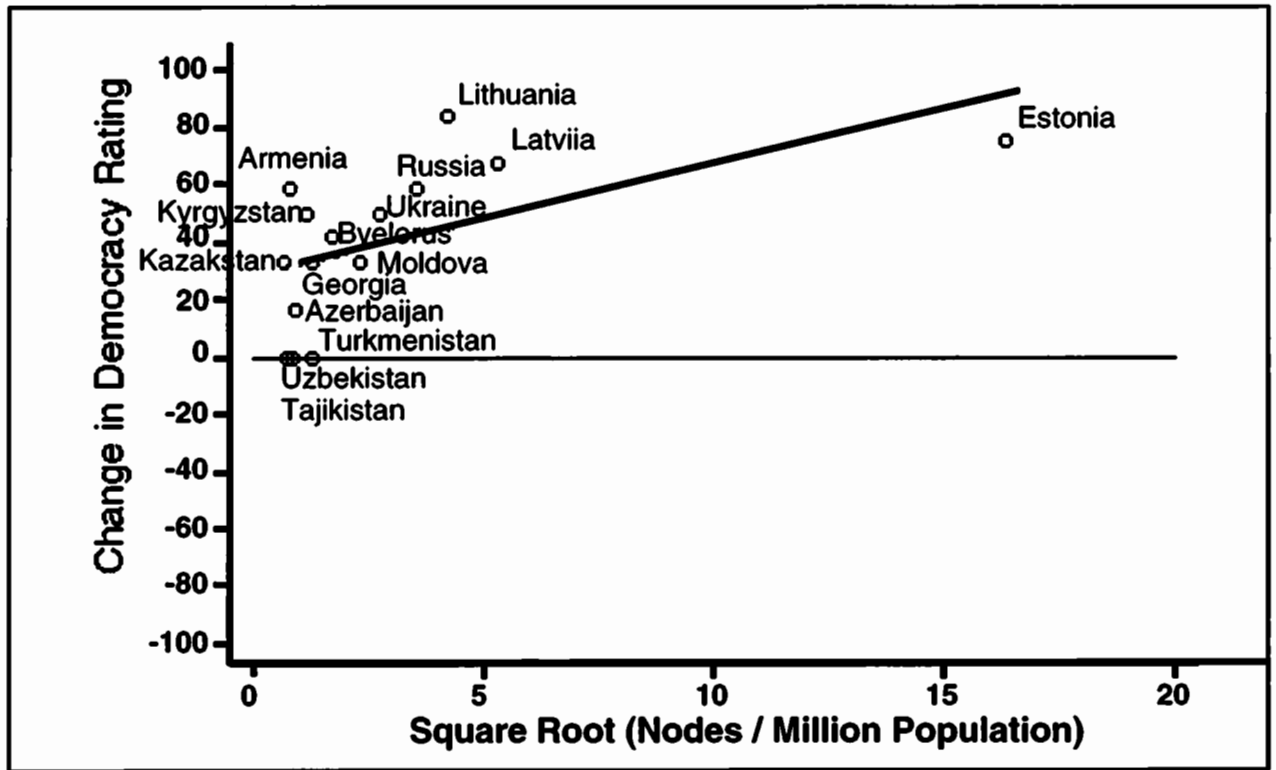
The R^2 for the regression suggests that interconnectivity can account for only about 20% of the change in democracy. The two outliers mentioned above degrade line fitting, but the points scattered at the top left-hand corner of the plot are the main cause of the relatively poor fit. The measure of goodness of fit for this regression is not as high as others have been but an increase in connectivity correlates with a steep increase in democracy level as indicated by the slope of the regression line and the magnitude of the regression coefficient. Introducing a hundred nodes per million population corresponds with a leap in democracy equal to a third of the scale.

The "Empty Corner" corroborates further the notion of the "Dictator's Dilemma," that greater connectivity can come only at the expense of political control. President Gorbachev provided the most dramatic example of an authoritarian leader who would seek economic benefits of information and communication while hoping to maintain political control. The record shown in Figure 4.5 indicates that neither he nor anyone else has yet been successful in exploiting networked communication technologies while simultaneously avoiding political liberalization.

The shatter of Gorbachev's Soviet Union resembles, in some aspects, a controlled experiment. The initial state was arguably monolithic. The constituent elements, subject to differing levels of intervention (interconnectivity and otherwise), diverged toward disparate outcomes. The results of this "quasi-experiment" are depicted in Figure 4.6. The point lying farthest to the left on this plot, representing Estonia, is one of the five points that hover around the top of the regression line in Figure 4.5. Analysis of these five points can offer additional

valuable insight. Since they describe the regression line best, if all five were from the same cohort of countries, the generalizability of the regression would be doubtful. However, the five points represent countries from four different cohorts on two continents: the former Soviet Union, former Yugoslavia, Latin America and Eastern Europe.

It is subsequently instructive to compare these five points with the others within their respective cohort of countries, such as Figure 4.6 depicts for the countries of the former Soviet Union. If the elements within a cohort were to line up vertically, no inference could be drawn because there would not have been enough variance in the independent variable to reasonably test or determine correlation. If the elements were to line up horizontally, the inference would be one of two depending on whether the horizontal line was high or low. A low horizontal regression line would be sufficient to reject the correlation hypothesis within that particular cohort. It would indicate that the independent variable had no effect on the dependent variable because even high values of the former would correspond with no change in the latter. A high horizontal line is more ambiguous. An elevated but flat distribution of points could result if an outside factor instigated change uniformly throughout the countries of the cohort, thus implying that interconnectivity was irrelevant, or it could result if interconnectivity in fact contributed to democratic change in leading countries and then the other less connected states in the cohort were influenced by the example or proximity of the leaders. Alternatively, a correlation within a cohort characterized by a line that rose to the right would be consistent with the notion that among similar countries, those which were the most interconnected were also those that experienced the greatest democratic gains. Of the four cohorts of countries, a correlation that rises to the right is clear in three of them although the samples consist of as few as three elements.

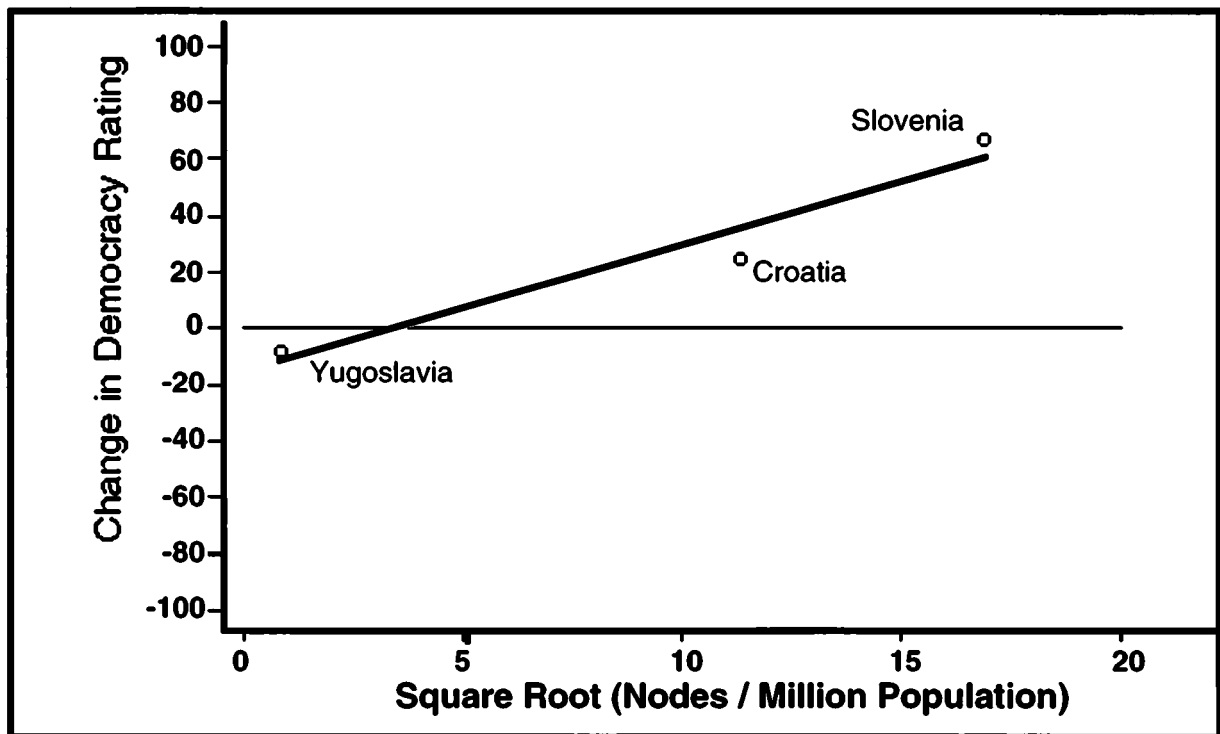


**Figure 4.6-Interconnectivity and Democratic Change
in the Former USSR**

In the case of the former Soviet Union, the cohort can be dissected to even smaller analytic units based on geography. The Baltic republics (Lithuania, Latvia and Estonia) are the most interconnected and the most democratic, tracing essentially a horizontal line at the top of the chart. None of the republics in the Caucasus (Armenia, Azerbaijan and Georgia) or Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) developed enough networking capacity to be able to test any effect relative to democracy. Nor did any of these republics register as much democratic improvement as any of the Baltic republics. The European republics (Byelorussia, Moldova, Ukraine and Russia) exhibit the most interesting scatter. A positive correlation is clearly evident. In this quasi-experiment, geography and all that is consistent within it such as economic conditions and political culture seem to matter in determining the output level of democracy from the common start, but so does communication. To some extent, the ability to

communicate across borders such as that which electronic networks facilitate is also embedded in the geographic distinctions. Historically, the Baltics have had the most access to communication with Western Europe, on which they border, and also with the rest of the world. At the other end of the spectrum, the Caucasus and Central Asia have been the most isolated. The European republics lie geographically and communicatively somewhere in the middle.

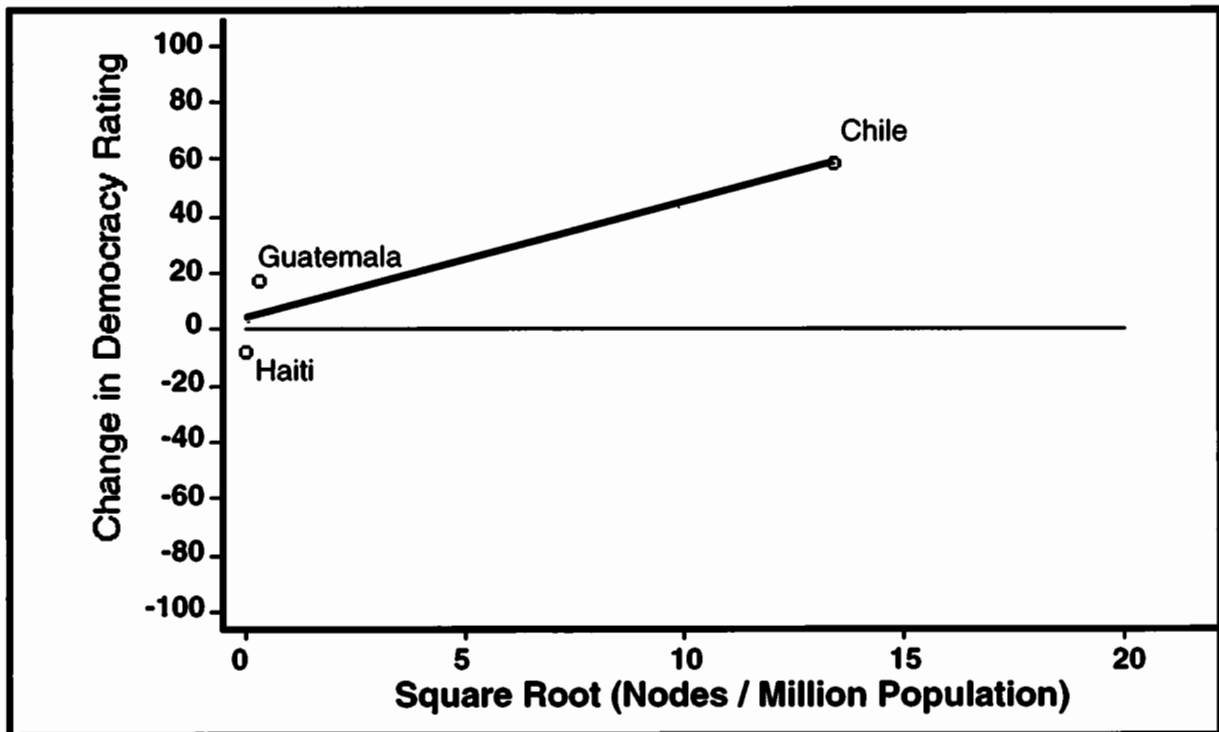
The break-up of Yugoslavia, like that of the Soviet Union, provides an opportunity to compare clearly divergent outcomes from a nominally uniform initial condition. The similarity extends to the results of this "quasi-experiment" also. The Yugoslav results shown in Figure 4.7 repeat the Soviet experience. The correlation between interconnectivity and change in democracy level is striking although the sample size is too small for strong statistical inference. Historic, economic,



**Figure 4.7-Interconnectivity and Democratic Change
in Former Yugoslavia**

demographic and cultural factors likely account for some of the correlation but perhaps not all.

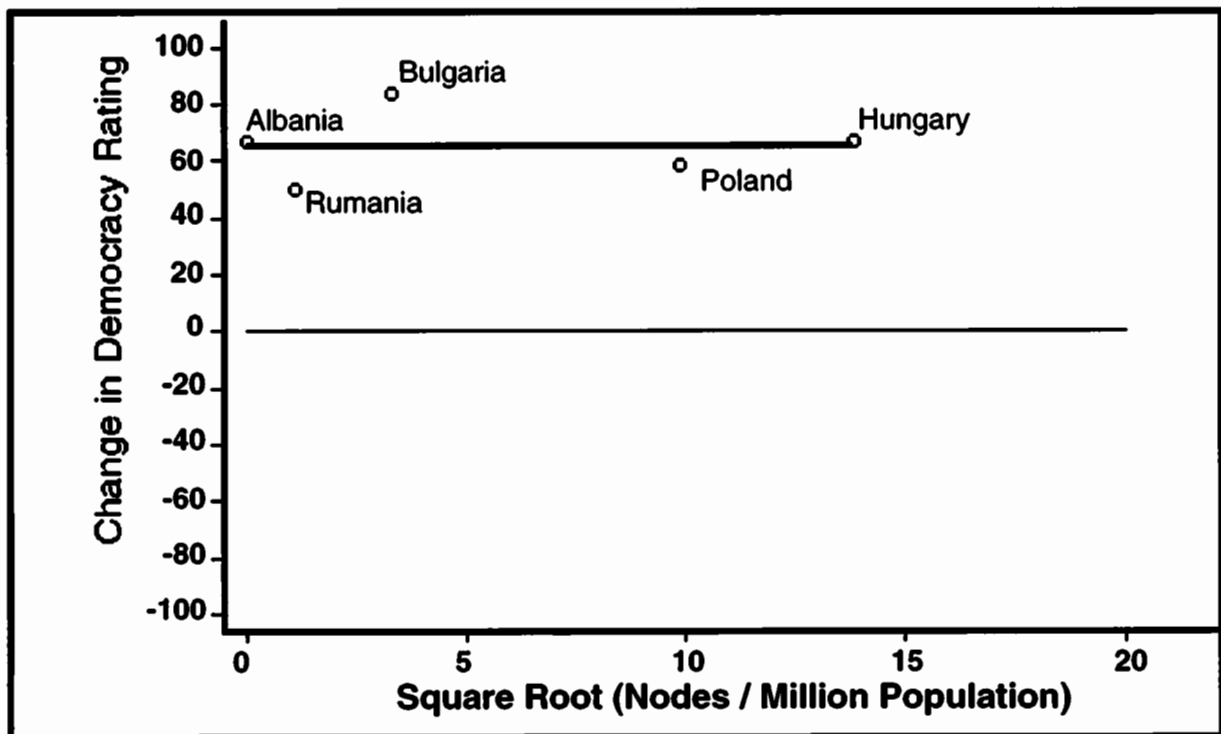
Only three countries in Latin America were classified as "Not Free" by Freedom House in 1983. There was no analogous unified starting point among these countries as there was for the Soviet Union and Yugoslavia, but the correlation shown in Figure 4.8 is again remarkably similar. Of the three countries, Chile alone became significantly interconnected. While the two unconnected countries, Haiti and Guatemala, recorded a democratic loss and minimal gain, respectively, the democracy level in Chile jumped up by more than half of the democracy scale. Of course, interconnectivity is only one of numerous plausible explanations why Chile might differ from the other two. In such a small sample, it is not possible to rule out all alternative hypotheses.



**Figure 4.8-Interconnectivity and Democratic Change
in "Not Free" Latin America**

Results from Eastern Europe (exclusive of the states of the former Soviet Union or of the former Yugoslavia) are the most ambiguous but they do not dispute either the other correlations or the hypothesis

regarding interconnectivity and democratic change. The horizontal regression line in Figure 4.9 shows no evident correlation. However, since the regression line is high, it is not possible to conclude that interconnectivity had no effect. For example, the ability to communicate may have functionally supported democratic movements in Hungary and Poland while Albania, Bulgaria and Romania simply followed the examples set by their neighbors. Hungary and Poland were among the first to move in the direction of democracy in their region and were credible role models for the rest of Eastern Europe. Furthermore, the democracy scale does not account for the stability of democracy in a given country. The prospects for sustained democracy in Albania, Bulgaria and Romania are arguably less than in Poland and Hungary. It is quite possible that within a few years a correlation between



**Figure 4.9-Interconnectivity and Democratic Change
in "Not Free" Eastern Europe**

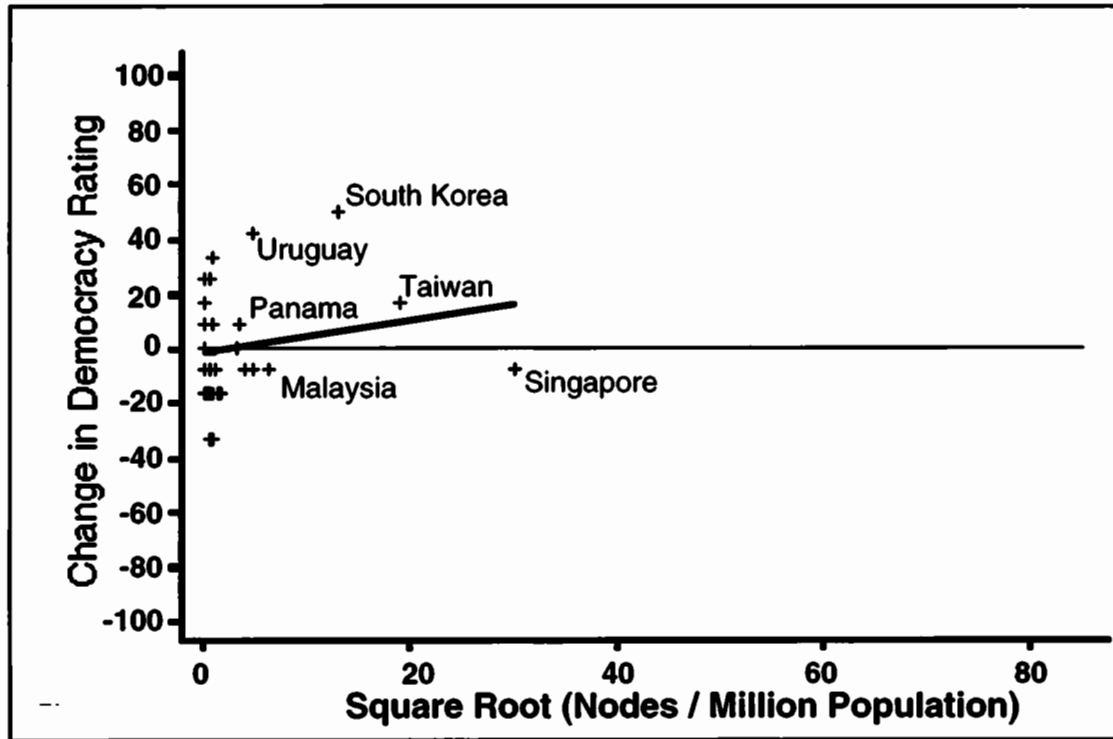
interconnectivity and net democratic change within this cohort may become more apparent. More importantly, there is also a quantitative reason, which does not rely on speculations such as these, that attests to a correlation actually stronger than it appears in Figure 4.9. The initial conditions among these countries were not identical, nor nearly so, as was previously the case. In fact, this cohort comprises two sets of polar extremes within the "Not Free" classification. Albania, Bulgaria and Romania, residing at the very bottom of the democracy scale, had significantly more room for democratic improvement than did Hungary and Poland, which were just short of the "Partially Free" threshold. Ultimately, the more interconnected countries remained equal to or more democratic than the less interconnected countries.

Interconnectivity in every other country of the "Not Free" segment (with the exception of South Africa already discussed above) was minimal or zero. Nowhere else was there enough variation in the independent variable to test the correlation hypothesis. Almost everywhere that the correlation was testable in this, the most important segment, it was strongly confirmed. A strong correlation between interconnectivity and democratic change was found in the complete population comprising 75 "Not Free" states and in three of the four salient subsets. In the single case in which correlation was not confirmed, it could not be rejected and there were statistical and speculative reasons why the correlation might actually be stronger than what was observed.

"Partially Free" in 1993

The group of partially free states is the smallest and the most diverse segment. It includes 31 countries with roughly equivalent representation each from Africa, Asia, Latin America and the Middle East. Thus, characterizing this group with a small number of variables is difficult. This is the only segment of the three in which the statistical significance of the interconnectivity variable as a predictor for democratic change is less than 99.5%.

Asia is the only region within this group that has sufficient variance of interconnectivity for meaningful hypothesis testing on a regional level. However, the dominant outlier, Singapore, is also from

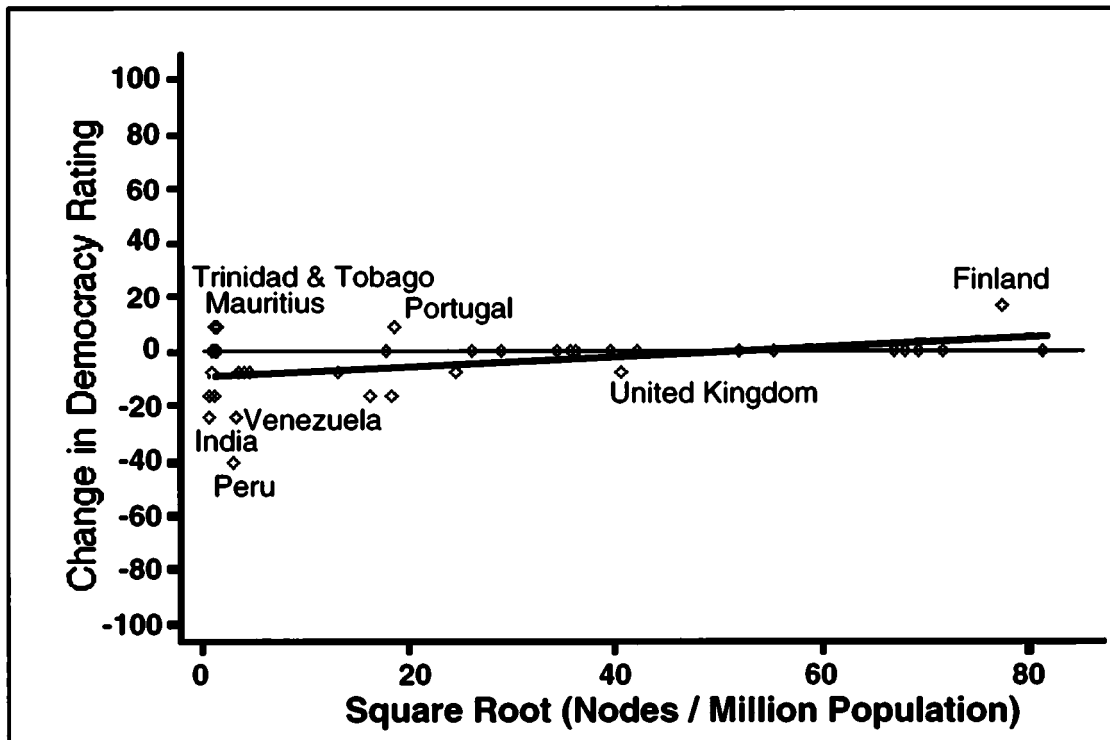


**Figure 4.10-Interconnectivity and Democratic Change
in "Partially Free" Countries**

Asia. Cohort analysis is, therefore, not helpful. The leverage of this one influential outlier is enormous. Excluding Singapore greatly alters the regression depicted in Figure 4.10. In its absence, the statistical significance on interconnectivity rebounds dramatically from about 60% to more than 95% and the R^2 goodness of fit measure quadruples.

Despite the huge deleterious effect of Singapore on the correlation between democracy and interconnectivity, Lee Kuan Yew's model does not hold a key with which to escape from the "Dictator's Dilemma." In the first place, Singapore is exceptional in many regards; it is doubtful that any other country can replicate this unique city state model. In the second, the Singaporean model may be just a temporary anomaly; it is not clear how long Singapore can resist pressure for more democracy, or more pointedly, whether the model itself can survive its charismatic but aging founder. In the third place, and most important perhaps, Singapore does not represent a counter-example that refutes the policy arguments developed here, but rather this data point simply suggests a

smaller less optimistic correlation coefficient. This realization is apparent upon examining Singapore's comparative position with other countries both in terms of interconnectivity and democracy. On a relative basis measured in percentiles with respect to the whole of the world, Singapore seems fairly well connected. On an absolute basis, however, measured in nodes per capita, Singapore is significantly less interconnected than almost all of the western democracies, some by nearly an order of magnitude. On the other hand, the level of democracy in Singapore, while not an ideal from the western perspective, would be a welcome improvement for a third of the countries and more than 40% of the world's population in 1993. In other words, if the interconnectivity level of "Not Free" countries were to be increased toward the level in Singapore, the expected value for the change in democracy in these countries would be positive whether the analysis includes Singapore or not.



**Figure 4.11-Interconnectivity and Democratic Change
in "Free" Countries**

"Free" in 1993

The segment of "Free" countries is probably the least interesting, at least from a policy point of view. Nevertheless, the trends, while subdued because these countries tend to have the most stable governments, are essentially the same as those in the previous two groups. Figure 4.11 exhibits a strong statistical significance in the correlation between interconnectivity and the change in democracy. The slope is lower because countries in this segment are less prone to dynamic political reversals. As before, some lesser connected countries improved on the democracy scale but none of the most connected countries registered substantial declines.

Figure 4.11 can be combined with the corresponding Figures 4.5 and 4.10 from the other segments to produce a useful composite for comparison. In the progression from "Not Free" to "Free" in Figure 4.12, the location of the regression lines descends and the slopes of

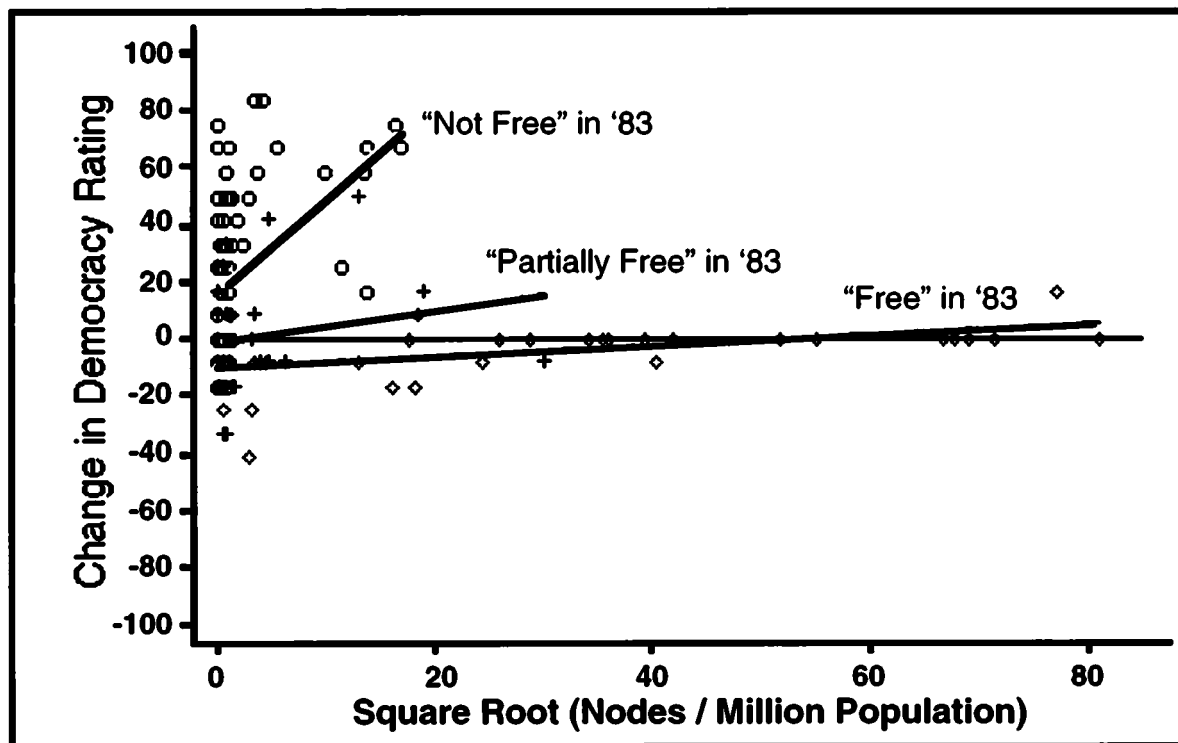


Figure 4.12-Interconnectivity and Democratic Change
Worldwide

the lines decline. The latter attests to the decreasing political volatility as democracies take root. The former results from the truncation at both ends of the democracy scale. "Not Free" states have a lot of room for improvement but there is nowhere for "Free" states to move except down although few do.

The locus of points demands a further explanation regarding the "Empty Corner." The triangular area that was empty in the "Not Free" segment representing the dilemma that dictator's face is now populated with several observations. The level of connectivity that associates with substantial democracy gains among "Not Free" states, such as 100 nets per million population, corresponds with a minimal gain in "Partially Free" states and even democracy losses in "Free" states. The general inference is that increasing levels of democracy have correspondingly greater communication requirements. The communication and information needs within established democracies, for instance, are quite profound. Meeting these needs would seem to be helpful in securing democracy. As shown above, for example, there are no points beneath the ordinate axis for levels of interconnectivity that exceed 2000 per million population. Conversely, failing to meet these needs leaves open the possibility of a democratic slide, perhaps a corollary to the Dictator's Dilemma. The countries that made a great leap into democracy recently might be expected to slip back somewhat unless or until their communication capabilities come on par with the communication needs that are associated with their new higher levels of democracy.

Multiple Endogeneity Analysis

It may be tempting to infer causality from these strong correlations between interconnectivity and both the change and level of democracy and then conclude that interconnectivity influences democratization. However, to do so would be erroneous. Causality could, in fact, flow in the opposite direction. Democracies rely on an informed public and uninhibited communication and may therefore seek interconnectivity. One way to explore this possibility analytically is through a system of simultaneous equations with multiple endogenous

variables solvable by two-stage least squares (2SLS) estimation. The two-equation model assumes that interconnectivity can influence democracy and also that democracy can influence interconnectivity. Then one can compare the relative statistical significance and sizes of the coefficients on these variables in each of the two equations. To perform these tests, both democracy and interconnectivity are both dependent variables in Model V. And to obtain a unique solution, at least one additional variable, called an "instrumental variable," must be included in the interconnectivity equation. Since electronic mail is text-based and travels over telephones lines, appropriate instruments are percent literacy and the number of telephone lines per capita. Independent variables in the democracy equation are, as before, related to economic growth, human development and ethnicity.

The resulting regression coefficients are also listed on Table 4.2. Interconnectivity remains a powerful predictor of democracy as before. *The magnitude of the coefficient for interconnectivity on democracy is even greater than in the comparable OLS model.* The level of significance remains exceptionally high. Democracy, however, does not prove to have any significant effect on interconnectivity. Thus, the suggestion that democracy leads to interconnectivity is not supported while the hypothesis that there is no positive effect cannot be rejected. The coefficient on population is still negative and significant. The coefficient on GDP is also still negative and nearly significant at the 10% level. The other outputs also closely parallel those of Model I.

The alternative explanation for the strong correlation between interconnectivity and democracy is that a third variable may influence both simultaneously. The obvious candidate is economic development, which many contend is an important prerequisite for democracy.³⁴ The correlation between interconnectivity and GDP, at 0.84, is also quite high, further encouraging tests on a hypothesis that economic development is the third variable underlying the correlation between

³⁴ The seminal work on this topic is Lipset (1959) but the literature is large. Also see, for example, Helliwell (1992), Lipset, Seong and Torres (1993), and Rowen (1995).

democracy and interconnectivity. In practical terms, equipment necessary to communicate electronically is expensive, especially for citizens of the Third World regions that Western democratization policy would be most eager to influence. The same economic resources that can finance participation in the communications revolution could conceivably fuel demands for personal rights and freedoms. In fact, in his seminal study, Lipset included measures of communication, radios, telephones and newspapers per thousand persons in his main index for wealth (1959: 75).

Again, a system of simultaneous equations can help unravel complex reciprocal effects. Model VI includes all three dependent variables: GDP, democracy and interconnectivity. The set of assumptions that this three equation model embraces are: economic development and interconnectivity predict democracy; democracy and economic development predict interconnectivity; and interconnectivity and democracy predict economic development. The relative effects of the predictors can be assessed and compared as before in Model V. The interconnectivity equation utilizes the same two instrumental variables. The independent variables in the democracy equation are the same as before except that schooling is used to serve as an instrument for economic growth in accordance with prevailing theory. Scholars surmise that education can influence democracy by increasing personal and national wealth, as discussed earlier. The 2SLS estimation results, shown in Table 4.2, are consistent with all those that preceded. *Statistical test results do not support the hypothesis that economic development is a confounding third variable. Strongly to the contrary, the regression coefficients for interconnectivity on democracy and GDP are both substantial and statistically significant, again above the 0.1 percent level. Neither democracy nor GDP proves to influence interconnectivity strongly. GDP again shows a negative correlation with democracy at a 10 percent significance level.*

In each model, without exception, interconnectivity positively correlates with democracy at high levels of significance. In each model, at lower but still high significance, the correlation with population on democracy is negative. Stories to explain both the country size and the interconnectivity phenomena may share a common

plot. Smaller size and greater interconnectivity may similarly be conducive to democracy by facilitating coordinated civic action.³⁵ Although perhaps a cliché, the often repeated analogy that information revolution technologies are shrinking the world offers appropriate insight. It is interesting to note that the most populous country that Freedom House labeled as completely "Free" became a democracy in 1776 when its population was only a fraction of its current size. At that time and at that size, available communication technologies, like pamphleteering, were sufficient to gel public support into popular action.

Comparative Media Analysis

Results presented above using advanced regression techniques involving two endogenous variables to ascertain more about the relative predictive power of each were not consistent with the hypothesis that causality flowed uniquely from democracy to interconnectivity. The various econometric models showed interconnectivity to be a statistically significant predictor of democracy, but not *vice versa*. Tangled collinearities pose an even greater problem to tease out the relative role of economic development as a third endogenous variable. Two stage least squares regressions consistently showed the predominance of interconnectivity, but the available instrumental variables such as literacy or number of telephones are all themselves highly collinear with both endogenous variables. *Thus, isolating any relationship is nearly impossible since everything is connected to everything else.* An alternative exploratory tack is to determine the relative effects of the various communication technologies on democratization. If uni-directional, bi-directional, and multi-directional technologies differ in their relative effects on democracy, the difference can be assigned

³⁵ The enormous size of India, nominally a democracy although Freedom House gives it only a "Partially Free" label, stands out as an obvious exception. As such, it exemplifies the epistemological difficulty of statistical inference to determine the causes of a complex effect like democracy. Close British tutelage as an important colony and the personality and presence of Mahatma Gandhi are likely key factors. However, the objective of this dissertation is rather more modest, to examine the effects of a single cause.

to the attributes of the technology itself since each communication technology is similarly, though not necessarily identically, dependent on wealth.

As before, this analytic approach employs regression modeling to predict democracy as a function of economic development, education, and population. Metrics for the prevalence of traditional communication technologies are additionally included for comparison. Per capita numbers of television sets proxy for uni-directional communication, telephone instruments for bi-directional and e-mail nodes for multi-directional.

Several of the variables have largely skewed distributions with a few wealthy or large countries forming a long tail far to the right. These variables are economic development, population and the three telecommunication technologies: telephones, televisions and networks. All of these variables were similarly modified for linear estimation using a natural logarithm transformation. In 1993, thirty-eight countries had zero connectivity, so a binary variable on the presence of networks was also incorporated into the analysis. Nearly complete data was available for 140 countries. For sixteen of these, including nine former Soviet republics, there were no data on the number of television sets.

The analysis involves two forms of linear regression equations. Inclusive equations contain all three communication variables. Each of the three corresponding exclusive equations includes only one of the three communication variables. The rationale for this approach is to best interpret unavoidable collinearities among the supposedly independent predictors. As discussed earlier, within the inclusive equation, collinearities between the communication variables may cause reduced predictor efficiency but no bias. In the exclusive models, on the other hand, efficiency is improved but effects of wrongly excluded variables will be assigned incorrectly to the included variables resulting in systematic bias. Together the inclusive and exclusive models provide alternative vantage points to examine the data for a comprehensive understanding of the complex interactions.

In accordance with the theory of the "Dictator's Dilemma," one could anticipate the results of the investigation as follows: multi-directional communication technologies as simultaneous enhancers of both autonomy and influence will presumably be most highly correlated with democracy; uni-directional communication technologies as the dictator's preferred communication instrument of control are likely to be the least correlated or perhaps even negatively correlated with democracy; and bi-directional communication as essential for market development will probably be somewhere in between, inconclusive or not statistically significant. *These predictable results are precisely the test outputs shown in Table 4.3.*

Table 4.3
Media Comparison Regression Results

	MODEL							
	I	II	III	IV	V	VI	VII	VIII
LHS Variable	DEM	DEM	DEM	DEM	LGDP	LGDP	LGDP	LGDP
N	126	140	126	140	126	140	126	140
Adjusted R ²	0.630	0.460	0.511	0.577	0.902	0.889	0.822	0.735
constant	71.03 (1.80)*	50.03 (1.19)	-19.39 (-0.61)	82.64 (3.50)***	7.32 (86.8)***	7.26 (113)***	6.76 (94.0)***	6.81 (63.4)***
Log(GDP)	-5.43 (-1.03)	-3.28 (-0.57)	7.30 (1.61)	-8.03 (-2.41)*				
Ave. School Yrs.	3.82 (3.35)***	6.58 (5.48)***	6.78 (5.98)***	3.69 (3.27)***	0.011 (0.567)	0.044 (2.61)**	0.121 (6.17)***	0.170 (6.85)***
Log(Population)	-4.64 (-3.43)***	-3.72 (-2.40)*	-4.70 (-3.09)**	-3.69 (-2.69)**				
Log(Telephones)	4.23 (1.28)	2.10 (1.19)			0.346 (7.54)***	0.450 (15.61)***		
Log(Televisions)	-5.47 (-2.18)*		-4.92 (-1.99)*		0.108 (2.58)*		0.353 (9.25)***	
Log(Networks)	4.10 (4.01)***			5.38 (5.40)***	0.058 (3.48)***			0.106 (4.43)***
Binary Networks	51.30 (5.57)***			57.19 (6.22)***	0.341 (2.21)*			1.050 (4.74)***

t-statistics are in parentheses

*** = Significance at the 0.1% level

** = Significance at the 1% level

* = Significance at the 10% level

The first column reports the results of the inclusive model. The network variables, both the binary variable showing presence and the continual variable showing prevalence, predict democracy with the highest recorded level of statistical significance, greater than 0.1 percent. The high statistical significance is particularly notable because the collinearities with other variables would tend to artificially decrease the apparent statistical significance. *In both cases the substantive values are also large. A one percent increase in networks associates with a 4 point increase on the democracy scale. The mere existence of networks in a country predicts a democracy level above half the entire democracy scale.* The regression coefficient on the television variable is also statistically significant but the sign is negative. Increasing the number of televisions by 1 percent corresponds with a decrease in democracy on the same order that increasing networks corresponds with an increase in democracy. The coefficient on telephones is positive but not statistically significant, therefore no meaningful conclusions can be made regarding its magnitude or sign. The exclusive models repeat results nearly identical to those of the inclusive model. The similarity suggests that the collinearities between media as predictors for democracy, beyond the part that is related to wealth, are not great. In other words, each media might influence democracy in its own distinct way.

The regression coefficient on economic development, on the other hand, oscillates dramatically between the models as a result of its collinearities with the communication variables. The only model in which GDP is statistically significant is the network exclusive model. This implies that the effects of collinearities between networks and economic development have less of a degrading effect on the slope estimate. This may indicate that the emergence of networks is less dependent on economic development. While the Maitland commission report found that, regarding telephones, "Telecommunications have often been seen as a luxury to be provided only after other investments" (Maitland 1984: 8), electronic networks might be viewed as more of a necessity which organizations, particularly those seeking to effect political change, purchase before other amenities. Notably, the sign on the

regression coefficient for economic development is again negative. This inverse relationship recalls previous analysis hinting that there might be some mutual exclusivity in the policy choices to between supporting democracy and economic growth. All else being equal, more of one might be obtainable only at the expense of the other. Of course, the coefficient on economic development in this exclusive model is biased by the excluded variables, but telephones and televisions seem to operate in different directions. They may somewhat balance each other out reducing the net bias. In the unbiased inclusive model, the sign is also negative although the standard error on the GDP variable is large.

Not only do networked communications appear as the most statistically significant predictor, they also predict the greatest percentage of the variance in democracy relative to the other communication technologies, almost sixty percent. Observing the adjusted R^2 values, the exclusive model with television predicts just over half of the variance in democracy and with telephones, even less. The inclusive model produces the highest adjusted R^2 , nearly two-thirds, again suggesting that the collinear effects among the communication technologies are not severe.

The four other models examine the opposing cutting edge of the "Dictator's Dilemma." Economic development replaces democracy as the dependent variable. Again, the empirical results are consistent with theory. Networks correlate with economic development at high levels of statistical significance, as do the other communication variables. The magnitudes of the coefficients for networks, however, are substantially less than those of either telephones or televisions. In the inclusive model with networks, the adjusted R^2 is the lowest of the four models. In effect, this corroborates the notion that networking may be less dependent on wealth than the other communication technologies. Also this lower correlation may be at least partially due to the accepted use policy (AUP) of the NSFNet. The main backbone for main networks, the NSFNet, having evolved in the research community forbade use of the networks for commercial purposes. It is expected that as policies and capabilities become more favorable to the conduct of business and trade, this correlation may strengthen over time (Jacobson, 1994).

Results of the media specific analyses lead to two important conclusions. First, national wealth cannot be a primary source of the significant correlation between democracy and interconnectivity. If it were, presumably the prevalence of telephones and televisions would produce similar statistical profiles. *Multi-directional networks are less tied with economic development than either bi-directional telephones or uni-directional televisions, yet of the three, only networks exhibit a powerful positive correlation with democracy.* Second, strengthening the relationship between networks and economic activity could well tighten the vice grip of the "Dictator's Dilemma." As such, this formulation of the choices that face anti-democratic regimes offers stimulating policy suggestions for western democracies who have national security interests in promoting global democracy.

5. IMPLICATIONS FOR POLICY

Communicating Democracy

If we in the West want to ensure that these [democratic] changes remain irreversible, the surest way to do it is to ensure that the flow of information technology does not diminish. . . . [A] people with whom we can freely communicate, who understand what is happening in the outside world and can apply its lessons to their own society will be a far more reliable partner in the maintenance of world order, both inside and outside Europe, than one which believes and knows only what its government allows.

Michael Howard, 1990

Crafting policy inexorably involves decision making in conditions of uncertainty. Both what is known and what is unknowable inform policy debates. The goal of policy research is to expand what is known while considering how that which is unknowable is likely to affect the conclusions drawn from what is known. This section summarizes this research effort's contribution to the knowledge of democracy and democratization. Then it addresses the unknowable, definitive causal relationships, this time from within the specific context of formulating policy. Various policy options are described with additional attention paid to related issues regarding implementation.

WHAT IS KNOWN

There are historic examples such as Gorbachev's Soviet Union in which it appears that new information and communication technologies, introduced or allowed for economic reasons played an additional perhaps unintended role in supporting the emergence of democracy. New communication technologies enable citizens of prospective democracies to learn more about how other societies operate. If they discover that others living elsewhere live more freely and appear to have a higher quality of life, not only in a materialistic sense, they are inclined to seek more freedom and democracy for themselves. Independent of whether one takes the position that freedom is inherently good or bad, this is precisely the reason that non-democratic regimes, from the Soviet Union

to Singapore, deem it necessary to attempt to control communication and information. There is a prophylactic measure against the infectious nature of freedom.

At the same time, new communication technologies empower citizens anywhere to broadcast charges that their own governments violate freedoms and human rights. The objective is to bring unified world pressure and public opinion to bear against repressive regimes unable to hide their misdeeds as successfully as before. That demonstrators in Tiananmen Square displayed signs written in English was not a coincidence. Cross-border communication in the defense of democracy and human rights is the activity on which citizen diplomacy groups like Amnesty International stake their success. The new technologies markedly enhance these capabilities.

As the "Dictator's Dilemma" formally suggests, governments that try to squelch the new information technologies to protect their monopoly on power do so at the peril of economic growth. It is the message that Shultz shared with Gorbachev and it is what leading analysts have begun predicting: "For nations to be economically competitive, they must allow individual citizens access to information networks and computer technology. In doing so, they cede significant control over economic, cultural, and eventually political events in their countries" (Builder, 1993: 160). A developing theory suggests that this reasonably ought to be so, that the new technologies, which combine for the first time both autonomy and influence in the same medium, couple decentralization of political power indivisibly with economic growth. While some communications media tend to assist authoritarian regimes in maintaining control, the characteristics of electronic networks are exceptional in their theoretic capability to sustain reciprocal communication on which democracy thrives.

Empirical evidence confirms the postulated correlation between democracy and network interconnectivity. Despite the inherent limitations of statistical analyses, several analytic perspectives, every model, set of statistical tests and functional form in this study is consistent with the hypothesis that interconnectivity is a powerful predictor of democracy, more than any of democracy's traditional

correlates. In univariate analysis, the correlation coefficient for interconnectivity on democracy is larger than that of any other variable. As a variable in an ordinary least squares multiple linear regression, interconnectivity is exclusively the dominant predictor. As an interaction term in conjunction with regional categorical variables, the correlation of interconnectivity with democracy is everywhere positive, and has both the largest substantive value and greatest statistical significance in regions characterized by dynamic political transformations. Interconnectivity correlates strongly not only with the level of democracy, but also with the change of democracy over ten years. The highest statistical significance is apparent among countries labeled as "Not Free." While many of the least democratic states became more democratic with becoming interconnected, not a single one of them became even moderately interconnected without also becoming more free. Within cohorts of states of shared historical conditions, a progression of greater connectivity evidently associates with advanced democratic development. Tests of alternative causal explanations invariably fail. As an endogenous variable in systems of simultaneous equations, interconnectivity always proves to be a significant predictor of democracy and economic development, but never is the reverse true. And finally, among communication media, the positive correlation with democracy of electronic networks is unique, deflating the apparent importance of potentially confounding economic factors.

WHAT IS UNKNOWNABLE

While provocative, even compelling, these results still cannot conclusively determine the direction of causality between electronic computer networks and democratization. Plausible alternative explanations introduce reasonable doubts with regard to nearly every country and every model. Uncertainty is inevitable in policy analysis but not unique to the realm of policy. Rather than the exception, it is more the rule in human activity. Analogous tasks in arenas from corporate investment to medical treatment confront those who must choose a course of action in the face of limited information. Relatively clear yet abstract objectives such as profit, health and democracy are

outcomes of complicated systems comprising myriad interacting elements. Feasible interventions are of a finite set and can be introduced only through ports at limited numbers of locations, often only at the periphery of the system. Unfortunately, the definitive causes of the desired outcome are not knowable. However, anticipated effects of potential interventions can be informed by empirical evidence such as market data, clinical surveys, and historical records. In each case, decision making is essentially placing bets in which the cleverest gambles are those that have the highest expected payoffs for the least cost. Although statistical analyses within these spheres is incapable of producing the unequivocal answers that would be desirable, the information that statistical analyses do provide establishes a reasonable basis for evaluating available options. Therefore, in a general sense, testing causality remains imperative to the conclusions and policy recommendations of this study, but proving causality never was.

More specifically, despite the persistence of the unanswerable causal question, the consistent test results that identify interconnectivity as the most powerful predictor of democracy should impress the policy debate on global democratization for several fundamental reasons. First, to the extent that the United States and other Western democracies aim to encourage the development of democracy worldwide they do so primarily through programs to improve economic development, education, health, legal reform, etc. The causal connection supporting those programs is no stronger, and in most instances quite a bit weaker, than can be inferred in the case of networked communication technology.

Second, the backdrop behind the empirical results presented here is a crescendo of anecdotal and theoretical analyses that cast electronic communications networks to the front among factors that may contribute to the development of democracy. The statistical results reinforce the validity and credibility of more subjective analyses.

Third, the causal relationships in international affairs are rarely either simple or in one direction only. The most plausible relationship between democracy and networked communication (and perhaps economic

development) is probably a virtuous circle with substantial positive feedback all around. Even if a causal argument positing an alternative explanation of the correlation, such as "greater democracy causes greater interconnectivity," could be established with completely irrefutability, the existence of such an argument does not negate or diminish the importance of a likely stream of causality in the opposite direction. Furthermore, the total weight of evidence makes denying the likelihood of the latter causal flow nearly untenable. In sum, if the United States seeks to influence international democratic development effectively and efficiently, for the purpose of its own national security interests, it ought not ignore the effects introduced by advanced capabilities to communicate and access information across borders.

WHAT TO DO

Whether the dictator admits it or not, E is in a bad situation. In some countries, like China with its "intranet," leaders might prefer to believe they can utilize information and communication technologies to serve their own economic needs while sufficiently sterilizing against the untoward social effects. The evidence and analysis here suggests that, in the long run, these hopes are unfounded.

Whether American and other democratic policymakers take advantage of it or not, they may be able to exploit the "Dictator's Dilemma" to their own favor, for the dilemma posits choices not only for the autocratic ruler but also for the democratic strategist. While the former is forced to ponder what E can do to avoid being scissored by the dual blades of the global economy and personal media, the latter ought to be thinking about what E should do to sharpen the cutting edges and make sure they work well in unison. Several types of implements are available, even in a policy environment characterized by significant budget cuts and political constraints.

- 1) The United States government can identify an institutional home to delegate the responsibility for international interconnectivity policies. Until now, the primary federal organization that has concerned itself with the development of global networks, albeit

specifically for collaboration in scientific research, has been the National Science Foundation. Current developments, however, lead in a discouraging direction. At the same time that world-wide information needs are ballooning, institutional support from the United States is deflating. NSF is phasing out its involvement because the "general purpose" (i.e. commercial) activity is assuming a dominant role over research (Goldstein, 1995).

A cabinet department such as State or Commerce could assume and expand the limited tasks that the NSF is shedding and adapt them to the new international communications circumstances. Alternatively or additionally, a more narrowly focused mission-oriented agency like USAID, could pick up some of the slack specific to its own mandate. To this end, a statement by James Russo from the Internet Data Services Group of USAID at the NATO Networking Workshop in Moscow seemed promising, although as yet unresolved, "We are currently working on a policy to decide to what level we want to get involved into telecommunication" (North Atlantic Treaty Organization, 1995: 157).

2) The United States can support international networking by providing expertise, equipment or connectivity internationally. There are numerous substantial low-cost high-payoff opportunities. A small scale, possibly covert, example that captures the imagination is the "Japanese guy" who delivered unsolicited modems to Czechoslovakian student activists "trying to coordinate the uprising across the nation." The gift-bearer summarily disappeared but several months later, "By mid-December, the Civic Forum was in power" (Sterling, 1995: 102).

On a grander scale with greater publicity, George Soros' International Science Foundation helped ignite a virtual explosion of networking in Russia that began by putting in place a direct 64 Kbps satellite link from Moscow to the United States in July 1993. This program is further expanding interconnectivity in Russia with the construction of a fiber "Moscow Backbone" (Shkarupin and Mafter, 1995). The initial ISF project budget was only \$10 million in private funds, a small sum indeed in terms of funds dedicated to U.S. national security interests.

Existing federal resources offer substantial interconnection possibilities. For example, U.S. Information Agency offices or Embassies around the world could serve as a net access point through which indigenous organizations in foreign countries could interconnect with the global information infrastructure.

3) The United States can unilaterally affect the dictator's decision and weight the scale in favor of interconnectivity and openness by augmenting the perceived and actual economic value of being interconnected. In this arena, domestic policy choices will have distant consequences. Policy options between those that could either stimulate or stifle commerce on the networks, debated within the national context, will reverberate in non-commercial ways in places far from the United States. Any autocratic conclusion and politically motivated decision to restrict information flows in China, for instance, become more economically painful to implement when the United States, its major trading partner, selects policies that support the use of electronic networks for trade and commerce.

Generally, internal U.S. policy deliberations on issues nominally related to domestic networks are thus artificially and unfortunately constrained if not conceived most broadly in the international context. In fact, the word "national" as in "National Information Infrastructure" is at best a misnomer and at worse can mislead policy in spheres where political boundaries have no practical significance.

Commerce friendly policy regarding networks is one means by which the United States can tip the economic freedom versus political control balance. Another is the demonstration effect by the world's strongest economy, which has already proven to be a powerful motivator. The greater the quantity and higher the quality of public information available on-line in America, the stronger the incentives will be everywhere to join the information revolution, both as recipients and as providers. With such projects as "Thomas," providing current legislative information on the Internet, to others such as making census data available online, the U.S. government has begun to use the networks to provide volumes of useful information aimed towards domestic audiences, thus setting a positive international example. A far-sighted

policy would consider foreign audiences as well. Translations of useful documents and information available electronically could assist aspiring democrats overseas. International human rights information could be made available from the same sources as commercial data such that one could not be blocked without also, painfully, losing the other.

There is also moral encouragement. When highly centralized countries, such as China and Saudi Arabia, take tentative steps in the direction of broader network connections, the United States should be liberal with laudatory motivation, if not material support for networking.

4) Similarly, the United States can unilaterally lower or eliminate barriers that prevent foreign access to useful information. Exemplifying the frustration that some foreign networkers encounter, "Iran's computer specialists worry as much about hard-liners in the U.S. Congress as they do about their own Islamic clergy. For some years, Iranian academics could not browse the library at, say, the University of Michigan, because the NSFNet was barred to them" (Bogert, 1995: 36).

Export controls on encryption technologies provide another distressing example. In many countries of the world, those who may have a need to guard against state scrutiny are not likely to be the "bad guys" as one might argue is the case inside the United States. Instead, those seeking to protect themselves may well be the democratic opposition or human rights activists. Prohibitions on encryption technology can inhibit communication and increase peril for such would-be networkers in their home countries.

Again, the demonstration effect is a potent force even when it provides an outstanding negative example. The Russian anti-encryption law, for instance, appears to have been inspired by aspects of the U.S. proposal. If both countries were to enforce such laws aggressively, it is perhaps an open question as to whether or not American democracy would be better off, yet it is almost certain that prospects for Russian democracy would unambiguously suffer. Thus, ultimately, both countries would be less secure.

5) The United States can more carefully align communication aid with the incentives of recipients. Traditionally, aid is provided

through government-to-government programs, although foreign counterparts may not have the right motivations to move in the direction of openness that are mutually beneficial. The implication is to reconsider the appropriateness of certain foreign assistance recipients in target countries relative to their natural inclinations. The probable outcome will be a switch in focus from governments to citizen groups whose natural inclinations are more compatible with U.S. national interests. The trend that analysts have begun to observe is that "the audience for American foreign policy is changing; it is less other national governments and more their publics--who are watching and listening and to whom the power is shifting" (Builder and Bankes, 1990: 22).

Therefore, best interconnectivity programs will probably not be of the sort that helps to advance connections through government ministries or PTTs, at least not exclusively. The central players' instincts are biased toward monopolizing power and control. A preferable strategy would target numerous private groups, schools, libraries and other non-governmental organizations. The variety of programs through which the United States supports small business development may provide useful templates for programs to seed the proliferation of electronic networks. Important policy choices will consider tradeoffs between supporting indigenous foreign NGOs or trans-national NGOs linking with local partners.

6) The United States should elevate the attention to and priority of information and communication programs in planning and implementation throughout foreign policy, from economic assistance in which the Maitland Commission found telecommunications to be a legitimate and critical element, to national security. Proponents have cogently argued that "information should now be considered and developed as a distinct fourth dimension of national power--an element in its own right, but still one that, like the political, economic and military dimensions, functions synergistically to improve the value and effects of the others" (Arquilla and Ronfeldt, 1995: 31). Whereas promoting democracy globally has been identified as a primary national security interest that the United States pursues with the tools of the three traditional dimensions and whereas this security interest is powerfully correlated

with the fourth, an information dimension, the last dimension ought rightly to be included among the others as a recognized instrument for the exercise of national power.

Overarching all of these policy recommendations is the notion of a "window of opportunity" that presently may be open but will not be so indefinitely. This notion is appropriate in considering both the ends and the means of policies recommended above. Relative to the ends, the current democratic wave may still possess forward momentum. Democratic expansion will be much more difficult to effect later, independent of the means, once the wave recedes and the momentum reverses. Because democracy seems to exhibit a quality of stickiness, the farther forward the wave can be drawn now, the brighter the outlook will be for the future. Relative to the means, communication technology in general can be a fickle ally, if history is a useful guide, due to cyclical innovation and advancement. Some technologies have favored the centralization of power, others decentralization. As the pace of change accelerates, it is not clear how long electronic networks, which associate with democracy, will be dominant, nor what will be the political tendency of successor technologies. Thus, a modest sense of urgency is extant in implementation of the policy recommendations.

On the other hand, objections may be raised against the implementation of international communication policies that arguably reflect "cultural imperialism." These are serious concerns for which there are several salient responses. First, the United States regularly attempts to influence the nature of foreign regimes with policies that range from economic assistance to troop deployments. Many of these interventions are far more invasive than simply encouraging interconnectivity. Military operations are an obvious trespass but less ostensibly imposing interventions can still be viewed as quite threatening by the ruling elite. One such example would be the National Endowment for Democracy programs that assist opposition groups to create credible political alternatives in countries without them. Even previous generation communication technologies such as state radio and television broadcasts assailing foreign borders ought to be considered

more intrusive. President Clinton's Radio Free Asia and VOA television proposal to "tell freedom's story to the people of China" is more offensive than electronic computer networks yet it is less likely to be successful. Broadcasts provide no opportunity other than passive reception subject only to the interests of the propagandist. Networks, much to the contrary, empower foreign participants to actively pursue their own communication objectives both as information producers and consumers. For the same reason, inherent "cultural imperialism," Clinton's plan is doomed to be less auspicious. Conversely, the power of the personalized media in energizing political change in Eastern Europe was augmented precisely because "It was indigenous. It did not bear the stigma of originating with the American government" (Rosenstiel, 1990: A15).

Second, with due respect to Marshall McLuhan who said "the medium is the message," this essay has specifically addressed the former but not the latter. The research and policy conclusions focus on the deliberate spread of a technology not an ideology. Democracy is a dependent output of theoretical and statistical models, not the centerpiece of a proselytization campaign. Both the theory and the statistics rest solely on the measured ability of people to communicate efficiently and effectively. The essence of the policy recommendations is merely to assist in establishing the technological and social infrastructure for robust international communications. In doing so, one can expect democratic outcomes even when diverse people everywhere are using this infrastructure for their own chosen ends.

Third, "revolutions do not occur until people learn that there is an alternative to their way of life" (Wriston, 1993: 121). It is essential to consider who might raise the charge of cultural imperialism, the dictator or *Es publicus*? Whom would the United States most want to benefit? Whose interests are closest to those of the U.S.? When the Tienanmen Square demonstrators chose Lady Liberty as their symbol for universal human rights it was obvious that cultural imperialism was not the source of their grievance or oppression.

Fourth and finally, the implementation of policies advocated here impose nothing on anyone, not even democratic governance. More subtly,

the policy goal would be to help create conditions that, were a people to choose a path toward democracy, the available means of communication would assist rather than hinder their progress.

Clearly, a hopeful metaphysical premise under-girds these arguments leading to the conclusion that inexorably the very tools required to build a strong economy will also be used to topple political autocracy. While there are competing beliefs, this premise holds that freedom and democracy are, indeed, universal values. Empirical evidence seems to support this optimism thereby reinforcing the policy recommendations. Although not everyone subscribes to this vision, Secretary Shultz was prescient in his observation regarding the "Dictator's Dilemma" and he may well be right also when he proclaimed, "History is on freedom's side" (1985: 721).

APPENDIX A
Data

cod = ISO Code
dem83 = Democracy rating in 1983
dem93 = Democracy rating in 1993
rgn = Region
pop = Population (millions)
gdp = GPD (\$ purchasing power parity)
lit = Adult Literacy Rate (%)
scl = Schooling (years)
lfe = Life Expectancy (years)
eth = Ethnicity (maximum percent)
tvs = Televisions (per hundred)
rdo = Radios (per hundred)
tel = Telephones (per hundred)
net = E-mail network nodes (per million)
con = Interconnectivity score

Country	cod	dem83	dem93	rgn	pop	gdp	lit	scl	lfe	eth	tvs	tel	nod	con
Afghanistan	AF	0.0	0.0	me	21.6	714	29.4	0.8	42.5	38	0.66	0.13	0	0
Albania	AL	0.0	66.7	ea	3.4	3000	85	6	72.2	95	8.59	1.32	0	0
Algeria	DZ	16.7	8.3	me	26.4	3011	57.4	2.6	65.1	99	7.34	3.64	0	0
Angola	AO	0.0	0.0	af	10.6	1225	41.7	1.5	45.5	37	0.62	0.46	0	0
Argentina	AR	83.3	75.0	la	33.1	4295	95.3	8.7	71	85	22.17	11.12	18.278	10
Armenia	AM	0.0	58.3	ea	3.5	4741	93	5	69	93	X	16X53	0.5714	2
Australia	AU	100.0	100.0	we	17.5	16051	99	11.5	76.5	95	47.98	47.18	5114.3	12
Austria	AT	100.0	100.0	we	7.9	16504	99	11.1	74.8	99.4	33.46	43.87	1768.5	15
Azerbaijan	AZ	0.0	16.7	ea	7.2	3977	93	5	70	82.7	X	9.13	0.8333	3
Bangladesh	BD	25.0	66.7	as	119.3	872	35.3	2	51.8	98	0.47	0.21	0	0
Belarus	BY	0.0	41.7	ea	10.4	5727	95	7	72	77.9	27.76	16.77	2.7885	4
Belgium	BE	100.0	100.0	we	10	16381	99	10.7	75.2	55	44.63	42.64	663.7	15
Benin	BJ	0.0	75.0	af	4.9	1043	23.4	0.7	47	99	0.49	0.32	0	0
Bhutan	BT	33.3	0.0	as	1.6	800	38.4	0.2	48.9	50	X	0.19	0.625	2
Bolivia	BO	75.0	75.0	la	7.8	1572	77.5	4	54.5	30	10.14	2.38	0.7692	3
Botswana	BW	75.0	75.0	af	1.4	3419	73.6	2.4	59.8	95	1.59	2.61	1.4286	5
Brazil	BR	66.7	58.3	la	156.3	4718	81.1	3.9	65.6	55	21.31	6.83	21.619	7
Bulgaria	BG	0.0	83.3	ea	9	4700	93	7	72.6	85.3	25	26	10.667	9
Burkina Faso	BF	16.7	41.7	af	9.5	618	18.2	0.1	48.2	25	0.53	0.21	0.8421	3
Burundi	BI	8.3	0.0	af	5.8	625	50	0.3	48.5	85	0.09	0.23	0	0
Cambodia	KH	0.0	41.7	as	9.1	1100	35.2	2	49.7	90	0.85	0.05	0	0
Cameroon	CM	8.3	25.0	af	12.2	1646	54.1	1.6	53.7	31	2.34	0.43	0.082	1
Canada	CA	100.0	100.0	we	27.4	19232	99	12.1	77	40	63.91	59.29	3041	16
CAR	CF	8.3	58.3	af	3.2	768	37.7	1.1	49.5	34	0.43	0.18	0	0

Country	cod	dem83	dem93	rgn	pop	gdp	lit	scl	lfe	eth	tvs	tel	nod	con
Chad	TD	0.0	25.0	af	6	559	29.8	0.2	46.5	X	0.12	0.07	0	0
Chile	CL	25.0	83.3	la	13.6	5099	93.4	7.5	71.8	95	20.49	8.92	179.78	10
China	CN	16.7	0.0	as	1176	1990	73.3	4.8	70.1	91.9	3.06	0.98	0.0026	2
Colombia	CO	75.0	66.7	la	33.4	4237	86.7	7.1	68.8	58	11.52	8.45	0.3892	3
Congo	CG	8.3	66.7	af	2.4	2362	56.6	2.1	53.7	48	0.57	0.75	0.4167	2
Costa Rica	CR	100.0	91.7	la	3.1	4542	92.8	5.7	74.9	96	15.05	10.54	14.516	9
Cote D'ivoire	CI	25.0	25.0	af	12.9	1324	53.8	1.9	53.4	23	5.95	0.67	0.2326	2
Croatia	HR	25.0	50.0	ea	4.8	X	X	X	70	78	X	19.89	129.17	8
Cuba	CU	16.7	0.0	ea	10.8	2200	94	7.6	75.4	51	20.74	3.19	0.5556	2
Denmark	DK	100.0	100.0	we	5.2	16781	99	10.4	75.8	91	53.5	57.75	1544.8	15
Dominican Republic	DO	83.3	66.7	la	7.5	2404	83.3	4.3	66.7	16	8.4	6.33	0.9333	4
Ecuador	EC	83.3	75.0	la	10.7	3074	85.8	5.6	66	55	8.33	4.97	11.682	3
Egypt	EG	50.0	16.7	me	55.2	1988	48.4	2.8	60.3	99	18.82	3.94	0.163	2
El Salvador	SV	50.0	66.7	la	5.4	1950	73	4.1	64.4	94	9.03	3.05	0	0
Estonia	EE	0.0	75.0	ea	1.5	6438	96	9	71	61.5	47.18	22.3	268	11
Ethiopia	ET	0.0	25.0	af	55.1	369	66	1.1	45.5	40	0.22	0.25	0.0181	1
Finland	FI	83.3	100.0	we	5.1	16446	99	10.6	75.5	89	49.5	53.76	5964.9	15
France	FR	91.7	91.7	we	57.4	17405	99	11.6	76.4	90	40.19	52.1	826.43	13
Gabon	GA	16.7	41.7	af	1.2	4147	60.7	2.6	52.5	X	3.79	2	0	0
Georgia	GE	0.0	33.3	ea	5.5	4572	93	5	72	70.1	X	10.41	1.6364	4
Germany	DE	91.7	91.7	we	80.6	18213	99	11.1	75.2	95.1	70.06	43.95	1254	12
Ghana	GH	8.3	41.7	af	16	1016	60.3	3.5	55	44	1.5	0.3	0.125	1
Greece	GR	91.7	83.3	we	10.3	7366	93.2	6.9	76.1	98	19.47	43.65	165.34	12
Guatemala	GT	25.0	41.7	la	9.7	2576	55.1	4.1	63.4	56	5.17	2.21	0.1031	1
Guinea	GN	16.7	25.0	af	6.1	501	24	0.8	43.5	40	0.7	0.19	0	0
Guinea Bissau	GW	16.7	25.0	af	1	841	36.5	0.3	42.5	30	X	0.65	0	0
Haiti	HT	8.3	0.0	la	6.8	933	53	1.7	55.7	95	0.46	0.66	0	0
Honduras	HN	75.0	66.7	la	5.1	1470	73.1	3.9	64.9	90	7.78	2.05	0.3922	3
Hungary	HU	25.0	91.7	ea	10.3	6116	97	9.6	70.9	89.9	41.03	12.59	191.17	13
India	IN	75.0	50.0	as	879.6	1072	48.2	2.4	59.1	72	3.26	0.77	0.2672	4
Indonesia	ID	25.0	8.3	as	184	2181	81.6	3.9	61.5	45	6.17	0.81	0.1033	1
Iran	IR	25.0	8.3	me	59.7	3253	54	3.9	66.2	51	6.81	5.02	0.0168	1
Iraq	IQ	0.0	0.0	me	19.3	3508	59.7	4.8	65	77	6.87	3.5	0	0
Ireland	IE	100.0	91.7	we	3.6	10589	99	8.7	74.6	93	29.29	30.92	589.72	14
Israel	IL	83.3	83.3	we	5.2	10840	95	10	75.9	83	26.29	35.48	1166.2	14
Italy	IT	100.0	83.3	we	57.8	15890	97.1	7.3	76	98	41.98	41.02	257.01	14
Jamaica	JM	75.0	75.0	la	2.5	2979	98.4	5.3	73.1	76.3	13.22	6.72	0.4	2
Japan	JP	100.0	83.3	as	123.4	17616	99	10.7	78.6	99.4	61.92	46.72	331.86	11
Jordan	JO	33.3	50.0	me	4.3	2345	80.1	5	66.9	98	8.1	6.47	0	0
Kazakhstan	KZ	0.0	33.3	ea	17	4716	93	5	70	41.9	X	11.36	0.4706	3

Country	cod	dem83	dem93	rgn	pop	gdp	lit	scl	lfe	eth	tvs	tel	nod	con
Kenya	KE	25.0	25.0	af	27	1058	69	2.3	59.7	22	0.92	0.77	0.1111	1
Kuwait	KW	50.0	33.3	me	2	15178	73	5.4	73.4	45	27.09	17.25	2	3
Kyrgyzstan	KG	0.0	50.0	ea	4.5	3114	93	5	68	52.4	X	7.53	1.3333	3
Laos	LA	0.0	8.3	as	4.5	1100	54	2.9	49.7	50	0.75	0.15	0	0
Latvia	LV	0.0	66.7	ea	2.6	6457	96	9	71	51.8	49.43	25.1	28.077	8
Lebanon	LB	41.7	25.0	me	3.8	2300	80.1	4.4	66.1	95	24.48	9.21	0	0
Lesotho	LS	33.3	58.3	af	1.8	1743	78	3.4	57.3	99.7	0.56	0.58	0	0
Liberia	LR	25.0	16.7	af	2.6	857	39.5	2	54.2	95	1.84	0.17	0	0
Libya	LY	16.7	0.0	me	4.9	7000	63.8	3.4	61.8	97	9.9	4.81	0	0
Lithuania	LT	0.0	83.3	ea	3.8	4913	96	9	72	80.1	X	21.9	17.632	7
Madagascar	MG	25.0	66.7	af	12.8	704	80.2	2.2	54.5	52	2.07	0.29	0.1563	1
Malawi	MW	8.3	25.0	af	10.4	640	47	1.7	48.1	55	X	0.3	0.0962	1
Malaysia	MY	50.0	41.7	as	18.8	6140	78.4	5.3	70.1	59	14.78	11.13	39.202	7
Mali	ML	8.3	75.0	af	9.8	572	32	0.3	45	50	0.12	0.13	0.8163	3
Mauritania	MR	8.3	8.3	af	2.1	1057	34	0.3	47	40	1.73	0.32	0	0
Mauritius	MU	83.3	91.7	af	1.1	5750	86	4.1	69.6	68	21.69	7.28	1.8182	5
Mexico	MX	58.3	50.0	la	89.5	5918	87.6	4.7	69.7	60	14.33	7.55	14.905	5
Moldova	MD	0.0	33.3	ea	4.4	3896	95	6	68	64.5	34.44	11.61	5.2273	6
Mongolia	MN	0.0	75.0	ea	2.3	2100	93	7	65	90	6.17	3.01	0	0
Morocco	MA	41.7	33.3	me	26.3	2348	49.5	2.8	62	99.1	7.37	2.49	0	0
Mozambique	MZ	8.3	25.0	af	14.9	1072	32.9	1.6	47.5	60	0.25	0.38	0.0671	1
Myanmar	MM	0.0	0.0	as	43.7	659	80.6	2.5	61.3	68	0.19	0.18	0	0
Namibia	NA	X	75.0	af	1.5	1400	40	1.7	57.5	86	2.61	4.07	0.6667	2
Nepal	NP	58.3	58.3	as	20.6	920	25.6	2.1	52.2	90	0.18	0.33	0	0
Netherlands	NL	100.0	100.0	we	15.1	15695	99	10.6	77.2	96	49.53	48.97	2694.4	16
New Zealand	NZ	100.0	100.0	we	3.4	13481	99	10.4	75.2	88	44.78	45.12	1289.1	11
Nicaragua	NI	33.3	41.7	la	4.1	1497	81	4.3	64.8	69	6.23	1.32	0.4878	2
Niger	NE	8.3	58.3	af	8.3	645	28.4	0.1	45.5	56	0.46	0.12	0.4819	2
Nigeria	NG	16.7	16.7	af	115.7	1215	50.7	1.2	51.5	50	2.98	0.28	0	0
North Korea	KP	0.0	0.0	ea	22.9	2000	95	6	70.4	100	10.91	4.76	0	0
Norway	NO	100.0	100.0	we	4.3	16028	99	11.6	77.1	87.8	42.2	52.74	6581.2	14
Oman	OM	16.7	16.7	me	1.6	9972	35	0.9	65.9	75	76.67	8.13	0	0
Pakistan	PK	16.7	50.0	me	115.5	1862	34.8	1.9	57.7	97	1.99	1.08	0.0519	1
Panama	PA	58.3	66.7	la	2.5	3317	88.1	6.7	72.4	70	16.54	9.71	10.8	8
Papua New Guinea	PG	83.3	66.7	as	4.1	1786	52	0.9	54.9	22	0.24	0.89	0.2439	2
Paraguay	PY	33.3	66.7	la	4.5	2790	90.1	4.9	67.1	95	5.8	2.85	0.6667	2
Peru	PE	75.0	33.3	la	21.9	2622	85.1	6.4	63	45	9.94	2.8	7.7626	5
Philippines	PH	50.0	58.3	as	64.3	2303	89.7	7.4	64.2	91.5	4.88	1.03	0.5599	3
Poland	PL	25.0	83.3	ea	38.4	4237	96	8	71.8	97.6	29.51	10.27	97.682	7
Portugal	PT	91.7	100.0	we	9.8	8770	85	6	74	97	18.44	32.27	340.31	12

Country	cod	dem83	dem93	rgn	pop	gdp	lit	scl	life	eth	tps	tel	nod	con
Romania	RO	0.0	50.0	ea	23	2800	95	7	70.8	89.1	19.48	11.19	1.1739	4
Russia	RU	0.0	58.3	ea	149.5	7968	94	9	70	81.5	40.47	15.28	12.388	8
Rwanda	RW	16.7	25.0	af	7.5	657	50.2	1.1	49.5	90	X	0.16	0	0
Saudi Arabia	SA	8.3	0.0	me	15.9	10989	62.4	3.7	64.5	90	26.9	9.86	0.7547	4
Senegal	SN	58.3	41.7	af	7.7	1248	38.3	0.8	48.3	36	3.57	0.75	1.8182	4
Sierra Leone	SL	41.7	8.3	af	4.4	1086	20.7	0.9	42	30	1.02	0.31	0.2273	1
Singapore	SG	41.7	33.3	as	2.8	15880	88	3.9	74	76.4	38.1	41.75	900.71	14
Slovenia	SI	25.0	91.7	ea	2	X	X	X	71	91	22.15	24.72	285	10
Somalia	SO	0.0	0.0	af	9.2	836	24.1	0.2	46.1	85	1.67	0.16	0	0
South Africa	ZA	25.0	41.7	af	39.8	4865	70	3.9	61.7	75.2	10.3	8.85	185.03	7
South Korea	KR	33.3	83.3	as	43.7	6733	96	8.8	70.1	100	20.99	36.3	164.97	6
Spain	ES	91.7	91.7	we	39.1	11723	97.5	6.8	77	99	39.78	35.27	308.59	13
Sri Lanka	LK	58.3	41.7	as	17.4	2405	88.4	6.9	70.9	74	3.53	0.78	0.3448	2
Sudan	SD	16.7	0.0	me	26.7	949	27.1	0.8	50.8	52	7.15	0.24	0	0
Sweden	SE	100.0	100.0	we	8.7	17014	99	11.1	77.4	94	38.28	68.03	4480.5	16
Switzerland	CH	100.0	100.0	we	6.8	20874	99	11.1	77.4	65	40.09	61.54	4623.7	16
Syria	SY	8.3	0.0	me	13	4756	64.5	4.2	66.1	90.3	6.11	3.95	0	0
Taiwan	TW	33.3	50.0	as	20.8	X	X	X	74.5	X	X	35.66	352.26	11
Tajikistan	TJ	0.0	0.0	ea	5.5	2558	93	5	70	64.9	X	4.87	0.5455	4
Tanzania	TZ	16.7	25.0	af	25.9	572	65	2	54	99	0.16	0.31	0	0
Thailand	TH	58.3	41.7	as	57.8	3986	93	3.8	66.1	75	9.36	3.1	2.0069	3
Togo	TG	16.7	16.7	af	3.8	734	43.3	1.6	54	X	1.06	0.4	0.2632	2
Trinidad & Tobago	TT	91.7	100.0	la	1.3	6604	96	8	71.6	43	31.46	13.85	0.7692	3
Tunisia	TN	33.3	25.0	me	8.4	3579	65.3	2.1	66.7	98	7.95	4.46	0.9524	5
Turkey	TR	50.0	50.0	me	58.6	4652	80.7	3.5	65.1	80	17.39	16.16	9.6246	6
Turkmenistan	TM	0.0	0.0	ea	3.8	4230	93	5	66.4	73.3	X	6.55	1.5789	3
Uganda	UG	41.7	25.0	af	18.7	524	48.3	1.1	52	17	1.04	0.15	0.0535	1
Ukraine	UA	0.0	50.0	ea	52.2	5433	95	6	71	73	X	14.52	7.5479	7
UAE	AE	33.3	16.7	me	1.7	16753	55	5.1	70.5	19	X	31.79	0.5882	2
UK	GB	100.0	91.7	we	57.7	15804	99	11.5	75.7	81.5	43.37	45.21	1638.8	12
USA	US	100.0	100.0	we	255	21449	99	12.3	75.9	83.4	81.23	56.49	4802.9	16
Uruguay	UY	41.7	83.3	la	3.1	5916	96.2	7.8	72.2	88	23.23	15.87	20.323	9
Uzbekistan	UZ	0.0	0.0	ea	21.5	3115	93	5	69	71.4	X	6.69	0.7442	4
Venezuela	VE	91.7	66.7	la	20.7	6169	88.1	6.3	70	67	17.08	8.71	10.145	4
Vietnam	VN	8.3	0.0	as	69.5	1100	87.6	4.6	62.7	87.5	3.93	0.29	0	0
Yemen	YE	33.3	41.7	me	13	1562	38.6	0.8	51.5	X	2.97	1.1	0	0
Yugoslavia	YU	25.0	16.7	ea	10.6	5095	X	X	72.6	63	16.5	17.18	0.7547	5
Zaire	ZR	8.3	8.3	af	39.9	367	71.8	1.6	53	45	0.11	0.09	0	0
Zambia	ZM	33.3	58.3	af	8.6	744	72.8	2.7	54.4	98.7	3.08	0.88	0.2326	2
Zimbabwe	ZW	41.7	33.3	af	10.4	1484	66.9	2.9	59.6	98	3.07	1.22	0.1923	2

BIBLIOGRAPHY

- Alesina, Alberto, and Enrico Spoloare, *On the Number and Size of Nations*, Working Paper No. 5050, National Bureau of Economic Research, Cambridge, Massachusetts, 1995.
- Ambah, Faiza S., "An Intruder in the Kingdom," *Business Week*, August 21, 1995, p. 40.
- "Another China Wall?" *International Herald Tribune*, January 22, 1996, p. 6.
- Arquilla, John and David Ronfeldt, *Information, Power, and Grand Strategy: In Athena's Camp*, Draft, RAND, Santa Monica, California (forthcoming).
- Arquilla, John, and David Ronfeldt, *Cyberwar Is Coming*, P-7791, RAND, Santa Monica, California, 1992.
- Aspin, Les, "Challenges to Value-Based Military Intervention," *Peaceworks* No. 3, United States Institute of Peace, February 1995, pp. 1-10.
- Bandow, Doug, "Another Crisis of Presidential War-Making," *Los Angeles Times*, July 7, 1994, B8.
- Baran, Paul, *On Distributed Communications: XI. Summary Overview*, RM-3767-PR, RAND, Santa Monica, 1964.
- Bell, Daniel, "Communication Technology-For Better or For Worse," *Harvard Business Review*, May-June 1979, pp. 20-42.
- Bogert, Carroll, "Chat Rooms and Chadors," *Newsweek*, August 21, 1995, p. 36.
- Bollen, Kenneth A. "Political Democracy and Measurement Traps," *Studies in Comparative International Development*, Vol. 25, No. 1, Spring 1990, pp. 7-24.
- Boone, Peter "Politics and the Effectiveness of Foreign Aid," London School of Economics and Center for Economic Performance, November 1994.
- Bremer, Stuart, "Dangerous Dyads: Conditions Affecting the Likelihood of Interstate War, 1816-1965," *Journal of Conflict Resolution*, Vol. 36, No. 2, June 1992, pp. 309-341.
- Bruce, Robert R., Jeffrey P. Cunard, and Mark D. Director, *From Telecommunications to Electronic Services: A Global Spectrum of*

Definitions, Boundary Lines and Structures, Butterworth Legal Publishers, Boston, Massachusetts, 1986,

Brzezinski, Zbigniew, "Moving into a Technetronic Society," *Information Technology in a Democracy*, ed. Alan F. Westin, Harvard University Press, Cambridge, Massachusetts, 1971, pp. 161-167.

Builder, Carl H., "Is It a Transition or a Revolution?" *Futures*, March 1993, pp. 155-167.

Builder Carl H., and Steven C. Bankes, *The Etiology of European Change*, P-7693, RAND, Santa Monica, California, 1990.

Builder, Carl H., and Steven C. Bankes, *Artificial Societies: A Concept for Basic Research on the Societal Impacts of Information Technology*, P-7740, RAND, Santa Monica, California, 1991.

Carothers, Thomas, "The NED at 10," *Foreign Policy*, No. 95, Summer 1994, pp. 123-138.

Carothers, Thomas, "Democracy Promotion Under Clinton," *The Washington Quarterly*, Vol. 18, No. 4 Autumn 1995.

Central Intelligence Agency, *World Fact Book 1994*, Washington D.C., 1994.

Clad, James C., and Roger D. Stone, "New Mission for Foreign Aid," *Foreign Affairs*, Vol. 72, No. 1, 1993, pp. 196-205.

Clifford, Mark, "Pressure for Change, Technology Brings a Wide Array of Growth Options," *Far Eastern Economic Review*, April 7, 1994, pp. 36-38.

Clinton, Bill, "Remarks via the President in Live Telecast to Russian People," Ostankino TV Station, Moscow, Russia, January 14, 1994a. [Also online] Available via ftp from info.tamu.edu in the directory /.data/politics/1994/tele.0114.

Clinton, Bill, "Clinton: Isolating China Wouldn't Improve Human Rights," *Los Angeles Times*, May 31, 1994b, B5.

Clinton, Bill, *A National Security Strategy of Engagement and Enlargement*, Washington D.C.: The White House, Office of the Press Secretary, July 1994c.

Clough, Michael, "Grass-Roots Policymaking: Say Good-Bye to the 'Wise Men,'" *Foreign Affairs*, Vol. 73, No. 1, January/February 1994, pp. 2-7.

Cutright, Phillips, "National Political Development: Measurement and Analysis," *American Sociological Review* 28, April 1963, pp. 253-264.

- Dahl, Robert A., *Polyarchy: Participation and Opposition*, Yale University Press, New Haven, Connecticut, 1971.
- Deutsch, Karl W., *The Nerves of Government*, London: The Free Press of Glencoe, 1963.
- Drucker, Peter "Trade Lessons from the World Economy," *Foreign Affairs*, Vol. 73 No. 1, January/February 1994, pp. 99-108.
- Dumbaugh, Kerry B., "Technology and Telecommunication in China's Democracy Movement," *CRS Review*, July-August 1990, pp. 34-35.
- Economist, "Let the Digital Age Bloom," *Economist*, February 25, 1995a, pp. 13-14.
- Economist, "Those Lies from Cyberspace," *Economist*, March 4, 1995b, pp. 37-38.
- Fagen, M. D., ed., *A History of Engineering and Science in the Bell System*, Bell Laboratories, New York, 1975.
- Farley, Maggie, "Hong Kong's Remedy for Subversive Use of Cyberspace: Pull the Plug," *Los Angeles Times*, April 25, 1995, H2.
- Freedman, David, "From Association to Causation via Regression," Technical Report No. 408, Statistics Department, University of California, Berkeley, April 22, 1994.
- Fukuyama, Francis, "Capitalism & Democracy: The Missing Link," *Journal of Democracy*, Vol. 3, No. 3, July 1992, pp. 100-110.
- Ganley, Gladys D., "Power to the People via Personal Electronic Media," *The Washington Quarterly*, Spring 1991, pp. 5-22.
- Ganley, Gladys D., *The Exploding Political Power of Personal Media*, Ablex Publishing Corporation, Norwood, New Jersey, 1992.
- Genschel, Philip, and Raymond Werle, "From National Hierarchies to International Standardization: Modal Changes in the Governance of Telecommunications," *Journal of Public Policy*, Vol. 13, No. 3, July-September 1993, pp. 203-225.
- Goldstein, Steven, "Future Prospects for NSF's International Connections Program Activities," presented at the Internet Society Annual Conference, INET'95, Honolulu, HI, June 25, 1995. [Also Online] Available WWW:<http://www.isoc.org/HMP/PAPER/178/abst.html>.
- Goodman, Sy, and Jerry Green, "Computing in the Middle East," *Communications of the ACM*, Vol. 35, No. 8, August 1992, pp. 21-25.
- Gorbachev, Mikhail, speech delivered before the United Nations, New York, trans. Novosti Press Agency Publishing House, December 7, 1988.

Gottlieb, Gidon, "Nations Without States," *Foreign Affairs*, May/June 1994, pp. 100-112.

Gurr, Ted Robert, *Polity II: Political Structures and Regime Change, 1800-1986*, Inter-University Consortium for Political and Social Research, ICPSR Database 9623, Ann Arbor, Michigan, 1990.

Hamilton, Alexander, James Madison, and John Jay, *The Federalist Papers*, Bantam Books, New York, 1982.

Helliwell, John F., "Empirical Linkages Between Democracy and Economic Growth," Working Paper No. 4066, National Bureau of Economic Research, Cambridge, Massachusetts, 1992.

Hills, J., "Telecommunications and Democracy: The International Experience," *Telecommunications Journal*, Vol. 60, No. 1, January 1993, pp. 21-29.

Hobbes, Robert, *Hobbes' Internet Timeline v2.3*. [Online] Available via WWW at <http://info.isoc.org/guest/zakon/Internet/History/HIT.html>, 1996.

Hodges, Jim, "Statistical Practice as Argumentation: A Sketch of a Theory of Applied Statistics," 1995.

Hoge, James F., Jr., "Media Pervasiveness," *Foreign Affairs*, Vol. 73, No. 4. July/August 1994, pp. 135-138.

Holland, Paul G., "Statistics and Causal Inference," *Journal of the American Statistical Association*, Vol. 81, No. 396, December 1986, pp. 945-970.

Howard, Michael "The Remaking of Europe," *Survival*, Vol. 32, No. 2, May/April 1990, pp. 99-106.

Huber, Peter, *Orwell's Revenge: The 1984 Palimpsest*, The Free Press, New York, 1994.

Huntington, Samuel P., "Will More Countries Become Democratic?" *Political Science Quarterly*, Vol. 99, No. 2, Summer 1984, pp. 193-218.

Huntington, Samuel P. "Democracy's Third Wave," *Journal of Democracy*, Vol. 2, No. 2, Spring 1991a, pp. 12-34.

Huntington, Samuel P., *The Third Wave: Democratization in the Late Twentieth Century*, University of Oklahoma Press, Norman, Oklahoma, 1991b.

Huntington, Samuel P., "The Clash of Cultures," *Foreign Affairs*, Summer 1993, pp. 22-49.

Huxley, Aldous, *Brave New World Revisited*, Harper & Row, Publishers, New York, 1958.

Inkeles, Alex, "Introduction: On Measuring Democracy," *Studies in Comparative International Development*, Vol. 25, No. 1, Spring 1990, pp. 3-6.

Jacobson, Thomas L., and Scott Zimpfer, "Noncommercial Computer Networks and National Development," *Telematics and Informatics*, Vol. 10, No. 4, 1994, pp. 345-358.

Jagers, Keith, and Ted Robert Gurr, "Tracking Democracy's Third Wave with Polity III Data," *Journal of Peace Research*, Vol. 32, No. 4, 1995, pp. 469-482.

Jipp, A., *Wealth of Nations and Telephone Density*, *Telecommunications Journal*, July 1963, pp. 199-201.

Kaplan, Roger, ed., *Freedom Review*, Vol. 25, No. 1, January 1994.

Kedzie, Christopher R., "International Implications for Global Democratization", in Robert Anderson et al., *Universal Access to E-Mail: Feasibility and Societal Implications*, MR-650-MF, RAND, Santa Monica, California, 1995a.

Kedzie, Christopher R., *Third Person Animate Singular, Gender-Neutral*, P-7896, RAND, Santa Monica, California, 1995b.

Kedzie, Christopher R., "A Brave New World or a New World Order?" in *Research Outposts on the Information Highway*, Sara Kiesler (ed.), Erlbaum, forthcoming 1996.

Keller, Kenneth H., "Science and Technology," *Foreign Affairs*, Fall 1990, pp. 123-138.

Landweber, Larry, *International Connectivity*, Versions 2 through 10, February 15, 1994, Available online via ftp at ftp.cs.wisc.edu in the connectivity_table directory.

Laqueur, Walter, "Save Public Diplomacy," *Foreign Affairs*, Vol. 73, No. 5, September/October 1994, pp. 19-24.

Levin, Norman D., ed., *Prisms & Policy: U.S. Security After the Cold War*, MR-365-A, RAND, Santa Monica, California, 1994.

Lewis, Peter H., "On the Internet, Dissident's Shots Heard 'Round the World," *New York Times*, June 5, 1994, p 18.

Lipset, Seymour Martin, "Some Social Requisites of Democracy: Economic Development and Political Legitimacy," *American Political Science Review*, No. 53, 1959, pp. 69-105.

- Lipset, Seymour Martin, Kyoung-Ryung Seong, and John Charles Torres, "A Comparative Analysis of the Social Requisites of Democracy," *International Social Science Journal*, 45, May 1993, pp. 155-175.
- Mackie-Mason, Jeffrey K., and Hal Varian, "Pricing the Internet," prepared for the conference "Public Access to the Internet," JFK School of Government, May 1993.
- Maier, Charles S., "Democracy and Its Discontents," *Foreign Affairs*, Vol. 73, No. 4, July/August 1994, pp. 48-64.
- Maitland, Donald, *The Missing Link*, Report of the Independent Commission for World-Wide Telecommunications Development, International Telecommunications Union, Geneva, Switzerland, December 1984.
- Malamud, Carl, *Exploring the Internet*, Prentice Hall, Englewood Cliffs, New Jersey, 1993.
- Matrix Information and Directory Services, Inc., unpublished data, October 1993.
- May, Ernest R., "Who Are We?" *Foreign Affairs*, Vol. 73, No. 2, March/April 1994, pp. 134-138.
- Merit, Inc., Internet statistics, available online via ftp nic.merit.edu in the directory nsfnet/statistics.
- Moaz, Zeev, and Nasrin Abdolali, "Regime Types and International Conflict, 1816-1976," *Journal of Conflict Resolution*, Vol. 33, No. 1, March 1989, pp. 3-35.
- Moaz, Zeev, and Bruce Russett, "Normative and Structural Causes of Democratic Peace, 1946-1986," *American Political Science Review*, Vol. 87, No. 3, September 1993, pp. 624-638.
- Mufson, Steven, "Dress Code: Jiang's Clothes Reflect His Political Thinking," *International Herald Tribune*, February 5, 1996, p. 1.
- Muller, Edward N., and Mitchell A. Seligson, "Civic Culture and Democracy: The Question of Causal Relationships," *American Political Science Review*, Vol. 88, No. 3, September 1994.
- Muravchuk, Joshua, *Exporting Democracy: Fulfilling America's Destiny*, The AEI Press, Washington, D.C., 1991
- Negroponte, Nicholas, "The Fax of Life: Playing a Bit Part," *Wired*, April 1994, p. 134.
- Nelson, Jack, and Jim Mann, "Carter's Foreign Policy Exploits Cause Unease," *Los Angeles Times*, September 22, 1994, A1.

North Atlantic Treaty Organization, *Proceedings of the NATO Advanced Networking Workshop*, Moscow, Russia, September 29 - October 1, 1995.

Office of Technology Assessment, *Global Communications: Opportunities for Trade and Aid*, OTA-ITC-642, Washington, D.C., U.S. Government Printing Office, September 1995.

Olson, Mancur, "Dictatorship, Democracy, and Development," *American Political Science Review*, Vol. 87, No. 3, September 1993, pp. 567-576.

Peres, Shimon, Address at Foreign Ministry seminar marking the First Anniversary of the signing of the Declaration of Principles, September 11, 1994.

Pitroda, Sam, "Development, Democracy, and the Village Telephone," *Harvard Business Review*, November-December 1993, pp. 66-79.

Pool, Ithiel de Sola, *Forecasting the Telephone: A Retrospective Technology Assessment*, Ablex Publishing Corporation, Norwood, New Jersey, 1983a.

Pool, Ithiel de Sola, *Technologies of Freedom*, The Belknap Press of Harvard University Press, Cambridge, Massachusetts, 1983b.

Press, Larry, "Relcom, An Appropriate Technology Network," *Proceedings of INET '92, International Networking Conference, Kobe, Japan, June, 1992*, Internet Society, Reston, VA. [Also Online] Available at <http://som1.csudh.edu/ssp/evangela/cis275ra.htm>, 1992.

Quarterman, John S., and Smoot Carl-Mitchell, "What Is the Internet, Anyway?" *Matrix News*. Vol. 4, No. 8, August 1994.

Rheingold, Howard, *The Virtual Community*, Addison-Wesley Publishing Company, Reading Massachusetts, 1993.

Richards, Lynn, "Greening the Globe: The Magic of Electronic Mail," *Surviving Together*, Winter 1993, pp. 20-21.

Ronfeldt, David, *Institutions, Markets and Networks--A Framework about the Evolution of Societies*, DRU-590-FF, RAND, Santa Monica, California, 1993a.

Ronfeldt, David, and Cathryn L. Thorup, "North America in the Era of Citizen Networks, State, Society, and Security," DRU-459-RC/FF, RAND, Santa Monica, California, 1993b.

Rosenstiel, Thomas B., "TV, VCRs Fan Fire of Revolution," *Los Angeles Times*, January 18, 1990, pp. A1-A15.

Roszak, Theodore, *The Cult of Information*, Pantheon Books, New York, 1986.

Rothstein, Robert L., "Democracy, Conflict, and Development in the Third World," *The Washington Quarterly*, Spring 1991, pp. 43-63.

Rowen, Henry S., "The Tide Underneath the 'Third Wave,'" *Journal of Democracy*, Vol. 6, No. 1, January 1995, pp. 52-64.

Salamon, Lester M., "The Rise of the Nonprofit Sector," *Foreign Affairs*, Vol. 73, No. 4, July/August 1994, pp. 109-122.

Schifter, Richard, "Is There a Democracy Gene?" *The Washington Quarterly*, Summer 1994, pp. 121-127.

Schimpp, Michele Wozniak, "A.I.D. and Democratic Development: A Synthesis of Literature and Experience," Agency for International Development, Center for Development Information and Evaluation, May 12, 1992. [Also Online] Available via ftp from [gaia.info.usaid.gov/0/promoting_demo/docs/iss_brief/ibdemoc.txt](ftp://gaia.info.usaid.gov/0/promoting_demo/docs/iss_brief/ibdemoc.txt).

Shane, Scott, *Dismantling Utopia: How Information Ended the Soviet Union*, Ivan R. Dee, Inc., Chicago, Illinois, 1994.

Shin, Doh Chull, "On the Third Wave of Democratization: A Synthesis and Evaluation of Recent Theory and Research," *World Politics*, No. 47, October 1994, pp. 135-170.

Shkarupin, V., and I. Mafter, "International Science Foundation Telecommunications Program," presented at the Internet Society Annual Conference, INET'95, Honolulu, HI, June 25, 1995. [Also Online] Available WWW:<http://www.isoc.org/HMP/PAPER/160/abst.html>.

Shultz, George P., "New Realities and New Ways of Thinking," *Foreign Affairs*, Spring 1985, pp. 705-721.

Shultz, George P., *Turmoil and Triumph: My Years as Secretary of State*, Charles Scribner and Sons, New York, 1993.

Skolnikoff, Eugene B., *The Elusive Transformation: Science Technology and the Evolution of International Politics*, Princeton University Press, Princeton, New Jersey, 1993.

Soldatov, Alexei (President, Relcom), remarks presented at the New Media for a New World Conference in Moscow, July 29, 1994. [Also Online] Available via <ftp://ftp.eskimo.com/GlasNews/nm.nw/russnet>.

Stapleton, Ross, "Opening the Doors to the Global Village," *IEEE Computer*, July 1992. [Also Online] Available via ftp from [dhvx20.csudh.edu/directory/global_net](ftp://dhvx20.csudh.edu/directory/global_net).

Starr, Harvey, "Diffusion Approaches to the Spread of Democracy in the International System," *Journal of Conflict Resolution*, Vol. 35 No. 2, June 1991 pp. 356-381.

- Starr, S. Frederick, "Soviet Union: A Civil Society," *Foreign Policy*, No. 70, Spring 1988, pp. 26-41.
- Sterling, Bruce "A Short History of the Internet," *The Magazine of Fantasy and Science Fiction*, February 1993.
- Sterling, Bruce, "Triumph of the Plastic People," *Wired*, January 1995, pp. 101-158.
- Tehrani, Majid, "Iran: Communication, Alienation , Revolution," *Intermedia*, International Institute of Communications, London, Vol. 7, No. 2, March 1979, pp. 6-12.
- Tehrani, Majid, "From Silk to Satellite: A Letter from Central Asia," *Fletcher Forum of World Affairs*, Vol. 19, No. 2, Summer 1995, pp. 147-167.
- Tempest, Rone, "The Internet Scales Great Wall of Communication with China," *Los Angeles Times*, April 25, 1995, p H2.
- Thorup, Cathryn L., *Redefining Governance in North America: The Impact of Cross-Border Networks and Coalitions on Mexican Immigration into the United States*, DRU-219-FF, RAND, Santa Monica, California, 1993.
- Toffler, Alvin, *The Third Wave*, Bantam Books, Inc., New York, 1980.
- Travica, Bob, and Matthew Hogan, "Computer Networking in the xUSSR: Technology, Uses and Social Effects." [Online] Available via ftp from dhvx20.csudh.edu, directory global_net, 1992.
- United Nations Development Programme, *Human Development Report*, Oxford University Press, New York, 1993.
- Valauskas, Edward J., "On the Nets and on the Streets: A First-Person Report of the Soviet Coup," *Online*, January, 1992, pp. 41-47.
- Voronov, Andrei, remarks presented at the New Media for a New World Conference in Moscow, July 29, 1994. [Also Online] Available via ftp://ftp.eskimo.com/GlasNews/nm.nw/russnet.
- Watson, Russell, John Barry, Christopher Dickey, and Tim Padgett, "When Words Are the Best Weapon," *Newsweek*, February 27, 1995, pp. 36-40.
- Weart, Spencer R., "Peace Among Oligarchic and Democratic Republics," *Journal of Peace Research*, Vol. 31, No. 3, 1994, pp. 299-316.
- Wolf, Charles Jr., *Foreign Aid: Theory and Practice in Southern Asia*, Princeton University Press, Princeton, New Jersey, 1960.
- World Bank, *World Bank Development Report*, The World Bank, Washington D.C. 1991.

Wright, David, "Mobile Satellite Communications in Developing Countries: The Role of Inmarsat," *Telecommunications Policy*, January/February 1994, pp. 5-11.

Wriston, Walter B., "Technology and Sovereignty," *Foreign Affairs*, Vol. 67, No. 2, Winter 1988/89, pp. 63-75.

Wriston, Walter B., "The Twilight of Sovereignty," *Fletcher Forum of World Affairs*, Vol. 17, No. 2, Summer 1993, pp. 117-130.

Yupeng, Pan, IT & Telecom Keys to Promoting China's Economic Reform, *Transnational Data and Communications Report*, November/December 1992, pp. 19-24.