New IT and Social Inequality: Resetting the Research and Policy Agenda

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Are new Information and Communication Technologies (ICTs) such as the Internet and the World Wide Web a boon to poor countries and poor people around the globe, enabling them to leapfrog their underdevelopment and become equal partners in an emerging global order? Or, have the new technologies, introduced into an asymmetric global system, already become an engine of greater social inequality?

There are few questions more important to the evolution of the global system, and few questions on which there is less agreement. *Yes*, the new ICTs are unequivocally an engine of inequality, according to the highly respected UN Development Program's (UNDP) annual publication, "The Human Development Report." The UNDP finds that, "The Internet is contributing to an ever-widening gap between rich and poor which has now reached 'grotesque' proportions" (UNDP Press Release, 12 July 1999, p. 1).

But according to the highly respected annual "World Development Report" (WDR) of the World Bank the new ICTs are quite positive and have tremendous equalizing potential. The WDR points to dozens of stories showing that telemedicine, distance education, and falling ICT costs are having positive and dramatic impacts on the growth prospects of poor people and poor countries (Knowledge for Development, World Development Report, 1998/99). It seems that for the World Bank, the glass is more than half-full. For the UNDP, it is less than half-empty.

If one thing is clear, it is that highly contested questions have bubbled to the surface regarding the impacts of the new ICTs on the poor. It is precisely at such moments that research and scholarship can make a valuable global contribution. For example, researchers can rephrase the World Bank-UNDP dispute as follows: "What will it take for countries and international organizations to achieve the positive outcomes described by the Bank and avoid the negative consequences described by the UNDP?" And,

"Under what conditions can ICTs be progressive and contribute to greater social equality?"

In order to answer these critical questions, the Center for International Development and Conflict Management (CIDCM) at the University of Maryland brought together researchers and policy analysts from universities, Non-Governmental Organizations (NGOs), bilateral and multi-lateral aid agencies, and IT corporations from around the world for a conference on "New IT and Social Inequality." The result was a wide-ranging international dialogue on IT and distributional issues that helped advance our understanding of these contentious and complex interactions, and pointed the way toward research and policy priorities to promote greater equity.

Organizing such a conference is keeping with the Center's mission, which has long worked to meet policy makers' need for reliable and relevant social scientific knowledge from which to devise programs capable of advancing development, peace, and equity. The Center's work now includes redressing *electronic inequality*, to avert a potential new source of conflict while maximizing IT's empowering and development capabilities. By *electronic inequality* we mean conditions under which access to the new and powerful technologies are unequal, and hence the consequences of this *access inequality* may exacerbate existing societal inequalities. The maldistribution of new electronic means increasingly necessary for executing work, expressing political opinion, accessing empowering information, and other key activities of modern society can impose serious burdens on economic development and on social integration.

The wide gap between the need for and the availability of reliable knowledge about new IT and social inequality is precisely what inspired the CIDCM conference. Conference participants addressed a puzzling irony. Discussions and analyses of electronic commerce, already a hugely disproportionate share of the new IT literature, are rapidly spreading through individual and institutional research. Yet materials on the link between IT and social inequality lag far behind. Yet arguably, E-Equity is at least as important as e-commerce. Conferees identified three key areas

that require greater attention. First, there is need for a research framework to organize, guide, and facilitate analyses of E-Equity by scholars in the field. Second, a clearly defined and strong foundation of important concepts and their logical relationships is needed badly. Such a common conceptual foundation will hasten research and sharpen dialogue among intellectuals in different disciplines concerned with equity and IT. Third, collecting and cataloguing large bodies of evidence in a coordinated manner is imperative for a more informed dialogue on IT and social inequality.

To address these areas, the conference discussions were organized around the following panel topics: (1) conceptual issues, models, and empirical evidence; (2) major research initiatives on IT and inequality; (3) regional studies of IT policies; and (4) setting the future agenda—better knowledge for better action. An expert assessment of IT, inequality and public policy was also presented by a senior government official.

SESSIONS I AND II

Since "New IT and Social Inequality" was mainly a research conference, Session I identified the major theoretical approaches to the subject, presented pointed criticisms of them, and suggested ways in which a better frame for the difficult topic of inequality, information, and communications technology could be produced better policy-relevant scholarship. The questions explored included the following: Under what conditions do ICTs contribute to greater inequality or equality? On what empirical and theoretical bases can analysts assert or deny causal relations?

Robin Mansell, head of the Information, Networks, Knowledge Research Centre at the University of Sussex, reported that the popular everyday rhetoric of "an explosion of equitable development of network access occurring all around the world" stands at odds with observed reality. Rather than simply reciting the putative general benefits of IT, or merely documenting aggregate increases in global access, some scholars are investigating the specific capabilities of the new technologies to contribute to improvements in social value chains, governance, innovation in social activity, and community and personal empowerment. Mansell argued that deriving maximum utility from IT in these areas demands two actions on the part of policy makers in both the public and private sectors. First and foremost, policymakers should promote and invest heavily in learning and social networking innovation. They already pay a great deal of attention to innovations in *technical* systems; they don't pay enough attention to innovation in *social* systems. Yet the latter is also a prerequisite to enhance productivity. For many years employees have learned to be efficient in traditional Industrial Age hierar-

chical organizations, but higher productivity in flattened, fluid, and networked organizations requires new skills. Innovations in civic organization are being pursued ad hoc in cyberspace as individuals coalesce around common interests and issues without knowledge of one another's ascribed or achieved demographic characteristics. If pursued seriously, IT-driven social networking innovation has the potential to facilitate greater integration and democracy for society, Mansell claimed. However, without serious and self-conscious efforts to strengthen social innovation, technical innovation and diffusion will falter.

Claims about ICT and learning should not be exaggerated, Mansell warned. ITs are only powerful tools that aid the acquisition and processing of information, not a replacement for learning. Moreover, the greater and more widespread learning is within a society, the faster new ITs will be adopted and the more subsequent innovation will occur in their applications. In important ways, knowledge and learning must precede ICT applications. At least on the surface, this positive correlation between the level of learning and IT adoption appears to auger ill for reducing international inequality, considering that Western societies have long progressed from universal primary education to mass college education while poor underdeveloped societies still struggle with extraordinary levels of illiteracy. For example, one-third of the world's out-of-school children are in Africa.

A second significant IT societal issue seized upon by Mansell and others explores the implications of social network innovation when new IT is principally adopted in historically privileged communities and generally absent in historically underprivileged ones. A slippery issue is the extent and ways in which historical inequalities are affected when ICTs are equitably distributed over these two groups. Is there evidence and a coherent rationale that E-Equity will grow, or will it be diminished under the weight of existing social inequality? Mansell asserts that public intervention in the name of public service and equity considerations is not only possible, it is essential. She maintains that the Internet and other telematics services should at least approach the level of universality of conventional public telephony. Accomplishing this ideal will be a daunting goal even in the world's richest country during a boom period of economic expansion. For instance, the U.S. Federal Communications Commission's modest E-rate program, designed to facilitate wiring classrooms and libraries in poor communities at a cost of approximately one-half of one percent of the average phone bill, is being constricted and continually threatened by many members of Congress and powerful private organizations.

Mansell also pointed out a related, yet different, issue—the applicability of IT in meeting local needs. Serious intellectual and financial capital must be invested in helping

organizations to learn to apply IT productively. After all, IT is neither designed in a vacuum nor designed to operate in a vacuum; it is both configured and ultimately embedded in local social contexts. Conference participants agreed that the social embedding of technology varies by everything from levels of education to specific cultural idiosyncrasies. For these complex reasons, representatives of all members of the community should be involved in the planning, design, configuration, application, and improvement of new information technology. These tasks should not be left to distant government decision makers and commercial technologists.

IT and Social Inequality: The Domestic Context

The conference addressed the IT question from the perspective of the national level as well as the international level. Economist Lawrence Mishell of the Economic Policy Institute provided a comprehensive and critical review of the principal theoretical claims and empirical trends in IT and equality in the domestic context, using the U.S. as a case. He carefully balanced claims and counterclaims linking IT, productivity, inequality, and social power. His first step was to caution participants to revisit and measure earlier trends, for we may be less *new* than we think. According to Mishel, one should not automatically assume that the rate of technological innovation today is any greater than it has been in earlier periods over the last century when there were no computers.

Another counter-intuitive observation he offered for discussion was the *productivity paradox*, summed up in a quip by Nobel economist Robert Solow: In recent years computers can be found everywhere except in the productivity statistics. Productivity growth when computer diffusion was low in the 1950s and 1960s was much greater than over the succeeding three decades. Labor productivity actually fell from 3.4% between 1948 and 1973 to 1.2% for 1979 through 1997, a time when mainframes and minis, then micros, as well as servers and networks became ubiquitous in American businesses. An explanation for the productivity decline might be invalid measurements of IT-generated productivity. There is a growing consensus that both output growth and productivity growth are poorly measured, particularly in the service sectors where over 80% of commercial computers are deployed. New IT-engendered productivity measurement problems occur with the complexity of measuring so much intangible output and the quantity of hours worked in the age of beepers, laptops, and email, where workers are available to employers well beyond the standard 40 hours per week.

Mishel and other economists also contend that another explanation for the absence of clear links on IT-related productivity gains is that they may have simply not yet manifested themselves at this time. This perspective insists that, given enough time, new IT will decisively prove to be the principal stimulus of rising productivity. For instance, before 1973, productivity in manufacturing sectors that were heavy investors in computers grew more slowly than in sectors that were not. However, labor productivity growth between 1990 and 1996 in those intensive computer-using sectors in manufacturing jumped 5.5% whereas it declined by 2.6% for those less intensive computer-investing manufacturing sectors (McGuckin and Stiroh, 1998).

Furthermore, according to McGuckin and Stiroh, in Western economy computers have been principally deployed as a substitution for more costly inputs, such as labor, materials, and other forms of capital. The pace of substitution is actually quickening as computer prices continue to tumble. Corporate spending on IT hardware alone is now running at a quarter of a trillion dollars a year. Corporate spending in the second half of the 1990s is 80% faster than in the 1980s when a trillion dollars were invested. Stephen Roach (1998) has observed that this heavy spending has led IT's share of business' total capital stock to soar from 12.7% in 1990 to 19.1% in 1996.

According to Mishel, if economists are unsure about the relationship between new IT and productivity growth, they are even less sure about the relationship between new IT and inequality. More effective and sensitive econometric methods are needed to properly apportion the reason for the sustained increase in inequality in the United States since the 1970s. The chief source is probably technological change, and some observers see a somewhat complex causal chain linking IT and inequality. They claim that due to both the knowledge-enhancing qualities of computers and the large gap between computer ownership based on socioeconomic status (i.e., 80% for the highest quintile, 50% for the middle, and 15% for the lowest) and race (i.e., 45.2% for whites and 21.5% for blacks), one can anticipate further worsening of electronically-generated socioeconomic inequality. In other words, given that IT actually extends human knowledge capabilities and given that these knowledge-extending tools are concentrated among the more privileged socioeconomic classes and ethnic groups within nations, then inequality is probably being exacerbated with the current form of market driven distribution of IT.

IT and Social Inequality: The International Context

Among the economists who tackled inequality from a more international comparative angle was Francisco Ferreira of the World Bank. He developed several alternative formal models to help participants think more clearly about how IT access and social inequality might interact. He presented three alternative models of how inequality and ICT may intersect. Model one assumes that ICT is a public or free good that is equally available to all. Yet, since

individuals possess very different skills and resources, then even when widely distributed, ICTs may serve minimally to maintain the preexisting inequalities. Unequal people and equal ICT produces more inequality. A second model posits that ICTs are obtained as a function of income, so the more income, the more ICTs one can obtain. This model, too, results in continuing or increasing inequality. A third model assumes that information and knowledge have become nearly a global good, and that individuals can tap into such an international pool of knowledge through new devices such as the World Wide Web. Ferreira argued that this could potentially lead to some greater global equality as Third World citizens gain greater access to the world's store of knowledge. However, this third framework was met with more skepticism by the conference participants.

The evidence to confirm or disconfirm hypotheses linking inequality and ICTs is not yet easily available, and the pictures we can see are quite mixed. For example, diffusion of new ICTs is fast paced and extensive in Brazil, the U.S., and the U.K., yet inequality is growing in all three. Diffusion is fast and extensive in Finland, too, which is one of the most wired countries in the world; yet, on the contrary, inequality is not increasing in that Scandinavian country. The evidence presented by Ferreira suggested that there is some convergence of income levels internationally, but mainly among relatively prosperous countries, and not between the rich and the poor. Indeed, the gap between the very rich countries and the very poor seems to be growing.

These findings collectively point to the conclusion that IT is not deterministic; rather it is conditional. What matters is not the technology itself, but the social and economic systems in which it is embedded. The Finnish conception of economic and electronic equity, for example, differs markedly from that of Americans. The country is highly egalitarian and it ranks among the world's highest PC-penetration and Internet usage rates. These outcomes are probably tied to attitudes of ethical distribution and to its government's efforts to create incentives for equitable distribution.

Institutional Research on IT and Social Inequality

After a critical treatment of these theoretical issues by the participants, the conference turned to the current research on inequality-related IT programs by leading think tanks, corporations, and international organizations around the world. Research questions included the following: What substantive topics are being addressed and which ones overlooked? How are the public and private sectors thinking about these issues?

Although some like Pruett and Deane contend that the Internet is driven so strongly now in developing countries that it is likely to flourish with or without the help of donors, most conference participants concluded that providing equitable IT distribution cannot be handled exclusively by the market. Governments, private firms, and NGOs all have crucial complementary roles to perform in meeting these socially and economically laudable objectives. Governments and NGOs need to be up-to-date about the evolving state of knowledge regarding IT diffusion among specific populations so as to generate the most efficacious policies, programs, and initiatives to augment the market distribution of IT in a more equitable fashion. Some pointed out that achieving near universal access to plain old telephone service (POTS) in Western societies is attributable first and foremost to leadership commitments to telephony equity, not only to the efficiency of the market. The same needs to be done for newer technologies, they argued.

Different viewpoints on the capability and limitation of the market to deliver services, including quality universal access, were clearly reflected among conference participants. Some observers criticized the mission of new IT agenda-leaders as much too narrow, wanting solely to open markets and ignoring risks of social inequality. For example, Sean O'Siochru in Ireland contended that research funding by OECD governments and by leading think tanks within those countries is narrowly directed to advance commercial interests through a very restricted definition of *universal access*. Wealthy Western governments and elite think tanks call for uninhibited universal access for Western telecommunications and other IT corporations into the world's 190 or so national markets. O'Siochru reported that his research was unable to find major research initiatives on new IT and inequality; projects are tiny and funds are extremely limited, especially in comparison to the scale of the problem. The overwhelming market focus has skewed research resources away from equality issues and toward commercial ones. Based on recent history, he believes that resources will almost certainly not be allocated to research on marketization itself as a core cause of IT inequality.

By contrast, the neoclassical free marketeers contend that global information capitalism appropriately drives new IT development and distribution, and that this is a progressive trend which creates widespread benefits that cannot and will not be achieved otherwise. Advocates at this end of the debate often point to technological successes, such as optical fiber manufacturing and transmission cost reductions of 70% annually, as evidence that the market is an efficient distributor of affordable IT benefits. Frank Baitman of IBM argued that his company is an example of one that is deliberately and continually designing technology that relies on the market mechanism to serve an increasing share of the world's population. To better serve its present and future customers, IBM (and presumably its competitors) is pursuing two strategic approaches

to growing new IT business. The first, under the banner of *pervasive computing*, involves selling more computing performance to a huge swath of the population, from the lower middle class to wealthy customers and businesses, in rich markets. The idea behind this marketing strategy is to facilitate the embedding of converging computing in everything we use. Information delivery technologies on diverse IBM platforms are to be incorporated into all appliances from watches to school rooms, not just computers. But promoting a growing market in rich societies is only one important path to pursuing future revenues. Another involves lowering the thresholds of user skills and affordability. Although IT products sold in LDCs and poor communities will be sold at lower prices and therefore risk less margin per unit, broader market potential may make the new approach to refashioning technology design worthwhile from a business perspective. This notion is in keeping with exhortations by many technologists to their engineering design colleagues around the world to improve and simplify the user interface, a point made at the conference by Professor Ben Shneiderman of the University of Maryland's Human-Computer Interaction Laboratory and Department of Computer Science.

Technologists who give considerable attention to the ways in which technology shapes society have observed that the power to overcome the technological growth barrier and widespread adoption in poor communities and nations is not restricted to the fields of public policy and general education, but is also the partial province of technological design. As opposed to a design focus strictly based on "big technology" and rich markets, socially conscious technologists claim that engineers in IT corporations should reshape the technology to fit the global society they wish to create. This proposition involves, among other things, refashioning the technology to lower the skill and affordability thresholds to be reached by a substantial proportion of the billions of people currently left behind. At the conference, Okuda of UNDP averred that the next generation of technologies can incorporate interfaces that are "right-sized" for the existing skill level of the particular undereducated populations in question.

This idea of universal customization of new IT to reach billions of people with the lowest purchasing power and skills raises the possibility of new IT going more the populist way of the radio instead of the computer as we know it today. Just three generations ago the radio was almost exclusively a technology of wealthy communities. Technological advancements, much more so than changing public policy and marketing strategy, have made the radio the principal means by which the world's population gets its non-local information and entertainment. This model, strongly advocated by Shneiderman suggests that in the context of fostering greater E-Equality, more attention should be given to paradigmatic shifts in strategic marketing, engineering, and software designs of IT corporations, as well as social networks and policy innovations.

Some think tanks have looked at other, though closely-related, issues and aspects of IT and society. For instance, the U.S. based National Research Council (NRC) has focused on: (1) how IT companies make IT Research & Development decisions; (2) mapping the scope and scale of current research on IT and society; and (3) identifying the crucial knowledge necessary to understand the effectiveness of IT today and in the future and how to learn tomorrow's. Researchers at NRC have learned that political leaders and intellectuals in poor communities truly want greater access, but they also truly want content that is much more reflective, respectful, and relevant to the needs of their own local cultural milieu, whether in Akron, Ohio or Ouagadougou, Burkina Faso. The prevailing conception of universal access means not only universal access to new IT, but in effect also greater universal access to Western culture, particularly American culture. This also means that more thought should be invested in empowering diverse nations and communities to develop their own culture-specific content to promote local demand and that will work synergistically with international or Western content and not be merely subservient to it. Additional research is sorely needed to determine the needs and preferences of diverse demographic groups and how they use new IT. For instance, Wendy White, a leading student of new IT international trends, for the National Research Council, has found that IT is not gender-neutral. Somewhat to her surprise, White's recent field experience found that women tend to use IT as a group rather than individually. Such findings are illustrative of how case study research can better inform technology design, marketing strategies, and NGO policies that claim to be in pursuit of universal access.

The issue of research links to effective public policy was the focus of a major address by Vivian Lowery Derryck, Assistant Administrator for Africa at the United States Agency for International Development (USAID). She noted at the conference that current research is agnostic on whether IT will bring about a net plus or a net loss with regard to equity. IT can be viewed as a "parliament of possibilities," where the purpose, the method, and the extent of its use in a given society will be determined largely by the leadership's political vision, its public policies, and the judgment exercised by the authorities of civil society. In Derryck's judgment, richly informed by practical international experience, the cardinal development challenge today is to learn how to reliably deploy IT to promote human development in a sustainable and equitable manner. Largely through USAID's Leland Initiative, a body of empirical evidence about which policies and programs work and which do not is starting to accumulate. All of Leland's projects are refracted through USAID's three

important priorities—policies, pipes, and people. That is, all policies must be flexible, market promoting, and geared toward sustainable equitable growth; the *pipes*, or technology, must be designed and deployed towards universal access; and the people must be educated and trained to exploit the tools, and be provided with the infrastructural support to do so.

For example, Leland has partnered with African governments to facilitate changes to their national telephone companies in a manner that not only minimizes costs, but actually generates new revenue, helps attract new investment, and breathes new life into civil society. Derryck reported that state telephone companies in most non-Leland countries have monthly charges of $10,000 to $15,000 for a typical Internet gateway access. Through the application of Leland countries' cost-base tariffing model, these prices are reduced to a level as low as $1800 per month in other countries where Leland works. The consequence for phone companies is that they earn more due to the surge in Internet subscribers who generate a large volume of local telephone traffic as they dial in to their ISPs. Cote d' Ivoire, for example, generates an estimated $200,000 per month through this approach.

SESSIONS III AND IV—REGIONAL INITIATIVES AND NEW DIRECTIONS

Session III comprised reports on major regional IT initiatives in Africa, Asia, Latin America, and the Middle East. The research questions that directed this session were: What noteworthy policy and research initiatives are underway by governments, NGOs, or others in developing areas? Are there coordinated regional efforts? Do any global multilaterals have major regional efforts underway (again, both policies and studies)? What are the gaps in our knowledge?

Bounerama of the United Nations Economic Commission for Africa (ECA) reminded other participants not to lose sight of the fact that IT developments in Africa per se are progressing. All but a handful of countries are connected to the Internet, and progress is quite solid. It is only when we juxtapose Africa's IT developments with those in other parts of the developing world that we witness relative decline. Studying African IT developments in both contexts constitutes an effective means of combining the benefits of knowing those countries, sectors, institutions, and policies on their own terms, as well as a means of learning best practices occurring in other regions experiencing swifter progress.

Figures of low teledensity (i.e., 6.7% for fixed lines and 11.3% for cellular) and even lower PC penetration and Internet usage rates (i.e., less than 1% in each case), as well as African-created content accounting for a mere 0.4%, tell much of the story of the daunting distance between the new global IT frontier and actual IT penetration in Africa. Often the principal city accounts for anywhere from one-half to two-thirds of the country's teledensity and more than 90% of its PC penetration and Internet usage rates. Africa's current IT challenge is not unrelated to its older infrastructural challenges, namely telecommunications and electrification. Over 70% of Africans live in rural areas, most without electricity. New solar technology is expected to help provide rural Africans' leap into electrification the way cellular phones have for telecommunications, but those innovations are still in the future. Indeed solar energy will help advance ICT spread around the continent. Both are required for further penetration by sophisticated information networks.

The "New IT and Social Inequality" conference was partially designed to assist the Economic Commission for Africa to refine the objectives and agendas for its first annual African Development Forum (ADF), entitled "The Challenge To Africa of Globalization and the Information Age," to be held in Addis Ababa in October of 1999. At that forum, leading analysts and practitioners of African IT affairs and institutions will cover four themes which were also discussed in College Park—strengthening Africa's information infrastructure, Africa and the information economy, information and communication technologies for improved governance, and democratizing access to the information society.

Not surprisingly, the trends in Asia are substantially different. Not only have Asian nations on the whole had greater access of capital to invest in IT industries than other developing regions, argues Izumi Aizu of Asia and Pacific Internet, but they also have had the greatest governmental commitment to this most enabling cluster of technologies. As a demonstration of this commitment, despite the fact that almost each and every Asian nation's economy shrank during the recent financial crises, some by more than one-third, the IT industry was hardly hurt. During the economically brutal year of 1998, PC sales, according to Aizu, still increased by 31.5% in the region while China experienced a 29.5% jump in sales. In Singapore, the "intelligent island," 85% of professionals use email, the highest in the world. Many believe that IT statistics like these will pull Asian economies out of the doldrums (Wilson, 1998).

Although the commitment of Asian governments to IT is laudable, their specific policies are fraught with self-imposed limitations. Aizu detects three broad common problems deterring further IT success in Asia. First, the stifling *top-down* government-inspired initiatives that are planned and executed by a technocratic elite has largely undermined the emergence of an American-style bottom-up IT innovative drive. Second, although Asian nations have benefited from being among the most willing to learn from the best in a given technology area, they may in fact now be tipping the balance against their interests. Most

IT infrastructural models as well as much of the content are imported, and the latter in particular may actually be adversely affecting community social networking since content imported from the West is embedded with social relations of Western traditions and not Asian ones. A final problem is the hugely disproportionate policy and media attention given to business incentives as opposed to social networking innovation. As a consequence of those trends, Asian nations are missing opportunities to promote their own cultures and to build more equitable societies. Aizu offers a note of caution to less developed countries (LDCs) regarding their purchasing of outdated IT equipment and systems from Asian IT companies. LDCs are particularly vulnerable in this age when they "look East" to find appropriate technology as well as general development models to emulate.

Turning from East Asia to the Middle East, Edmund Ghareeb, a Lebanese historian at American University, presented important new data and nuanced insight into the growth of Pan Arab satellite services. Following the vision that Nasser created and subsequently helped initiate in practice, some Arab leaders in the Middle East today seek to deploy new IT for dual purposes, fostering Arab unity and simultaneously making money. Whereas many other crusaders for Arab unity centuries ago used the printing press and other older technologies to help accomplish this goal, Nasser opened the door to the modern era in the 1950s with the voice of Arab radio. The concept was to pull together far-flung Arab interests electronically on a regular basis to experience common Arab programming. The concept is now being updated with advanced satellite TV.

According to Ghareeb, numerous Arab satellite TV channels out of Egypt, Bahrain, Kuwait, and other countries reach diverse Arabic-speaking audiences from North America to the Far East. In conjunction with other new IT such as Internet-based listserv discussion groups satellite TV is, as Ghareeb points out, "beginning to create Pan-Arab public opinion," the societal impacts of which may be quite significant in the future. One result may be to reduce conflicts among Arab states. The flip side of new IT, however, is perhaps equally poignant, that is, the same technology that can foster cultural unity can also fracture it. New IT constitutes new media for importing increased quantities of Western and other cultures into Arab communities, potentially altering the preferences, sensibilities, and tastes of Arabs, which is not much different from the experience of other communities. Gareeb notes that the pioneers of E-Arab community building are working to create an intermediary level of ICT and content a brand new regional level between the national and the global levels.

In Latin America, a number of major initiatives are underway, and many E-equity advocates and NGOs have invested considerable hope in projects such as telecenters as short-term devices for bringing new IT to poor rural populations around the world. Ricardo Gomez, who researches and helps build telecenters in Latin America for the Ottawa-based International Development and Research Centre (IDRC), asserts that "IDRC's is gambling with telecenters." This approach, however, is being taken for understandable reasons. After all, a telecenter is a point on a continuum between two extremes: no access to telephones, the Internet, and satellite and terrestrial TV, versus universal household ownership of these technologies. The former is unacceptable and the latter is presently impossible, given prohibitive costs and skill requirements of the existing state of new IT. Telecenters provide public access to basic information and communications services to poor people who cannot afford private ownership.

One of the most surprising and unsettling findings at the conference was shared by Gomez. He stated that, despite their populist appeal and their dramatic impact in theory, IDRC has yet to find much empirical support for positive impacts by telecenters on communities. In part, telecenters were overhyped in terms of what they could actively deliver and when. On the other hand, given that telecenters provide a potential platform as a gateway to universal access, it is well worth more scholarly and organizational attention, evidence, and analysis of their impacts. Here we confront the same challenges as those described by scholars on Panel I: "How to capture ICT impacts on society" (i.e., on productivity or village impacts).

The final session was designed to suggest explicit research strategies for improving research methodology, analysis, evaluation, and public action. Questions addressed in this session included the following: What have we learned at the conference to guide our thinking on IT-inequality links? What is the state of research on this topic? What intellectual and organizational steps should we take now?

There is an undeniable scarcity of knowledge about the intersection of ICT and social dynamics of any type. One has only to review the many hundreds of books in the computer sections of major bookstores. One is hard pressed to find *one* serious book that takes up the social organizational issues of computers. One of the principal objectives of the "New IT and Social Inequality" conference was to help clarify how the topic should be studied and how the evidence and analysis should be presented. Until scholars have sufficiently begun a debate about theory, content, and methods of a new complex scholarly topic like this, there is little prospect of a sizable literature emerging.

Professor Rob Kling took up an important practical issue of the economics of computer diffusion to which most observers are oblivious. With respect to computer costs, according to Kling, most consumers, policymakers, and analysts focus exclusively on initial computer costs, while hardly any attention is given to other non-trivial total cost of ownership (TCO). Although the business community is somewhat more attuned to TCO, consumers and

policymakers on the whole overlook an array of less visible costs such as those of support services, infrastructures, and upgrading which Westerners take for granted. In some instances, these costs can run annually five to ten times the cost of the computer. This knowledge is particularly important for those advocating for E-Equity. Such advocates have become further emboldened upon witnessing PC prices continuing to decline, noting that accompanying each price decline is greater affordability. We now know, however, that even though initial hardware and software cost declines are dropping, from a long-term maintenance point of view E-Equity is not necessarily being enhanced if the secondary and tertiary inputs are financially unavailable.

Kling further points out in "Can the 'Next-Generation Internet' Effectively Support 'Ordinary Citizens,'" (Kling, 1999), that the new technologies are "often discussed as tools or simple appliances, even when they refer to complex arrangements or varied equipment (or) organizational practice." (p. 59) By ignoring organizational structures and capacities, we risk retarding the more rapid diffusion of new IT services, especially to less sophisticated user populations. It is more useful, Kling suggests, to see networked technologies like the Internet as "sociotechnical packages," a unique, "complex and interdependent system comprised of people . . . hardware . . . software . . . techniques, and data" (Kling, 1999)

Another theme to be addressed by E-Equity advocates requires taking stock of the media *content* to which subscribers are acquiring access. Professional and scientific communications do not constitute the primary source of bandwidth in U.S. TV and new technologies. According to Kling, 25% to 30% of home Internet use is spent in chat room discussions. Despite how one chooses to study it, culturally diverse and varied views are often marginalized on the Internet while pornography has entered the Internet mainstream. We still know little about the content preferences of users in poor LDCs; additional research is required. When scholars and analysts contend with issues of E-Equity, they should pay more attention to controversial topics such as content.

Some IT nonprofit organizations are considerably more action-oriented than research-oriented. Mario Morino and the institute he heads have spent the last six years studying the social impact of the Internet and promoting its use in depressed areas in the United States. Despite the Internet's inviting and seductive participatory style, some communities are not participating and are in fact dropping behind at an exponential rate. Morino notes that there are real punitive costs starting to accumulate for not being literate, functional, and participating in e-commerce and other Internet-based activities.

Again, not only has the Morino Institute been studying and documenting these problems, but they have also been actively searching for and advocating means by which to redress them. The Morino Institute advocates widening investment priorities to include human capacity building as well as hardware. In terms of research priorities, the Institute advocates a research agenda on the social and psychological infrastructure of individuals in poor communities to facilitate and encourage their IT use. In other words, more research is needed to learn exactly what day-to-day barriers and disincentives produce the lower rates of Internet use in poorer communities. The next step is to ask what social infrastructures are needed to aid a broader and deeper utilization of the Internet. As the conference demonstrated, this same question asked of poor communities in rich countries is as relevant for all communities in poor countries.

Indeed rich and poor countries alike are confronted by waves of new ICT innovations and by waves of globalization. The countries most likely to succeed in the Information Age are those that have institutions that favor knowledge creation and dissemination, a rational and flexible regulatory framework, and an educated work force. The World Bank's Carlos Braga observed that information flows are at the core of the globalization process. And, because some countries already have possession of a daunting array of IT deployed throughout the economy as well as the proper skills and attitudes that are in sync with the dizzying pace of globalization, while other countries possess next to none of these characteristics, Braga sees increased divergence on the horizon. Sufficient evidence was presented at the conference and compelling arguments were made to support certain generalizations. These ICT attributes are not embodied equally in the 160 or so poor countries that collectively constitute less than a mere 10% of global IT deployment. For Braga, the chief challenge is getting governments to foster attitudinal shifts on innovation, high educational attainment, and flexibility in policy formulation and implementation.

The thesis here is that an enabling environment with the right macroeconomic picture will better position nations to attract enough IT investment and absorb the technologies to compete effectively in the new global economy. This view of reality is attractive because it places tremendous power in the hands of political leaders in poor nations to determine, through the right vision and programs, whether their respective societies will develop and grow in tomorrow's global society. In such a vision, the incomes and well-being of rich and poor converge and inequality is reduced. Yet, reality may be much more resistant to vision than the visionaries foresee.

CONCLUSION

Our efforts to explore the distributional impacts of new information and communications technologies on societal

Demographics	Constraints & Opportunities	Information Technologies			Demographics
Education Income Race Occupation Gender Geography	Financial Content Skills	Telecommunications	Computers	Media	Education Income Race Occupation Gender Geography

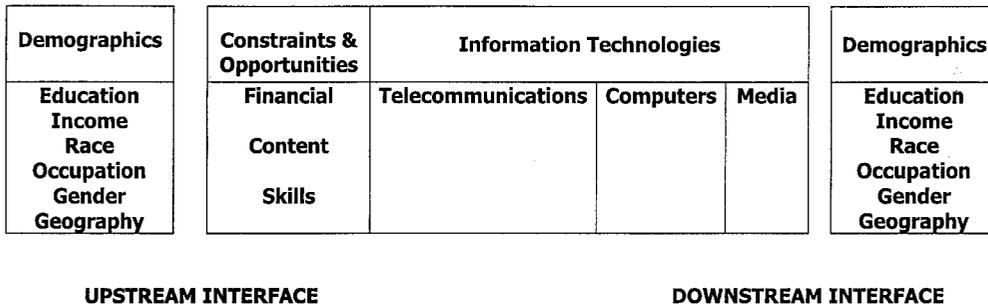**UPSTREAM INTERFACE**   **DOWNSTREAM INTERFACE**

FIG. 1.

inequality began with a few main presuppositions. First, that the utopian claims about the inevitably progressive impacts of ICTs were untested and hence perhaps untrue. Second, we were convinced there was an inchoate but active and large research community aggressively pursuing issues of ICT and social inequality. Third, we believed that some additional work needed to be done along theoretical, conceptual, and empirical lines.

Our first presupposition was found to be true. The utopian claims about ICT and equity were indeed untested empirically and limited logically. Second, we were surprised to find how little serious scholarly work had been done on this important subject we call "E-Equity." Instead, we found a community of scholars who work on social inequality, another which works on ICTs, and very little overlap or scholarly exchange between the two. Third, there is indeed a tremendous opportunity for good work to be done at all three levels—theoretical, conceptual, and empirical.

All in all, the participants successfully pushed forward the theoretical, conceptual, and empirical bases for a better understanding of IT's complex, interactive and often contradictory relationships with social equity. A consensus emerged that when ICT is introduced into a societal context already marked by substantial structural inequalities, whether global or domestic, then the dispersion of the ICTs will tend to follow these same structural patterns of inequality.

Summing up the research challenge, CIDCM Director, Ernest J. Wilson, III, proposed that scholars expand their investigations of *equity* beyond the traditional attention to *access* to the technology itself. He found that a disproportionate share of research and scholarly attention is devoted to what might be called the *upstream* linkages between technology on one hand, and individuals and groups on the other. At this upstream interface, researchers ask how individuals with certain demographic characteristics do or do not gain access to ICT hardware and services. This is certainly an important interface.

But there is another interface beyond access. We might call this the *downstream* interface. This refers to the points

where asymmetric ICT access patterns (the upstream interface) intersect with subsequent patterns of societal changes in education, health, wealth, and income. It is this downstream interface that has received far less scholarly attention. Yet commentators and policy makers regularly make extravagant claims about the inevitable impacts of upstream access on downstream inequality. This conference showed that, on the contrary, equal access to technology doesn't equate to social equality.

Figure 1 illustrates one way to conceptualize and structure the research problem of ICT and social equity. There are certainly other ways to do so, but this approach speaks especially to the need to distinguish between access and impacts. To the left are indicated the basic demographic factors that seem to shape an individual's access to ICT, as filtered through financial, skill, and content constraints. Thus, a highly educated, high income professional urban male is likely to have greater access to the technology than those in other demographic groups (for example, a rural female with low income and no formal education). How precisely does this happen, and in policy terms, what can be done to facilitate wider access to ICT appliances?

Scholars analyzing the second, downstream interface, indicated on the right hand side of the illustration, would ask different questions. They would ask how the upstream differential access to telecommunications, computers, and media, in turn, reshapes demographic and social structures, translating into shifts in relative wealth and social power. Through what mechanisms does ICT enhance the occupational, income and educational prospects of the users? These were the kinds of questions posed at the conference by Ferreira, Mansell, Mishel and others. What theories, generating particular hypotheses, best illuminate the impact of ICTs on social structure and demographic dispersion? What does the evidence show? These are the kinds of difficult research questions that the next "generation" of research should pursue, as communities around the world seek to expand their knowledge about the ways in which social inequality and information and communications technologies interact for good and for ill.

REFERENCES

Kling, Rob. 1999. Can the 'next-generation' Internet effectively support 'ordinary citizens'? *The Information Society* 15(1):57–64.

Mansell, Robin. 1998. *Knowledge societies: Information technology for sustainable development*. New York: Oxford University Press.

Mansell, Robin. 1995. From telephony to telematics: Equity, efficiency and regulatory innovation. In *Information superhighways: Multimedia users and futures*. New York: Academic Press.

McGuckin, Robert, H., and Kevin J. Stiroh. 1998. Computers can accelerate productivity growth. *Issues in Science and Technology* 14(Summer):41–48.

Mishel, Lawrence. 1999. *The state of working America*. Armonk, New York: M. E. Sharpe.

O'Siochru, Sean. 1996. *Telecommunications and universal service*. Ottawa: International Development Research Centre.

Roach, Stephen, S. 1998. No productivity boom for workers. *Issues in Science and Technology* 14(Summer):49–56.

United Nations Development Program. 1998. *Human Development Report 1998*. New York: Oxford University Press.

Wilson, Ernest J., and B. Kahin, eds. 1997. *National information infrastructure initiatives: Vision and policy design*. Cambridge, MA: MIT Press.

Wilson, Ernest, J. 1998. *The Asian economic crisis and the information revolution*. InterMedia.

Wilson, Ernest J. 1998. *Globalization, information technology, and conflict in the second and third worlds. A critical review of the literature*. New York: Rockefeller Brothers Fund, Inc.

Wresch, William. 1999. Institutional reactions to the information highway: Namibia's first year on the Internet. In *Science and technology in Southern Africa and East and South Asia*, Ed. Rubin Patterson. Boston: Brill Academic Publishers.