The Digital Divide and the Stockholm and Rome Challenge

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1 Introduction

The world is entering the 21st century in the midst of despairs and great hopes. Despairs about massive poverty and exclusion of large parts of humanity and hopes of a much better future as we enter the information society with all its promises of inclusion and global development. The issue of the digital divide crystallises in a powerful fashion this mix of despairs and hopes. On the one hand it highlights the fundamental inequities of a world where dreams of dot.coms wealth go hand in hand with the poverty of millions who do not even have access to a telephone. On the other it focuses the imagination and energies of people and institutions in a way that can only reinforce hopes for a better future.[1]

Indeed, ever for a long time has a better chance existed to make a real improvement in the quality of life of millions of people. There is consensus in that the use of ICTs for development offers an avenue for momentous transformations in the development processes of poorer countries and communities. There is also a consensus in that these countries and communities may be left even further behind and excluded from the benefits of the information society if nothing is done to counteract such a possibility at the present early stages. This consensus is underpinning the emergence of many initiatives and activities at multiple societal levels to tackle the challenge of the digital divide. The common sentiment is that ICTs can help to nurture an information society for all and that something can be done about it.

This paper is written against this background of hope and action and examines how two cities –Stockholm and Rome– have given rise to instruments that marry their own enlightened self-interest with the wider vision of contributing to a better information society for all. These are the Stockholm Challenge Award launched by the City of Stockholm in 1996 and the Global Junior Challenge launched by the City of Rome in 2000. The Challenges start from the premise that societies around the world are embarking in long-term learning processes concerning the use of ICTs for the benefit of all. They aim to create platforms for highlighting best-practices, rewarding innovation and stimulating the sharing of experiences among all those pioneering on the ground the build up of a better information society. In this sense, the Challenges are fundamentally positioned as instruments to help palliate the digital divide between the have and have-not and, in this process, they seek to join forces with other worthwhile networks working for the same end.

The discussion is structured as follows. Section 2 briefly examines the nature and magnitude of the digital divide. Section 3 addresses the origins, concept and evolution of

[1] Often the same theme is referred to as the *digital opportunity*, *digital dividend*, *digital inclusion*, or *digital bridge* to put emphasis on the opportunity generated by ICTs. The spirit of all terms is however the same.

the Challenges of Stockholm and Rome. Section four looks at the value of the Challenges for pioneering experiences, making use of the results of a survey recently conducted among participants in both contests. The paper ends with the introduction of a number of ideas the Challenges are seeking to promote in order to enhance the value already created in the form of networks of information society pioneers.

2 The Nature and Magnitude of the Challenge of the Digital Divide

The digital divide can be understood as a predominantly quantitative gap in access to ICTs, or, as an intrinsic element of the much wider and deeper problem of exclusion and relative poverty with all their manifestations. Both present huge challenges but where a quantitative vision would imply greater concentration of efforts on ensuring the wide diffusion of ICTs; the deeper exclusion/poverty vision would also imply concentration on implementation of ICTs for purposes of improving the quality of life and work of the millions who are at present outside the emerging digital economy.

2.1 A Quantitative Gap

In its simplest concept the digital divide is about access to telecommunications infrastructures and particularly the Internet, perceived as essential to participate in the emerging electronic commerce and, more generally, the emerging digital or knowledge economy at the heart of the Information Society. Figures 1 and 2 illustrate the striking disparities existing between the 'advanced' countries of the OECD and those outside (i.e., non-OECD) in terms of both telephony access and Internet hosts. Although static, the figures clearly make the point that huge amounts of people are simply excluded from access to the technologies that are today driving the development of the new global economy.

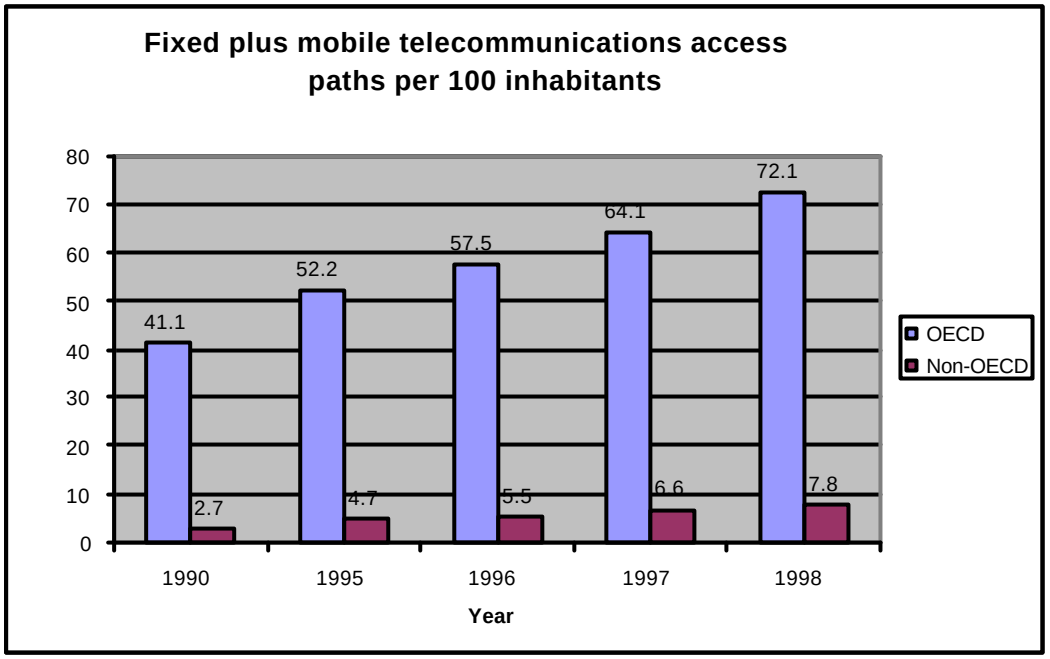
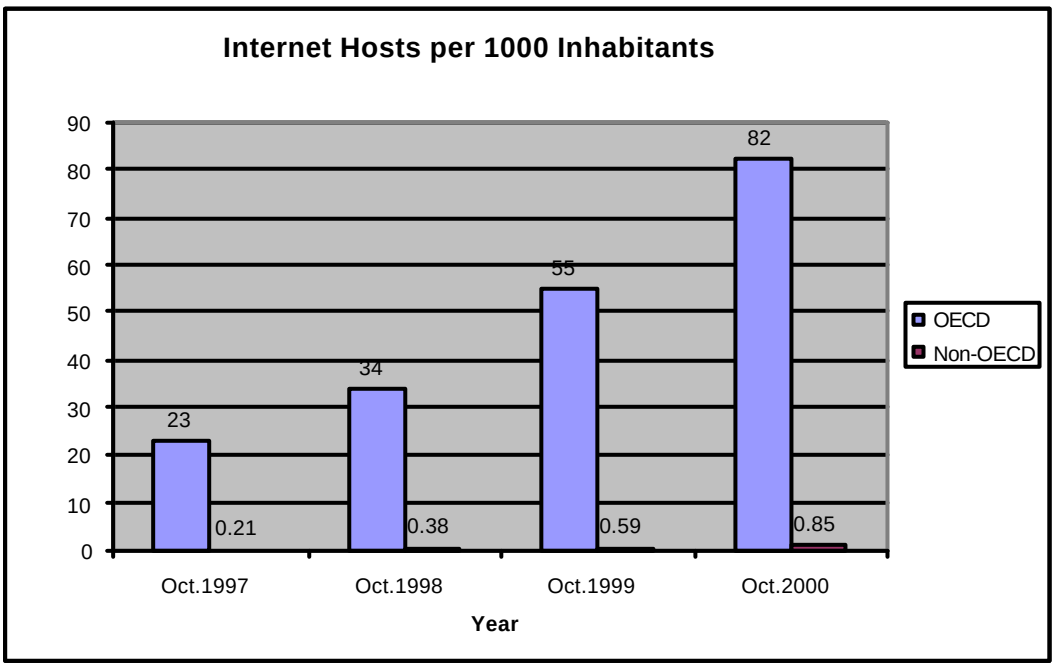


Figure 1. Divide in Telephony

Source: OECD, *Understanding the Digital Divide*, Paris, 2000, p.7.

Figure 2. Digital Divide in Internet



Source: OECD, *Understanding the Digital Divide*, Paris, 2000, p.8.

The same message has been put in the following words by Kofi Annan, UN Secretary General, "At present, a yawning digital divide still exists in the world. There are more computers in the USA than in the rest of the world combined. There are as many

telephones in Tokyo as in all Africa..."[2] or, "Visions of a global knowledge-based economy and universal electronic commerce, characterised by the "death of distance" must be tempered by the reality that half of the world's population has never made a telephone call, much less access to Internet."[3]

Of course, there OECD and non-OECD countries are neither homogeneous nor free of divides between and within them. Various reports exist providing finer statistical details for different countries, technologies and different segments of populations.[4] Figure 3 provides details of geographical distribution of Internet hosts in July 1999.

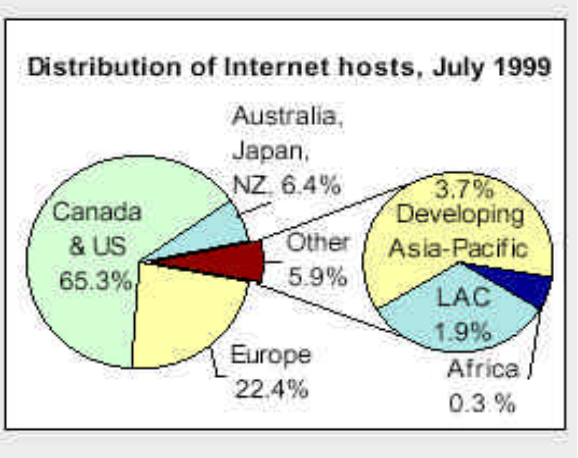


Figure 3. Geographical Distribution of Internet Hosts, July 1999.

Source. ITU, *Challenge to the Network. Internet for Development*. Executive Summary, ITU, Geneva, 1999, p.5.

Even in the cradle of the Internet, the digital divide has been well documented. In the words of Larry Irving, Assistant Secretary for Communications and Information in the Clinton administration: "Overall, we have found that the number of Americans connected to the nation's information infrastructure is soaring. Nevertheless, this year's report finds that a digital divide still exists, and, in many cases, is actually widening over time. Minorities, low-income persons, the less educated, and children of single-parent households, particularly when they reside in rural areas or central cities, are among the groups that lack access to information resources."[5]

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[2] Extract from the Report of the United Nations Secretary-General, Dr Kofi Annan, to the Millennium Assembly. (Found in http://www.itu.int/wsis/brochure-4.htm)
[3] OECD (1999).
[4] See ITU reports. Information in http://www.itu.int. Also Department of Commerce (1999).
[5] Ibid., p.xiii.

2.2 A Manifestation of Exclusion and Poverty

The more the issue of the digital divide has been examined, the more it has become accepted that the nature of the challenge is not just one of access to ICTs, be it telecommunications infrastructure, computers and the Internet. It is simultaneously one of implementation and use for effective development. Thus, according to OECD (2000), "the term "digital divide" refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities." (p.5)

Four organisations aiming to help tackle the "divide" – Digital Partners, Bridges, MIT's Digital Nations and Harvard's Center for International Development- have made the point more forcefully: Digital Partners, for instance, believe that "Most researchers now look beyond questions of access to the various ways that digital technologies can be employed as a factor in reducing poverty, and many now wonder if concepts of poverty itself must be reexamined in light of the Digital Divide movement."[6] Bridges stresses that 'technology use needs to mean more than just global market expansion: it can be part of the solution for improving education, healthcare, environmental protection, government administration, and local economic development."[7] In turn, MIT's Digital Nations states that: " the digital revolution has yet to touch the lives of most people in most parts of the world. Even where new technologies are available, they have had only minimal impact on the great social needs of our times: improving education, reducing poverty, enhancing health care, supporting community development.[8] Last but not least, Harvard's Center for International Development believes that: "The technological gains of the last several decades lie at the core of staggering new surges of wealth and well-being within the richest countries of the world… Yet the developed world is reaping the vast majority of these gains. It is our view that the appropriate use of information and communication technologies can also improve the lives of the 80% of the world's population that lives in the developing world."[9]

These inclusive visions achieve perhaps the widest expression in the G8 Charter on the Global Information Society signed in Okinawa in July 2000.

> The essence of the IT-driven economic and social transformation is its power to help individuals and societies to use knowledge and ideas. Our vision of an information society is one that better enables people to fulfil their potential and realise their aspirations. To this end we must ensure that ICT serves the mutually supportive goals of creating sustainable economic growth, enhancing the public welfare and fostering social cohesion, and work to fully realise its potential to strengthen democracy, increasing

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[6] http://www.digitaldivide.org. Also "a new 'digital paradigm in philanthropy' is emerging to address the challenges of the Digital Divide. New foundations arising from digital fortunes are challenging traditional approaches to grant making and social problem solving." (Ibid.)

[7] http://www.bridges.org

[8] Digital Nations: New Research Consortium at the MIT Media Laboratory. Prospectus. Found in http://dn.media.mit.edu/prospectus.html

[9] Information Technologies Group (ITG) (2000), found in http://www.readinessguide.org

> transparency and accountability in governance, promoting human rights, enhancing cultural diversity and to foster international peace and stability.[10]

This paper argues that this embracing approach is the only consistent with serious developmental goals for the poor and excluded peoples of the world. It puts technology access in its proper perspective: a necessary but not sufficient condition. It also helps to highlight that behind striking contrasting numbers such as those of Figures 1, 2 and 3, there are realities of people living in *integral environments* of families, communities, employment, health, education, government, etc. The pictures in Figures 4, 5 and 6 below help illustrate the point more forcefully.

Figure 4 shows a fully-included citizen and knowledge worker of the information society in his work environment. His problem is likely to be information overload rather than the satisfaction of basic needs of health, education, employment, environment, etc. In contrast, figure 5 shows Purnima and her children from a slum in India and Figure 6 shows Cynthia, a blind girl from Chile. Both Purnima and Cyntia are potentially excluded from the emerging information society - Purnima because of poverty and lack of work, Cyntia because of disability: rarely the preferred market segments of profit-maximizing free market economies. Yet it has not got to be this way!

Fig 4. Fully Included

Fig 5. Potentially Excluded (Poverty)

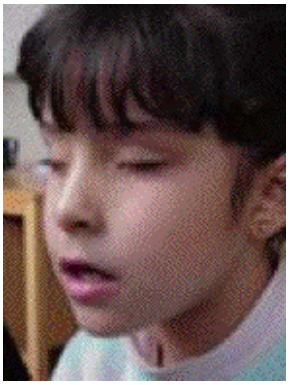

Fig 6 Potentially Excluded (disability)

[10] G8 (2000).

2.3 Tackling the Digital Divide

Can the digital divide gradually reduce in the future even if it may be expanding today between richest and the poorest areas of the world? If we focus on access alone and look back at Figures 1 and 2, in the long term the answer is most likely yes, for a simple logic. As developed countries gets closer to full access and saturation, the developing nations are most likely to increase their proportions of access and, consequently, reduce the quantitative access gaps between them.

An interesting angle is given by Figure 7 often used to reinforce the point of the crucial economic importance of Internet given the enormous speed of its spread relative other technologies in the past. One can ponder that if this is the case then simple extrapolation should result in a reduction of the access-gap at a faster rate than there has been the case with other technologies.

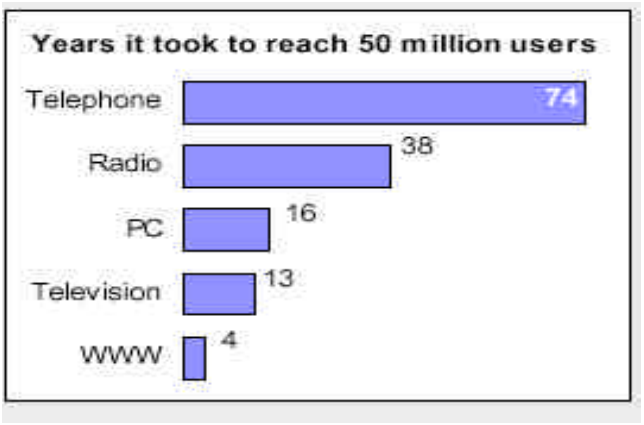

Figure 7. Years to Reach 50 Million Users

Source. ITU, *Challenge to the Network. Internet for Development*. Executive Summary, ITU, Geneva, 1999, p.4.

Of course, this is only impressionistic and behind the figures there are issues of pricing, monopolies, liberalization, regulation, language barriers, etc., in short, the economic, political and policy processes of the governance of local and gbbal network infrastructures and their contents.

Furthermore, we have touched only on the quantitative perspective of access and not on the more complex challenge presented by poverty and exclusion as discussed in the previous section and as crystallised in the goal of the UN Millenium Summit, namely, reducing poverty by half by 2015. Such wonderful goal demands a much more exacting effort, probably entailing the formation of the widest social movement focused on poverty and exclusion ever seen on the planet. This 'digital divide' movement would itself be inclusive – inclusive of governments, international organisations, private sector, non-profit sector (NGOs, foundations, ect.) communities, and indeed, any organisation or individuals sharing the sentiment of an information society for the benefit of all.

There are some encouraging steps in this direction, particularly, in the work of organisations such as the G8 *dot.force*, the UN ICT Task Force, the World's Bank Global Development Gateway, the non-profit sector and governments adopting digital divide policies today. Also important is the adoption of 'social inclusion' policies by the private sector,[11] as well as the emergence of organisations such as Bridges, Digital Partners, Technology Empowerment Network,[12] Digital Nations and the Stockholm and Rome Challenges (the challenges will be discussed below). Above all there are the many community and grassroot experiences already pioneering the path for an information society for all.[13]

Yet the optimism must be tempered by lessons from the past since it is not the first time that technology brings the issue of economic development at centre stage. There has indeed been a long tradition of science and technology policy for development, particularly following the end of the Second World War. During the seventies and eighties it was computers and microprocessors that triggered the imagination and many national and international organisations focused on IT policies and programmes for development. Among the initiatives, France launched the Centre Mondial de l'Informatique under the leadership of Seymour Papert and Jean Jacques Servan-Schreiber and in the UK there was also the UK Council for Computer Development (UKCCD). In their time they were well-intentioned experiences but they faded as concerns for Third World development diminished in the West during the late eighties and nineties.[14]

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[11] ICL for instance has defined that "as a leading IT services company, we aim to make a significant contribution to 'social inclusion' in today's Information Society." (http://www.icl.com/about/community/index.htm). So is the case with many other major corporations. See for instance http://www.digitaldivide.org/corps.html for social responsibility declarations and policies from over 50 corporations.

[12] TEN describes itself a Support Network for Pioneering Public Good Projects. It "is a global network of organizations and individuals whose purpose is to identify, support and empower projects that contribute to improving the state of the world. TEN has a special interest in projects, for whom information technology plays a central role in achieving their objectives. TEN is an initiative of the Technology Pioneers, a community of the World Economic Forum. See http://www.techempower.net/

[13] The Okinawa Charter on the Information Society states: "Efforts to bridge the international divide, as in our societies, crucially depend on the effective collaboration among all stakeholders. Bilateral and multilateral assistance will continue to play a significant role in building the framework conditions for IT development. International Financial Institutions (IFIs), including Multilateral Development Banks (MDBs), particularly the World Bank, are well placed to contribute in this regard by formulating and implementing programmes that foster growth, benefit the poor, as well as expand connectivity, access and training. The International Telecommunications Union (ITU), the United Nations Conference on Trade and Development (UNCTAD) and the United Nations Development Programme (UNDP) and other relevant international for a, also have an important role to play. The private sector remains a central actor driving IT forward in developing countries and can contribute significantly to the international efforts to bridge the digital divide. NGOs, with their unique ability to reach grassroots areas, can usefully contribute to human resource and community development. IT, in short, is global in dimension, and thus requires a global response." (G8 2000)

[14] Freeman (1999) makes the point that "Concern with social inequality is a recurrent theme in political life… This ethical concern has been periodically reinforced by fear and prudence – the *fear* of rebellions and social unrest and *prudence* in attempting to avert rebellion by timely reform… In the 1980s and 1990s it has sometimes seemed that both the ethical concern and even prudence had disappeared. In Britain and the United States especially, but also in many other European countries, the trend of fiscal

Maybe we are just experiencing the wave of just another cycle of concern for economic development for the poorer regions of the world, this time opened by the rapid spread of the Internet and the digital economy in the most advanced regions of the globe. Maybe it will fade without much real impact like other efforts in the past. Maybe yes, but this should not stop us now to try to make a difference to world's poverty and exclusion taking advantage of the opportunity created by the technology and the perception that it can help to improve the lives of millions of people across the globe. Moreover, there are good reasons to believe that this time the digital opportunity may be more lasting and profound than previous occasions.

First, it has been shown that with ingenuity the market economy can create business solutions that address the problem of the poor. The microcredit movement started by the Grameen Bank is the classical example, but other experiences such as Village Phones and Telecentres are following suit. Prahalad (2000) has made the intellectual argument for the business opportunity offered by the millions living in poverty across the globe.[15] His first condition however is challenging:

> there must be a mind shift in the way we look at our poverty. Rather than considering the poor as a problem, they should be seen as an opportunity to innovate; and those innovations could be applicable to the 4.5 billion poor worldwide. It is a great 'market opportunity' for development. And in catering to the bottom pyramid of the Indian population we do not use old technologies or imitate western ways. We must go in for a creative bundling of the most advanced technology with a local flavour.

Second, in an increasingly interconnected and globalising world, massive widespread poverty is highly destabilising for development and peace with consequent negative impact on uncertainty and risks for business investment and market growth. The present situation is hardly in the interest of anyone, let alone a digital exacerbation of the gulf between rich and poor leading to an even more unfair and unstable information society.

Third, people are more than *homo economicus* and although profit and market rationale have tends to dominate arguments, the fact is that humanity also possesses a generous, altruistic humanitarian streak whose drive is solidarity with fellow human beings in the pursuit of a better world for all. This humanitarian streak tends to be more visible in the work of the non-profit sector and government policies for the public good, but it is also present in the private sector through corporate policies of social responsibility.[16] Whether the drive comes from pure altruism or from enlightened self-interest is immaterial for purposes of tackling the digital divide as long as the focus remains the improvement of the

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policy which had been flowing strongly in favour of progressive taxation ever since the Second World War, was reversed." (p.2)

[15] See also *Business Week* (2000).

[16] The Technology Empowerment Network is a good example. The Technology Pioneers, a community of companies of the World Economic Forum are a good example. They created the Technology Empowerment Network because they "realise and acknowledge that much public good is done by organisations, which often have to spend their limited resources in search of support from others, rather than achieving the ends for which they were set up. TEN is an effort to shortcut part of that process."

life of less fortunate fellow human beings. In this light, the market is a powerful force as expressed in the first point above.

Fourth, the end of the Cold War has all but brought to an end the deep ideological divisions between radically different social systems. This has opened the way to more pragmatic national and regional centre politics but it has also removed from the agenda much of the 'big dreams' and 'utopias' of a global society free of poverty and with equal opportunities for all peoples in the planet. This is probably one of the reasons why people feel less excited to participate and voting abstention has been reaching very high levels. A wide social movement focused on poverty and exclusion might just re-kindle the dreams and give youth in particular a cause to channel time and energies.

These four reasons (and there may be others) reinforce each other and should provide the foundations for this widest digital divide social movement. This global movement is not just desirable, it is a necessity if the UN Millennium Summit goal of reducing poverty by half by 2015 has any chance of becoming a reality: The reason is simple and it has been recognised in the G8 Global Poverty Report:

> Poverty in the midst of plenty is one of the central challenges in today's global economy and society. Fighting poverty is both a moral imperative and a necessity for a stable world. In recognition of this, the international community adopted International Development Goals during the 1990s. However, progress in meeting these goals has been slow and uneven across regions, while some parts of the world have retrogressed, with poverty increasing in countries of the former Soviet Union, and mortality rates deteriorating in Africa due to the HIV/AIDS epidemic. If trends of the past decade continue or worsen, the International Development Goals are not likely to be achieved. The global community needs to make a concerted effort to accelerate progress and more effectively address the causes of poverty at country and global levels.

3 The Digital Divide Social Movement – "Let One Thousand Flowers Bloom"

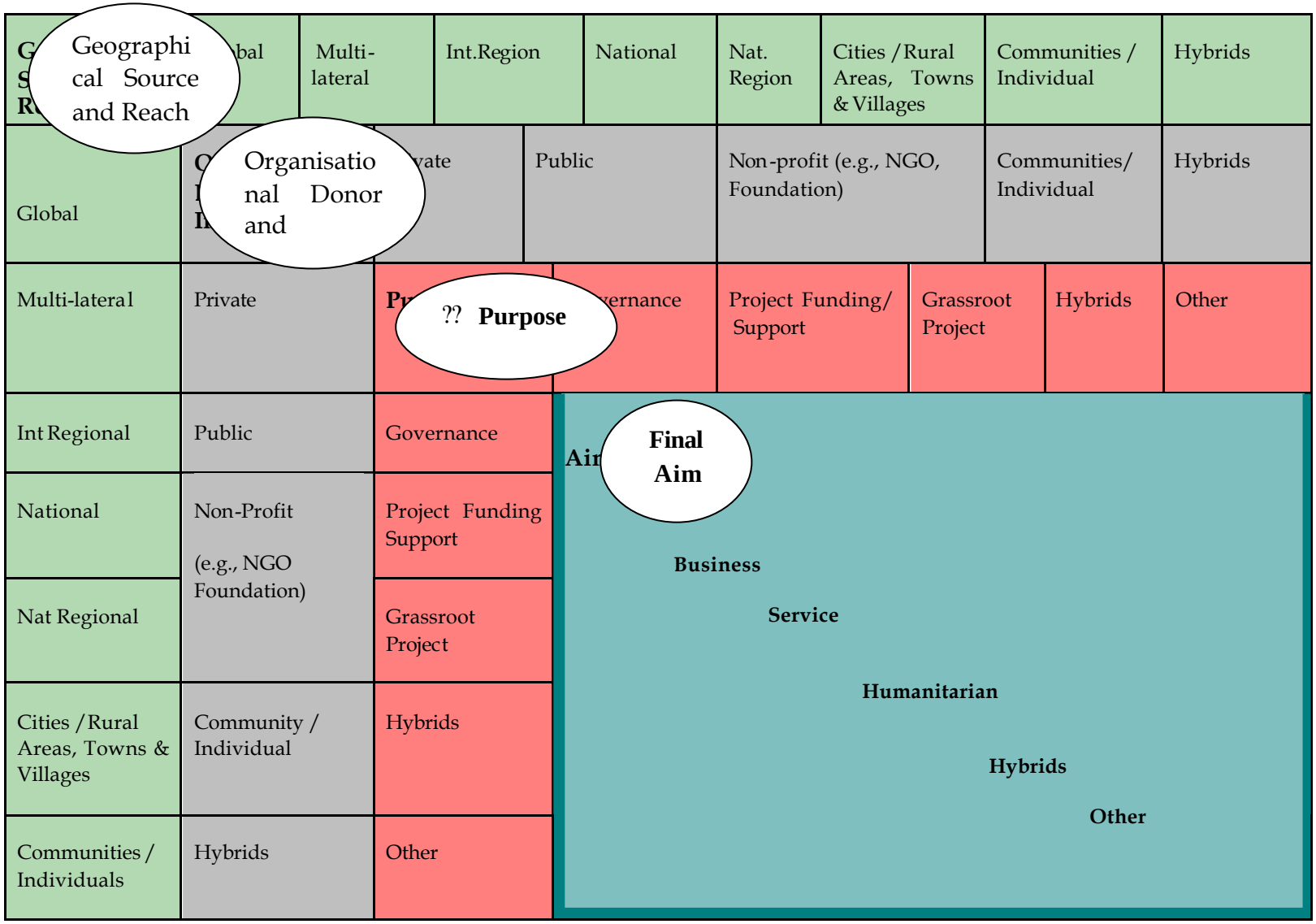
The beauty of a social movement is that it is a boundless, free flowing association of people sharing and pursuing in myriad ways the realisation of a dream. It is a space for leadership, creativity, innovation, emulation, cooperation, competition, fulfilment and disappointments in pursuit of change. It may be partly coordinated or simply loosely associated through mechanisms for sharing and learning about different experiences. The bond –whatever its manifestation- is simply the shared dream and the desire to do something about it. So it should be with the 'digital divide' movement and the key is just to plant the seeds worldwide and "let one thousand flowers bloom" so that in years to come we may see the Earth as a garden for all.

Table 1 provides and idea of the enormous variety of possible digital-divide initiatives and actions by geographical source and reach, by donor or implementor, by purpose and by final aim. The table is constructed in four layers, with multiple columns and rows to stress the huge combinatorial possibilities of initiatives and actions.

The first broad layer (green column-row) shows the geographical possibilities at many levels, illustrating the point that there might be multiple forms of interactions (eg., bilateral, multi-lateral).

The second broad layer (light blue column-row) shows that inside the geographical possibilities, there are many organisational possibilities both as donors and/or implementors, including the private sector, public sector, non-profit sector, communities individuals and the many hybrids forms combining them.

The third broad layer (light red column-row) illustrates that inside the other combinatorial potential of the previous two layers, there are various possibilities for the broad purpose pursued by the different initiatives and actions. This includes governance purpose with all those initiatives aiming at changing or creating legal frameworks and more broadly changes in cultural practices and attitudes in government, business and other stakeholders such as those referred to by Prahalad (2000). It also includes funding/suppport purpose for other initiatives, grassroot projects and all the hybrid possibilities.



G / S / R	bal	Multi-lateral	Int.Region	National	Nat. Region	Cities / Rural Areas, Towns & Villages	Communities / Individual	Hybrids
Global	O / I / D	vate	Public		Non-profit (e.g., NGO, Foundation)		Communities/ Individual	Hybrids
Multi-lateral	Private	Pu	vernance		Project Funding/ Support	Grassroot Project	Hybrids	Other
Int Regional	Public	Governance	Air					
National	Non-Profit (e.g., NGO Foundation)	Project Funding Support						
Nat Regional		Grassroot Project						
Cities / Rural Areas, Towns & Villages	Community / Individual	Hybrids						
Communities / Individuals	Hybrids	Other						

Table 1. Variety of Initiatives, Actions by Source-Reach (Geography), Donor-Implementor, Purpose and Final Aim

The final box inside all the other layers (deeper blue) shows the various possibilities for final aim, including business or profits, public services such as improvements in education, humanitarian such as non-profit projects aimed at improving the livelihood and/or working conditions of fellow human beings, and all the possible hybrids forms.

Clearly the huge challenge of the digital divide demands initiatives and actions at all these layers, some having larger impact than others, some maybe in competition with others, but all focused on the challenge of reducing poverty and exclusion through the exploitation of the digital opportunity. This is what would make it a global social movement. Sometimes the initiatives of international organisations (e.g., G8's dot.force, UN's ICT Task Force, OECD, ITU and others) attract most of the limelight, but in reality they are only one player in the total ensemble required to effect a real change. There can be no claim to overall supremacy or control of this movement, only the will to play a part, publicly or anonymously, for the sake of an information society for all.

In this movement the frontline of change is occupied by the myriad projects and experiences that are in direct contact with the poor and excluded in countries, regions, cities, rural areas and communities. Ultimately, it is at this grassroot level that the realisation of the dream of an inclusive digital economy is being made to happen by the pioneers and innovators of the information society. For this reason, to a large extent, the entire ensemble of governance, policy and support/funding thinking and action at all geographical levels will be tested in their effectiveness in the degree to which they help create the fertile terrain and environment for these "digital-divide" projects to flourish. Conversely, grassroot digital-divide projects will be also tested in their effectiveness in the degree to which they are able to effect change in the living and working conditions of the poor and excluded and, implicitly, in the degree to which they are able to generate the resources necessary to exist. One problem and opportunity at this early stage of development of the global information society is that its governance is still in process of formation and the issue of the digital-divide, although largely absent from the spontaneous workings of its predominant profit-driven market mechanism, may yet find a salient place in the consciousness, attitudes and actions of all players – public, private and non-profit sectors, communities and individuals. This new governance would be the fertile environment for "1000 'digital-divide' flowers to bloom."

In the following, the paper briefly describes two of those "digital-divide flowers." Then, it discusses the international contests known as the Stockholm Challenge Award and the Global Junior Challenge as the support mechanisms through which the Cities of Stockholm and Rome are playing their part in the stimulation of a digital divide movement.

4 A Tale of Two Pioneering Projects

This section looks briefly at the concepts of two projects from developing countries: project SITA from India and project Hyperstories from Chile.

4.1 SITA - Studies in Information Technology Applications: Training in Computer Skills for Low-income Women[17]

The central question addressed by Project SITA is how to bring the physically and/or socially disabled sector into the mainstream applications of emerging information and communications technologies. SITA's answer has been to create facilities, resources and content to train women from low-income families in computing skills as a step into finding employment and, ultimately, improving the wellbeing of their families. The choice of women as the focus of the initiative lies in the belief that "If you teach women, you're changing the future, because women are the natural teachers of the coming generations."[18]

The idea evolved from a long-standing concern of its leader, Krishna Sane, who as a Professor at the University of Delhi, directed the UNESCO sponsored project *Locally Produced Low Cost Equipment Project* (LPLCE) during 1980-1995. At the same time, Dr. Kamalni Sane, his (late) wife and professional colleague found that it was possible to train needy women in the area of Desktop Publishing (DTP) using the manuscripts they had written for the LPLCE Project. Appropriately people who were trained in the first group joined the enterprise helping to take it further as funds became available through a grant provided by InfoDEV - the support/funding programme from the World Bank.

Project SITA for women empowerment began operation in mid-1999 aiming to achieve the following targets:

- Training a core group of trainers
- Developing a resource package (print and audio-visual material with multimedia modules)
- Training 500 disadvantaged women for employment by December 2000

To achieve these targets, SITA selected small batches of trainees and gave them, free of charge, intensive hands-on computer training based on real life exercises using MS Office 2000. For these purposes, SITA's core team has also developed an extensive resource package consisting of modern office computer skills, a multi-lingual training manual, audio-visual and interactive multimedia modules for self learning and other developmental support materials, including an English-Hindi-Urdu dictionary for minimal comprehension of English.

Wherever possible trainees were attached to a potential employer and, at the end of the two-month course, each trainee was required to offer part-time services as an assistant to a Trainer. Project SITA has so far registered 448 needy applicants of whom more than

[17] Based on K. Sane (2000) and text found in http://www.gjc.comune.roma.it/uk/show.asp?IdPrj=593
[18] Phrase from Krishna Sane.

80% are below the age of 30 and have limited reading, writing and communication skills coupled with low-confidence levels. This did not prove a deterring factor for most of the trainees to achieve commendable proficiency in basic computer skills. Successful trainees were given a Certificate and assistance in trying to get employment.[19] One of the persons to benefit from the training was Purnima who was shown in her slum living environment in Figure 2 and is now shown in Figure 8 working in a computer in the SITA training facilities. Also shown in the background are children of SITA staff who were allowed and encouraged free use of all facilities in a playful manner.

Figure 8. Purnima training in computer literacy in SITA's facilities

From the slums to hope! is what SITA has given needy women of Delhi. Securing jobs, however, has proven a more difficult challenge and so far the majority of women trained by SITA have failed to find jobs, leading to a significant drop out rate. SITA's answer has been to try to evolve the project's business model into a cooperative model and this is where the enterprise is battling today, with deep awareness that the underlying socio-economic factors are complex and not easy to overcome. This confirms that the path trailed by humanitarian projects devoted to improve the lot of the poor is seldom an easy one because the difficulties for sustainability tend to be higher than normal business projects. Yet if the digital-divide is to be tackled this type of projects must also find a salient place in the agenda of change.

[19] For these achievements, SITA has received international appreciation as finalist in the Stockholm Challenge Award 2000 competition in June, 2000; finalist in the ICT story competition organised by IICD, October, 2000; and winner of the Global Junior Challenge Award, Rome, December 2000

4.2 Hyperstories for Blind Children[20]

Project Hyperstories was started in March 97 by Jaime Sanchez and his team at the Department of Computer Science of the University of Chile. From all the possible applications of their knowledge, it was the concern for the needs of excluded blind children that attracted their efforts to develop an innovative application of ICT. The team was not satisfied with this exclusion and wanted to change it. For them, "Childhood is an exciting period for the discovery of the surrounding world and, due to the primary role of vision in learning, visually impaired children risk of falling behind in their cognitive development. Furthermore, this type of disability imposes a strong barrier to access to different media, mainly those of interactive nature."[21] The answer was Hyperstories, a project exposing Chilean blind children to a learning methodology that uses a set of 3D sound interactive software to help them construct cognitive structures that allow the representation of their surrounding space.

The start was not easy. In 1997 most blind schools in Chile did not have computers and most funding organizations in Chile did not finance projects for disabled people. Curriculum materials for the blind are based on Braille and no interactive materials were available for blind learners in Chilean schools. Sound-based software was very uncommon in the literature. This did not discourage the team who brought their own computers to the schools to work with blind learners in the effort to break the walls of exclusion through patient trial and error and learning by doing. Looking back, they had no experience of how to work with blind children, nor did they know much about their interests, needs, and the way they think. Furthermore, the team found that to understand the learning processes of blind children, they had to unlearn many of the assumptions related to learning of sighted people.

> We developed the first prototypes little by little, testing and retesting with blind learners, learning from them in their contexts, exposing parts of the software to them, asking them to criticize, redesigning, and redo and redo again and again. As a result, we came with prototypes very much suited to blind learners to start doing the initial testing from the scratch. We learned a lot from the initial testing to the full cognitive testing. Research, questioning, criticizing, testing, constructing, and creating were our main motto of the project group.[22]

Four years later, Hyperstories has worked with 50 to100 poor blind learners discovering that each of them is a real individual case, because many, besides their blindness, have cognitive disabilities that make more complex the learning work. Above all, the project

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[20] Based on Lumbreras, M., and Sanchez, J. (1999). Sanchez, J. and Cernuzzi, L. (1999). Also on information found in http://www.gjc.comune.roma.it/uk/show.asp?IdPrj=715. For further information visit www.c5.cl/hhblind or www.c5.cl/hh.

[21] See www.c5.cl/hh. In Marco Teorico, translation of following text in Spanish, "La niñez es un período excitante para el descubrimiento del mundo circundante y debido a que la visión juega un rol primario en el aprendizaje, los niños con impedimentos visuales enfrentan el riesgo de retardar su desarrollo cognitivo. Más aún, este tipo de discapacidad impone una fuerte barrera para el acceso a medios de variada naturaleza, principalmente los interactivos."

[22] Hyperstories entry to Global Junior Challenge, see http://www.gjc.comune.roma.it/uk/show.asp?IdPrj=715.

has made significant advances in the development of an ICT application that truly helps bridge the digital exclusion of blind children.

Thus Hyperstories has confirmed that blind children enjoy computer applications and the learning enabled by them. It has revealed that it is possible to achieve the construction of mental structures rendered with only 3D sound, and that spatial imagery is not purely visual by nature, but can be transferred through spatialized sound. In so doing, the project has contributed to the improvement of the quality of learning and introduced a new way of training blind learners for cognitive learning and development. Not surprisingly, the Hyperstories team are proud to say that their work has resulted in "happy blind children that are highly motivated to have the opportunity to interact with learning software through their most developed sense, the auditory."[23]

One of the blind children to benefit from the Hyperstories ICT application is Cyntia who was shown in Figure 3 and is now shown in Figure 9 (a) and (b) working on a computer in her school for the blind (a) and reproducing her visualisation of spatial distribution on a Lego (b).

Figure 9. (a) Cyntia in front of computer and (b) Cyntia enacting "sight" of space distribution

From darkness to 'aural vision'! is what Hyperstories has began to give disadvantaged blind children in Chile. And there is more to come. Hyperstories pioneers are developing software editors for parents and teachers of blind children to enable them to design a wide variety of software for their needs. The software may include the design of their neighbourhood with squares, supermarkets, streets, etc., in such a way that children can early learn the spatial structure of their surrounding environment. Most importantly to take the benefit of the ICT application beyond the confines of schools for the blind in Chile, the

[23] Ibid.

team is also designing the Hyperstories environments for the Web. This will make it accessible worldwide and will enable the development of distributed activities synchronously and asynchronously.

Securing funding, however, is still difficult and the project has benefited from its protective environment in the university. The rapid realisations and exploitation of the full potential concept is certain to require the investment of more resources. Hyperstories may have the potential to generate a marketable product, albeit for a niche market. Maybe this is the place for university-industry partnerships for an inclusive information society. Whatever the path, if the digital exclusion of disabled children is going to be mitigated, endeavours such as those of the Hyperstories pioneers must continue to happen with the support of those concerned with the goal of making a reality an information society for all.

5 One Spirit, One Challenge: The Stockholm Challenge Award and Rome's Global Junior Challenge[24]

The origins of the Challenge go back to 1995 when Sweden joined the European Union and in a brilliant stroke of 'enlightened self-interest," the City of Stockholm decided that they wanted to be at the centre of Europe in spite of their more peripheral geographical position. The way to do it was by challenging all large European cities to demonstrate whether they were "doing better than Stockholm" in each one of the 10 areas identified as strategic for information society development in Europe by the then famous policy report, The Bangemann Report.[25] This report had been issued in 1994 by a high-level Commission chaired by European Commisioner Martin Bangemann.[26]

So the Stockholm Bangemann Challenge was born and became a major success with the participation of over 120 projects submitted by approximately 25 large European cities. Fourteen winners were honoured at the time with the Globe Award (Figure 10) made of recycled TV tubes that has become the symbol of the Stockholm Challenge. The experience certainly fulfilled all expectations, not only positioning Stockholm at the centre of Europe, but also laying the foundations for an even more ambitious next event: the Global Bangemann Challenge.

Launched in 1997 during the final ceremony of the first European Challenge, the Global Bangemann Challenge took the contest to the entire world, attracting over 700 projects from all continents, a massive quantitative increase whose evaluation became a small challenge in itself. The Global Bangemann Challenge's final ceremony took place in June 1999, honouring 18 winners from 11 categories and paving the way for the year 2000's

[24] Based on speech "The Spirit of the Challenge" given by A. Molina at the Stockholm Challenge Award Conference on 5 June 2000, Stockholm.

[25] The categories were: Teleworking, Distance Learning, Network for Universities and Research Centres, Telematics Services for SMEs, Road Traffic Management, Air Traffic Control, Healthcare Networks, Electronic Tendering, Trans-European Public Administrations Networks, City Information Highways.

[26] Commission of European Communities (1994).

Stockholm Challenge Award (SCA), with over 600 projects, over 80 finalists and 13 winners from 7 categories (see Table 2). The final ceremony of the SCA was celebrated in June 2000 in the splendid Blue Hall of the city of Stockholm and the prizes were handed over by the Mayor of Stockholm, Carl Cederschiold.

Fig. 10 Stockholm Challenge Award Given to Winners

Looking back it is clear that "enlightened self-interest" was an important driving force in the rise and development of the Challenge. Most importantly, this "enlightened self-interest" developed into a profound vision and spirit of generous contribution to the dream of "an information society for the benefit of all." In effect, from the very first event it became clear that in the spirit of the Challenge "everybody is a winner" and not only the Award winning projects, or even the City of Stockholm through their success in creating the prime world event for pioneering information society projects.

Table 2. Categories and Winners in the Stockholm Challenge Award 2000

Categories	Winners
New Economy	Mujeres, Oportunidades y Negocios, Argentina
Education	MIKSIKE from Estonia CISCO Networking Academies from Malaysia e-Library of the Open University from Hong Kong
Health and Quality of Life	Hyperstories for Blind Children from Chile Mindmouse from Sweden
Public Services and Democracy	Gyandoot from India (Dhar) Technology for Social Justice (InfoXchange) from Australia
Culture and Entertainment	Canada's Digital Collections from Canada
Environment Equal Access	Bogota Car Free Day (within @World Car Free Day Forum) from France Manguzi Wireless Internet from South Africa Kgautswane ICT Centre from South Africa Computers for Homebound and Isolated Persons (CHIPS) from the United States

Truly, the vision and spirit of the Challenge travelled down much deeper than the result of a high-profile international competition. At the dawn of the era of the information society,

it understood that humanity is engaged in a massive long-term learning process, much of it trial and error, that is simultaneously carving the shape of the global information society. It understood that, in this process, free market and competition are certainly central dynamic forces, but that there are major issues concerning globalization and, particularly, the complex goal of "social inclusion", of the elimination of the divide between "information-rich" and "information-poor", of the elimination of the divide between the "have" and "the have-not," that require dialogue and collaborative approaches by all those working for an "information society for all."

This is where the spirit and contribution of the Stockholm Challenge has been shining high as a beacon signalling the possibilities of working together for a better future. This spirit has travelled far inspiring others to think of the possibility of contributing their own Challenges in close relationship with Stockholm.

The City of Rome was one of those who took this inspiration and transformed it into reality. The Eternal City identified education as critical for the development of an information society for all and launched the Global Junior Challenge (GJC) in 1999, in the context of its presidency of the European Telecities Network[27] - with Stockholm holding the vice-presidency. The GJC was presented to the world as an international competition for the most innovative educational projects developed by students, educators, young adults entering the job market and others.

Education is at the heart of the process of building an information society for the benefit of all peoples and Rome understood that to improve its own educational structures and processes through the use of ICTs it is important to inspire, share and learn from one another. The premise is that Rome and societies around the world are embarking in long-term learning processes concerning the use of ICTs in education and the Global Junior Challenge is Rome's enlightened self-interested way to contribute to this process.

The GJC final ceremony took place on 4 December 2000 in Rome's famous Campidoglio City Hall honouring 14 winners from 5 categories (see Table 3) and 90 finalists from 588 projects and from over 50 countries from all continents of the world. The prizes most appropriately represented by the symbol of the foundation of Rome –La Lupa and Romulo y Remo- (Figure 11) were handed over by the Mayor of Rome, Francesco Rutelli and the success of the experience paved the way for the launch of a bolder instrument to advance the vision of a new educational renaissance for the future of Rome-Lazio in particular and Europe in general. This is the Digital Youth Consortium briefly described in Appendix 1.

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[27] The Telecities network is an association of European cities working for the information society. See http://www.telecities.org. The Global Junior Challenge was also part of the Global Cities Dialogue (GCD), an initiative of Mayors of the World for a Global Cities Dialogue on the Information Society. The spirit of the challenge is enshrined in the Declaration of the GCD signed in Helsinki (the Declaration of Helsinki at http://www.globalcitiesdialogue.org/declaration.htm) and both Stockholm and Rome are members of the GCD's Strategic Steering Group, with Stockholm as vice-president to the presidency of Issy-les-Molineaux. For the GCD visit http://www.globalcitiesdialogue.org/ For the original strategy of the Global Cities Dialogue, see Molina (1999).

Figure 11. Global Junior Challenge Award Given to Winners

Table 3. Categories and Winners in the Global Junior Challenge 2000	
Categories	**Winners**
Up to 10 year old	Babynet (Spain)
Up to 15 years old	3D Sound Learning Environments for Blind Learners (Chile)
Up to 18 years old	Kidlink (Norway) Yomag.net - European online magazine for young consumers (Germany) Junior Journal (International)
Up to 29 years old	I*earn (the international education and resource network) (Morocco) The WebQuest Page (USA) Lernforum Deutsch (Germany
'Work'	SITA (Studies in Information Technology Applications: Computer Skill Training for low-income women) (India)
Special Mention	I eat therefore I am (Sweden) Mentor Girl (USA) Scuola Fuore (Italy)
President of the Italian Republic Awards	Frenzy of the End of the Millennium (Caserta, Italy) The adventures of Piera…the tin which was not inclined to end up in a rubbish bin (Spoleto, Italy)

The Stockholm Challenge Award and Rome's Global Junior Challenge are 'one challenge, one spirit" and together they offer a platform for highlighting best-practices, rewarding innovation and stimulating the sharing of experiences among all those concerned with an information society for the benefit of all. The Challenges have an in-built assessment of best-practice mechanism in the presence of its international jury. And, as we shall see below in the results of a recent survey, the ceremony and other associated activities such as the finalist exhibition, project shows, and web exposure provide an environment that helps pioneering projects, experiences and individuals driving the dawn of the information society to become visible, to network, and to learn from each other.

In the Challenges Stockholm and Rome have donated to the world an opportunity and a practical framework to nurture a globally-shared learning environment of information-

society projects. They have also donated occasions for inspiration and, truly, they have given to all those who are battling day to day to build the information society in their cities and countries, a reason to dream of the possibility of global recognition for the fruits of their endeavours. They have created the possibility of fleeting but beautiful and highly energising moments that should help in the less glamorous, often frustrating days, of most of the year. The pinnacle of these moments is illustrated in Figures 12 and 13 showing the leader of the Hyperstories project, Jaime Sanchez, and the leader of SITA project, Krishna Sane, receiving their respective prizes in the famous Blue Hall of the City of Stockholm and Campidoglio City Hall of Rome.

Figure 12. Jaime Sanchez, Leader of Hyperstories Project Receives Award from Mayor of Stockholm, Carl Cederschiold

Figure 13. Krishna Sane (middle), Leader of SITA Project Receives Award from Mayor of Rome, Francesco Rutelli in the presence of Indian Ambassador in Italy

Not surprisingly, Jamie Sanchez later wrote: *"The Challenge motivated us to continue our work where technology has meaning only when you have creative ideas that fit peoples problems and needs."* And Krishna Sane commented: *"The Challenge provided an unforgettable opportunity to meet and share a variety of thoughts and experiences with so many like-minded people from different countries."* Others have been equally positive as can be seen in the selection of quotations in Table 3.

Great opportunity for both - the world and projects
Mihkel Pilv, MIKSIKE, Estonia

Reinforce our confidence in our work
Nabil Said, Egyptian & Arab Kids Cyber Internet Society, Egypt

The Challenge was a great opportunity for the Conexiones Team to appreciate other projects and share all around the participation in Challenge Award
Claudia Maria Zea, Conexiones, Colombia

We have turned the information highway to villages
Rajesh Rajora, Gyandoot Project, India

"The Challenge has provided an opportunity to network, learn what is happening globally and to use the international recognition received to promote our own project locally and globally"
Evie Ledger, The Human Race, South Australia

Cont.

"It has helped me, my students and a (little!) part of our school community to believe in our digital dream about a new world in which we can take part and give our contribution against social, racial, religious, sexual and economic divides"
Ersilia Salvatore. Frenzy at the end of the Milenio, Italy

"we have been able to compare our own efforts in IT made by our own School with other projects and realize the importance others give to these efforts. It has meant an important source of promotion for our Project and for our expectations of financial support"
Eulalia Vico, Babynet, Spain

"it was a valuable and worthwhile experience which both proved that there are worthwhile projects over the net which can make a difference and to some extent gave us the strength and incentive to continue our work"
Spiros Tzelepis (14 years old), Junior Journal, International

Table 3. Comments on Challenge from a Selection of Projects

Alvaro Galvis leader of project Ludomatica,[28] winner of the Education Category of the Stockholm Challenge 1999, has explained in vivid terms the energising impact of the Challenge for finalists and winners:

> "…becoming a finalist meant the possibility of sharing ideas at a global level with other groups, as well as participating as an exhibitor in a very exciting fair. We were able to realize that local initiatives become increasingly global when others know what you are doing and when you have the opportunity to share it. But winning the contest in the Innovations in Education category was a hit. In Colombia the educational sector

[28] Ludomatica is a project about playful, creative and collaborative interactive learning environments for children aged 7 to 12. See http://lidie.uniandes.edu.co/ludomatica

> does not bring many good international news to the social arena. But when Ludomatica was awarded in The Global Bangemann Challenge 1999, it was the case. Many unbelievers of the importance of the project had to recognize its unique nature. Groups that were investing in the pilot phase decided to help in its expansion. National and international funds were obtained based on this international recognition.[29]

Clearly, the Challenge has seen the concept of winning projects reinforced and their leaders energised to take their dreams forward to new heights. But this should not stop here, and the leadership of the Stockholm and Rome Challenge are looking at ways of improving the value the contests can bring to pioneering ICT projects and, more broadly, to all those engaged in the cause of an information society for all. A survey has been conducted among finalists and winners and the results provide an idea of the nature of the value of the Challenges as well as of the areas where challengers would like to see more done.

6 Survey of Value of the Challenge

The survey was conducted by email at the beginning of 2001 amongst the finalists and winners of both the Stockholm Challenge Award and Rome's Global Junior Challenge. Around 170 emails were sent with about 10 coming back as wrong address. Just over 40 answers were received of which a few were not filled properly and could not be processed. This left 36 surveys to be processed including 3 persons who had participated in both challenges and gave replies to both of them. Overall the sample represents about 25% of the total number of people contacted.

The survey was divided in five areas of value: social value, inspirational value, knowledge value, promotional value and financial value. For each value area, it presented the respondents with a set of statements to be marked from 1 to 6 depending on perceived value, with 1 (not at all), 2 (to some extent), 3 (most definitely) 4 (not so far), 5 (not so far, but expected in the future), 6 (not relevant). It must be noted that the answer of the respondents is heavily dependent on whether they attended or not the series of events associated with the final ceremonies in Stockholm and Rome. People who did not attend the ceremony events either found it difficult to fill the survey or found limited value in most areas of the survey.

For purposes of this paper, we shall concentrate on the answers given by those who attended the key event of the Challenges and it suffices to provide a view of the type of value perceived as most definitely achieved (marked 3). This is given in Figures 14, 15 and 16, with Figure 14 showing the number of respondents who definitely found Social and Inspirational value.

[29] For full text see http://www.challenge.stockholm.se

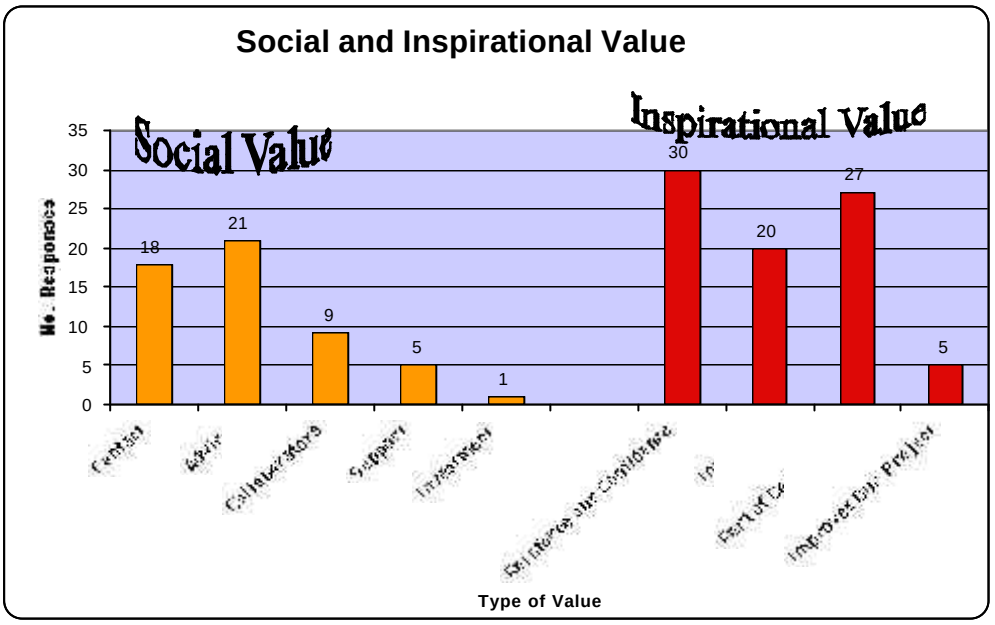

Figure 14. Perceived Social and Inspirational Value of Challenge

Figure 15 shows the results for Promotional Value in relation to helping raise project profile with support/funding organisations on the one hand, and with different types of media on the other. Figure 16 shows the number of respondents who found most definite Knowledge and Financial Value through participating in the Challenge.

A look at the results in the three figures show that most respondents definitely found inspirational and social value in the Challenges, particularly they felt that the Challenge had helped them to:

?? contact interesting people who share their interests and concerns
?? feel part of a network of people they can use to get advice and contacts
?? reinforce confidence that the work they are doing is valuable
?? be inspired by the work of other projects and people
?? gain a sense that they are part of a global community of IT pioneers

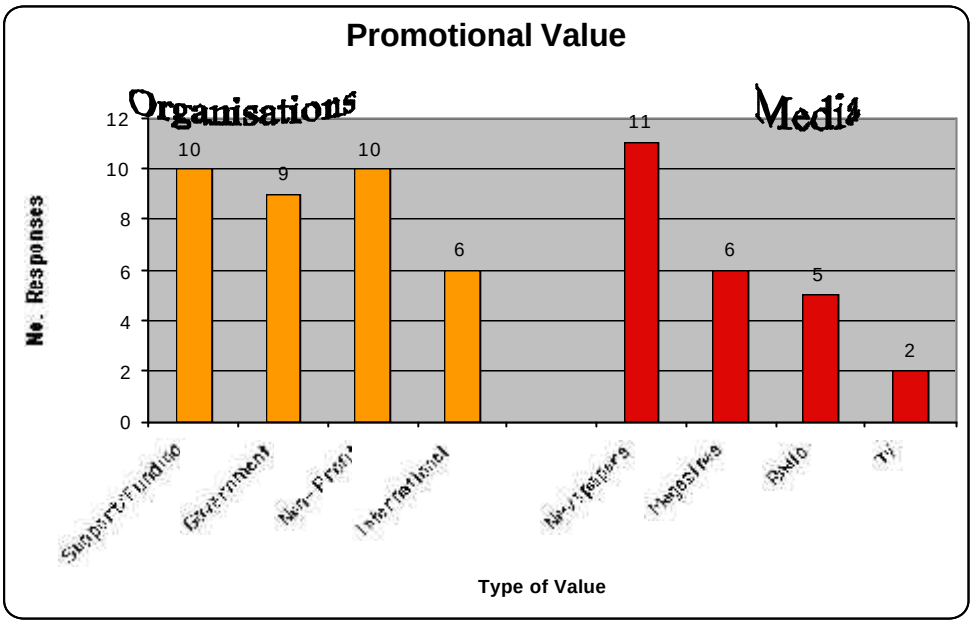

Figure 15. Perceived Promotional Value of Challenge

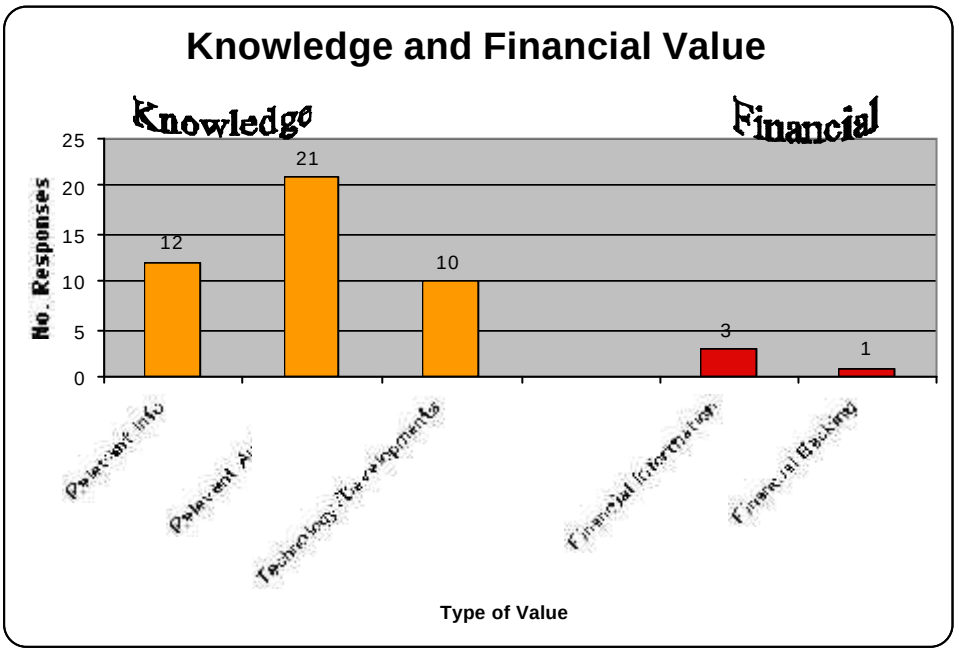

Figure 16. Perceived Knowledge and Financial Value of Challenge

The majority also felt that, in terms of Knowledge Value, the Challenge enabled them to introduce their project to a relevant audience.

A smaller although significant number of projects (25% to 30% of respondents) also found most definite Promotional Value in various forms (it must be remembered that this does not mean that other respondents found no value at all – meaning that they marked their answers with a 1- since we have not included in the discussion respondents who marked 2 (some value) or 5 (expected in the future)). In particular, the Challenge helped to raise profile with government and non-profit organisations in the category of support/funding organisations; whereas newspapers came the highest in relation to media. Also a significant number of projects found Knowledge Value regarding both learning relevant information for the project and learning about new technologies and developments of importance to the project. In Social Value, the establishment of contacts with potential collaborators and partners also received a significant number of responses.

Not unexpectedly the lowest number of responses of most definite value gained through the Challenge was associated with the most demanding targets, particularly financial gains in the form of:

?? meeting people who will back and invest in the project (only 1 respondent)
?? obtaining valuable information to improve financial performance (3 respondents), and
?? obtaining financial backing for the idea or project (only 1 respondent)

Television proved also difficult with only 2 respondents finding definite promotional value in relation to this media. Magazine and radio fared a little bit better. Finally, a rather small number also reported definite value in terms of contacting people who will support the development of their project; and in terms of having improved their projects by applying ideas of other projects in the Challenge (only 5 respondents).

The survey did not stop at asking finalists and winners about perceived value. It went further to enquire about both "things they would like to see happening" and "things they are prepared to do for the Challenge." The results are shown in Figures 17 and 18, with Figure 17 showing that most respondents would like the Challenge to make more of the opportunities created by the contest. Interestingly, the highest number of respondents want to see the Challenge interacting with other networks of potential advisers and funders and, above all, they want to see the spirit of the Challenge grow into a global social movement of ICT social pioneers. This movement is precisely the digital divide movement.

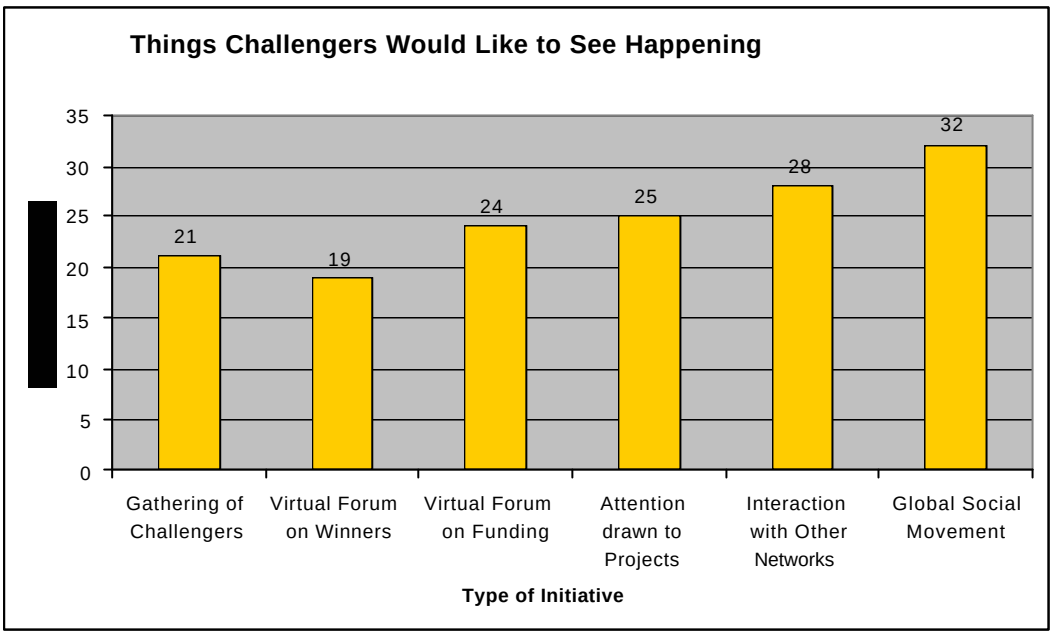

Figure 17. Things Challengers Would Like to See Happening

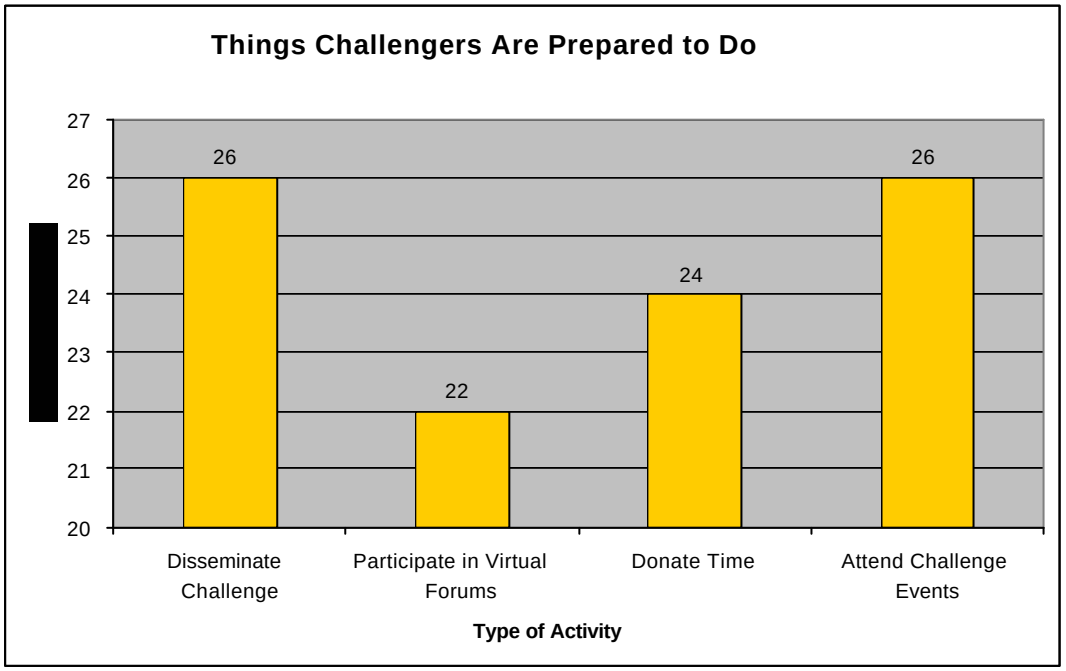

Figure 18. Things Challengers Are Prepared to Do

Finally, Figure 18 show what respondent finalists and winners are prepared to do to contribute to the Challenge. Clearly most Challengers are prepared to:

?? disseminate the Challenge to their networks
?? participate in virtual forums of relevance to their projects
?? donate some time to advice other pioneers working in similar areas
?? attend Challenge events of major significance for their project

At present, the Challenges are defining ways to realise this potential resource in a more systematic manner than it happens today. It is interesting to note, however, that the lowest number of "most definite" responses was for "participation in virtual forums of relevance to their projects." This result seems paradoxical for a set of pioneers of the information society, yet, it may be just a reflection that pioneers are normally very busy people who find it difficult to participate in virtual forums through a sometimes slow Internet medium. It may also be a reflection of the fact that people still prefers good face-to-face gatherings such as those created by the Challenge ceremonies.

7 Concluding Discussion

It is useful to start the concluding discussion with a fresh reminder of the huge magnitude of the challenge of the digital divide. In this paper, I have posed this as the challenge presented by poverty and exclusion and crystallised in the goal of the UN Millennium Summit of reducing poverty by half by 2015. The sobering fact is however that the present state of affairs is not leading to the fulfilment of this goal. Flemming Larsen, Director of the IMF Office in Europe, has made the case[30]

> There is a striking contrast in the global economy… The income gap between the rich and the poor has never been so great… The IMF has analyzed the reasons behind the failure of the many countries that have not taken advantage of the last half-century's prosperity. These reasons are complex: economic mistakes, institutional shortcomings, political instability, chronic civil disturbances or armed conflict. And we must also take into account external factors such as sudden changes in the terms of trade, the recent flare-up of petroleum prices, or the paucity of foreign capital. Nor is the ineffectiveness of the financial assistance provided by the wealthy countries, especially during the Cold War, alien to this situation.

Among the explanation for the failure of aid to put countries on the path of sustainable growth, the Larsen cites:

> (1) the absence of associated measures essential to the viability of public and private investment projects; (2) the tendency of donor countries to favor projects more in keeping with their own exporters' interests than with the needs of the countries receiving aid; and (3) the propensity of recipient countries to give precedence to military spending or wasteful projects and, all too often as well, shortcomings in public administration or corruption.

[30] Larsen (2001).

An angle from a developing country is given by Nii Quaynor, Executive Chairman of Network Computer Systems (NCS), Ghana. In a speech to a recent conference on the Digital Inclusion in Berlin, he expressed the following thesis,

> developing countries are embracing the requested reforms. But it may also be that the developed countries will also have to reform in a somewhat different way… We heard that action was very necessary. We've been discussing this for ten years. The investment that we've seen is actually quite little.

He went on to focus on a simple example of scale of investment required for IT training in a country of 20 million and 5% population growth simply to stay the same.

> in terms of awareness, without widening the gap, in one year you have to train a million… If you want provide one million PCs, which is really just 5%, you're probably talking one billion dollars of investment. If you want to provide one million telephone lines you're also talking about one billion dollars additional investment. I've not added backbone, infrastructure, no interconnection to the international community. Thus the investments are in billions of dollars just to improve the penetration on various indices to 5%, yet many of our government's annual revenue is less than one billion. The countries cannot implement such a monumental task without assistance. Yes, we've embraced the enabling environment requests made of us, we're democratic, have free press, establish independent regulatory agencies, introduced competition, investment incentives. Is this necessary and sufficient? Ghana has done a fair amount of that but why don't we have one million telephone lines?

These are the harsh realities facing the challenge of the digital divide poverty crystallised in the goal of the UN Millennium Summit of reducing poverty by half by 2015. Any logical extrapolation of the present state of affairs is likely to lead to some pretty pessimistic conclusions which would make a great deal of what we have discussed earlier look rather idealistic. Fortunately, there is also some logic in the four factors identified in Section 2 of this paper.

- the market economy can create business solutions that address the problem of the poor.
- massive widespread poverty is highly destabilising for development, peace and trade in an increasingly interconnected and globalising world.
- people are more than *homo economicus* and humanity also possesses a generous, altruistic humanitarian streak whose drive is solidarity with fellow human beings in the pursuit of a better world for all.
- politics has become less exciting and a wide social movement focused on poverty and exclusion might just re-kindle the dreams and give youth in particular a cause to channel time and energies.

This leads us back to reiterate the importance of stimulating the formation of the widest digital divide social movement as a boundless, free flowing association of organisations and people sharing and pursuing in myriad ways the realisation of the dream of reducing poverty by half by 2015. The survey conducted among the information society pioneers participating in the Challenges have provided at least two good supporting reasons.

First, it showed that the Challenge has contributed definite value to grassroot projects in some areas more than in others. This is a typical situation since single initiatives are highly unlikely to provide high value-added in all aspects of a complex problem such as the digital divide. The only effective solution is in networking and joining efforts with

others sharing the same spirit and implementing similar or synergistic actions. This is imperative if the challenge of an information society for all is ever to be realised.

Second, it showed that among grassroot projects there is clearly a heartfelt wish to see the spirit of the digital divide to grow into a global social movement.

Looking back to Table 1, this movement should have initiatives and actions at all layers - by geographical source and reach, by donor or implementor, by governance, support/funding or grassroot-project purpose, and by final business, service, or humanitarian aim. They are all necessary to give 'institutional thickness' and reality to the massive transformation and endeavour required. The leadership of such movement should be everywhere, geographically and organisationally. In fact, such movement should be an environment to stimulate entrepreneurship and innovation in all spheres, in partial coordination or loosely associated through mechanisms for sharing and learning about different experiences. We have seen how grassroot projects such as SITA and Hyperstories are in the frontline and City initiatives such as the Stockholm Challenge Award and Rome's Global Junior Challenge are playing their part to energise their efforts and, hopefully, help in their development. Similar valuable contributions are being made by the initiatives of international organisations (e.g., G8's dot.force, UN's ICT Task Force, OECD, CEC, ITU, IBD, etc.) and by others such Digital Partners, Bridges, TEN, Digital Nations, ITG. Many more are required to make reality of the idea of "letting one thousand flowers bloom."

At these early stages, the initiatives of international organisations and government have a significant responsibility to give an impulse to the movement by promoting awareness, conditions and initiatives to mobilise and facilitate the actions of the total ensemble required to effect a real change (see Table 1). This includes the issue of access to digital infrastructures as well as the development of appropriate governances for this access to happen together with improvements in living and working conditions through employment, health, education, and sustainable development.

As said in Section 3, the governance of the global information society is still in process of formation and this provides a problem and a window of opportunity. On the one hand, it is true that the issue of the digital-divide is at present largely absent from the spontaneous workings of its predominant profit-driven market mechanism. On the other, a momentum is building up and it may yet find a salient place in the consciousness, attitudes and actions of all players – public, private and non-profit sectors, civil society, communities and individuals.

To take advantage of the window of opportunity, three interrelated sets of actions should be pursued.

(1) Continue to stimulate and support all initiatives and actions (public, private, non-profit, etc.) emerging and taking place at the moment as well as their networking to exploit synergies. Brokering of grassroots projects with support/funding organisations is particularly important, including reviews and support for sustainable business development

purposes. An annotated 'mapping' of such initiatives and actions would be useful probably building from the databases of current initiatives with a broad purpose. Equally important is the reporting of experiences for learning and inspirational purposes. This has not got to be only about successes because 'failures' are a natural part of learning especially at early stages very much dominated by trial and error.

(2) Stimulate massive awareness on the issues of the digital divide and its deep relation to the challenge of poverty and exclusion reduction raised by the UN Millennium Summit: reduction of poverty by half by 2015. This should be high on the agenda of every player and every opportunity should be taken to persuade others to join the challenge. Participation need not entail radically new activities or change. There will be this too, but most participation can actually happen through incremental changes in scope.
Just ask yourself: is there a possible way in which what I do can be of benefit to the digitally excluded? Or, what incremental change would I need to implement to be able to benefit the digitally excluded with what I already do?

(3) Continue to demand from the most advanced countries to act in consequence with their avowed commitment to reducing digital poverty and exclusion. For instance, Larsen (2001) states that "The IMF has long stressed that debt has risen to intolerable levels. We therefore place great hope in the "enhanced" initiative introduced in 1999 to ease the debt burden of countries applying reform programs to combat poverty. Debt service relief for the first twenty beneficiaries is expected to substantially exceed US$30 billion." He then continues to demand that advanced industrial economies should:

- make greater efforts to completely open their markets to developing country exports. A 50 percent reduction in the trade barriers throughout the world would generate gains for everyone exceeding US$100 billion per year.
- find the way to support farm incomes without recourse to export subsidies, which hamper the introduction of profitable agriculture in many developing countries.
- improve their official development assistance (ODA) in terms of quality and volume. The level of ODA is currently well below the target of 0.7 percent of GNP which the international community had agreed upon. The gap between promises made and the effective level of ODA is on the order of US$100 billion per year.[31]

(4) Encourage the formulation, sharing and implementation of local, regional, national, international action plans or programmes for inclusive digital economies. The purpose of this initiative would be to bring all relevant players in to work together in partial or holistic processes of strategy-making and implementation. Any programme should be the crystallization of such processes and not just a document devoid of roots. Here government and international organisations have a major role given their 'public good' nature.

All these policy aspects reinforce each other and as long as they are bound by the challenge of reducing poverty and exclusion through the exploitation of the digital opportunity, then we may harbour great hopes for an information society for the benefit of all.

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[31] Ibid.

Finally, as I come to the end of this paper, oscillating between the logic of the harsh facts and the aspiration of a global information society free of poverty and exclusion, I wonder if the latter is just an impossible dream. As I fight the disappointing conclusions of this possibility, I cannot help thinking the following words:

It is not true that people stop pursuing dreams because they grow old,
they grow old because they stop pursuing dreams![32]

[32] Adapted from a letter from Garcia Marquez. "I would show men how very wrong they are to think that they cease to be in love when they grow old, not knowing that they grow old when they cease to be in love! "

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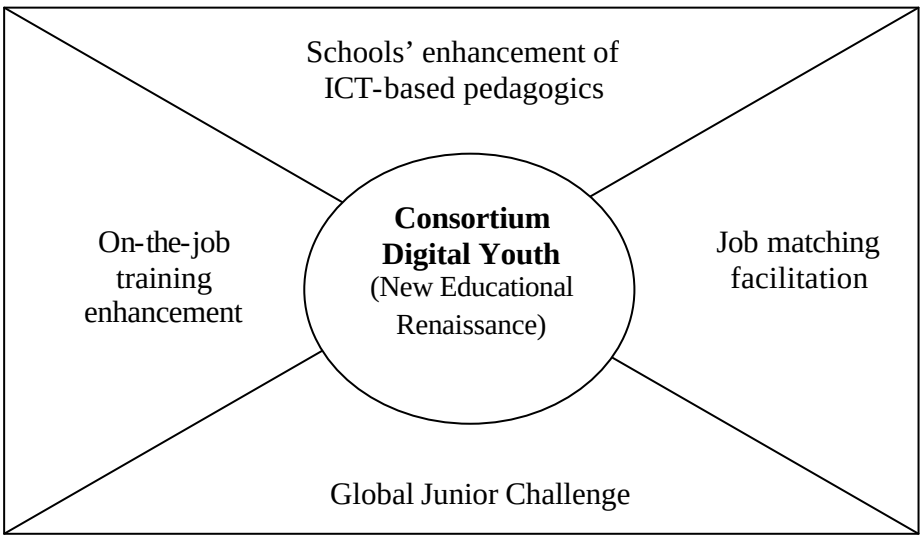
Appendix 1

Digital Youth Consortium[33]

The Digital Youth Consortium starts from reasserting the belief that the development of the information society for all presents a major opportunity and, indeed, a demand for a *new educational renaissance*. New technologies, new pedagogical and learning practices, new forms of partnership between educational stakeholders (including the teaching and supporting staff professions, students, the public and private sector and academia) are all key ingredients in this *new renaissance.* Those cities, countries and regions that embrace an innovative vision and pursuit it with bold determination will emerge as the leaders in this long-term enterprise. The City of Rome subscribes to this vision of the educational renaissance and aims to play a leading role in its realisation for the benefit of the new generations, educational stakeholders and development of the information society in the Lazio-Rome in particular and the European region in general.

To contribute to the realisation of this vision the Digital Youth Consortium pursues four areas of synergistic activities and services illustrated in Figure 10:



1. Enhancement of ICT-based pedagogics/learning at schools and training centres. Promotes the upgrading of the educational infrastructure and pedagogics through the implementation ICTs to stimulate a harmonious innovative educational community

[33] Based on *Digital Youth Consortium Business Plan. An Initiative of the Municipality of Rom as part of the Telecities Presidency*, Rome, December 2000.

2. Facilitation of job searches and matching. Promote the inclusion of a network of Internet Cafe amongst its members in order to support a search engine for job offers.

3. Enhancement of on-the-job training effectiveness. Pursues the matching of skills and companies' requirements inside the organisational environment.

4. Global Junior Challenge. Provides a complementary window to the world's innovative educational ideas and practices to illuminate and inform the local practice. It provides a source of international best-practice to inform educational policy and practice at local level, as well as opening huge international promotional opportunities for both the public and private sectors.