Information and Communication Technologies for Development

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Abstract

How do Information and Communication Technologies (ICTs) contribute to international development? What roles do the state and market play in deploying ICTs? How can one assess the development impact of ICTs, and are these impacts scalable or sustainable? To approach these questions this chapter maps key ideas and debates surrounding the field of Information and Communication Technologies for Development (ICT4D). Practical examples of ICT use in the developing world are examined, including telecentres, LAN houses, and the growing number of mobile devices affordable to the poor. Critical issues include the extent to which markets provide access to ICTs, and the extent to which ICTs empower wider social transformation. Looking forward, ongoing debate revolves around internet governance and which policies foster or

threaten online rights. Will the future use of ICTs expand human freedom and development, or enabling increased surveillance and control?

Keywords: information and communication technologies, ICT4D, telecentres, LAN house, internet freedom, scalability, digital divide

Introduction

The use of Information and Communication Technologies (ICTs) in the developing world has raised many questions and debates. Where do ICTs stand compared to other development priorities? What roles do the state and market play in their deployment? How can one assess the development impact of ICTs projects? Are these impacts scalable or sustainable? What comes next once ICTs are readily available to all people? And how are these technologies connected to policy making?

To approach these questions, this chapter briefly describes the field of Information and Communication Technologies for Development (ICT4D) and maps key debates surrounding it. The concepts and dynamics of ICT4D theory are described through an analysis of empirical experiences, examining their relation with the state and the market, and the conditions under which they become an infrastructure for innovation. These examples include telecentres, LAN houses, mobile devices, and their appropriation and use by the poor. Emphasis is placed on how the use of ICTs can emerge spontaneously in an open and uncontrolled context, rather than out of an ideological position in favor of provision through either the state or markets. This is followed by a discussion of current trends, including access to ICTs through markets, the growing number

of devices affordable to the poor, and the benefits of ICTs in terms of empowering wider social transformation. While the state has an important role, new business arrangements are also promoting access to ICTs in the developing world. As connectivity expands, practical examples of the impact of ICTs emerge, both in connection with economic opportunity and with the exercise of basic civil rights.

Looking forward, the future of ICT4D involves threats to Internet rights and the freedoms connected to the deployment of ICTs. Are the practices and policies related to ICTs leading to democracy and public access to knowledge, or are they leading to increased surveillance and control? This field is evolving beyond the debates described above, to encompass questions on internet governance and policies that foster or threat online rights and freedoms.

Emergence and evolution of ICT4D

The debate about the importance of Information and Communication Technologies (ICTs) in the context of development studies dates back to the mid-twentieth century, yet exploded in the 1990s when the G7 began to address the governance of the cyberspace and electronic commerce.

At the time, the main issues were the norms for interconnecting networks, rights to access such networks, and taxation of goods and services delivered through the web (Hart 2004). But as criticism from anti-globalization movements increased, pressure against the G8 governance became stronger, reaching a peak in 1999 during the World Trade Organization (WTO) meetings in Seattle. One of the main complaints was the lack of space in the decision-making processes for non-G8 countries and the international institutions that were supposedly more representative of their interests. In response to such pressure, the G8 established a Digital Opportunity Task Force (DOT Force) in 2000. The goal was to bring together forty-three teams composed by government, private sector, non-profit and international organizations from both, developing and developed countries to debate the "digital divide". The idea, as put by Castells (1999) was that ICTs represented an opportunity for countries to leapfrog stages of economic growth, yet could further disadvantage those economies unable to adapt to the new technologies. DOT Force meetings were held in Tokyo, Cape Town, Siena, Dubai, Berlin, Davos, Berlin, Cairo, and Naples.

In 2000, the same year that the DOT Force was established, the G8 adopted the Okinawa Charter on Global Information Society which argued in favour of the potential for ICTs to transform

economies and societies, and in which the G8 committed to address the digital divide. This commitment carried over into the United Nations' Millennium Development Goals, which expressly included the role of ICTs as target 8f "make available the benefits of new technologies, especially information and communication." From that moment on, several international organizations addressed access to ICTs, including the OECD, World Bank, International Labour Organization and other UN agencies.

In 2001, the G8 DOT Force released the report *Digital Opportunities for All*, focusing on access in terms of connectivity and human capacity. In November of the same year, the UN Secretary-General, Kofi Annan, established an ICT task force in response to a request from the Economic and Social Council (ECOSOC). As a multi-stakeholder initiative under the umbrella of the UN, developing countries considered this forum more legitimate than the G8 DOT Force. The goal of the UN ICT Task Force was to provide policy advice to government and international organizations for bridging the digital divide, through partnerships within the UN system and other stakeholders, from states, to private sector and donors, in order to "lend a truly global dimension to the multitude of efforts to bridge the global digital divide, foster digital opportunity and thus firmly put ICT at the service of development for all."[1] The UN ICT Task Force had an

important role in the World Summit on the Information Society (WSIS). Established by the UN General Assembly, through the resolution 56/163, the WSIS recognized the urgent need to harness the potential of knowledge and technology, and to find ways to put this potential at the service of development. This summit convened twice, in Geneva in 2003 and, interestingly, in Tunis in 2005, the country which six years later captured world attention at the start of the Arab spring.

The idea of using ICTs to advance development goals consolidated under the acronym of ICT4D. In accordance to the international debate, many organizations in the private, public and third sectors became part of the discussion and implemented projects based on the assumption that access to technologies would have a positive impact on development. ICT4D activities were carried by the World Bank, the Massachusetts Institute of Technology, Canada's International Development Research Centre, the Open Society Foundation, and private companies (including Microsoft, Intel, and Cisco). While developed countries relay on high-tech infrastructure and human expertise to innovate in the field of ICTs, emerging and developing economies are falling far behind. Figures from the International Telecommunications Union (ITU) show that in 2011 two-thirds of households in the developed world had access to the Internet, while in the

developing world the figure was less than one in six households. Overcoming this "digital divide" was therefore the main concern in the beginning of the debates regarding ICT4D.

Yet as technology evolved, the strategies and theories to deal with this challenge shifted. Initially, the central policy idea was to provide access to low-income populations through "telecentres", government-funded public spaces where people could have access to computers and the Internet. The telecentre approach inspired a number of programs and generated passionate discussion, yet this first wave of ICT4D was criticized in terms of sustainability, scalability, and lack of evaluation. Criticism also arose in connection to programmes aiming to giving laptops to the poor, as such devices were costly and relied on communication and power infrastructure than was often not available. Richard Heeks (2008) labels this initial phase of projects as "ICT4D 1.0" analogous to the first generation of web services.

From the mid-2000s, telecentres began to lose ground as mobile phones became more prevalent within ICT4D debates, and soon became the new symbol for providing access to low-income populations. In contrast to telecentres, mobile phones depend on lower infrastructure costs than landline broadband connections. Also, private markets for mobile telephony seem to thrive in

almost any context, even when states fail to foster competition, meaning that mobile telephony is capable of reaching a larger portion of the population. This change in focus to mobile phones reflected an increasing perception that markets had a role in providing access to ICTs. Though influenced by public policy, the spread of mobile phones were the result of market forces. This example illustrates conflicting views in the ICT4D field and development theories. On one side, a market-oriented approach argued that a search for profit would lead to the spread of ICTs. On the other side, the market was seen to have insufficient incentive to provide ICTs to the poor and other action was required.

Nevertheless, new criticism soon emerged towards advocates of the mobile phones as the new means of achieving digital inclusion. Notably having a mobile is not equivalent to being connected to the Internet. In many countries, the majority of mobile phones work as pre-paid accounts which have limited connection to the Internet. Therefore, it is important to consider what kind of access is possible through these devices, which tend to have a restricted set of features and are not a perfect substitute for desktop or laptop computers. In short, mobile phones have mitigated, but did not resolve, the digital divide.

Yet ICTs continued to change at a fast pace leading to tablet computers and increasingly an "internet of things" which allows various objects (such as video players, cameras and vending machines) to be connected online with their own address. Such technologies have immediate and direct consequences for the assumptions underpinning ICT4D. Accordingly, projects increasingly consider the different levels of technology available in a particular context, even where such availability does not correspond to the ideal connectivity reached in a developed country.

ICT4D also increasingly paid attention to the availability of broadband infrastructure, a resource seldom available in much of the developing world. Access to broadband once again raises the role of state and market in deploying the necessary infrastructure. Many broadband plans work under the assumption that market forces have failed to provide the investment to expand infrastructure or foster competition. Mainly because the private sector usually finds adequate incentives for investing in certain areas, such as those densely populated and with attractive markets, but find little incentive to expand service to rural areas, smaller cities and less populated areas. Facing this situation, a number of countries invested in broadband plans as part of the stimuli packages adopted after the financial crisis in 2008. Thus, in the early 2010s, many

countries had some sort of broadband plan including Argentina, Botswana, Brazil, Chile, Colombia, Ghana, Indonesia, Kenya, Lebanon, Malaysia, Mexico, Nigeria, Romania, South Africa, and Uganda.

Recently the literature has gone in new directions, moving from "bridging the digital divide" towards "impact assessment". Recent work responds to criticism based on the perceived lack of sustainability, scalability, and evaluation. In short, the goal has shifted from promoting access to ICTs, to a focus on the consequences of such access. Richard Heeks (2008) describes "ICT4D 2.0" as renewed focus on:

- *Readiness* - having the policies and infrastructure to make ICT availability possible;

- *Availability* - rolling out ICTs to the poor to help them become users;

- *Uptake* - implementing and applying ICT to make it useful, taking into account demand and usage; and

- *Impact* - using ICTs to make the greatest developmental impact, in terms of efficiency, effectiveness, and equity.

As ICT4D struggled to evaluate the relation between connectivity and development, numerous methods for measuring impact were introduced. For instance, Heeks and Molla (2009) developed an overview of different frameworks that could be used for impact assessment of ICT4D projects, classifying then into six categories: *Generic:* frameworks used to assess a variety of different types of projects (e.g. cost-benefit analysis); *Discipline-specific:* an integrated perspective drawing on computer science, information systems, and developmental studies; *Issue-specific:* focused on a particular development goal, (e.g. gender); *Application-Specific:* centered on a particular approach (e.g. telecentres); and *Sector-Specific:* assessment centred on an individual development sector. The relative strengths and weaknesses of each framework are still being assessed.

The struggle for impact assessment has even led some Western donors to view ICTs as a luxury, something to strive for once basic needs are met. In contrast, some advocate ICT4D on moral grounds, claiming that access is a matter of fairness. For example, Weigel and Waldburger (2004) argue that "[f]or the poor, the real issue is not whether ICT are desirable because the technology is already part of their broader context. The issue is whether we accept that the poor should, in addition to the existing deprivation of income, food and health service, etc. also be further deprived of new opportunities to improve their livelihoods." Indeed, there is a clash of

views regarding the importance of ICT for development; this divergence of opinions has been present in the literature, even questioning the existence of ICT4D as a research field.

Key debates within ICT4D

If the emergence of ICT4D in the past few years has become an ineluctable force, with various practical consequences to academia, international organizations, NGO's, and the private sector, the debate about the efficiency, validity, and existence of the field is a lively one. While proponents see ICT4D as a crucial component of development, critics see it as a fad or distraction from development priorities. In the words of Bill Gates[2] "[t]he world's poorest two billion people desperately need healthcare, not laptops." His words raise, rather bluntly, the question of what is the priority of ICTs compared to other needs of the poor. This view stresses the fact that uncritical enthusiasm for ICT4D creates expectations of "leapfrogging" over development obstacles, diverting attention from other factors that are needed for development to occur (Estherhuysen 2009). Besides this clash of priorities, critics tend to add that there is an abundance of case studies, and intensive debates about how to measure the impact of ICTs over development, but so far little consensus. Proponents tend to ascribe a positive value to

technology, with academic inquiry making only modest contributions to determining priorities or assessing the impact of ICT4D initiatives.

In summary, the main criticism of ICT4D is that can be an isolated field, which ascribe a positive value to technology, without fully establishing the links to development, and little academic critique informing its agenda. It is important to assess the priority and value of ICT4D initiatives (Oura 2009). Besides this fundamental argument there are also specific critiques based on implementing projects. These points are also raised by some enthusiasts, willing to improve upon experiences in the field, improving their sustainability and scale, and refining the role of the state. In terms of sustainability and scalability, projects can lead to obscure relationships between business suppliers and government, and many projects have ended up dependent on continuous public or donor funding to continue its activities. Such projects are clearly unsustainable and have tended to be implemented in a top-down fashion, rather than relying on bottom-up experimentation.

In terms of the approach to technology, connectivity has ambiguous implications. The consequences of investing in any type of connectivity need to be examined from a variety of perspectives. The adopted technology must give people chances to use them in ways that help

them to escape from poverty and to make improvements in their lives (Mansell 2006). In addition, there has been an unhelpful dichotomy between productivity and leisure, or work and play. ICT4D has tended to focus on the former, ignoring that "play" has been integral to the dissemination of ICTs. Similarly ICT4D has tended to focus on modern electronics, ignoring traditional media, such as radio and television, even though these technologies are widely used by poor people. There is also an assumption that market-led expansion of products and services, particularly in mobile telephony, are solving the problems that governments and international organizations have failed to adequately address. This is a simplistic view that sees ICT access as a by-product of liberalization and privatization, which ignores the role of the state in policy reform that drive markets to expand, for instance in fostering National Broadband Plans.

Despite critiques, strong arguments remain for considering ICTs in development. Economic, social, and political life in the twenty-first century will be increasingly digital and those without access to ICTs will be increasingly excluded. The lack of access to ICT amplifies present inequality. There is a complex re-adaptation of old power relations into the digital era, posing a significant threat to the ability to develop in the knowledge economy, where information is the primary resource. While lack of ICTs could widen the inequality gap around the world, access to them can contribute to narrowing it.

ICTs can enable greater participation in economic and civic life, permitting the creation of "smart" systems that allow for more efficient use of scarce resources, access to education and health care through distance learning or telemedicine, or mechanisms that enable rural enterprises to connect with new markets. Yet ICTs are not an end in development policies themselves. They are an opportunity for development, but not a panacea. Rather ICTs are tied to fundamental issues at the heart of development, such as infrastructure ownership and governance. ICTs have become a strategic field worldwide, not only for business purposes, but also leading to initiatives intensively focused on the public interest, such as e-government, e-health, and distance education. For example, the Chinese government views ICTs, not as a luxury or consumable good, but as a form of infrastructure capable of generating efficiency and positive externalities to all social systems. In the words of Jia Zemin (2009), "One might prophesize that the ubiquitous network [of ICTs] will become a general infrastructure, just like power grids and pipelines, merged into people's daily lives and work, and become a key platform for economic, political, cultural, and various other social activities."

At one level, realizing ICT4D in practice requires the four prerequisites of computing, connectivity, content and (human) capacity (Tongia et al. 2005). At another level ICT4D is

intrinsically linked to broader issues such as infrastructure, governance, transparency, and an understanding of local needs and aspirations. ICT4D also raises important issues that normally are not at the core of development debates, including concerns about how to foster innovation, the transformation of the public sphere, and the promotion of linguistic diversity, privacy and freedom of expression. The debate is no longer about privileging ICTs above other development priorities, but how ICTs can further development goals more generally. Ultimately, the consequences of connectivity depend on whether they aid people to escape from poverty and improve their lives.

The following section analyses empirical examples that mix of state-led, market-led, and bottom-up initiatives, to highlight examples of new approaches to the role of state, sustainability, and scalability.

Looking ahead to new debates

New business models for enhancing connectivity

Beyond a shift from telecentres to mobile phones, other relevant models have emerged in the past decade, such as the "LAN house" phenomenon in Brazil.[3] Originally created to allow people to play multiplayer games, LAN houses work as cybercafés and have proliferated in poor communities, including favela slums. Charging a small fee, generally between US $0.70 to $1.0 per hour, LAN houses have become the main internet access point for low income families. Far from being a marginal phenomenon, in 2011 they were used by over thirty-two million Brazilians, 46 percent of whom had incomes below $300 per month (Fukuyama 2012).

The LAN house phenomenon is partially an accidental side effect of the federal program "Computers for All." Rather than simply distributing computers to poor people, this program created credit lines that allowed low-income families to purchase computers by paying small instalments every month for a few years (approximately US $25 per month). The result was an entrepreneurial wave since 2002, in which people bought a handful of computers and opened shop for others to play games. These new entrepreneurs soon contracted broadband connections and resold them "retail" through their computers terminals, charging by the hour in both cases. Interestingly, LAN houses began to offer assistance with government procedures, banking services (such as payment of utility bills), searching for employment, and even partnered with local schools that lacked access to computers.

LAN houses illustrate new avenues for ICT4D, emerging spontaneously as people appropriate consumer technology in new and creative ways. They result from entrepreneurial activities by and for the poor, expanding connectivity without direct government or donor support. LAN houses began to face competition as smartphones and home computers became more affordable, but they remained important public spaces for their communities, acting as meeting places and offering services of interest. According to CETIC (2010) most people use LAN houses to connect with other people, as the most popular uses include e-mail and communicating with friends and relatives. Other popular uses include leisure—playing games and following sports—work, research, and searching for jobs.

As mentioned above, ICT4D debates often disregard the connections between work and play. They assume ICTs must be used for "serious" content, directly related to top-down initiatives deemed important to the poor. Nevertheless, low-income populations have their own ideas about how to use ICTs when they are deployed autonomously, driven by demand. The poor use ICTs not only to access websites, but to connect with other people, which is itself an important capability in the context of development.

Within a bottom-up approach to technology, LAN houses can act as a locus for multiplication of initiatives. For instance, in Cidade de Deus—a slum in Rio de Janeiro during 2012— the "melhora comunidade" project created an online research tool for LAN house owners, enabling a rapid feedback on public policies and to capture policy demands from the population.[4] The project spread widely through social networking among youth at the LAN houses, and captured youth perception of social changes and their demand for policies in that particular community. The platform was developed in an open source format and could be used and modified by anyone with some knowledge in programming in order to implement other surveys. Thus it is an example of usage of open technologies with clear impact in the possibilities of scalability.

Tablets and mobile phones

A symbol of the first generation of ICT4D projects is the *One Laptop per Child* (OLPC), championed by Nicholas Negroponte, founder of the MIT Media Lab. The project sought to design and build a low-cost connected device—originally a laptop, and then a tablet—and gather a number of governments to purchase them, so that the economies of scale would bring down prices further. By 2011, over 2.4 million XO laptops had been supplied, which while an impressive feat in itself, remained modest compared to the potential population of users. What

kept the OLPC from reaching scale? One of the reasons is price. Originally designed to cost US $100, by 2011 prices were still above US $200. Moreover the OLPC pursued a top-down approach offering a single product for all users, and that product has experienced issues related to usability, technical support, security, content filtering, and privacy. Lee Felsenstein, who played a lead role on developing the first mass-produced portable computers, argues that OLPC design and distribution were disconnected from local needs. Warschauer and Ames (2010) agree noting that the production, distribution, and use of millions of educational computers must be sensitive to specific local demands. In sum, the OLPC experience suggests that no one single technical solution is able to improve life in the developing world. Instead different communities may adopt different mixes of technologies.

Indeed the late 2000s saw the emergence of a new generation of cheap ICT consumer products without any state subsidies. While only a small percentage of the global population can afford to buy top-tier globally-branded products, low-income populations are purchasing cheaper ICT products, designed by less popular brands that cater to their needs and reality. One example is low-cost tablets priced below $70 that run on open-source operating systems. Another example is low-cost smartphones with limited internet connection that are sold for less than $20. These affordable products are not merely copycats, but can contain features valued by low-income

consumers, such as built-in television and radio receivers. Others are capable of using multiple SIM cards simultaneously, allowing the user to switch between phone carriers, thus enjoying price promotions, and selecting the carrier with the cheapest price at a given moment. These are features highly valued by low-income people, and are often missing both from top-tier consumer products and from top-down ICT4D projects.

By designing products based on the preferences of poor populations, markets innovate and tap into latent consumer demand. Increasingly the most effective products may be those designed in the developing world itself, driven by users' needs. This illustrates exciting possibilities for future work, based on cooperation between technology companies and innovation centers in the developing world. Access to ICTs has increased dramatically, with 5.3 billion mobile phones by 2011, many of them in the hands of the poor people. Yet this has happened not as result of top-down ICT4D initiatives, but due to complex economic, governance, and regulatory forces. Given this access, and as the prices of consumer products continues to decrease, new avenues open for ICT4D to examine how their use enhances freedoms and creates a vibrant public sphere.

Impacts on civic life

Besides examples for narrowing the digital divide, there have been a series of ground-breaking initiatives in the developing world that use ICTs to foster democracy and provide access to public services, civic rights, and human rights which would have been difficult to achieve without ICTs.

For instance, in late 2007, Kenya was drawn into a disastrous humanitarian crisis after accusations of electoral manipulation. Ethnic-based violence erupted, resulting in the deaths of over thirty unarmed civilians. The creative usage of the Internet was crucial in overcoming this situation as civil society mobilized to produce a web platform called Ushahidi that allowed the public to report the location of violence via email or mobile text-messages. This information was used to generate online maps of the unfolding crisis. Since then, such "activist mapping" has proved successful in tracking attacks on immigrants in South Africa, violence in eastern Congo, medicines shortages in East Africa, monitoring elections in India, and distributing humanitarian aid in Haiti.

Web-based activism was also instrumental in Indian anti-corruption legislation, or the *Jan Lokpal* bill. A broad social media response arose in support of a hunger strike by pro-reform

activist, Anna Hazare. From an initial 500,000 mentions through top social networking sites, two days later this number had shot up to nine million. The resulting public pressure forced the government to include civil society in redrafting the anti-corruption bill.

In Brazil, civil society mounted an online petition against draft legislation on cybercrime. The "Mega Não" movement collected over 165,000 signatures and distributed information on the threats it posed to privacy and internet freedom. This pressure resulted in the House of Deputies delaying the bill and opening debate about which legislation would be most appropriate for the country. Subsequently, a civil rights bill for Internet, or *Marco Civil da Internet*, was written based on principles contributed by the online public. The full text of this new bill was open for line-by-line comment from the public. Related blog posts, tweets, institutional and individual contributions, and published articles in the traditional media, were all sent to the Ministry of Justice, and made available on the consultation website to promote and enrich the online debate.[5] The result was crowd-sourced legislation establishing rights and obligations for internet in Brazil.

While such initiatives are promising and only a few highlights among many others on the go, they are threatened by other trends in internet policy and telecommunication regulations, pointing to an important aspect to be incorporated into future debate.

Rights and freedoms

According to Amartya Sen's capability approach (1999) development means advancing human well-being and freedom. Conversely, poverty is seen as a deprivation of basic capabilities, rather than merely as low income. Thus, enhancing substantive freedoms and providing individuals with the capability of exercising choices is integral to development. The examples previously mentioned, of new business models for addressing connectivity and positive impacts of ICTs to civic life, show how the usage of ICTs can build capacities and create societies where the individual potential can be realized. Thus ICTs can have a positive impact on development.

Sen's approach also emphasizes the importance of political freedoms, economic facilities, social opportunities, transparency, and other factors that allow individuals to make choices free from the interference of others. As ICTs emerge, political debates concerning their use and

development has circled back somewhat to initial debates of the 1990s, focusing on policy proposals with international scope regarding network management, cybersecurity, electronic commerce, and intellectual property rights. Emerging and developing economies are therefore facing a double challenge: while they are constantly chasing affordable access to telecom infrastructure, they also need to seek greater technical expertise so they could establish their own position in the global political debates regarding ICT policies. Approaches taken in international forums can influence innovation and online freedoms, such as the right to privacy, freedom of speech, and access to the network, potentially to the detriment of using ICTs for development.

For instance, the Convention on Cybercrimes within the Council of Europe has already become an instrument for political pressure to establish severe intermediary liability laws, even over countries that are not signatories. Holding internet service providers liable for users' content without safeguards means to establish arbitrary and non-transparent mechanisms to filter, block, and remove content, sometimes taking down entire domains, interfering with the internet's end-to-end architecture. This Convention and other proposals have been used to criminalize legitimate expressions and disconnect users on the pretext of preventing the transmission of illegal information, copyright violations, drug trafficking, and cyber-attacks.

These debates on ICT policies are even reaching technical forums, with the same potential to harm rights and freedoms. That was the case of the latest and very polemical meeting to review the international telecommunications regulations (ITRs) at the World Conference on International Telecommunications held in 2012. This meeting centered on debate over the scope of the treaty, with some proponents arguing to expand the treaty to encompass content issues, in addition to questions of network infrastructure. Content goes far beyond the goal of the ITRs, envisioned to guarantee the interoperability of international telecommunication services. Additionally, the decision-making process within the International Telecommunication Union is based on member states and does not enable a multi-stakeholder debate. As Sir Tim Berners-Lee, inventor of the World Wide Web, cautioned "some attendees would push for a UN agency to 'run the internet' rather than leaving it to groups already doing a good job."[6]

During the conference, many member states pushed for debating issues of internet governance, such as cybersecurity, under the new ITRs. Such an approach would disregard the best practice fostered in other international forums that act according to a multi-stakeholder approach, such as the Internet Governance Forum (IGF) and the Internet Corporation for Assigned Names and Numbers (ICANN). This is problematic in terms of procedure and content. Mainly because proposals under debate were setting forward provisions that could fragment the Internet and even

justify blocking and filtering practices performed by authoritarian governments, severely restricting freedom of expression and privacy rights. Fortunately, these proposals did not move forward because of the strong opposition from developed countries, such as US and UK, interested in maintaining a free and open market for their IT companies, yet citing human rights concerns to support their view. Ironically, these same countries push for the strong enforcement of intellectual property and cybersecurity provisions in other forums and political contexts, such as the Budapest Convention or bilateral trade agreements.

Such efforts can impose new regulations on ICTs in disregard to their potential contribution to development, as has already happened in the case of intellectual property. As Ha-Joon Chang (2002) argues, there is a need for a greater awareness of history, as Western countries themselves treated intellectual property less rigorously when they were at earlier stages of their own development. Chang argues that almost all rich countries made use of subsidies and tariff protection at some point to develop their industries. Developing countries may benefit from other kinds of arrangements, with flexibility in intellectual property protection. For instance, South Korea fostered a catching-up process that enabled the country to occupy a prominent position in the world economy in part through reverse engineering of outside technology. Developing

countries advocate for ICT policies consistent with their stage of development, as international decisions ultimately affect the potential for implementing and scaling up ICT4D.

Access to content

Once ICTs are deployed and the infrastructure is in place, there remains the question of what content is available for access? The answer leads to consideration of the current state of the intellectual property debate, and the different perspectives regarding access to knowledge. An important milestone was the 2007 adoption of a Development Agenda in the World Intellectual Property Organization (WIPO). Initially proposed by Brazil and Argentina, the original document argued that "intellectual property protection cannot be seen as an end in itself, nor can the harmonization of intellectual property laws leading to higher protection standards in all countries, irrespective of their levels of development." The Development Agenda consists of forty-five recommendations to the member states. Part of the Agenda addresses technology transfer, ICTs and access to knowledge in the development context, within which recommendation 27 calls for "facilitating intellectual property-related aspects of ICT for growth and development."

The Development Agenda represents a refocusing of the intellectual property debate, from promoting stronger protection everywhere, to considering how the rules surrounding intellectual property affect the incentives for local creativity. The World Trade Organization agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) promotes the former, with harmonization of intellectual property law. This approach has been critiqued as ultimately promoting a flow of resources to developed countries, as a result of increased royalty payments in regard to copyrights and patents. In contrast, the Development Agenda seeks to promote a more balanced system, which requires proponents to demonstrate the need for stronger intellectual property regimes. The issue has a direct impact in the lives of underprivileged populations, as ICTs become more accessible, an unbalanced intellectual property rights system can create new divides, this time in terms of access to content rather than access to technology per se.

ICT4D increasingly looks to promote local content, and the infrastructure needed to access that content. Developing countries pay higher prices for internet connection than developed countries due to the costs of information exchange. Developing countries tend to pull more content from abroad that they provide to the world, creating an imbalance in internet traffic. Consequently local service providers tend to lack "peering" agreements that facilitate low-cost data exchange

in developed countries. The smaller the customer base, the less content developing countries create and host on local servers. In many cases, even the content created in the developing countries is hosted on the servers in a developed country. The more a user in developing countries needs to access content hosted in North America, Europe, or other developed regions, the more expensive internet access becomes locally.

Furthermore, access to broadband content, such as streaming videos or using social networks, is gaining traction and represents a growing share of the total internet traffic in developing countries. Therefore connection costs related to the exchange of traffic tend to increase. This suggests a role for ICT4D to inform public policy through data-driven analysis of content demand on connectivity prices.

Privacy, cybercrime and expression

The Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights ensure every citizen's right to seek, receive, and impart information. Likewise, the Tunis Agenda for the Information Society[7] addresses these rights, reaffirming a

"commitment to the freedom to seek, receive, impart and use information, in particular, for the creation, accumulation and dissemination of knowledge."

Freedom of expression relies on the free flow of information. Yet this flow is threatened by well-intentioned efforts to address copyright infringement and the transmission of illegal information (such as hate speech or child exploitation). Several governments have proposed that internet intermediaries filter, block, or remove online content, deactivate users' accounts and hand over their subscribers' information. Draft legislation in the United States included provisions to seize website domains while the UK Digital Economy Act included provisions for blocking entire websites. In Europe, the Court of Justice ruled that an injunction issued to an internet service provider to undertake filtering for potential copyright infringement was not proportional and violated fundamental human rights.

Such subjects are also debated in developing countries. The challenge is to strike a balance between security, privacy, and freedom of expression. In Venezuela, radio and television legislation[8] already restricted the broadcast of messages that "may constitute media manipulations aimed at creating social unrest or disturbing public order." Amendments proposed in 2010 would have further restricted access to websites that distributed messages or information

that sought to "discredit legitimately constituted authorities." Congress proposed to create a single access point to handle, and presumably monitor, all traffic originating in and sent to Venezuela (Varon et al. 2012). Access providers would be required to establish mechanisms capable of restricting the dissemination of messages, access to portals, and disclosure of information related to the actions subject to the regulations. In Mexico, similar provisions appeared in a bill that proposed to monitor and regulate the use of social networks in the country. Under the draft legislation, the mere exchange of information that helps others violate the law would be considered a crime. Proponents sought to create an online police force to monitor and hamper drug cartels using the net. Yet the Mexican public feared the proposed law would merely lead to increased government surveillance. In Colombia, draft legislation to regulate the Internet would allow service providers to remove or block access to content preventively in the event someone claimed that such content violated copyright. These and other efforts to police the Internet pose serious threats to citizens' rights of privacy and freedom of expression. Thus ICT4D is increasingly interrelated to issues of internet governance.

Prospective paths for ICT4D

The past decade has been marked by unrealistic expectations that ICTs offered automatic gains in all sectors, from e-government and e-health, to telework and distance education. Technology does not automatically result in development. Instead results emerge with a fine tuning of implementation and building a local capacity that sees ICTs not as 'taken for granted' products, but as the infrastructure for other services. In this sense, the choices made at an early stage, and the regulatory framework, do matter. Certain regulatory frameworks can lead to market entrenchment and reduced competition, saddling countries with specific—soon outdated—technologies. In contrast, the right mix of policy and market forces can foster a flexible environment open to future technologies.

In the coming years, ICT4D is likely to move from the theoretical perspective that dominated the last decade to a more positive perspective based on real-world experience (Heffernan et al. 2012). Considering that ICTs are a reality for many low-income populations, it is important to evaluate their impact. Such evaluations will prove more valuable if it leaves behind the controlled context of ICT4D projects, and explores spontaneous use by the poor, in an open and uncontrolled context. Thus, a path forward for ICT4D is to focus on the conditions that enable such adoption. Governments, non-government organizations and donor agencies create incentives for ICT design and adoption and these must be grounded in local needs and reality.

However, there are new obstacles ahead. In spite of the importance of ICTs to promote positive externalities, lower transaction costs, provide new ways for people to live, work, foster political organization and pursuit democracy, the last few years has seen an increase in ICTs being used as a form of political repression, manipulation, and control. Practices such as internet filtering and surveillance are a growing concern in developing countries where basic civil rights may be weak or seldom enforced.

Therefore, besides encouraging ongoing local experimentation, a good ICT policy will help support fundamental internet principles in order to maintain an innovation friendly environment in the web and respect users' rights. These become important tasks of ICT4D when market forces have provided universal access. Particularly developing countries stand much to gain from the implementation of principles such as the net neutrality,[9] from fostering a free and open source software market, pursuing balanced intellectual property regimes, open licensing, and general-purpose computing.

Accordingly, moving forward, ICT4D must address the following issues directly connected with the idea of development in a broader sense:

Impact assessment – As noted by Richard Heeks (2010), the emphasis in the ICT4D literature has shifted from "readiness" to "impact." Another aspect of the move towards impact is that ICTs, especially mobile phones, are now readily available in many developing countries encompassing significant amount of low-income populations. Accordingly, further research about impact assessment can take place from practical perspective, under real-world conditions, rather than from a theoretical project perspective. ICTs affect a much broader group than those who are directly connected through them. Positive impacts include entrepreneurship and job creation, as well as a vibrant public sphere and greater social connection. This broader perspective on the impacts of ICTs reflects the findings by Jensen (2007) that South Indian fishermen benefit from the presence of mobile phones, even when they personally did not own one.

Policy-making after access – What next for ICT4D when the technologies have become available to most people? Market forces can play a significant role in expanding access, at times aided by efforts to encourage local design efforts, such as the Aakash tablet in India, that take into consideration the local infrastructure and needs. This suggests a role for developing countries in fostering a diversity of solutions rather than a one-size-fits-all approach. Furthermore, intellectual property rights will play a significant role in a world where ICTs

become accessible to the poor. The Development Agenda at WIPO has initiated new debate about the links between intellectual property regimes, ICTs, and development. Arguments in favor of a more balance intellectual property regimes gain new importance, given that much of the positive impact expected from ICTs lies in promise of facilitating access to knowledge and information. Investigating new opportunities for development at the intersection of ICTs and intellectual property is one of the tasks for ICT4D in the years to come.

Infrastructure and governance – ICT4D needs to examine policy for net neutrality, infrastructure governance, and content. Depending on how infrastructure is governed and regulated, it can result in higher costs of data exchange. New efforts might promote local content and servers, rather than relying on those located in developed countries. Similarly there are opportunities for optimizing network architecture so local users do not rely on internet exchange points (IXPs) located in developed countries.

Freedom, Privacy and Filtering – With the spread of ICTs in developing countries, including mobile phone networks, cybercafés, computers and tablets, the threat of ICTs being used for surveillance is real. Accordingly, ICT4D is increasingly concerned not with the issue of access, but the concrete and direct impact of ICTs in promoting local development. The Arab Spring is

only a recent demonstration of the impact of ICTs in political movements and public participation. Long discussed in theory, proposals for using ICTs to improve representative democracy are increasingly applied in practice. Examples include the use of social networks in the debates for a new constitution in Iceland, and crowd-sourced legislation in Brazil. The misuse of ICTs for the purposes of political persecution, surveillance, and limiting speech deviate from this goal.

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[1] http://www.unicttf.org/about/

[2] http://www.guardian.co.uk/technology/2000/nov/05/billgates.microsoft

[3] LAN stands for Local Area Network

[4] Accessible at www.melhoracomunidade.com.br

[5] http://culturadigital.br/marcocivil/

[6] http://www.bbc.co.uk/news/technology-20594779

[7] The Tunis Agenda was a consensus statement drafted at the World Summit on the Information Society in 2005. The document also called for the creation of the Internet Governance Forum and a new multi-stakeholder governance structure for the Internet.

[8] *Ley de Responsabilidad Social en Radio y Televisión*

[9] According to Tim Wu, professor at Columbia University that popularized a proposal for a rule on net neutrality: "Network neutrality is best defined as a network design principle. The idea is that a maximally useful public information network aspires to treat all content, sites, and platforms equally".