Introduction: CyberPolitics in International Relations

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The Issue in Context

This issue of the *International Political Science Review* is devoted to new challenges and opportunities—as well as attendant problems—created by new information and communication technologies and applications in political science, with special attention to implications for international relations. The challenges are shaped in large part by the convergence of three trends: globalization, world-wide electronic connectivity, and emergent practices in knowledge networking. Increasingly, this convergence is reinforcing the role of knowledge in the global economy and in power politics. While each of these trends, individually, is having an impact on social discourse and modes of interaction, jointly they may be shaping powerful new parameters of politics, both nationally and internationally. They may also affect our ways of generating and managing knowledge, creating new knowledge, and even framing or re-framing the core concepts in political science. Central among these concepts, of course, are power, politics, representation, accountability, conflict, contention, and a host of others. In the context of the broader social sciences, these trends are also transforming traditional knowledge practices, creating new research modes, and accelerating "new knowledge."

It would certainly be misleading, if not dangerous, to overestimate the meaning or impact of these developments; it would be also unwise to err in the opposite direction, by underestimating the matters at hand. In the absence of a clear precedent—and established methods for dealing with such uncertainties—the most reasonable course is to sample the nature of these developments, establish baselines to the extent possible, and record some key milestones in both the scholarly and the policy communities as they manage adjustments to these convergent trends.

The New Semantics

The focus of this issue is on CyberPolitics, a concept that reflects realities at the conjunction of two processes (or realities): those pertaining, on the one hand, to

human interactions surrounding determination of "who gets what, when, and how," and on the other, to the formation of virtual spaces that assume realities of their own. Despite continued contentions, there is a general scholarly understanding about the meaning of "politics," the second part of the newly coined term. It is the uncertainties and ambiguities surrounding the first part, "cyber," and the connectivity that shapes the joint term in the newly constructed semantic. At the core is the created reality of *cyberspace*. Intuitively, it is relatively easy to form a general understanding of what is meant by cyberspace. Far more difficult, however, is to acquire a sufficiently detailed understanding to encompass relevant features.

The difficulties inherent in rigorously defining cyberspace are well illustrated by the question: "How does 'cyberspace' relate to 'virtual reality (VR),' 'data visualization,' 'graphic user interfaces GUIs),' 'networks,' 'multimedia,' 'hyper-graphics,' and other such catchwords for recent developments in computing technology?" (Benedikt, 1994: 122); it is the answer that illustrates the perva-siveness of the new space. "More than this," adds Benedikt, "in some sense "cyberspace" *includes* them all and much of the work being done under their rubrics." More formally, cyberspace is generally understood to refer to

> ... a globally networked, computer-sustained, computer-accessed, and computer-generated, multidimensional, artificial, or "virtual" reality. In this reality, to which every computer is a window, seen or heard objects are neither physical nor, necessarily, representations of physical objects but are, rather, in form, character and action, made up of data, of pure information. This information derives in part from the operations of the natural, physical world, but for the most part it derives from the immense traffic of information that constitute human enterprise in science, art, business, and culture (Benedikt, 1994: 123).

In practice this refers also to the use of advanced electronic technologies for purposes of shaping ideas, exchanging information, exploring options, and broadening access to knowledge, evidence, and alternative modes of reasoning and reflection.

The implications for political science pertain to the use of electronic technologies for purposes of communication, participation, and decision. This definition presumes the existence and operation of significant infrastructure-enabling patterns and modalities of utilization, managed by evolving norms. In many ways cyberspace could well constitute the great equalizer—in the sense of reducing barriers to entry and increasing the empowerment of people through enhanced ability to express views, contentions, or simple reflections. Voices can now be more readily heard.

Domains of CyberPolitics

This issue highlights selected milestones in the evolution of cyberPolitics by sampling three fundamentally different uses of cyberspace. Each is driven by central questions in political science revolving around the discipline's core concepts, such as those highlighted above. Individually, each of the articles in this issue addresses salient new developments in the domain of cyberPolitics; jointly they may be regarded as providing a sense of the new domains of political discourse that are being created by the extension of the conventional dilemmas surrounding "who gets what, when, and how" into the cyberspace domain while, at

the same time, using the virtual instruments in (and of) cyberspace to influence prevailing configurations of power and politics along more conventional domains of reality.

The coverage in this issue is threefold, relating to (a) technological change and infrastructure of information and communication, and new applications to cyberspace; (b) innovative uses for concept clarification and connectivity in the domain of political theory; and (c) applications of information technologies in the global domain of power politics related to sustainable development and emergent strategies toward sustainability. All three pertain to new modes of knowledge generation and use, and all three reflect transitional conditions, in that they record the "state of the art" at this point in time and provide, directly or indirectly, some clear milestones on current practices in and of cyberPolitics.

Contours of New Domains and New Terrains

In "Political Science and the Internet," Max Kaase reminds us of the historical precedents whereby innovations in information technology revolutionized the organization and dissemination of knowledge, in theory and in practice. The conjunction of several critical innovations—the printing press, paper processing, printed products and their standardization—invariably heralded the creation of new social roles and legal relationships upon which the entire science system of today was founded. The growth of science in the eighteenth and nineteenth centuries was predicated on these foundations which, in turn, permitted new modes of communication and information dissemination and, much later on, computation technologies and computing. At issue is less the matter of precedent or determining the degree of historical equivalence, than of reminding us of critical and concurrent contextual developments.

The search for illuminating precedents is always important to social scientists generally; it is a particularly salient preoccupation among historians of science who seek to isolate the emergence of new technologies whose impacts appear to be sufficiently pervasive as to be labeled "revolutionary." Matters of degree aside, the fact remains that significant shifts traced to key inventions—such as the written language, printing machines, motion pictures, television in the home, video-based services, and the like—have all penetrated the social order in powerful and generally unpredictable ways.

In this context, the creation of the Internet—or better still, its "invention"—is the most recent of such revolutions. To the skeptic, the Internet may be no more significant than the telephone, the radio, or the telegram, to name a few; to the enthusiast, the Internet constitutes a shift of fundamental proportions with few if any historical precedents. At issue here is not the relative merits of these positions, but the speed of entry for this invention, its sustained support by public funds, the explosion of uses and users, and its use as both a cause and a consequence of globalization that may be truly without clear historical precedent. Particularly significant is its nature as a system of communication and information dissemination that enables and thrives on the decentralized conjunction of a myriad of individual users worldwide.

Recognizing the conveniences afforded by this new venue—the technology, the new "space," and the impact on conventional modes of scientific communication, Kaase illustrates current implications for science generally, and for the social sciences in particular. Kaase's broad review of the modalities of Internet use in the

scholarly professions and implications for the range of supporting services both commercial and non-commercial—such as publishing, distribution, reproduction and so on—points to ways in which the profession itself is being influenced by cyber-realities. Not unrelated, but beyond the scope of the article, is their enormous impact on politics and markets.

In the economic domain, the formation and formalization of electronic commerce (e-commerce) is already a significant factor in global trade. In politics, almost every critical national or international issue in industrial countries is aired, if not argued, on the Internet. In the United States, at least, electioneering invariably entails a Web site and a strategic Internet posture presence. In this domain, the conduct of cyberPolitics is the rule rather than the exception. It is a fact of this new reality that the answer to the question "What's Going on Right Now?"—to borrow Max Kaase's query—will inevitably be outdated. That is perhaps why he ended his analysis with "In Lieu of a Conclusion."

While Max Kaase expresses concern with applications and uses of the Internet in political science, he forces us to consider the expansion of the discourse of politics to this new reality—the virtual one that is becoming as real and measurable as the traditional real and measurable reality. By contrast, Mauro Calise and Theodore Lowi address the matter of concepts head-on by showing how an application can help improve knowledge formulation and exposition in political science. In their article entitled "Hyperpolitics," Calise and Lowi report on an experiment in computer-assisted applications for political theory. This is an article not on infrastructure, uses and users, nor on global politics, but on concepts and linkages among concepts. It represents an experiment in using innovative technology for theory-development purposes. In essence, Calise and Lowi endeavor to relate seemingly polar opposites: the frontier of information technology and the tradition of discourse in political theory.

Drawing on the conventions developed for the World Wide Web (a subset of the Internet), Calise and Lowi focus on concept articulation in political science. For them, the goal is to expand the prevailing understanding of core concepts, their uses in the field, and their potentials as instruments for "creative political discourse." This article reflects a dual exercise: application of an innovative modality of knowledge formulation and dissemination, on the one hand, and attendant extensions of the concept-building terrain, on the other. To the extent that the authors engage in "theory-making" they are addressing the core of the discipline. In their words, "We are not here preparing ourselves or readers for disquisition on language; we are trying to prepare a language for the disquisition of politics."

Therein lies the arena of cyberPolitics: positioned at the intersection of innovation in information and communication technology and applications to the discourse of political analysis and political inquiry. Both "frontiers" are explored simultaneously. One is dominated and shaped by engineers, technicians, and computer scientists; the other by political scientists. What makes for pervasive and persuasive innovation is the conjunction between the two.

Clearly, there is always a danger of overstressing the gains of innovation. There is always a temptation to err toward the experimental at the risk of endangering the fundamentals. Calise and Lowi appear to appreciate this danger and to take appropriate precautionary measures by reminding us early on that their work at present can best be viewed as a "working software prototype."

If the first article in this issue is best understood as highlighting the evolution of

cyber-infrastructure and its uses, and the second shows applications to concept clarification and connectivity, the third addresses issues that fall squarely in the domain of global politics. Christian Brodhag shows how the United Nations system itself is seeking to reconcile the contending requirements of information needs, infrastructure developments, and the uses of knowledge for decision and policy— here and now.

In "Information, gouvernance et développement durable," Christian Brodhag highlights the role of information in Agenda 21, a political document that should be seen not only in the context of a UN institution reflecting the positions of individual states, but far more importantly, as expressing a consensus around the mission of steering the global community throughout its transitions toward sustainability. The "catch," however, is that both the goal and the process remain highly contentious, in policy circles and in academic and educational circles. As a negotiated document, Agenda 21 was the product of an extensive consultative process involving governments as well as the non-governmental community. The issues addressed—and the positions adopted—represent as near a global consensus as can be formulated, given current institutional and technological mechanisms. The importance given to information, the conception of the role of communication, and the issues selected for special attention represent an end-of-century barometer, a milestone of critical significance in both historical and contemporary contexts.

Brodhag shows how Agenda 21 places special emphasis on the role of information and information technology in facilitating transitions toward sustainability. He shows their presumed uses, as well as the glaring gaps in the international community's conception of them. By drawing attention to the difference between information, on the one hand, and communication, on the other, Brodhag hints at the multidimensionality in the *content* of knowledge—an issue to which we return later on in this introduction.

Agenda 21 is, by definition, a product of times characterized by accelerated rates of change along almost all the dimensions of human interaction; it is invariably bounded by the prevailing understanding of information and communication technologies. As with Max Kaase's analysis, which closes with a statement "In Lieu of a Conclusion," Brodhag's article serves as a milestone, for it points to a baseline against which future perspectives can be assessed.

While the article "Information, gouvernance et développement durable" is a careful survey of the international community's vision of the role of information as manifested in Agenda 21, it reveals only the tip of the iceberg of this complex assessment. The follow-up reports on national and international initiatives, presented at the subsequent annual sessions of the United Nations Commission on Sustainable Development, reveal some operational features of seemingly contradictory significance. For example, while Internet access appears to reduce bias in international discourse as it enables greater access to knowledge, hence reducing knowledge-gaps worldwide, new cyber-related demands are also being placed on information, communication, and interactions, requiring special attention to changing international realities.

Fundamental to an emergent understanding of global realities as we enter the twenty-first century, is greater recognition of social and political *diversity*, increased *complexity* in political discourse at all levels, sustained *globalization* (as noted early on in this introduction) and the seemingly paradoxical conjunction of greater *localization*. The latter term refers to local conditions and local understandings

that shape how globalization and global complexities affect, and are understood by, communities "on the ground." Underlying these developments—and transcending those addressed by the authors in this issue—is an increasingly robust understanding of some powerful obstacles in the use of cyberspace in and for politics and political science. Many of these are rooted in the emerging "map" of cyberspace; others in conceptual ambiguities due to rapidly changing global contours: still others are due to somewhat underdeveloped methods of facilitating the uses of cyberspace.

The remainder of this introduction is devoted to these issues. Accordingly, we turn first to the technological trajectory and highlight evolving features on a global basis, particularly those that dispose toward equality and inequality. Then we review some major ways in which politics at national and global levels appear to be influenced, if not shaped, by the new cyber realities. Not unrelated to these developments is the increasingly central role of knowledge in the global economy, coupled with evolving patterns of knowledge networking.

In this connection we will also consider, somewhat briefly, an ongoing application of global knowledge networking designed to reduce the barriers to knowledge development, dissemination and sharing that bear on the complex challenges of transitions toward sustainability at all levels and in all contexts. This case highlights, and shares, many of the challenges addressed in the articles for this issue. Finally, the very nature of the subject matter disposes us toward the use of an illustrative approach in this introduction. Cyberspace is a new "terrain" in the social sciences broadly defined, as well as for political scientists in all parts of the discipline.

Mapping Parameters of Cyberspace

Until the mid-1990s, the World Wide Web had been largely "free-space": free of matters related to price, cost, quantity, demand, or supply. The explosion of users had not yet led to the explosion of electronic-based profit. A system that had originally been created by the US Department of Defense as a means of retaining operations for its computer networks in case of nuclear attack, it was gradually evolving into a network for government and universities. It was not until literally the close of the century—as late as 1999—that the full implications of a worldwide commercial net-explosion were recognized. By then, the nascent multi-dimensionality of Internet and World Wide Web interactions and exchanges had taken off.[1] This development put in place cyber-conduits for behavior that highlights the duality of international political economy, namely, "the pursuit of power and the pursuit of wealth."[2]

Evolving Configurations

By 1998 it was estimated that there were over 150 million users of the Internet worldwide, a figure that was expected to increase to 700 million by the year 2001 (UNDP, 1999: 58). At the time of this writing about 50 percent of cyberspace use is within the United States; but within a year or two it is anticipated that over 80 percent will be outside the United States. Compared to earlier innovations—the radio, the personal computer, and television, for example, the Internet is the fastest-growing information mechanism in human history. And despite significant disparities in cost structures around the world, everywhere transmission of
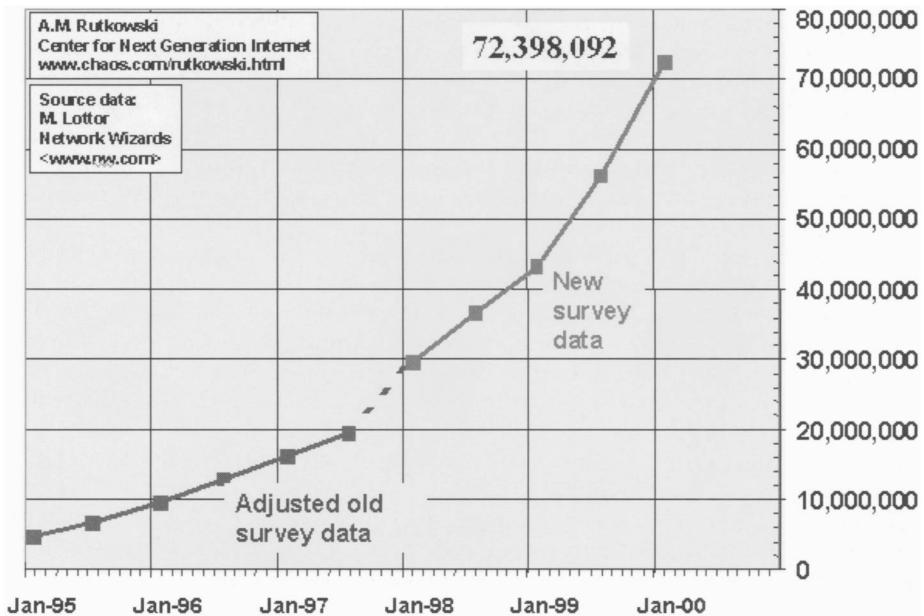
FIGURE 1. *Internet Hosts, 1995–2000*
Source of data: MIDS (www.mids.org)

documents through the Internet is significantly cheaper than through any other mechanism (courier service, for instance). What we now have is a situation of enhanced globalization of electronic communication and networking, and with it increased globalization of sustainability debates and deliberations on cyberspace.

The scale and scope of worldwide connectivity is rapidly changing. At best we can record in snapshots of moments. Figure 1 shows the development of Internet hosts over the past decade. Figure 2 shows that by 1997 almost every country in the world was "wired" electronically, in some form or another. Figure 3 visually illustrates the density of global electronic connectivity, revealing the presence as well as the paucities of linkages. Regional perspectives are shown in Figure 4, which highlights the densities in Europe, and Figure 5 illustrates the linkage in Africa in December 1997.

Disparities aside, the fact remains that widespread access to electronic communication and increased reliance on advanced technology for generating, storing, and diffusing information have become facts of life in industrial countries and are shaping new frontiers in developing societies. We can anticipate a continued extension of this technology and capability to all parts of the world, an expectation based on a review of major networking national initiatives such as those supported by the United Nations Development Program (UNDP), among others.

Design of a New Geography

The Internet is opening new venues and research horizons, the full implications of which remain unclear. Experience to date suggests that the information management challenges are at least as daunting as the technological challenges of
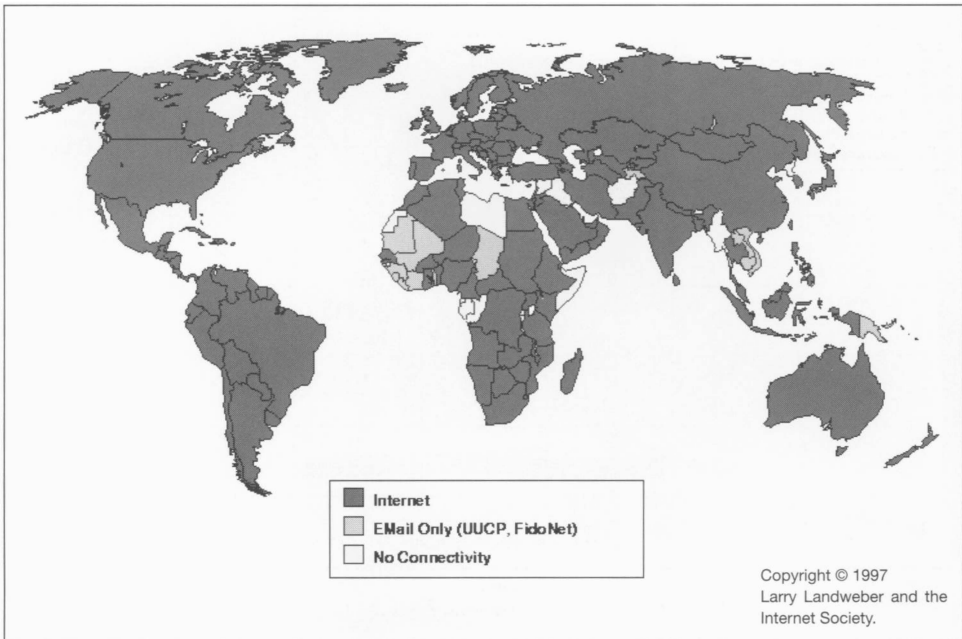
FIGURE 2. *International Connectivity (version 16, 15 June 1997).*

ensuring robustness. The innovations required are as much in the domain of the sociology of knowledge as they are in the know-how of managing professional interactions via the Internet. At issue is the need to better understand the challenges, the opportunities, and the dangers in the configuration of these new conditions.

If the *Atlas of World History* (Barraclough, 1998), with its combination of visualization techniques and textual annotations, represents a synthesis—albeit in stylized fashion—of the major historical, political, geographical and develop-mental trajectories in human history, then the emergent initiatives described in "Mapping the Unknowns Of Cyberspace" (*The New York Times,* 20 September 1999: E1) could, collectively, lead to a common conception of cyberspace, its virtual realities, and its representation of behavior therein. The absence of shared conventions in the mapping process reflects the nature of the challenge. Not unrelated is the lack of common geographical reference points coupled with the variety of idioms or models including special models, neuro-networks, spiderweb-like systems, and multilayered structures—to name a few. In a language remini-scent of the early colonial expansion by European powers, the new pioneers of cyberspace remind us that maps are needed not only to navigate toward and through the unknown, but also to chart the new terrain and delineate its topography.

None of this is simple. In contrast to the modern era, medieval society was characterized by significant ambiguities about territoriality and the exercise of authority over space. Overlapping loyalties were the rule rather than the exception. With the Treaty of Westphalia (1648) emerged the notion of national sovereignty and the delineation of territoriality; cyberspace, with its attendant
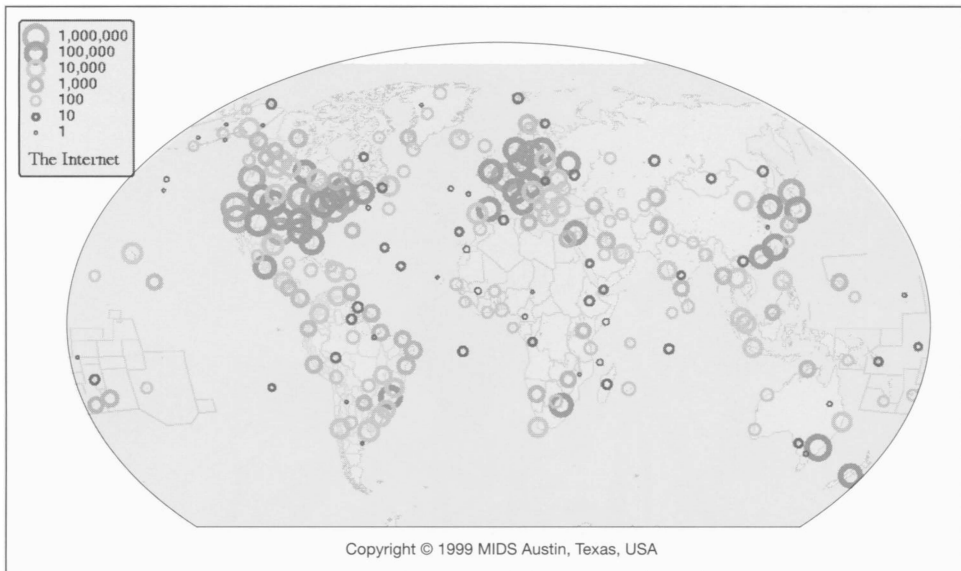
FIGURE 3. *The Internet January 1999.*

conduits for communication, transcends territoriality in rather significant ways. It is not so much the permeability of territorial borders that characterizes the cyber-age but rather the absence of any modes of effective control over *who* transmits, *what* is transmitted, *when*, and *how*.

It is useful to draw one more parallel, namely that between exploration of outer space and that of cyberspace. Venturing into outer space was reserved for those few nations that were very determined, technologically far advanced, and who could make the decision to engage in such ventures. By definition, it was a game for the very few, and for the most select among the few. Cyberspace, by contrast, is a "terrain" available to everyone. It is often dubbed "the great leveler." Subject to some specific and serious constraints, barriers to entry remain trivial compared to those in outer space. Even when these are acknowledged to be serious, if not overwhelming, there are powerful forces pushing for their management, if not elimination.

Among the most significant barriers to entry are limited bandwidth, uncertain reliability, uneven cost structure (including hardware and infrastructure prices), and significant institutional requirements. While none of these is particularly significant in industrial countries, all are impediments in the developing world. Transcending these more technical barriers are new, additional, barriers that are more related to content and to quality than to the infrastructure that enables transmission of content. Such barriers include the explosion of information (of variable quality), the difficulties in tracking the sources of data and the methods used to interpret them, and the rapid expansion of both the Internet infrastructure and the user base.

So, too, the fluidity of the cyber-age (if that is an appropriate characterization) appears to challenge some of the fundamental "rules" of social interactions, notably the institution of property rights—particularly intellectual property
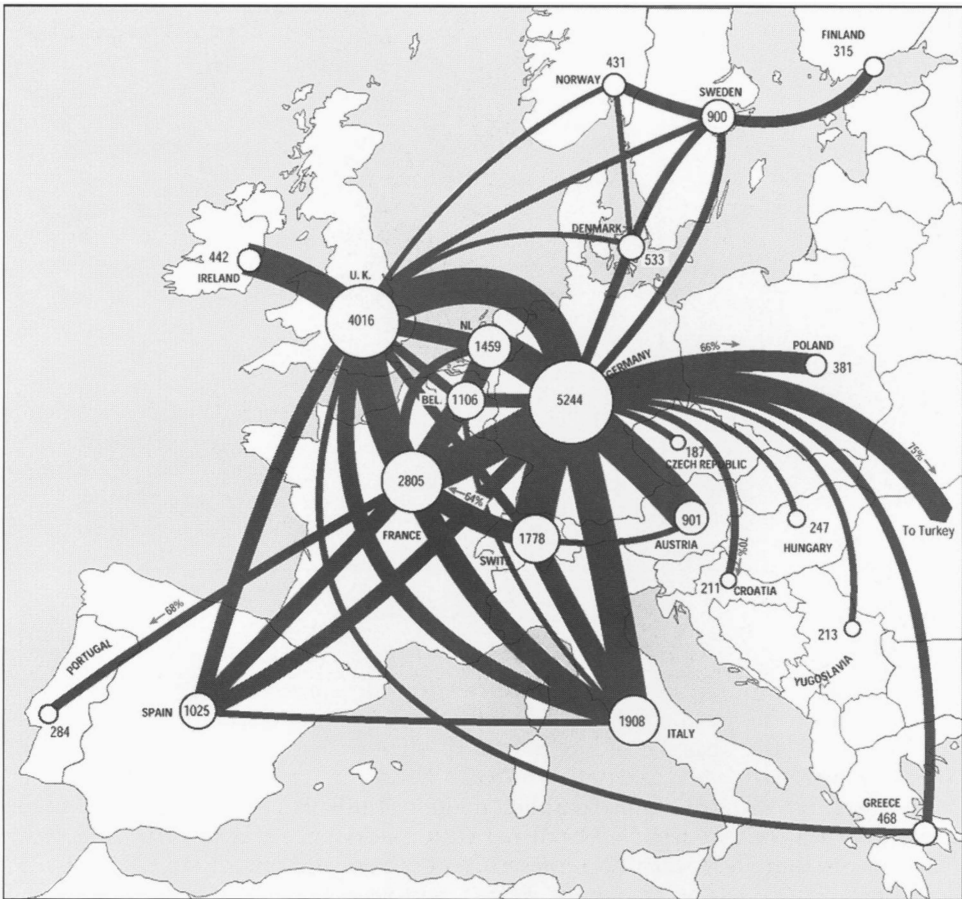
FIGURE 4. *European Trafic Flows.*
Source of data: © Telegeography, Inc. 1999 (www.telegeography.com)

rights—in relation to Internet usage. Digitalization of economic activities is particularly perplexing. What is the "commodity" or "service" embedded in a digital image? Who owns what? Not unrelated is the implication of control: Who will control the new spaces? At this writing, legal ambiguities surrounding "rights" on the Internet are compounded by the absence of regulatory frameworks predicated on some notion of "sovereignty" and guaranteed by a "sovereign" entity. Increasingly, it appears that access control is done through technological means rather than legal ones. The proliferation of filter software, which prevents access to Internet sites, has already enabled some, albeit marginal, degree of regulation.

Parameters of Inequality

Differential access to the Internet has heightened awareness of socioeconomic gaps worldwide, and the language-related obstacles to the diffusion of knowledge.
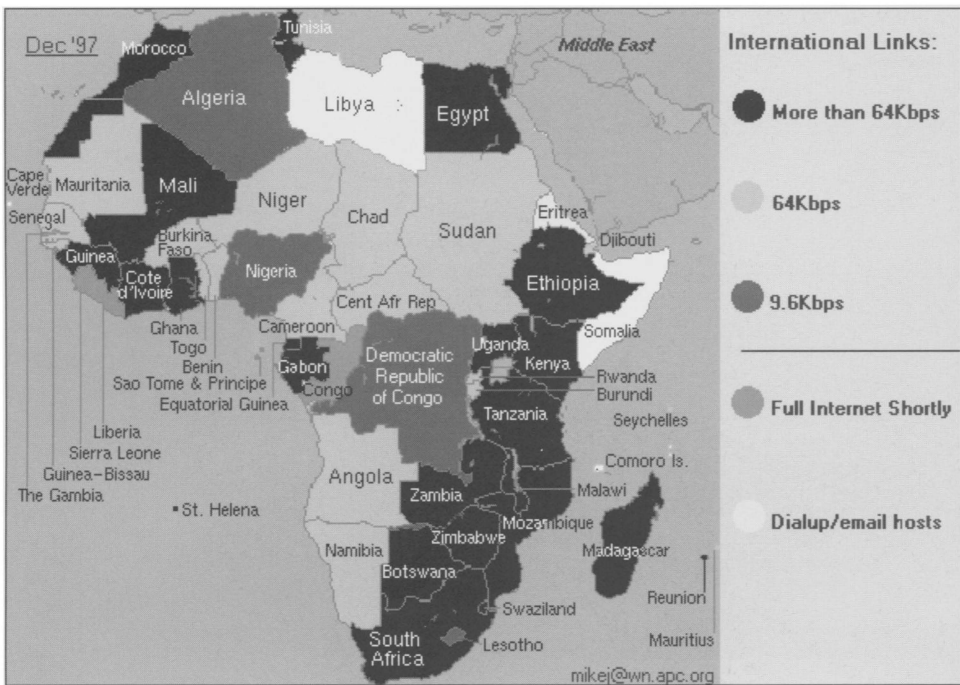
FIGURE 5. *The Internet in Africa*

When viewed in cross-regional contexts, the stark discrepancy between total population, on the one hand, and percentage of Internet use, on the other, amply document the critical distributional parameters. As we are reminded, today the "United States spends 10 to 12 percent of its economy on computer hardware and software ... [and] spends about $3000 per person per year on computers. Bangladesh spends $3 per person,"[3] reflecting implications of prevailing inequalities worldwide. It is not that Bangladesh wishes to spend only $3 per person on computer-related services; it is that it is unable to do otherwise. This case illustrates both the constraints and the opportunities inherent in current developments in information technology. Inequalities are real and generally deeply rooted in the parameters of the global system.

On such a basis alone, it is tempting to draw the conclusion that the non-Internet world is being marginalized, placed outside the pale of communication highways, but the empirical record is substantially more complicated. The presumption is that, subject to reasonable constraints, states are able to manipulate their own parameters.

Perhaps the only robust generalization is this: despite worldwide disparities in access to information technologies, everyone, everywhere, is being ratcheted into a participatory Internet-based culture. Indeed, the whole issue of "leapfrogging" implies not only the desirability of such manipulation but also the possibility of shaping new parameters and new opportunities—drawing heavily on applications of information technology and attendant infrastructure. With appropriate caveats and qualifications in mind, Figure 6 illustrates the cross-national relationship between Internet infrastructure and economic performance, as of 1993. In this

Internet Host Computers - Jan 1995

(Chart: Internet Host Computers (Jan 1995) plotted against 1993 GNP ($M). Countries plotted include Norway, Finland, USA, Denmark, South Africa, Australia, Canada, UK, Germany, Hong Kong, Sweden, Netherlands, France, Japan, Poland, Switzerland, New Zealand, Austria, Belgium, Spain, Italy, Portugal, Singapore, Israel, Czech Rep, Taiwan, Korea, S, Hungary, Mexico, Brazil, Iceland, Ireland, Russian Fed, Slovenia, Chile, Greece, Turkey, Estonia, Slovakia, Malaysia, Thailand, Argentina, Costa Rica, Romania, Latvia, Ukraine, China, Luxembourg, Ecuador, Kuwait, India, Lithuania, Bulgaria, Peru, Indonesia, Jamaica, Uruguay, Egypt, Venezuela, Zambia, Cyprus, Tunesia, Puerto Rico, Philippines, Nicaragua, Zimbabwe, Iran, Colombia, Armenia, Panama, Algeria, Macau, Kazakhstan, Fiji, Moldavia, Belarus, Guinea, Azerbaijan, Saudi Arabia. Regions marked "Better Than Average" and "Less Than Average".)

GNP - World Bank. Host Count - M. Lottor
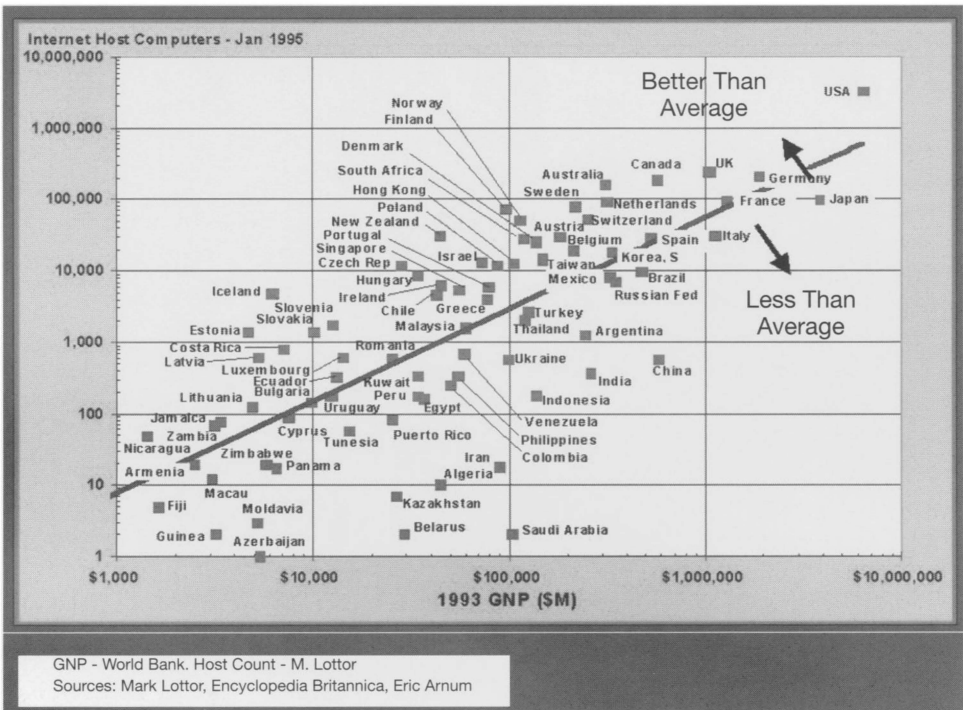Sources: Mark Lottor, Encyclopedia Britannica, Eric Arnum

FIGURE 6. *Internet Global Infrastructure Diffusion.*

context the comparison among the individual country cases is revealing: infrastructure for the use of cyberspace is closely and positively associated with economic performance. The figure provides no basis for drawing causal inferences, of course, but it would be difficult to entirely avoid them.

Effective use of the Internet is contingent on at least three interacting processes—connectivity, content, and capacity—"the 3C's," which jointly serve as necessary and sufficient conditions for participation in the Internet culture and are essential prerequisites for sustaining Internet access and use. Connectivity refers to the infrastructure needed for a viable presence on cyberspace, covering basic telephone lines, telecommunication systems, satellite connections and so on, including all related managerial and legal requisites. Content is of course determined by the availability, quality, and quantity of materials that fill the users' needs. Capacity refers to the skills required to utilize physical connectivity and make effective use of the knowledge-content transmitted. Invariably, countries differ markedly along each of the 3C's.

Potentials for Leveling the Playing Field

According to the United Nations Development Program (UNDP, 1999: 62), the Internet "runs along the fault lines of national societies, dividing educated from illiterate, men from women, rich from poor, young from old, urban from rural." However impressive this sweeping generalization may be, the fact remains that the

Internet reduces nationwide marginalization and provides the foundations for empowerment, in social, political, and commercial terms. But when governments move toward an "Internet-push" strategy, the stark divides along national fault lines begin to erode. The UNDP itself provides the data for this inference. Pointing to Egypt, Estonia, and India—each adopting a different communication and cyber-strategy—even the most peripheral communities become connected and linked to the mainstream. In Egypt the pilot program for a national strategy of Technology Access Centers provides services associated with connectivity and capacity-building; in Estonia the strategy is to push Internet access for all citizens; in India the M. S. Swaminathan Research Foundation targets the most remote villages with supporting services to enable group-based access.

Creative ways of communicating knowledge, sharing new ideas, and forging new research strategies are providing means of bypassing some key impediments to access—as we show below—and are thriving under less-than-optimal conditions. An important common element across these cases, significant in almost all known "push" cases, is the development of community-based modes of organization for access. What could be called cyber-cafés in industrial countries have a wide range of counterparts in the developing world. While international institutions have generally heralded such initiatives as supporting "creativity"—accurate, to be sure, but singularly incomplete if not misleading—far more important are the implications for reducing barriers to knowledge. This stipulation is meant to encompass knowledge from "outside" the community boundaries as well as even the most local knowledge from "inside." Therein lies another direct effect of the powerful synergism created by the worldwide electronic connectivity, globalization, and new modes of knowledge-networking that enable people to obtain the knowledge they need and to make it possible also to transmit knowledge to others. These dual imperatives place knowledge at the center of communication and interaction, view people as active rather than passive participants, and recognize the value of local knowledge without undermining the importance of access to global knowledge.

This "mapping" exercise, however sketchy, characterizes some of the significant cyber-realities as we enter the twenty-first century. Jointly, these reflect social and political *diversity,* increased *complexity* in political discourse at all levels, sustained *globalization* (as noted above), and the seemingly paradoxical conjunction of greater *localization.* It also serves to remind us of both the barriers and the opportunities associated with these new realities.

Evolving Patterns of CyberPolitics and Political Behavior

It would be as foolhardy to predict the nature of politics in the twenty-first century as it would be to anticipate the full implications of cyberspace on politics and political behavior, at any level and in any context. Predictions aside, however, some observers and analysts are gradually converging around a few broad trajectories and future contours of politics, nationally and internationally. Without assigning undue legitimacy to any of the current thinking, at least three trajectories appear to crystallize in ways that assign them special roles in the emergent contours of cyberPolitics. They may even provide the foundations for new developments in global governance.

The Virtual State

The first trajectory is characterized by the title of Richard Rosecrance's (1999) book, *The Rise of the Virtual State*. The essence of the "virtual state" lies in its ability to garner the power of finance and ideas, and to transform ideas into sources of global influence. Seemingly simple in its conception, this presumption's implications are pervasive in that they call into question the fundamentals of traditional politics among nations and the competition for territory, trade, and military prowess, replacing these with new parameters, namely those tied to educational capability, skill levels, modes of managing ideas, and all related facets of processing the power of the mind. Without putting too fine a point on the distinction, Rosecrance argues that while all nations are gradually moving toward the "virtual state" some will do so faster and more thoroughly than others. These will be the global brains; the remainder will be the global bodies.

The prescriptive nature of this argument is straightforward: investment in education is the fundamental source of national power; once today's cyber-realities are fully recognized, then the implications for how we think about politics, nationally and internationally, will be revolutionized. This presumes the credibility of the "virtual state" and of the substitution of skills and ideas for the traditional bases of economic power, namely physical goods and manufactured products. But even if one were not to accept the potential for full substitution, the fact remains that in all societies, everywhere, access to knowledge—and putting in place the infrastructure that enables this access—is regarded as ranking high among national priorities. None of this presumes commensurate performance. It does presume intent and anticipation of new opportunities.

Urban Concentrations

The second trajectory of emergent cyber-futures is characterized on the one hand by the new "mega-city," stressing the size of urban conglomerations, and on the other by the more traditional concept of the "city-state," highlighting the old and the familiar. Both refer to sub-national agglomerations, and both remind us that Internet services are invariably more developed in urban centers, that the city population is more familiar with cyber-explorations, and that the density of communication is by definition far greater in urban contexts. The convergence of population density and cyber-communication creates a virtual reality that parallels the demographic reality. However interesting such aggregate, macro-characterizations might be, they are rooted in cyber-connections at the individual level, the micro-unit of social systems.

Global Citizenship

The third potential trajectory of note pertains to the "reach" of individual connectivity and its implications for the state and for the global community. Most commonly the term "global citizen" is used to connote individual responsibility to the world at large. Ambiguities and uncertainties also accompany the notion of global citizen. Nonetheless, it shares with the notions of the virtual state and the mega-city a degree of empowerment due almost exclusively to the use of electronic technologies shaping the new cyberspaces.

In less than a decade and without undermining the reality of the state-bound

legal foundations of the term citizen, Internet use has made it possible for individuals to express preferences, make claims, "verbalize" posture, and argue positions. It has empowered people in ways that are truly unprecedented, in scale and scope.

Do these trends translate into greater and more effective democratization and governance on a global scale? It would be facile to argue affirmatively, but it would be fundamentally misleading, if not dangerous, to underestimate the impact that such potential democratization might have, nationally and internationally.

Democratization. One way of sorting out realities from attributions might be to distinguish between the "demand" side and the "supply" side of democratization—with apologies for the mixture of economic and political idioms—and to parse or partition the trends as we see them for purposes of conceptual and empirical clarity. To simplify, "demand" refers to making claims on the political system; "supply" refers to responses to claims being made.[4] To simplify further, in this context democratization is the process of reducing the gap between demand and supply and, in the course of this process, reinforcing and being reinforced by prevailing mechanisms of accountability.

On the "demand" side, the mere existence of a growing number of Internet sites that address one facet of democratization or another, suggests that cyberspace is being used as a conduit for expressing positions, making claims, and, to the extent possible, calling for "action." All of this illustrates the increasing robustness of the demand side. The trends on the "supply" side are neither as stark nor as seemingly unambiguous in salience and content. While there is some evidence of the provision of government services through the Internet, the use of cyber-facilities by candidates during electoral competitions, and a clear "push" by international institutions to show evidence of performance, none of this can be considered sufficiently indicative of the supply side.

On balance, it seems reasonable to conclude, however tentatively, that the demand side of the Internet-based democratization process is far more developed than the supply side. Voices are raised; claims are made; and groups are being organized. But while on the supply side more information is being offered or provided, at least in principle, there is little evidence that the nature of the response is commensurate with the demands being made. At a minimum, the two sides of the democratization process are "moving" but they are not converging; there is insufficient basis to infer a reduction of the gap between "supply" and "demand." Nonetheless, the overall impacts are far from neutral—in either national or international contexts.

Global Governance. Since Internet access generates new possibilities for empowerment of individuals, by necessity it opens new venues for governance and for modes of consistent and reliable interactions across levels of authority, both formal as well as informal. Therein may be found another cyber-created paradox. On the one hand, since no one is in control, Internet use can legitimately be characterized as chaotic and as reinforcing "global anarchy." On the other, the democratization potentials may push toward governance structures and processes that bypass the constraints of sovereignty as it is conventionally understood.

Several UN agencies have actively embarked on initiatives to introduce concepts of "global governance" in their support for expanded Internet usage. And while carefully avoiding any implication of undermining state sovereignty, Agenda 21

devotes an entire chapter to information for institutional development. Moreover, follow-up on both Agenda 21 and two key global conventions—the United Nations Convention on Climate Change and the Convention on Biological Diversity— stress information needs and national reporting requirements in electronic form as requisite for ensuring compliance. To be sure, compliance does not in itself translate into global governance; however, ensuring compliance is indeed a major step toward the institutionalization of new global regimes.

Developing protocols for tracking the impact of networking on modes of governance and on the management of multiple voices that have previously been unheard is a major challenge for research and policy. Creative possibilities are embedded in the nexus of knowledge, power, and networks. Then, too, in order to effectively exploit the enabling powers of cyberspace and the instrumentalities of the Internet, it is no longer sufficient merely to gain technical proficiency. Especially relevant is the need to foster the managerial and organizational skills required to engage in networking and meta-networking practices sufficient to exploit the full powers of the Internet in such domains as those of governance, commerce, and research, among others.

Politics of Knowledge and Knowledge-networking

If there is a cliché that most aptly characterizes the competitive features of the world economy today it is the "global race for knowledge" (UNDP, 1999: 57). While scholars and observers alike may differ on the determinant role of knowledge, everyone agrees that we have already embarked on a transformation of such pervasive importance that it may be compared to the agricultural revolution (independently in different parts of the world around 8000 BC) or of the Industrial Revolution of eighteenth-century Europe. And, if "knowledge is power," as is commonly believed, then the global economy at the end of the twentieth century is increasingly reliant on the use of cyberspace facilities for fueling the world economy and accelerating transformation of knowledge into power.

It is less important here to engage in a debate about the salience of knowledge relative to agriculture and/or industry in shaping if not creating social values, than it is to highlight a seemingly obvious maxim in world politics today: knowledge matters. And it matters a lot. The power of knowledge is, funda- mentally, the power of access, use, diffusion, and expansion. This composite power is shaped by the interaction between the *content* of knowledge and the *value* of knowledge—and both are significantly enhanced by knowledge-networking practices made possible through innovative uses of the Internet. In this context, the Internet becomes both a "cause" and a "consequence" in the global race for knowledge.

A key element in this process pertains to the value added by the collaborative efforts known as knowledge networks. A knowledge network is defined as: "A computer-assisted organized system of discrete actors with knowledge producing capacity, whereby (a) knowledge is combined through common organizing principles, (b) the actors retain their autonomy, (c) the network enhances the value of knowledge to the actors, and (d) knowledge is increased as a function of the operation of the network" (Choucri and Millman, 1999).

Knowledge networks and knowledge-networking create new ways of exchanging knowledge, developing new knowledge, and devising mechanisms for generating feedback on the robustness of knowledge. Central to these challenges is

understanding boundary conditions, processes of access across boundaries, and the resulting cognitive, social, jurisdictional, and other impacts that might arise. Both the networks and the networking involve new behavioral modalities, institutional performance, and technological capabilities.

Two mutually reinforcing dual outcomes are enabled by knowledge-networking: one is globalization of knowledge via greater diffusion; the other is localization of knowledge via representation of distinct local technical and linguistic features. And the diffusion of knowledge-networking practices now makes it possible to engage in multidirectional and multiparty interaction (that is, top-down as well as bottom-up) and enables the flow of knowledge generated bottom-up into domains at the top, both within and across societies that greatly enhance inputs into decisions. Access to interactive knowledge-networking enables stakeholder communities to express their preferences and make explicit inputs into decisions. This gives decision-makers access to multiple stakeholder communities. The capacity for multidirectional interactions has the potential for transcending underlying social structures.

CyberPartnerships in International Relations

Among the most politically relevant uses of cyberspace—and hence reflective of cyberPolitics—are collaborative undertakings based on global knowledge-networking. One such case, known as the Global System for Sustainable Development (GSSD), is an experimental initiative in international collaboration devoted to the matter of sustainability.[5] The initiative is particularly relevant to the introduction to this issue of *IPSR* because it addresses head-on key problems that impede knowledge-access worldwide, and develops and implements specific solutions to these problems.

The subject matter of "sustainable development" is itself highly complex; this complexity makes it difficult to obtain an overall perspective. While there is a large volume of knowledge that is developing, that knowledge is of varying quality, thus some quality controls may be helpful. Given the global nature of the challenges, there are many different types of users, with differing capabilities and differing needs; this may call for "customization" of knowledge demands. Further, as noted by Kaase in this issue, most of the resources on the Internet are in English; most of the world's population is not English-speaking. And, as also noted earlier, infrastructure quality for use of cyberspace differs greatly around the world; poor access to bandwidth is more a rule than an exception. Finally, and perhaps most important of all, the knowledge base we now consider relevant to sustainability has been developed in industrial societies; there is relatively little bottom-up knowledge available from the developing world, and its own capacities for knowledge generation are inadequately tapped.

None of these problems is trivial. Jointly they appear daunting, if not insurmountable. All of this reinforces the inequalities discussed earlier and impedes leveling of the playing field. These problems are generic in nature—central to the emergent scholarship and policy challenges connected to the new cyber-realities. The GSSD initiative shows how cyberspace can be used as interactive and synergistic mechanisms for access to, and use of, knowledge bearing on all facets of sustainable development, at all levels of analysis, nationally and internationally, and the attendant host of serious problems. And, as Christian Brodhag reminds us, the role of information is central to Agenda 21, and Agenda

21 is the closest thing we have to a strategic plan for transition toward sustainable development.

In terms of content, GSSD focuses on the range of human activities and actions that threaten environmental and social viability, on the one hand, and on the other the range of policy instruments and strategies available for providing an opportunity to influence the path of change. The overall architecture is structured as a set of relationships which are nested hierarchically. These are rooted in (a) human actions, which (b) generate a set of social and environmental dislocations, which in turn calls for (c) modalities of technical and scientific interventions currently considered as viable "responses," as well as for (d) institutional and social adaptations and changes, commensurate with (e) evolving international modes of coordinated actions. To the extent that these might be effective or successful, changes in human activities may result, thereby reducing environmental strains, and so forth—schematically and iteratively from (a) through (e) above. To the extent that such capabilities provide a basis for correctives and effective feedback, then the stock of the international community's entire knowledge base bearing on sustainability issues would be enhanced, as would its quality.

For purposes of this introduction, we consider three features of GSSD designed specifically to reduce the gap between knowledge and policy. These are its (a) Interactive CyberLibrary on Sustainability; (b) Specialized Search Engines; and (c) Multilingual Electronic Capacities, including western and non-western languages. Jointly they enable users to mobilize Internet-related technologies in ways that accommodate the realities of diversity, complexity, globalization, and localization: they are fundamental to the diffusion of knowledge; they are relevant to all societies at all levels of development; and they will almost certainly remain central to all future uses of the Internet.

CyberLibrary on Sustainability. Most, if not all countries of the world support a national library. The size, scale, and scope of coverage differ, as do the management, indexing, and updating. In the United States, for example, the Library of Congress is the repository of the nation's "knowledge" and its intellectual holdings. There is a presumption of effective coverage coupled with standard setting indexing systems: if an item of interest is housed in the Library of Congress, it can be readily located. None of this holds for the "holdings of the Internet." Indeed, the reality approximates a Library of Congress with no librarian, no indexing system, and no shelving conventions, retrieval protocols, and the like. Also absent is any sense of what the actual holdings might be, there is no quality control of any kind (such as for example the review system prior to publication), and no record of deposits of new holdings. In these respects, characterizing Internet holdings can best be made by resorting to images somewhere between a jungle and a plate of spaghetti—well beyond the comfort zone for effective uses or users of this potentially powerful resource. So, what is a GSSD "solution" to this generic problem? What is an interactive cyberlibrary and, more specifically, what is the CyberLibrary on Sustainability?

We take as an anchor the physical library, which is commonly understood to be "a building or room containing a collection of books; a collection of . . . records, computer programs."[6] A cyberlibrary has the basic properties of a library plus a few distinctive others. And, with the addition of interactivity, distributedness, and dynamic multi-sourcing, the traditional concept of a library takes on significantly new properties. Without digressing to provide a full description and illustration,

three properties are particularly illustrative of intellectually driven "cyber" features. These are (a) an evolving understanding of the subject matter, (b) a robust content-based indexing system, and (c) a system for delineating connectivities across contents and concepts.

Recalling that "sustainable development" has been defined by the Brundtland Commission in its Report to the United Nations General Assembly as meeting the needs of current generations without compromising options for future generations, the world's intellectual and policy communities have proceeded to formalize and elaborate on this core definition. A previous issue of the *IPSR* devoted to sustainable development (1999, 20: 2) reviewed both the origins of the concept and its evolving intellectual and political ramifications. The CyberLibrary on Sustainability seeks to capture quality-controlled, diverse, and multidisciplinary materials on key features in a comprehensive way.

In cyber-parlance, the core principle of a library is one of "posting," meaning that items are deposited in cyberspace, with the expectation of sequential and one-way interaction. Users can "withdraw" them from the Internet as needed. A cyberlibrary, by contrast, is both interactive, iterative, participatory, and based on conferencing conceptions. Almost by definition, the materials placed in a cyberlibrary are subject to revision as needed, with as many "cooks in the kitchen" as relevant (subject of course to the library's operating principles). It is these factors that transform a cyberlibrary into an evolving knowledge system and enable acceleration as well as the rapid diffusion of new understandings.

Referring back to the earlier discussion on modes of knowing, the current holdings of the CyberLibrary on Sustainability consists of well over 250 institutional Internet holdings, represented in close to 3000 indexed and cross-referenced Internet sites. Unlike a conventional library where the indexing system generally covers title, author, and select related items, the power of this cyberlibrary lies in the cross-indexing and referencing of the contents available within each site, a concept akin to the term "spidering" in Internet idiom. As an evolving knowledge base, it covers a comprehensive range of sustainability-related resources. Since it is a distributed system, not only are the holdings generated throughout the user community worldwide, but they are also maintained at the source.

The final feature of note for the CyberLibrary on Sustainability derives from its distributed properties. Given that the holdings remain under the control of author or authorial institution, the contents of the CyberLibrary consist of the cross-referenced, cross-indexed system embedded in an abstract whose contents are "keyed" to the conventions of an indexing system. Since the latter is itself based on a coherent multidimensional conceptual framework, the coherence of the knowledge base for the CyberLibrary as a whole is ensured.

Specialized Search Engines.

In the absence of search engines such as Yahoo, Excite, and others, the Internet would be even more of a jungle or a plate of spaghetti than is presently the case. But every user of the Internet knows that these search engines cast their nets in broad terms, with as much discrimination as is allowed by the user. Nonetheless, the need for specialized search engines is now widely recognized in both scholarly and policy-making circles. While specialized search engines are considerably more difficult to design and operate, they are invariably more valuable to the discerning user. The design difficulties are generally not technical in nature, but are rather

related to content representation and configuration of representation. The GSSD search engines operate over the CyberLibrary's quality control and evolving holdings, and are directly responsive to the user's conception of his or her specific needs. Of course the retrieval record is only as good as the holdings of the entire CyberLibrary and the skill and interests of the user(s). In the context of Figures 3 and 4, we can illustrate the search engine's options in terms of retrieval by subject (Figure 3), or by modality (Figure 4), or by location (geographic), or level (global, regional, local)—with as many options as specified by the user (assuming relevance to the subject in hand).

Multilingual Capacities. The Internet is an English-speaking domain operating in a non-English-speaking world. This means that most of the world's population, in almost all of the world's areas, is not served by this cybersystem. Under normal circumstances—however these might be defined—linguistic barriers, if not the most serious obstacles to social communication, are among them. Under these conditions, expanding current Internet capabilities, with new services and innovative functionalities, are akin to bringing coal to Newcastle—or in a different idiom, making the rich richer and the poor poorer. Extending these analogies further (with all the caveats that this entails), we require mechanisms that reduce the gap between rich and poor and take the coal to places where it is needed. Equally, and perhaps more importantly, we must make available the linguistic tools to enable users in all parts of the world and from all different cultural contexts to provide their own knowledge and represent their own experiences.

Multilingual functionality enables *improved access to information* by reducing difficulties facing non-English speakers. Each site included in the GSSD knowledge base is abstracted, and that abstract is, in turn, translated into each of GSSD's supported languages. These are then available for e-searches through the system's five search modes. Multilingualism also enables *the strategic use of resources,* given that GSSD's abstracts allow the user to identify where the most fruitful information is housed. Furthermore, this type of functionality contributes to the *expansion of the knowledge base,* since the absence of a platform for non-English content has traditionally impeded the ability of many groups to make their own data and perspectives widely available. Jointly these facilities enable electronic multiple directionality—both top-down and bottom-up—thereby providing mutual reinforcement between two trends that might at first appear contradictory, namely globalization and localization.

Powerful Potentials

Without prematurely presuming effectiveness, or imputing success, such initiatives may well contribute to leveling the playing field, facilitating transparency, coherence, and relevance to user needs. This is another way of saying that with advanced electronic technology comes the possibility of broadening participation and communication, and with this expanded involvement comes access to a diversity of views and perspectives far beyond what is available with printed communication, television, or any other form of "one-way" exchange.

Networking practices such as these constitute a form of global "policy-feedback," which is necessary to steer societies towards sustainability. All of this also enables the political science and the social science communities worldwide to contribute on an ongoing basis to the widening, deepening, and globalization of knowledge.

Notes

1. Anecdotally, it is illustrative of trends and timing that the Person of the Year for *Time Magazine* (27 December 1999) is the chief of Amazon.com, with the cover page note of "E-commerce is changing the way the world shops."
2. For a conventional definition, see Gilpin (1987).
3. Michael Dertouzos, Director of MIT's Computer Sciences Laboratory, quoted in *Boston*, December 1999, 142.
4. This definition is for illustrative purposes only, relevant largely to the contents of this argument. But it does draw attention to the fundamental differences between economists and political scientists in their conceptions of "demand." To economists, demand means willingness to purchase; and this willingness is contingent on the dollar in hand, that is, the ability to purchase. Making claims on the political system rather than a willingness to purchase is the essence of the political scientists' view.
5. The Global System for Sustainable Development was presented in the form of a working paper at the IPSA Roundtable on the Deterritorialization of Research, Naples (1999), and can be accessed at <http://gssd.mit.edu>.
6. Dictionaries may provide a more detailed or a less detailed definition of "library," but the core notion is captured above, as presented in *Chambers Everyday Dictionary*, 1975.

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