Past, Present and Future of Research in the Information Society

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1. INTRODUCTION: LEARNING FROM THE PAST, PRESENT AND FUTURE

Wesley Shrum, *Louisiana State University*

The event summarized in this volume was one of four official side events that occurred in conjunction with the second phase of the World Summit on the Information Society. Both events were held in Tunisia, near the Mediterranean coast of Tunis, during mid-November 2005. "Past, Present and Future of Research in the Information Society" (PPF) took place over the three days (13-15 November) preceding the main Summit (16-18 November). The chapters in this volume are abbreviated versions of the sessions at the PPF conference. Each author was asked to provide an extended abstract of their presentation and the lead author of each chapter edited these together.[1]

"Past, Present and Future of Research in the Information Society" was a challenge for many reasons. By most accounts, it can be considered a successful meeting—cynics said more successful than the main Summit. But such skepticism depends very much on how such events are judged. First, the World Summit on the Information Society was the only such multilateral event to be planned and implemented in two phases, less than two years apart. Given that the second phase was originally intended to be a follow-up meeting where actions would be reported and evaluated, it is open to debate whether the timing of the phases was ideal—a typical development project takes at least three years after it is funded. Second, not unexpectedly, the WSIS was the first such multilateral event to make use of the full range of modern information and communication technologies from the planning of the event through its final moments. Third, partly owing to the use of these technologies, the WSIS was the first such multilateral event to involve civil society in partnership with governments and the private sector. If the outcomes of international meetings are judged in formal terms of Declarations and Plans of Action, then Geneva (WSIS, phase I) will certainly be judged more successful than Tunis (WSIS, phase II). In my view, such Declarations and Plans are relatively insignificant. But if outcomes are judged in human terms of interactions and meetings, communication and collaborations, then surely Tunis was unequalled.

The title of our event, at various times during its evolution, contained "Science," "Technology," "Engineering," and various combinations of those terms. It eventually became "Research in the Information Society," but it was always "Past, Present, and Future." Any Summit, and any Satellite

Summit must consider where we are, how we got here, and where we are going. Our "road to Tunis" was not an easy one—but in the end it was worth it. I had never planned a meeting before. Neither had Rick Duque—my friend and co-conspirator. If you want to try this yourself, I could recommend getting started with something less complicated than an event during the largest convocation in Tunisian history, especially when you are hit by Hurricane Katrina, the largest disaster in American history, two months earlier.

The idea for a science and technology event in Tunis had little to do with information and communication technology (ICT) and everything to do with sustainable development. I attended the World Summit on Sustainable Development during August of 2002 in Johannesburg, South Africa, as a guest of Bok Marais, one of the key architects of the social scientific review that hammered a nail in the coffin of apartheid. Marvelous as the main Summit might have been, I never entered it—nor did anyone else who was not highly credentialed. What I did, along with most mortals, was to visit the public exhibits in Ubuntu Village. But there were a number of fascinating "side events" or "parallel events" available as well, including one that focused on science for sustainable development. This conference was hosted and funded by the National Research Foundation of South Africa, with its key partners the International Foundation for Science (ICSU), Third World Academy of Sciences (TWAS), and the World Federation of Engineering Organizations (WFEO). What was remarkable about the event, in my mind, was the relative decentralization, the freedom of various groups and organizations to use this opportunity for presentations, launches, and discussions. It was not a political event but a place to air a diversity of viewpoints and experiences—an approach that would become a hallmark of our PPF conference as well. During coffee breaks in the garden of the Wanderer's Club, the idea for a similar event at the WSIS was born, together with officers from ICSU and TWAS.

That fall of 2002, the concept of a Satellite Summit on science and technology in the information society was adopted by Wiebe Bijker, incoming President of the Society for Social Studies of Science. His support, from the initiation of the idea to his editorial work on this volume, was indispensable. After a discussion of the possibilities and opportunities such an event might offer, the Council of the Society endorsed the meeting. This decision, more than any other, paved the way for PPF and introduced science and technology studies into the summit process, as the Society for Social Studies of Science became an accredited civil society entity in a major multilateral enterprise. Subsequently, the science and technology studies component of the conference grew during a meeting of the officers of the

'STS Consortium' (History of Science Society, Society for the History of Technology, Philosophy of Science Association, and Society for Social Studies of Science) in San Diego in May, 2003. In partnership with the Society for the History of Technology, and the History of Science Society, 4S hosted a stream of sessions highlighting science and technology studies in the information society, a contribution that eventually represented a critical component of the PPF meeting. About one third of the presentations were by individuals who could be considered STS (science, technology, and society studies) scholars.

The seed money for the "Past, Present and Future" conference was provided by Louisiana State University's Center for Computation and Technology. Special thanks are owed to Steve Coffee for the web site, launched in January of 2004, and registration interface provided by the 4S. Primary funding for the conference was provided by the Society for Social Studies of Science and Hewlett Packard, with further contributions by the International Federation of Information Processing (IFIP), the Committee on Data for Science and Technology (CODATA), Microsoft Research, and Internet2. However, particular gratitude goes to Wayne Johnson and Barbara Waugh of Hewlett Packard for their personal and financial assistance to the Louisiana organizers in the weeks after Hurricane Katrina. To borrow a phrase from the comic books, they saved the day. Hewlett Packard is also the primary sponsor of this volume.

From August of 2002 through November of 2005, a chain of events culminated in the "Past, Present and Future of Research in the Information Society." These are the lessons I learned in planning and organizing the meeting.

(1) *Organizational decentralization.* While there are two groups that might be considered "lead organizations" for the PPF meeting, they did so only in a restricted fashion. The Society for Social Studies of Science provided funds and organizational legitimacy—not to mention a bank account for wire transfers to Tunisia. Its role was <u>not</u> to dictate a particular program of events for the meeting. The Visions Committee of the 4S, established by former President Sheila Jasanoff in 1998, suggested that a society that has been the major international association of scholars examining issues at the interface of science, technology, and society since 1975 should take a more engaged role in global and policy matters related to its areas of academic concern. The "Past, Present and Future" event was an illustration of this form of engagement, which is not to suggest an outcome, but to make a forum for discussion available.

The second entity is not much of an organization, but a network of collaborators we call the World Science Project.[2] The only thing "world" about it is the name: easily the worst project name in world history. The

origin of the name is simple: a graduate student needed a business card and articulated the words that most closely matched the website. Since the web site for the PPF meeting was the simplest available domain name (worldsci), our project became its namesake. World Science Project has three meanings, corresponding to the macro, meso, and micro denotations of science. At its macro level it refers to globalized science, in which all regions of the planet exchange information equally about research and knowledge. At the meso level it is merely our own project—six countries where participants in the research enterprise are followed over time to understand the local and international extent of their communication. It is only at the micro level that we appreciate the name, a small "science project" anywhere in the world—a girl or boy dissecting a bug or taking apart a radio to see how it works. As the Director, this is the only meaning I can accept.

Organizational decentralization was important because a Satellite Summit should not, insofar as possible, be weighted towards any national or regional group. I say "insofar as possible" because individuals from developing areas are much less likely to attend if travel funds are not provided, and this will always lead to a deficit of participation. Since the scientific digital divide was one topic of the meeting, we hoped to have significant representation from sub-Saharan Africa. We knew this representation would be a problem and it is to the credit of the various groups responsible for particular sessions that they attempted to address this issue. The Committee for Data on Science and Technology (CODATA) became a key participant as a result of a recommendation by Paul Uhlir at the U.S. National Research Council, who worked with them on open access issues. Kathleen Cass in the CODATA executive office organized their Berlin meeting in late 2004 and became a key behind-the-scenes person. The International Network for the Availability of Scientific Publications (INASP), especially Carol Priestley and Peter Ballantyne, organized an integrated sequence of sessions addressing key issues involving scientific output and distribution in partnership with the FAO. The International Federation for Information Processing, which organized one of two major science and engineering side events at the Geneva phase of the Summit, became involved through Klaus Brunnstein, one of the editors of this volume. As a result of meeting Chen Huai at the trilateral meeting of U.S., Chinese, and Japanese scientists in December 2003, the National Natural Science Foundation of China sponsored a session. Hewlett Packard, which became one of our key sponsors, and organized two sessions at the PPF, became involved in early 2005, through a nearly random email and follow up call with Wayne Johnson.

What should be emphasized here is the change in organizational participants. The list above is the final group, rather than the group as it existed during any specific point in time during the three year run up to the meeting. In the spring of 2004, to take one example, it would have included Intel, the National Research Foundation of South Africa, the World Federation of Engineering Organizations, the Science and Development Network (SciDev), the International Council for Social Science, and a Microsoft division in the U.S. rather than India. All of these organizations dropped out, for various reasons, sometimes late in the game. But this is to be expected. They were replaced by others that were more interested, as evidenced by their inclusion in the final program. Remember, when you are organizing a Satellite Summit, participants receive an associated benefit no other kind of meeting can provide: they may attend the main summit as well.

In sum, a diverse group of *organizations* were the main driving force behind the meeting. I would strongly recommend this as a model for Satellite Summits or similar events. The main organizers of the event should not have any specific control or right of refusal over the presenters of these subsections of the meeting, so long as their topics fit generally into the themes. The event that results will be less unified than if every session were meticulously planned from the top down. It also yields a rich and diverse sampling of topics, that often surprised and sometimes delighted participants—such as the young academic who said, after a session organized by Hewlett Packard, "you know, these private sector people seem pretty cool." And she soon found out that Barbara Waugh, one of the lead organizers, had once been a bodyguard for Angela Davis.

(2) *Internet-based planning.* The Internet was crucial, and not simply for the development of an online program. Clearly, in the modern era, meeting participants expect and deserve web-based materials, including information about the location, accommodation, and program. But as many have said, email remains the only proven technology for research collaboration, and the same is true of meeting planning. I traveled around the world three times during this period and was in Africa and Asia for about nine months during which much of the meeting organization was done. Internet-based meeting planning, at its most basic, is spending sufficient time in the cyber cafes of Accra, Nairobi, and Trivandrum.

But take careful note of one thing, in view of the organizational decentralization discussed above. In each case, a single person took the lead in putting together sessions for their organizations. So when you are planning a meeting with organizational partners, you must quickly forget that fact, and get to know their people. Call them on the phone if you need to. Visit them if you have a chance. If they are active on email and respond to prompts, you will be fine, regardless of how reliable their organization is.

When they are not—often when you deal with people who are famous (or simply think they are)—the value added will be minimal, and you will regret the name-dropping potential they offer. After organizing the PPF, I doubt that the meek will inherit the earth, but they make it worth living on.

The Internet had another benefit for our Satellite Summit. Since 4S was an official, accredited entity under the Civil Society sector of the WSIS, we had the ability to accredit all of our participants to the main summit as well. To put it another way, even if you thought the "Past, Present and Future" was a waste of time, you could go to the Kram Centre and learn about the global programs and offerings in ICT the following day. Given the state of security in Tunisia last November, this ready ability to "get badged" for the main Summit was a major bonus. The regular emails sent by two or three of the civil society lists for WSIS were invaluable sources, alerting us to deadlines and allowing us to provide information for our participants. Early in 2005, we determined to produce an exhibition for the Kram Centre during the three days following our own meeting. There we could distribute materials for anyone who had contributed to the PPF, including posters for the Society for Social Studies of Science as well as results from our own National Science Foundation project. Meredith Anderson and B. Paige Miller were primarily responsible for this, with artwork provided by Susan Arnold.

(3) *Costs and Control*. One painful and extremely counterintuitive lesson involved a decision made by one organization not to fund the conference. They were initially expected to be our major source of funding and their initial enthusiasm was, truth be told, the source of my own confidence in proceeding. As I recruited participants and organizations, I told them, in all honesty, that the conference would likely be providing travel funds. Given the travel problem for developing area participants, it did not seem possible to plan a meeting without this source of funding. But I was wrong.

In most academic conferences—the annual meeting of 4S, for instance—a single organization implements a periodic event, according to a set of guidelines (or, at least traditions!) used by its planners to meet standard expectations of participants. Travel costs such as airfare and accommodation are paid by participants themselves, together with a registration fee to defray event costs. In the PPF conference—unlike the IDRC conference held in the same hotel during the same period—we followed largely this model after we lost our expected source of funding.

The decision to charge registration and move to a self-funding model was not made all at once, nor was it in the expectation of the funding withdrawal that later occurred. It was made because sometimes there was greater interest in participation than our hotel and organizational capacity allowed. The

timeline of the event was such that most of the participating organizations indicated their interest before the main funding source fell through. By the end of 2004, there seemed no turning back. It would be impossible <u>not</u> to have some sort of conference in Tunisia. When, surprisingly, our expected funding source disappeared, the PPF conference was still going to happen. The anticipated consequence was that fewer participants from developing areas would attend, since we could not fund their travel. The unanticipated consequence was that it freed us, the Louisiana organizers, from the significant time and energy associated with implementing the payment of hotel and airfares in accountable ways.

It seems strange to me now, but without the *expectation* of this significant source of funding, the PPF meeting would assuredly never have occurred. I would not have gone forward, others would not have signed on, and the momentum eventually generated would not have been possible. But the funding itself was unnecessary.

(4) *Visits to Sites and Conferences*. In organizing such an event, two kinds of site visits are necessary. It goes without saying that you should not try to manage an event in another country when you have not been there. Wiebe Bijker and I conducted the first site visit in October 2003, and selected what appeared to be an outstanding conference hotel, one that had even hosted an ICANN meeting. However, the meeting staff proved almost impossible to reach over email during the months that followed and we felt this had been all ill-advised choice. This difficulty led Keith Benson and I to revisit the site and change the meeting hotel in May of 2005, which was quite late in the process, given the level of hotel and meetings activity occurring during the Summit high season in Tunis. Human rights issues and security issues led to additional challenges. On one of my two site visits I was detained by the police for taking a photograph of the Kram Centre. After the Jordan bombings, shortly before the Summit, the Tunisian government had tightened security to the point that taxis themselves were unable to approach the Kram within one mile. The Corinthia Khamsa hotel, which proved an outstanding venue for the event,[3] declined to sign a room contract without payment in advance—something we could not offer. We kept the hotel as a meeting site, but shifted course in providing accommodations, since we could no longer guarantee our participants rooms in the meeting hotel. Instead, we created a link to the main Summit accommodation site, and provided feedback to their travel agents on site design.

The second kind of "site visit" was not to Tunisia but to other conferences, in order to observe and learn. Many of us do this without realizing it, but in planning an event it must be explicitly noted. Observe what others do that fits the situation, and see what they do that might work for them, but will not work for you. I have mentioned the importance of the

South African Global Science Forum, the group of science and engineering events held simultaneously with the World Summit on Sustainable Development. Our original idea was to hold the PPF meeting along with the WSIS. But after Rick Duque and I attended the CERN event at the Geneva phase of the WSIS ("Role of Science in the Information Society"), we changed the dates of our PPF event to the three days immediately before the main Summit. Given the new Summit model of greater accessibility and participation by Civil Society, events that are simultaneous with the main Summit simply experience too much competition. We also eliminated the idea of large, formalistic banquets that are wildly expensive and unnecessary when there is an interesting city to explore and participants have spent the entire day at a meeting. The CERN and IFIP events in Geneva taught us much about what, and what not to do.

(5) *Flexibility*. In the summer of 2005, with stress levels increasing owing to the lack of funds and the absence of a room contract for our participants, the hotel rented our meeting rooms to another conference. Hard to believe, but true. After two site visits, a personal guarantee from the sales manager, and apparently good relationships with the staff at an "international standard" conference hotel, the impossible had happened. We had no place to hold the conference. I discovered this, while in the south of India, through an email from Steve Song of the International Development Research Centre (Canada), who remarked that we were both holding conferences in the same place at the same time. Frantic emails, faxes, and phone calls with Khalid Fourati and other excellent folks at the IDRC led to the best of all worlds. Their African Bandwidth Conference, to which they had invited a great number of the Africans that our PPF no longer had money to fund, was going to last a day and a half, and would only involve some minor switching of rooms. Participants at each conference would be free to go to the other, and the benefits would be mutual. So luck keeps coming—whether good or bad, you never know—and crisis turns into opportunity. How do you increase your odds? Check your email every day, don't hesitate to make phone calls when something is unclear, and establish personal relationships in which you yourself are as flexible as you want others to be.

(6) *Hurricanes*. On the 29th of August, 2005, Rick Duque and I sat in front of a computer to begin drafting the final program for the PPF on a computer in Lake Charles. We had evacuated Baton Rouge, Louisiana, the day before, because Hurricane Katrina was coming and no one knew exactly where she would hit. It was an exciting time for us. We had worked towards this day for three years. It was the day we could finally look at our web site with pride, knowing we would soon shepherd a group of interesting people

into a coastal hotel for three days of fascinating presentations on a subject dear to our hearts—science and the Internet in the developing world. As that day wore on, and bled into the next, we lost all interest in Tunisia, in WSIS, in the PPF meeting. Our First World had become Third. Nothing like this had happened—had *ever* happened—before. The levees had failed, and the City of New Orleans had flooded. What we did not know then was that the water would not stop rising for another three days, until the water in the city was level with the lake that now filled it.

Borrowing from Samuel Johnson's comment on the dog that could talk, it was no longer a question of whether the conference would be done well, or poorly. It was a question of whether it would be done *at all*. And we did not care much, in the days that followed, whether there was any "Past, Present and Future" conference. Life—real life—had centered us. The hurricane drew a boundary around our insignificant concerns with meeting rooms, confirmed registrants, and receptions. It revealed our trivial issues in the richness of their triviality. It could not possibly matter whether academics, policy makers, and program managers wandered around a beach hotel, gave a talk, and went off to see the ruins of ancient Carthage. Within the space of a day, I did not care whether the "History of the Internet" or "ICT for Development" was in the El Melia room at 10:30AM. Rick Duque was indifferent to whether merlot or cabernet would work better for the reception on the 13th of November. And it was not over yet. The house where we were working to draft the program was rendered uninhabitable three weeks later by two massive trees through the roof. This was courtesy of Hurricane Rita, which flooded the Lower Ninth Ward of New Orleans for a second time.

The pretentious "world science project" quickly became nothing more than a local hurricane recovery project. Using video ethnographic methods we had developed in Africa and Asia, we tried—though it was beyond anyone's ability—to document the devastation of the Lower Ninth.[4] After the water from the second flood had been pumped out, we received permission to enter and film before residents were allowed to return. On the 13th of November, this moonscape footage of crushed homes and cars in trees provided a visual backdrop for the opening remarks of "Past, Present and Future." We showed it without the soundtrack, because there were few sounds in the ninth ward after the hurricane. We showed it because it represented something we could not have imagined two months earlier, with our attention focused on World Summits. The Lower Ninth Ward became a world where all basic infrastructure—not just the infrastructure of information and communication technologies—had simply disappeared. In the context of a Summit focusing on the Information Society, it was worth seeing.

Looking back, had our Louisiana group stayed home, it is certain that Wiebe Bijker, and R. Sooryamoorthy, and Tony Palackal, and Paul Mbatia, and Dan-Bright Dzorgbo, and many others would have simply taken over and brought the PPF meeting to fruition. This is why you have friends and colleagues. No one and no organization appointed me as the organizer of this event. If you wait for someone to appoint you, you will "just wait"—as they say in Ghana. What happened, in the end, was a momentary consolidation of bodies in physical space, interacting and establishing or maintaining relationships. What kept me going for three years was not just the feeling that it was a worthwhile objective to pursue, but support from many people. They very well know who they are, and do not need to be thanked any more than I do. Which is not at all.

Next time, I hope you will take up the challenge: an adventure is always worthwhile. I will be on the sidelines, to cheer you on.

Notes

1 In many cases PowerPoint versions of the presentations may be found at the conference web site (archived at http://worldsci.net). If you would like to see any of the presentations, email me at shrum@lsu.edu and I will burn you a DVD from the digital video tapes of the three day meeting. A video version of this essay, shown during the exhibition at the main Summit, is also available: "The Making of Past, Present and Future" was produced and edited by Timothy Brown and Rick Duque.
2 Our project has been funded since 2001 by the U.S. National Science Foundation through an Information Technology Research grant. We thank, in particular, Patricia White of the Sociology Program, who has provided enormous support and encouragement throughout this time.
3 Our experience was truly enhanced by Karima Ouertani, who was outstandingly helpful during this entire event.
4 Of the many individuals who went into the field to chronicle the aftermath of the hurricanes, I want to thank in particular Rick Duque, Marcus Ynalvez, Meredith Anderson, and Paige Miller, all of whom were key organizers and presenters at the "Past, Present and Future" event in Tunisia.

2. ICT FOR DEVELOPMENT: ILLUSIONS, PROMISES, CHALLENGES, AND REALIZATIONS

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In this chapter we will critically examining some of the illusions, promises, challenges, and realizations of the Information Society. Handed down from the past are specific myths that may create illusions in the present and promises for the future that in effect will hamper the realization of the Information Society in its most promising forms.

In the first section the standard definition of the Information Society and the related issues of digital divide, development, and democracy are scrutinized. We will show that often the usage of these concepts and related policies implicitly draws on technologically determinist assumptions. We identify three myths as constituting this set of assumptions: the myth of technology as *not* human-made, the myth of the technical fix, and the myth of technology's neutrality. When these myths are not adequately deconstructed, the ideological character of the discourses around the Information Society and the digital divide will remain hidden. This would hamper the adequately addressing of the underlying socio-economic dimensions of the digital divide.

The second section follows suit by adding a socio-economic analysis to the socio-cultural and political analysis of the first section. We ask the question how the capacities are currently distributed in this globalized world, and how this distribution is related to hardware and software development. The negative effects of lock-in are identified, and we conclude that a targeted effort to stimulate local socio-technical development would be important to help in bridging the digital divide.

In the third and fourth sections we move to the promises and challenges of the Information Society, especially relating to the large amounts of information that people have to deal with. In the third section a software solution is described that builds on an analysis of the structure of digital information as well as its content and context. In the fourth section a series of conferences is described, aimed at offering a solution for the specific challenge of integrating the huge amounts of environmental data that now exist globally.

In the final section some of the effects of realizing the Information Society are addressed. We wonder what the effects are of foreign graduate education on the Internet use by Philippine researchers. As we will show, such questions can only be answered by analyzing the local context of these researchers. The meaning of 'personal computer', for example, is quite different in the Philippines as compared to countries in the north.

We thus hope to demonstrate in this chapter that the Information Society and the bridging of the Digital Gap can only be realized when supported by a comprehensive research program that includes science, technology, and society (STS) studies. This heterogeneous set of approaches comprises, as we demonstrate in this chapter, a broad range of humanities, social sciences, and engineering disciplines. For bridging the digital divide, a deconstruction of its ideological character is as much needed as a software solution to the information overload; a socio-economic analysis of lock-in processes is as much necessary as a sociological analysis of Internet use in developing countries.

2.1   Technological Determinism and Ideology: Questioning the 'Information Society' and the 'Digital Divide'[3]

The 27 September 2004 issue of *Business Week* featured a cover story entitled 'Tech's Future'. Both the cover and the story were illustrated with pictures of dark skinned women. The one on the cover was of an inhabitant of Recife in the poor North East of Brazil described as a 'prospective PC buyer'. The main story was illustrated by a full page photograph depicting an Indian woman, Neelamma, dressed in a traditional sari decorated with a garland of flowers holding a Hewlett Packard digital camera. The message in the story was driven home by a large font, bolded, subtitle stating: "With affluent markets maturing, tech's next 1 billion customers will be Chinese, Indian, Brazilian, Thai..." This message was illustrated by the case story of Neelamma, a 26 year old village woman from Andhra Pradesh, who, as part

of an experiment organized by Hewlett Packard, was charging local villagers "70 cents apiece for photos of newborns, weddings and other proud moments of village life" taken with a digital camera and printed with a portable printer powered by solar charged batteries which had been rented from Hewlett Packard for $9 a month.

Both in the pictorial metaphors and in the textual message Business Week was presenting a particular strategy for bridging what has become known as the 'digital divide'. The poor and those marginalized from the 'Information Society', particularly women and black people, need to be brought into it as potential customers rather than as human beings with needs. This, it is suggested, will simultaneously eradicate poverty and create the conditions whereby basic needs are satisfied.

The strategy promoted by Business Week had been advocated in December 2003 at the 'World Summit on the Information Society' (WSIS) in Geneva. To justify the summit, the WSIS web site cited the existence of the 'digital revolution' which has been "fired by the engines of the of Information and Communications Technologies" and which has "fundamentally changed the way that people think, behave, communicate, work and earn their livelihood... forged new ways to create knowledge, educate people and disseminate information ... provided for the speedy delivery of humanitarian aid and healthcare, and a new vision for environmental protection". Further, "access to information... has the capacity to improve living standards for millions of people around the world" and "better communication between peoples helps resolve conflicts and attain world peace".

But the site also points to the paradox that while the "digital revolution has extended the frontiers of the global village, the vast majority of the world remains unhooked from this unfolding phenomenon" and "the development gap between the rich and the poor among and within countries has also increased". The purpose of the World Summit was therefore to discuss ways to bridge the digital divide and "place the Millennium Development Goals on the ICT-accelerated speedway to achievement".

In its "Declaration of Principles" the WSIS declared that its purpose was: "to harness the potential of information and communication technology to promote the development goals of the Millennium Declaration, namely the eradication of extreme poverty and hunger; achievement of universal primary education; promotion of gender equality and empowerment of women; reduction of child mortality; improvement of maternal health; to combat HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and development of global partnerships for development for the attainment of a more peaceful, just and prosperous world."

But the general tone for the Summit was set by the UN Secretary-General in his keynote speech: "The future of the IT industry lays not so much in the developed world, where markets are saturated, as in reaching the billions of people in the developing world who remain untouched by the information revolution. E-health, e-school and other applications can offer the new dynamic of growth for which the industry has been looking."

This example is typical of the way the relationship between technology and social change is often portrayed by the media and by policymakers. There are a number of different aspects to this representation. The first is that it ignores the fundamental fact that technology is created by human society. Instead it reifies technology, which in this representation acquires a 'phantom objectivity' as an agent of social change, 'an autonomy that seems so strictly rational and all-embracing as to conceal every trace of its fundamental nature: the relation between people' (Lukacs 1971:83).

The second and inter-related representation involves the myth of the 'technical fix', the implicit assumption that technology provides the best or the only feasible solution to complex social problems. Thus the World Summit on the Information Society, in its Declaration of Principles, implies that information and communication technologies possess quasi-magical powers to provide solutions to the world's greatest social and economic problems such as poverty, disease, illiteracy, race and gender discrimination, and environmental pollution.

The third is the use of myths about technology in order to promote particular policies and help create particular ideologies. The reification of technology, by creating the impression that the technological change is a rational, objective and inevitable quasi-natural process which is driving social change, hides the social forces and social interests behind the change and the fact that there are winners and losers in the process. In this case the new technologies are associated with the neo-liberal 'free-market' ideology and the combination is presented as creating a process in which everybody wins: the transnational corporations find new markets and the poor find new ways to improve their conditions- by making money from other poor people.

De Miranda (2005) traces the way that the concepts of the 'Information Society' in Europe, and of the 'Information Age' in the United States have moved from their origins in academic social science to acquire an important normative role in determining the policies of countries and of international organizations. It shows that these concepts are inherently technologically determinist and argues that their widespread adoption as a normative policy tool is due to their ideological usefulness to the dominant interest groups, which include the ICT corporations. It also demonstrates that the concept of the 'digital divide' plays a similar ideological role. The concept developed

during the same period as social and economic inequalities within countries and between countries increased greatly. It reduces the problem of lessening socio-economic inequalities 'bridging the technological divide'. The physical and intellectual development of human beings is thus reduced to the ability to access and use the latest technologies. However some studies have shown that the spread of ICTs have been a contributory factor to increasing these inequalities (cf., *inter alia*, *Economic Report of the President*: 1994). It is therefore difficult to understand how 'bridging the digital divide' can be seen as the main means to improve socio-economic inequalities. The appeal of this approach to those in power resides in the fact that it enables the creation of new markets for the ICT corporations and justifies like-minded policies and public investments under the guise of 'building the Information Society for all'. The need to accelerate the 'bridging of the digital divide' becomes all the more urgent as IT markets become saturated in the developed countries.

It can be concluded that whilst the 'digital divide' is undoubtedly real and dealing with it is important because access to ICTs can now be considered a basic human need, it can only be 'bridged' within the broader context of tackling the socio-economic divide through effective actions by governments using redistributive policies. But to prepare for such redistributive policies, we need to have insight in the existing distribution of capacities and the possibilities for, and barriers to, their further development. It is to this issues that we turn in the next section.

2.2 Globalization and ICT: Lock-in barriers for capacity building in developing countries?[4]

The last decades ICTs have seen an enormous growth in both homes and businesses especially in industrialized countries. More than any other technology ICTs drive economic and financial globalization as they facilitate rapid transactions and global market transparency. Moreover, the Internet is the means of transport for a rapidly growing service economy. However, globalization and the formation of dominant technologies in the ICT sector pose problems for capacity building, using ICT in developing countries.

Globalization leads to a more rapid spread of products and services than we have ever seen before. Locally a wider variety of products will (has) become available. On a global scale product diversity will decrease as the larger (global) suppliers have a large cost advantage. Understandably this has an effect on local cultures both in the developing world as in industrialized countries.

This applies even stronger for software. Fixed costs of developing software are high, but the marginal costs of selling an additional software