Virtual enclaves or global networks? The role of Information and Communication Technologies in development cooperation

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ABSTRACT

This article investigates the evolution of the struggle for bridging the digital divide in developing countries. Taking into account tendencies that have been registered in disciplines other than development, such as urban sociology and social psychology, the author demonstrates how a frequent over-estimation of the potential of Information and Communication Technologies (ICTs) has influenced the previsions about their impacts and led to results and phenomena different from the expected ones. ICTs have been perceived more as a black box that can produce the same effects everywhere, independent from pre-existing cultural and socio-economic contexts, than as an open artifact, capable of integrating local needs in their functioning mechanism and being adapted according to different conditions of use.

Nevertheless 10 years have passed since the first pioneers launched their projects for reducing the digital gap and new approaches have emerged since then. ICTs are more and more at the heart of the strategies developed by international organizations for providing a better future to new generations and a new consciousness has emerged as a result of the many errors. The article describes some of the new approaches in the fight against the digital divide, explaining how they have a better chance to success and bring digital equity.

1. Introduction

   This year is the tenth anniversary since the expression 'digital divide' was developed for defining the moral challenges of, and political responses to, the uneven diffusion of Information and Communication Technologies (ICTs) around the globe and among different social classes. First coined by the Clinton administration, the term was initially

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used for internal purposes, framing actions aimed at calling on board the highest number of American citizens in the miracle Information and Communication Technologies were about to promote in the country[1]. Conscious that the power and value of networks is the result of the number of nodes that compose them[2], the fighters against digital exclusion were moved not only by their moral understanding, but by the perception that the highest number of users corresponded to the better performance of the new system. A similar vision, based on the mix of the right to access ICTs and economic growth ICTs could promote, is what has inspired the progressive exportation of the concept of digital divide outside U.S. borders, starting a new era of a "computer assisted" fight against poverty.

This article will investigate how the approach to the digital divide as a global challenge has changed in the past ten years. It has shifted from a technologically driven conception of development – the idea that poor counties should be equipped with ICTs to join the economic miracle that has been benefiting the industrialized world – to the less inspiring but more pragmatic conception of technology as a component of a more long-term development process.

The analysis of the main changes in the "ICT for Development" framework will take into account the tendencies that have been reported in other disciplines that have explored the impact of ICTs in different aspects of modern life, from social interaction to urban development. This exercise will help the reader in understanding the patterns that have characterized the investigation of the impact and potential of new technologies. I will demonstrate how a common idea of transformation brought up by technology has often caused an over-estimation of ICTs' real effects, partially mitigated only by case study research.

2. Before the digital divide: vanishing cities and vanishing bodies

In the past ten years many scholars have expressed their views and concerns on the risks of the digital divide and official documents have often incorporated recommendations on how to use ICTs for development[3]. Some formulas have been

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[1] The apex in the fight against digital exclusion in the U.S. was reached after the publication of the Department of Commerce's report *Falling through the Net* (NTIA, 1999). The study demonstrated how the irregular diffusion of the Internet could have widened the gap among classes, thus requiring additional interventions by the government. This policy has completely changed with the Bush administration, more inclined to leave to the market the role of reaching who has been left behind by the Information Revolution.

[2] In 1973 Robert Metcalfe, the inventor of Ethernet, proposed an equation for showing how the value of a network increases exponentially with the increase of the number of its nodes. Metcalfe's Law states that the value of a network equals approximately the square of the number of users of the system . The equation is $V = n^{(n-1)}$ where n is the number of nodes of the network (see http://en.wikipedia.org/wiki/Metcalfe%27s_Law).

[3] See, among others, the Final Report of the Digital Opportunity Initiative (2001); African Information Society Initiative (AISI): an action framework to build Africa's information and communication infrastructure, published by the Economic Commission for Africa (1996); Challenge to the network:

elaborated on how to prepare efficient and promising information systems[4] and sceptics had the floor for expressing their doubts on the real potential of information and communication technologies[5]. They argue, for example, that there is a strong need to first address the most basic challenges poor countries have to face (such as access to water, primary education, HIV/AIDS, etc.), before jumping to the wiring of cities and villages.

There is no doubt, however, that the initial enthusiasm for the contribution new technologies could provide to the wealth of developing countries has progressively been substituted by a more cautious approach to the topic. It can also be argued that while ICTs remain at the centre of a revolution that many have compared to the one provoked by the 'automobile-highways-petrol system' [6], the lesson on over-estimating the impact of ICTs could have been learned far in advance. Political economists and technocrats should have looked to what was happening in other disciplines that had been dealing with the use and effects of ICTs.

An interesting example can be taken from urban sociology. At the beginning of the Information Revolution, a long-time before the invention of the World Wide Web in CERN[7] would have boosted the diffusion of the Internet on a mass scale, the idea that new technologies would provoke the end of the city was one of the most popular and fascinating within the discipline. New technologies were perceived as a means for generating a more sustainable and human-compatible system where people could tele-work from cottages in the countryside and interact without enduring the burden of overcrowded metropolis.

As Graham and Marvin (1996) pointed out through an attentive analysis of the literature on the future of the city, it is mainly the immaterial essence of telecommunications that has nourished these utopian visions that human beings would be liberated from their obligation to be components of the urban scenario and become intelligent nodes of a pulverized global network. Marshall McLuhan can be seen as the initiator of this tradition. In 1964 he predicted that the emergence of his global village would have meant that the city "as a form of major dimensions [had to] inevitably

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Internet for Development by the International Telecommunication Union (1999) and the 2001 UNDP Human Development Report. Making new technologies work for human development.

[4] Many international organisations such as the United Nations Educational Scientific and Cultural Organisation (UNESCO), the United Nations Development Programme (UNDP), the International Telecommunication Union (ITU) and the World Bank have produced manuals and "cookbooks" on how to introduce ICTs into different aspects of economic and social life, from a guide on how to install and maintain a telecentre to how to write laws related to the use of ICTs. Most of these documents are available on the websites of the organisations listed above.

[5] The most recent and aggressive critique to the failure of ICTs in promoting development in poor countries comes from The Economist (see Vol. 374, N. 8417, March 12-18 2005)

[6] See, for example, The Information Age: Economy, Society and Culture (Castells, 1996)

[7] The CERN (Conseil Européen pour la Recherche Nucléaire) is where Tim Berners Lee started his internet-based hypermedia initiative for global information sharing, that in 1989 led to the invention of the World Wide Web (WWW).

dissolve like a fading shot in a movie" (McLuhan, 1964). In 1968, Melvin Webber stated that "for the first time in history, it might be possible to locate on a mountain top and to maintain intimate, real-time and realistic contact with business and other societies. All persons tapped into the global communications network would have ties approximating those used in a given metropolitan region" (Webber, 1968). And the futurologists Naisbitt and Aburdene, riding a wave of excited speculation in the late 1980s and early 1990s about the future Information Society, saw "a new electronic heartland of linked small towns and cities as laying the groundwork for the decline of cities". Anthony Pascal (1987) extrapolated this logic, arguing that:

> *"The era of the computer and the communication satellite is inhospitable to the high density city. What once had to happen in the city can now take place anywhere. With the passage of time [will come] spatial regularity; the urban system converges on, even if never quite attains, complete areal uniformity. The newly emerging technologies will soon begin to provide excellent substitutes for face-to-face contact, the chief remaining raison d' être of the traditional city" (Pascal, 1987, p.602).*

In contrast, Graham and Marvin demonstrated through their impressive analysis in *Telecommunications and the City (1996)* and *Splintering Urbanism* (2001) that the diffusion of telecommunication has rather encouraged the opposite phenomenon. The concentration of human and economic capital in huge metropolis, where the production of value and innovation is more and more taking place, has actually been further accelerated thus disconnecting global peripheries and suburban areas from the creation of wealth and knowledge.

It can be argued that behind the rhetoric of the dissolution of the city lies the belief that technologies are the raw materials used for building a world that can progressively substitute the previous one, assembling a new system with its own rules that does not necessarily have to adhere to the features of the previous one. The same idea of leaving behind the material past for embracing the new opportunities disclosed by technology is what has also characterized the initial researches in Computer Mediated Communication (CMC), which is essentially the social interaction among individuals through computers connected together. Most of the first explorations in this field have been carried out by social psychologists in laboratory settings with the aim of verifying

how efficient a team could be without sharing the same physical environment[8]. Lee Sproull and Sara Kiesler (1992), among others, pointed out how in CMC systems the lack of information on the social and physical background of the participants was encouraging more audacious behaviour and greater participation, thus equalizing the status of the participants.

These findings have also been sustained by the first academic journeying in virtual environments, such as Multi Users Dungeons (MUD), chat lines and Massive Multi-players On-line Role Playing Games (MMORPG). As Sherry Turkle (1997) has underlined through her first experiments of virtual ethnography[9], CMC systems allowed people for the first time to recreate multiple on-line personalities independently from their social and economic background and from their physical appearance. However, recent research has demonstrated how difficult it is to leave behind social and physical cues when part of more complex computer mediated interactions. According to Lea (2005) off-line social cues could be deduced or reproduced in a different way while connected to CMC systems but continue to be "attached" to users: they could be performed in a different way according to different social contexts, but they cannot just disappear. This is evident when we move apart from specific laboratory settings or game-playing scenarios that encourage and require in a way the creative reproduction of virtual personalities and behaviours and we shift to long term on-line presence, tracked by actions such as work correspondence, e-buying, registration to news alerts and mailing lists, etc.

These brief excursions in various disciplines demonstrate how the fascination stimulated by new technologies, rather than their real potential, has often influenced the initial research on the future impact of ICTs. It can be argued that in some cases sociologists and urban planners have approached the prediction of a technological future with a style more familiar to science fiction writers than to academic scholars. Science fiction worlds are not assembled completely from the scratch, but rely mainly on the capacity of socio-technical elements embedded in a given reality to evolve according to their potential, disconnecting them from the friction provoked by history and other social variables. Social and political theories instead have to take into greater account the force of gravity exerted by economic, cultural and social contexts, which, if

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[8] These researches were primarily aiming at identifying the main differences between CMC systems and Face to Face interaction, considered intrinsically richer in terms of bandwidth, and increasing the productivity of groups interacting through computer networks for work related purposes.

[9] Virtual ethnography, a methodology developed in the early 90s, is based on a spatial metaphorization of cyberspace. It deals with Usenet newsgroup, chat lines, mailing lists or weblogs as places that can be explored by the researcher in a participatory way.

technology were to take off as hoped, constitute the preconditions for the effective development of functioning human-technology systems[10].

3. ICT for Development: a global solution or a localized support to poverty reduction?

A main critique of the first pioneers who exported the concept of digital divide outside the U.S. is that the idea of ICTs they had in mind was much grander than the mere technology. Embedded within the new tools there were also the uses people belonging to a particular culture and socio-economic context were making of them. As Castells reminds us, the Internet as we know it, anarchic and a-centric, was created by the singular mixture of Big Science, military research and a culture of freedom that could not be found anywhere but in the American West Coast. New information tools found their place within a given scenario that was characterized by massive investments in research and development, a corporate culture open to innovation, alternative movements eager to use computer for changing the world and rampant economic growth. These tools thus contributed to further accelerating the phenomena that were already taking place. These elements, and the many others that have contributed to the success and further development of electronic networks, are far from being common in most of the places on earth[11]. The problem is that all these factors have been condensed in technical artifacts that at a first glance could appear easy to use and capable by themselves of producing great things, but in a way that is simultaneously obscuring the systemic nature of these artifacts and the preconditions needed to put them to work. Some of the promoters of the propulsive role of technology forgot that "a

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[10] In the case of the Information and Communication Technologies science fiction has played an important role in defining possible scenarios that in part have inspired both applied and academic research. As Lawrence Lessig writes in the introduction of his Code and Other Laws of Cyberspace (1999) sometimes science-fiction writers have the ability to capture phenomena that help the understanding of our world, positioning us in unusual perspectives. At the same time it is interesting to notice how a genre like the cyber-novel, that had its major names in William Gibson and Bruce Sterling, has progressively declined – not only in terms of selling but also in its creativity and appeal – with the progressive expansion in the real world of the same technologies used by the authors for building their imaginative worlds. In a way this demonstrates how fascinating are the potentials embodied in a given technology but how less inspiring is a technology when it reaches its maturity.

[11] Another interesting perspective of the risks of exporting technology in different context is the one of Cultural Attitudes towards Technology and Communication (CATaC). Charles Ess, for example, addresses the issue of the supposed democratizing power of ICTs and how this is impacting in non-Western Cultures. "During the 1980s and 1990s in the Western world, much of the moral imperative for the development and distribution of Computer-Mediated Communication (CMC) technologies such as the Internet and the Web derived from Marshall McLuhan's utopian vision of an "electronic global village." This wired village presumed that these technologies were accessible, culturally neutral, and communicatively transparent to all the peoples of the world: as such, CMC would facilitate the realization of ostensibly universal ethical and political values - equality, freedom of expression, democratic governance, and, of course, economic prosperity as the result of radically free and global trade. As the events of September 11, 2001, made tragically clear, however, Western - specifically American - visions of the Good, the True, and the Beautiful are not always as manifestly universal in their scope and validity as their proponents tend to assume. On the contrary, Western emphases on material prosperity through capitalism and free trade are seen - with considerable justification - to have enormous human and social costs, beginning with increasing problems of mal-distribution of important social and economic resources, as the gaps between rich and poor grow both within the United States and between the developed and developing nations. A particular reflection of these gaps is the "digital divide," the split between the *information* haves and have-nots. At a still deeper level, contemporary Western models are called into question as continuing forms of colonization, i.e., the imposition, through subtle and gross forms of force and coercion, of economic and political arrangements that both contradict and override the traditions, values, practices - indeed, the very identity - of diverse peoples and nations" (Ess, 2004).

technology is successful only when society is in the position to accept it" (Graham & Marvin, 1996).

3.1 The rhetoric on the ICT impact on economic growth and democratisation process

As a comprehensive study commissioned by the Organisation for Economic Co-operation and Development (OECD) pointed out, technology is only a part of a much broader range of changes that helps economies to enhance their performance. Firm-level research has showed that "the complementary factors which were found to have significant influence were: human capital, a firm's experience in innovation, its use of advanced business practices and the intensity of organisational restructuring" (OECD, 2004). Some of these elements have not been fully integrated into the corporate and innovation cultures of firms in many OECD countries, which have failed to provide evidence of productivity gains received from investments in ICTs. It easy to understand that if important factors such as those mentioned above are lacking in some of the most developed countries, the situation in poor economies is clearly worse[12]. A long process has to be undertaken in these countries for promoting a culture more open to research, innovation and change, before ICTs could possibly start to provide developmental effects in broad areas of economic and social life.

Also in the case of the popular idea of the democratisation effect of ICTs and of information in general[13] – promoted by futurologists such as Alvin Toffler – there are many counter-examples that demonstrate how the diffusion of new media in authoritarian and semi-authoritarian regimes is not directly promoting more open environments and democratic processes. The most famous cases can be found in countries like China and Iran, which, while strongly promoting the use and diffusion of ICTs for gaining a technological primacy in their respective areas of influence, are at

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[12] OECD researches on the impact of ICT have demonstrated that, within a favorable environment, characterized by the ability of firms to absorb new technology, the introduction of new workplace organization and the availability of relevant know how, ICTs can foster growth:
– Through capital deepening, as ICTs are an important asset in overall business investment;
– Through multi-factor productivity (MFP) growth in the production of ICT goods and services;
– Through MFP growth thanks to the use of ICTs, either through efficiency gains in individual firms, or through network/spillover effects from ICT use (OECD, 2004).

[13] Arising from the struggle for the liberty of the press, there is a broad and deep body of European and American scholarship on the role of information in democratic and transitioning societies. Some of its most prominent early thinkers include Thomas Jefferson, John Milton, Thomas Paine, Jeremy Bentham, Alexis De Tocqueville and Max Weber. Various aspects as to how freedom of information is a natural right and how state censorship facilitates despotism and silences the truth have been put forward solidifying the role of a free media in general as an essential component to modern democratic society. A number of more recent social scientists, such as Robert Dahl (1971), Barrington Moore (1966), Robert Putnam (1993) and Joel Migdal (1988), have made substantial contributions to this area of study. In addition, international organizations such as the World Bank with its report *The Right to Tell* (2002) endorse the idea that information plays a fundamental role in promoting political accountability through increasing transparency. Similar scholarship has also been put forward by Amartya Sen (2000) and Joseph Stiglitz (2003), who argue that individuals and governments have asymmetrical information - increased information and transparency thus improves the ability for citizens to reduce this asymmetry and promote accountability.

the same time constraining the potential of ICTs bringing additional opportunities for empowering opponent groups and promoting a more democratic debate. However, as Cherian George (2005) has demonstrated in a recent article on the Internet's political impact in Malaysia and Singapore, it is not only strong state censorship and control that is hampering the flourishing of democratic arenas for free and fair exchange of ideas, but it is also the absence of a pre-existing tradition of social and political activism that is hindering the use of the Internet and other media for fuelling the public debate. In reality, as stated by Pippa Norris (2001), rather than the Internet creating new active citizens eager to take part in political and social life it has merely activated the ones already active by giving them new instruments for pursuing their goals.

3.2 Reducing the scale

If we shift our focus from states and regions to more limited areas and sectors, many ICT based projects seem to have provided an important contribution in improving the living conditions of individuals and communities in developing countries. In this sense the fighters against digital poverty have to be credited for the role they played in including the digital divide on the development agenda. They have activated different actors, from donor agencies to international organizations and NGOs, strengthening their commitment in the application of ICTs in their development programmes. The market of projects aimed at reducing the information gap has grown exponentially. "The social and commercial 'venture capital' element of the first experiences has been very positive and has generated huge amounts of essential knowledge. [The approach of] 'Let's try everything and see what works' has produced a lot that works" (Spence, 2003).

In the past ten years there has been a proliferation of applied research/pilots in poor communities or with organizations working directly with the poor. They have focused on livelihoods, education, health, community development and other sectors. Most of this applied research has been supported from the perspectives of ICT specialists and practitioners, who understood or predicted the large impact of ICTs earlier than most, and were in the position to carry out core technical parts of projects and investments. In the case of these kinds of projects we can find a plethora of successful examples, from the trade sector to health and education.

In the case of the application of ICTs to trade and commerce, great results have been achieved through initiatives such as the Virtual Souk or PEOPLink. They offer a valuable service to artisans in the Middle East and all over the world in selling their

handmade items on-line while showing their cultural richness. Artisans are trained to use e-commerce platforms to create their own web catalogue and get in contact with the global community on the Internet. As stated on the PEOPLink's website "this coordinated yet direct connection dramatically reduces the cost of the transaction by bypassing 2 or 3 levels of middlemen, thereby at least doubling the income that stays with the artisans for their handworks"[14].

Health has also been one of the sectors that has benefited most from the introduction of ICTs. In Peru, for example, Engineers without Borders has activated a network of health-posts connected together and to hospitals in main cities through wireless communications for providing real-time diagnosis for people leaving in remote areas where there is shortage of qualified medical personnel. Geographic Information Systems (GIS) and databases have exponentially increased the capacity of creating maps that show patterns of diseases and help understand the schemes of epidemics.

Telecentres installed by small NGOs or international organisations such as the United Nations Educational Scientific and Cultural Organisation (UNESCO) in remote communities have empowered people in rural areas to share information on issues relevant to them, to learn through the Internet and to produce local content for the Web.

All these projects share the common feature of being highly intensive in terms of human capital, training and specialization. To be effective, emphasis must be limited in scope, restricted to geographic areas where people can share a common vision on how to implement the new tools and on focused and intensive training on how to make the best use of ICTs.

At the same time, problems arise when these localized experiences are scaled up on too wide of a scenario. Thus, new technologies are used without adequate contextualization and are applied as stand alone systems that by themselves cannot provide a solution to a problem more rooted in the social cultural and economic background of a country. A good example of the risks of using the newest technologies in contexts not prepared to accept and make a proper use of them can be taken from an education programme recently launched in Ethiopia. The programme, known as Schoolnet, consisted of the installation in every secondary school across the country of Plasma TV sets that can receive, through a satellite communication, school lessons broadcasted in English on 8 different channels from the capital Addis Ababa. More than 600 schools were equipped with TV sets and dishes and 161 were provided computer laboratories. The reasons that pushed the government to start this enterprise were,

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[14] See www.peoplink.com

according to the former Minister of Education Gennet Zewdie, "the lack of qualified teachers in secondary schools, the poor quality of education provided to secondary students and the necessity to improve students' command of English". But the results are far from the ones expected. Apart from the frequent power failures, malfunctioning Plasmas that have never been repaired and the high maintenance the system requires, the main problems relate to students' understanding of the lessons, both for their format and content. Most of students barely speak and understand English, lessons cannot be interrupted and the time for taking notes is too short. In addition, in remote areas some people have never seen a normal TV set and the system still appears obscure to them. Technology has not brought the expected improvements in the quality of education[15] and even if for the first time it could be said that everyone in the country has the same learning opportunities independent from where she or he is located, most of the students have not been adequately prepared to benefit from this opportunity. Thus, if the synchronization effect produced by the globalization of markets and communication has made available the newest technologies also for the Least Developing Countries including secondary schools in Ethiopia, it doesn't mean that there are the conditions for making adequate use of them.

4. Future scenarios

The previous examples, taken from various disciplines and sectors, account for a very simple assumption: the risk of focusing on single, even if astonishing, products and events generated by the diffusion of ICTs and generalizing them on a wider scale. If a professional can decide for the first time in history to live on a remote mountain while keeping in contact with friends and colleagues and being updated on what happens all around the world, this won't mean that cities will lose their citizens and other people won't need to move to urban areas for finding jobs and participate to the creation of knowledge and value. Similarly if it's possible to invent new personalities on the Net and leave to the new characters the role of interacting with other people, this won't mean that everyone will use this opportunity or will be in the conditions of using it 24 hours a day, leaving behind his/her body and identity for ever. And if a telecentre, a web catalogue or an e-learning program has been successful in expanding the opportunities of particular groups or categories of learning, earning money and communicating, this won't mean that these new projects will impact the economic performance of a whole country or allow it to join the Knowledge Era.

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[15] See the Joint Review Mission Reports 2004 and 2005, commissioned by the Education Working Group of the Development Assistance Group (DAG) in Ethiopia (http://www.dagethiopia.org/education.aspx).

This, of course, doesn't negate the great transforming power that resides with ICTs. It contextualizes them as a component of a transformation that could not be driven by technology itself. As it has been claimed by Actor Network Theory, every configuration of elements has different characteristics that have to be carefully taken into account for reaching the expected results[16]. The same component in a different scenario could produce effects completely different from the one experienced in the past, but not necessarily in a direction beneficial for the new situation. These effects could be virtually embodied in different human, social and technical nodes of a network but are actualized only by the combination of the two (or of the many) as part of a new organism generated by their assembling.

Ten years of computer assisted development programmes and the fight against digital exclusion have produced a deeper understanding of the problems brought by the digital divide. After the enthusiastic endorsement of new technologies as a driving force for reducing poverty, more cautious and/or localized approaches have emerged. Among the many, three of them can be addressed as the prevailing ones.

The first one aims at providing technical high-level solutions for problems experienced in developing nations. Instead of exporting and applying the same artifacts produced in the industrialized world in different cultures and countries characterized by low levels of e-literacy, wealth and innovation, specifically adapted and tailored tools and solutions that can directly address the needs of the poorer need to be produced. Bill Gates has been one of the first who followed this path, but in a sector that has nothing to do with operating systems and office applications. His foundation in fact has been involved mainly in the health sector, sponsoring a model that strongly differs from the one usually adopted by cooperation agencies. It consists not in the building of – usually low quality – hospitals and clinics in Africa or Latin America, but in the strengthening of the research in the best laboratories of the developed world for finding vaccinations and medicines for diseases that almost disappeared from rich countries but still cause millions of deaths among the poor- such as malaria, infectious diarrhoea and acute respiratory infections[17]. In the ICT sector a similar approach has been recently

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[16] When not all the interconnections among elements are taken into account the results of actions could be strikingly different from the expected ones. The following story illustrates why this is so important. In the early 1950s, the Dayak people of Borneo suffered from malaria. The World Health Organization had a solution: it sprayed large amounts of DDT to kill the mosquitoes that carried the malaria. The mosquitoes died; the malaria declined; so far, so good. But there were side effects. Among the first was that the roofs of people's houses began to fall down on their heads. It seemed that the DDT was also killing a parasitic wasp that had previously controlled thatch-eating caterpillars. Worse, the DDT-poisoned insects were eaten by geckos, which were eaten by cats. The cats started to die, the rats flourished, and the people were threatened by potential outbreaks of typhus and plague. To cope with these problems, which it had itself created, the World Health Organization was obliged to *parachute 14,000 live cats into Borneo.*

[17] On the other hand Microsoft Corporation is actively working for promoting its products in developing markets and in a way that could not be beneficial for developing nations. In fact, as many researches have demonstrated, the use of Free and Open Source Software (FOSS) could help developing countries in their struggle for digital development. In fact the low or null cost of FOSS, its capacity to be modified and localized

promoted by Nicholas Negroponte with his 100$ laptop. He managed to gather together some of the most important players in the IT sector to develop a product tailored on the needs of kids in developing countries but incorporating the most advanced solutions for reducing costs without constraining performances[18].

The second approach is the one promoted by international organisations and programs such as the African Information Society Initiative, the United Nations Educational Scientific and Cultural Organisation (UNESCO), the United Nations Development Programme (UNDP) and others. Their belief is that, while ICTs could be a fundamental ally in the fight against poverty, they require some basic preconditions and enabling environments capable of putting them to work for development. In this sense the efforts of these organisations have focused mainly on producing effective and tailor made policies and projects at the country and regional level, thus encouraging a comprehensive approach to communication and information. According to these organisations it is through education, public-private partnerships and major investment in research and development the diffusion of ICTs will be promoted to simultaneously encourage the growth of a culture open to innovation and creativity.

The third approach is more right-based and sees access to communication and information as a basic human right that governments and international organisations have to strongly promote and realise. This could be considered closer to the initial idea of digital-divide that centred mainly on the urgency of closing the gap between information haves and have-nots. However, the focus on components such as freedom of information, state censorship, and the concentration of media ownership has contributed to promote a deeper understanding of the functioning of media and ICTs as well as active solutions to the problems emerging in developing, particularly authoritarian, countries.

5. Conclusions

This article has demonstrated how the fight for bridging the digital divide as a global challenge has produced various, sometimes conflicting, approaches and solutions to the problem. It has also illustrated how the enthusiasm for the discovery of a new potential ally in poverty reduction has generated an excessive faith in the role ICTs could play in developing countries. Finally it has been argued how the translation of theories on the use of ICTs for development into concrete projects has re-oriented the

according to different needs, the model it promotes, that is based on the strengthening of local capacity and human capital could be a better solution for a large number of poor countries.

[18] For more detailed information on the *100$ Laptop,* visit http://laptop.media.mit.edu/

approach to the problem, producing effective examples of how ICTs can benefit communities and individuals on a small scale.

It is clear that ICTs can re-shape the way of working, learning and communicating not only in the rich world but also in poor countries. Nevertheless, up to now, the lack of adequate preconditions – such as a diffused culture of innovation, the availability of skilled human capital and a rich pre-existent media environment – has hampered the process of networking among the ICT-rich isolated enclaves that do exist within a country or region. Technological and information hot-spots are now flourishing everywhere, also in the poorest areas of the globe. What is still missing is a terrain conductive to their inter-connection, capable of transmitting their effects on a wider-scale and multiplying their influence outside limited borders. This terrain is made not only of wires and cables, but also of the needs of people and groups, the capacity to animate the new tools with local passions and aims and the perception of innovation as a support to local activities. On the one hand, technology has to be receptive and incorporate the requests coming from cultures different from the ones who firstly invented it. On the other hand, governments and international organisations in developing countries must further promote factors such as education, research and development and freedom of expression to adequately welcome these new technologies.

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