An Examination of Information Communication Technologies in Latin America

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During the last half of the twentieth century, the development of information and communication technologies (ICTs) proceeded at an amazing rate. Now, the data production in the world makes it such that our knowledge doubles every three to five years. With new policies associated with free market economies, minimal governmental regulations regarding production, and the dismantling of tariffs and related international trade controls, neoliberalism has become the driving force in the development of Latin America. Building on these ideals, and stressing the priority of the individual, new trends in sustainable human development have married the goals of sustainable and equitable development, long the goal for many Latin American countries, with new ICTs.

In past years, the use of new ICTs has enabled many Latin American countries to leapfrog stages of development. Skipping older, outdated and often costly technologies, some countries have afforded their people opportunities never imagined. The ability to leapfrog older and less useful modes of technology has long been acknowledged. Where those in rural areas of Latin America did not even have electricity twenty to thirty years ago, they now have cellular telephones and access to the Internet. The newfound right to information has previously been examined by multiple authors. Their studies have been limited to time-centered analysis of availability of information or quantitative measurement of the increases in measures of political and economic success.

An examination of the growing Digital Divide in technologies is necessary to evaluate the future of Latin American development. The growing gap in knowledge and technology use threatens to leave Latin America a heavily underdeveloped region. Without an examination of how ICTs can or have helped impact Latin America's development, there is no baseline measurement for future development projects. More

research is needed to determine the policies, procedures, and actions Latin America should consider in order that the region achieve maximum results from implementing information communication technologies and move the region and its people into a more developed state.

History of Development in Latin America

Sustainable development partners modernization with globalization. Progress is measured by gains made in not only the economic realms, but also in political and social, coupled with a strong consideration for the new global economy. The road to development in Latin America began in the post World War II era. Development was then centrally related to economic progress, as import, substitution and industrialization (ISI) with its high tariff subsidy system was the preferred method of spurring development in lesser developed countries. The global economy was quite unsuccessful after the boom and bust of the Korean War. Also, the United States did not have Latin America on the list of its priorities and did not invest the same type of resources as it did with the Marshall Plan and the reconstruction of Europe. The state took on the role of directing Latin American businesses, and while the increases in GDP spurred increases in wages, poverty and inequality persisted.[1] As the Economic Commission for Latin America (ECLA) under Raul Prebisch touted macroeconomic adjustment and heavy government intervention.[2] Regulation and direction during this time was needed. However, ISI exaggerated the growth of the industrial sector while sacrificing the agricultural sector. Thus, government interventions were needed to keep food prices low

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[1] Bryan Roberts, "Citizen Rights and Social Policy" in Rethinking Development in Latin America (Pennsylvania: Penn State Press, 2005).
[2] Eliana Cardoso and Albert Fishlow, "Latin American Economic Development: 1950-1980," Journal of Latin American Studies 24, (1992): 4-6.

and the government was called upon to act as the employer of last resort. Towards the end of the 1950s, these resulted in rampant inflation and a desperate need for stabilization of an out of control government.

The limitations of ISI soon became apparent and tariffs were lowered across the region. International funds began to trickle into the region and investment slowly increased. By the 1970s, Latin America had undergone a severe shrinkage of the agricultural sector and saw a population flight to the city. Rural-to-urban migration was a direct result of the commercialization of agriculture and the workings of the ISI systems. Overestimations of the importance of ISI led to companies operating at inefficient levels, with workers, management, and contracts being awarded based on clientalism and not qualifications. The role of free markets was restored with the reduction of the public sector in business, lowering interest rates, and eliminating tariffs. With the rise of technology in the 1980s, a push towards technocrization characterized Latin America. Leaders were educated in the United States and some development projects were using quantitative data to determine planning and economic development. The failure of previous development processes shows that limited regulation and intervention with close attention to decentralization and attention to market signals with a widened scope of private initiative provides Latin America with the greatest chances for development. Within the past 20 years, an emphasis on free trade reduced public spending and taxes, privatization of enterprise, and individualization of responsibilities for individuals have promoted liberal policy reforms in Latin America along with increased attention to rights advocacy and rights based social movements.[3]

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[3] Cardoso, "Latin," 22.

Technology and Development: To Bridge the Digital Divide

Development is no longer simply a measure of economic prosperity. Instead, we now find ourselves examining the relationships between growth, inequality, poverty, policy, and human capital, all in a matrix of global systems.[4] Today, this involves the complicated task of analyzing digital technologies and the spread of knowledge as a living, breathing organism. Technology is not only a means for increasing economic growth, but also for increasing the overall degree of development in a society by impacting social standards and stabilizing a nation.[5] Every aspect of human life is now pervaded by technology, and ICTs are built on the transfer of knowledge. An ICT is anything that stores or transfers knowledge, in any form. From books to audio recordings, cell phones to laptops, ICTs come in every shape and size. Their common foundation, however, is that they are all easily managed, maintained, and networked. ICTs are independent of barriers, whether cultural or geographical, and focus on communication, content and building human capacity.[6]

The importance of ICTs in development is multifold. The World Bank and reports such as The World Telecommunication Development Report, along with notable scholars, acknowledge the ability of ICT to meet the Millennium Development Goals (MDGs) set by the United Nations. However, ICTs are not the final solution to the problems of underdevelopment, like lack of water and electricity, but rather the goal of the dissemination of ICTs in developing countries is to discern which new tools will

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[4] Joseph E. Stiglitz and Lynn Squire, "International Development: Is It Possible," Foreign Policy 110, (1998): 138-151.

5 Martin Hilbert, "Latin America on its path into the digital age: Where are we?." ECLAC (2001).

[6] Rahul Tongia, Eswaran Subrahmanian, V. S. Arunachalam, "Information Communications Technologies for Sustainable Development: Defining a Global Research Agenda." (Banglore: 2005).

effectively provide the population with the knowledge they need to address the acute needs presented by poverty and underdevelopment. Development efforts can be tailored to specific conditions and requirements and focus on the transfer of knowledge to empower underdeveloped populations.[7] It is important to remember that solutions using ICT are seen not as an end to water, electricity, and other life necessities, but rather as a powerful means to an end.[8] Connecting rural populations to the global market allows for them to boost productivity and utilize accurate weather forecasts, global supply and demand rates, and learn about new farming or fishing techniques.

Knowledge transfer is predicated upon a digital framework within which we exchange bits and pieces of information at speeds once unimaginable. Think about it, when is the last time you went an entire day without using your cell phone to call long distance, or caught up on global events using the Internet or cable television. In our hyper-globalized world, the gap between the developing and developed nations is widening. ICTs such as the Internet help to generate economic productivity by reducing costs of doing business. The ability to instantly link with the market, encourage efficient intermediaries, and more are realized as ICTs transmit information quickly and inexpensively.[9] By 2000, almost seven percent of the world's population was connected to the Internet. Whereas the United States had almost seventy-five percent of the population connected to the internet, Latin America had only four percent.[10] Most simply, the digital divide is this- the large and ever growing gap between developed and lesser

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[7] Tongia, "Information."
[8] United Nations ICT Task Force "First Meeting of the United Nations ICT Task Force Latin American and Caribbean Regional Network," (New York: 2001).
[9] World Bank Report in Alberto Chong, "The Promise and Challenge of Information Technologies" Inter-American Development Bank 2001 Economic and Social Progress in Latin America (2001).
[10] NUA 2001 in Martin Hilbert, "Latin America."

developed nations in their access to information technologies. Included in this concept are illiteracy rates, growing poverty that limits access to information technology, and the fact that the majority of information on the internet is published in English.[11] Also, the E-readiness indicator, accounting for infrastructure and current state of technologies, continues to show glaring disparities between nations. For example, number of Internet hosts and the personal computers per capita are effective indicators of technology spread. Whereas developed countries have an average of around 800 internet hosts per 10,000, Latin America has only twenty-three per 10,000. The number of personal computers per thousand is 353 for developed countries, compared with forty-four in Latin America.[12]

In Latin America, the most common use of the Internet is browsing for information. More than fifty percent of those surveyed in Brazil, Peru, Uruguay and Colombia who have Internet access surf the web primarily for information, and around fifteen percent use it for sending electronic mail. In Ecuador and Mexico, people browse the Internet mostly as part of office tasks. The Internet has also changed the time people spend at their job, watching television or reading a newspaper. In fact, more than fifteen percent of those surveyed in Mexico, Chile, Brazil, Paraguay, Argentina, Venezuela and Honduras report changes in the time they spend at their office because they now have access to the Internet. And in Uruguay and Peru, around 15 percent of people say they have changed the time they spend watching television because they now have the alternative of receiving their information from the Internet.[13]Almost half of the online

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[11] Martin Hilbert "From Industrial Economics to Digital Economics: An Introduction to the Transition," Serie Desarrollo Productivo, CEPAL (2001) in Martin Hilbert, "Latin America."
[12] Litan and Rivilan (2000) in Chong, "The Promise."
[13] International Telecommunications Union (ITU)

population is younger than twenty five, and two-thirds of them have a higher education degree.[14]

With 561 million inhabitants, just slightly under ten percent of the world's population, the Digital Divide is real and no where more threatening than in Latin America. The Digital Divide, or the growing gap between those who use ICTs and those who do not, can be a factor of social, economic, geographic or any other number of types of exclusion. The gap between the number of Latin American Internet users (seventy-five million) and the next highest region of users, North America (225 million), is 150 million people, and Latin America has over 200 million more inhabitants.[15] From 2000 to 2006, Africa experienced over 600 percent growth in usage of the Internet. During this same time, Latin America had 370 percent usage growth, and now only has approximately fifteen percent penetration of Internet throughout the region.[16] What is the cause of this stunted growth?

Compared with other developing regions, the recognition of the potential for ICTs is outstanding in Latin America. Many major newspapers have online sites that report the same stories in print, thereby making the news available on a global level. Cellular telephone access is widespread across many large cities and even spreads to remote areas of several countries. Latin America is the world's largest growing internet community.[17] Latin American companies have utilized ICTs to gain footing in the world economy. By revolutionizing their communications and buying, Latin American companies have

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[14] ITU
[15] ITU
[16] ITU
[17] ITU

utilized digital technologies to monitor inventory and resources.[18] In the mid-1990s, the Argentinean steel company Siderar sought to use easier and more efficient communication technologies through the simple use of electronic mail. By using web pages to coordinate buy materials and coordinate deliveries, suppliers and buyers were able to keep paperless records of inventory, sales, and receipts. Standardization throughout the company and with clients has resulted in lower administrative costs and less confusion. The total cost to the company has been less than $1 million USD.[19]

Increasing this type of total factor productivity is the goal of any economic development program. Information technologies affect productivity, which in turn stimulates the economy, as it is one of the key inputs into economic production. The implementation of a digital economy in Latin America would have an enormous impact on the entire region. Retail trade, restaurant and hotels, finance, and services make up almost seventy percent of Latin America's gross domestic product.[20] Digital technologies and ICTs have been shown to have the most impact on these types of industries, thus positioning Latin America with the greatest potential for advancement seen in any region across the globe.[21]

Causes of the Digital Divide

The Digital Divide is more than just the availability or cost of ICTs. It has been said that the Digital Divide is "a manifestation of other underlying divides, spanning economic, social, geographic, gender, and other divides."[22] The Digital Divide can be

[18] Chong, "The Promise."
[19] Bianco, Peirano, and Porta 2000, in Chong, "The Promise."
[20] Hilbert, "Latin American."
[21] Hilbert, "From Industrial."
[22] Tongia et. al 2004 in Tongia, "Information."

broken down into the Four A's- awareness, availability, accessibility, and affordability.[23] In order for ICTs to be successfully implemented in any situation, populations must be aware of the technology. This constitutes not only awareness of the program, but also a willingness to use the technology and an understanding of the capabilities of the technology. Technologies must be offered within close proximity to populations in order for them to use it, and also must be compatible with education level, language, and have appropriate hardware and software. All together, the ICT in question should also be under ten percent of a person's income. This cost includes the total cost of ownership, accounting for education, hardware, software, and any costs of connectivity. Many ICTs though remain just out of range of affordability or accessibility to many populations of Latin America.[24]

The development of the Internet in the United States has lead to large disparities across the globe in the growth and distribution of digital technologies. The persistence of the Digital Divide can be linked to simple economics. The United States economy has seen an accelerated growth in output, labor productivity, and total factor productivity since the 1990s. Information technology (IT) industries, which deal with the use of computers and technology, gained prominence in the United States economy. IT revolutionized an economy based on service and fueled record breaking economic growth.[25] During 1995 to 2002, one-third of the economic growth in the United States

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[23] Susan D'Antoni, "Building and supporting international Communities of Interest:Open Educational Resources/Open content," Forum on the impact of Open Courseware for higher education in developing countries. Final report. (Paris: UNESCO, 2002).
[24] Tongia, "Information."
[25] Dale Jorgenson, ed. Economic Growth in Canada and the United States in the Information Age (Industry Canada: Ontario, 2004).

was attributed to ICT.[26] Now, the Digital Divide continues to widen. The Internet, and other ICTs are overwhelmingly concentrated in only a few locations. The United States, for example, has over sixty percent of the current Internet Protocol (IP) version 4 addresses that exist, the current version in use, and already has thirty-eight percent of the IP version 6 addresses, the planned expansion of the current system. By comparison, Latin America has fewer than two percent of the current IP addresses, and is slated to have roughly four percent in the next expansion of the Internet. Even then, two counties (Argentina and Brazil) will hold the majority of the Internet capabilities.[27]

Likewise, an overwhelming amount of the content delivered on the Internet is in English. Estimates are that seventy to eighty percent of the content on the Internet is in English, with fewer than two percent in Spanish.[28] Thus, planning, networking, and other initiatives regarding ICTs, specifically the Internet, are conducted in English, based in and only provide benefits to, the United States. The Internet is undoubtedly American, and is little in the way of the "Latin American" variety. Connectivity and cost also arise in the Digital Divide. With higher costs in Latin America, Asia, and Africa, Internet usage, and in fact most ICT usage, is limited to shorter and less frequent sessions. Cost is one of the major factors to more widespread use of the Internet.

Trends of ICTs in Latin America

The average Internet user in Latin America has more in common with the average American than with their fellow countrymen. A fraction of the small minority that already controls the wealth and resources in Latin America is the population most likely

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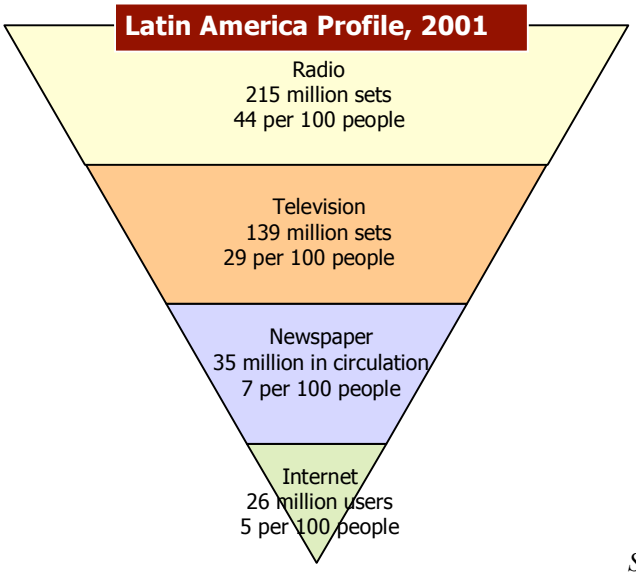
[26] Tongia, "Information."
[27] Cooperative Association for Internet Data Analysis in Tongia, "Information."

[28] Ricardo Gomez, "*The Hall of Mirrors: The Internet in Latin America,"* Current History, 99, no. 634 (2000): 72.

to access the Internet: urban, male, upper-class, middle-aged, and English proficient. Latin American businesses have been slow to adopt the Internet and ICTs, disregarding e-commerce, although some large scale transactions have been noted in recent years.[29]

Instead, Latin America, like many developing regions, places a strong emphasis on older, normative technologies. In 2001, Latin Americans had a pyramid like structure of ICT use, with a base grounded in older, analog technologies.

Figure 1: *Profile of ICTs in Latin America- A Pyramid Structure*



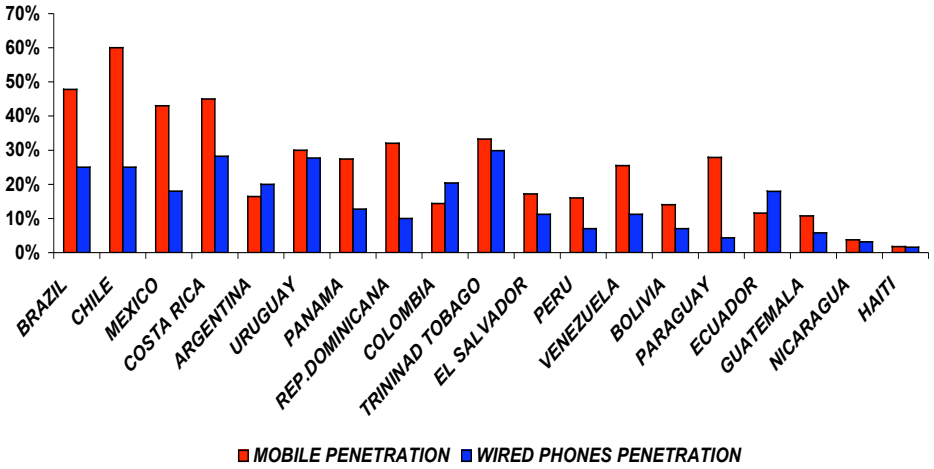
Source: ITU

Compared with other countries, these numbers are extraordinarily high in relying on what is considered to be conventional technologies. Regionally, a gap exists in the usage of newer and more advanced ICTs. For example, while roughly ten percent of households in Mexico and Brazil use personal computers that number jumps to fifteen percent in Chile and twenty-five percent in Argentina.[30] There is a visible Digital Divide not only interregional, but also intraregional. The differences in fixed and mobile penetration

[29] Gomez, "Hall."
[30] Gomes, "Hall."

rates, or the amount of population with access to a technology, also show this intraregional Digital Divide. Data from the World Economic Forum in 2005 show that while countries like Brazil, Chile, Mexico, and Costa Rica have twenty percent and higher fixed line penetration coupled with as much as sixty percent mobile phone penetration, in countries such as Nicaragua and Guatemala, both fixed and mobile phone access is each available to some ten percent of the population.[31]

Figure 2: *Mobile and Wired Phone Penetration Percentage by Country*



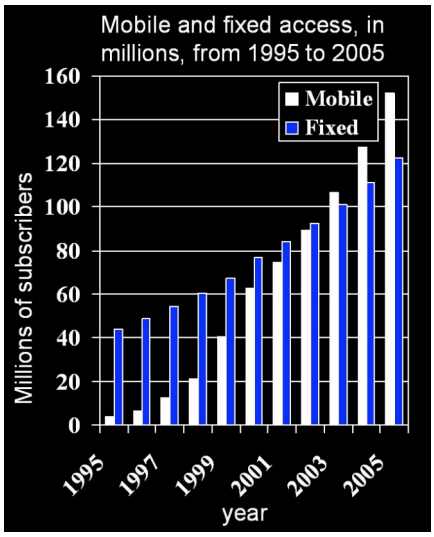
Source: World Economic Forum

The gaps extend from country to country, and give a greater indication of regional stratification. The northern countries of Latin America show that between fixed and mobile telephone in 2005, 100 percent of the population was covered by some type of access. However, the southern and central regions showed less than twenty-five out of 100 people had access to fixed or mobile telephones, and data from the Caribbean region showed, alarmingly, that only every ten out of 100 people had access to any sort of telephone whatsoever.[32] Despite these Divides, mobile and fixed access has been steadily

[31] World Economic Forum, see Figure 2
[32] ITU

growing in the past ten years. Across Latin America, fixed access is up from forty million to 120 million subscribers and mobile access has grown from about five to 150 million subscribers, region wide. When charted, the numbers show the continual advancements of ICTs, as exhibited in mobile phone usage. The results show a liner growth of analog technology, and, as predicted by Gordon Moore.[33]

Figure 3: *Growth of Mobile and Fixed Access by Millions of Subscribers in Latin America 1995 to 2005*



Source: ITU

This evidence of theory in action is an exciting confirmation that the growth of ICTs is proceeding at very high rates, but also creates a very real awareness of the Digital Divide.

Along with this record growth is the notion of leapfrogging stages of development. The concept of leapfrogging is perhaps the most exciting concept in the world of development. The idea hinges on the needs of the region, thus ensuring adaptability and sustainability. For instance, in areas with high illiteracy rates,

[33] Gordon Moore, founder of Intel, stated in 1965 that the computing power of technology would double every eighteen months, thus fueling exponential growth in ICTs.

introduction of telephones or radios would have a greater impact than the telegraph or newspapers. In places where the postal system is insecure or undependable, online applications have the greatest values. The point is that trying to reduce the effects of globalization on a population, or fighting the impending tidal wave, is pointless. By utilizing the tools of globalization and standing up to the flattening of the world,[34] populations are kept from falling further behind and help to improve their level of development.[35]

One of the most important questions raised in this leapfrogging of technologies is the idea of substitution versus supplement. In some countries, such as Paraguay, Venezuela, El Salvador, and Mexico, mobile phones account for over fifty percent of the amount of total phones. Less than fifty percent of households have telephone access. Cellular telephone service is being used here as a substitute for older analog, wired telephone service. In the United States and Canada, however, close to 100 percent of the population has a telephone, and mobile phones account for forty to fifty percent of the total amount of phones. Here, the use of digital technology complements analog technology and supplements the ICT infrastructure. This trend will continue, as previously discussed with the reality of Moore's Law. From 1996 to 2004, the number of fixed telephone line subscribers in Latin America doubled, from ten to twenty per one hundred inhabitants. During the same time, mobile subscribers grew from one to twenty-three per one hundred inhabitants, a 230 percent increase. The growth is only expected to continue, as the compound annual growth rate from 1998 to 2000 for fixed and mobile

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[34] The concept of the "flattening world" is taken from the book The World is Flat by Thomas Friedman in which Friedman states that markets are leveling as developing countries such as India and China, utilizing ICTs are becoming integral in large global economies that extend across oceans and ignore borders.
[35] Hilbert, "Latin American."

subscribers was eleven point three percent and sixty three point two percent, respectively.[36]

This growth is both promising and frightening. The complete disregard for older, proven reliable technologies such as wired telephones creates an environment prone to disaster. In a region already known for its lack of infrastructure and development, a heavy reliance on digital technologies as substitutes and not supplements has the potential for major setbacks. A disaster rendering the digital technologies inoperable would leave no failsafe mechanisms, found in the form of older, often easier repaired analog technologies. Such a disaster could set development in the region back a number of years and leave populations worse than they were before. In fact, the technologies are often built to be very reliable[37] and the problem in depending on the technologies comes in support structure. For instance, cell phone towers will only work with dependable electricity and transmission lines. More long term and critical evaluation is needed to determine threat of such occurrences in specific regions, carefully assessing capabilities of countries down to micro levels.

Perhaps the best uses of ICTs in Latin America, and by far the most noted and fastest growing, have been in the context of social movements. The symbolic importance of the Internet cannot be denied as it plays a pivotal role in giving social movements a worldwide voice. With state power decentralized as a result of post-structuralism, more attention is being paid to socioeconomic dynamics. Citizenship has been a growing topic of research as civil society, rooted in social foundations, is confronted with organizational and political decisions made on a global level.

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[36] ITU

[37] The "Goal of Five 9's" is common in technology production, to create a product that has 99.999% reliability.

Only in recent years have social movements started to integrate ICTs into their practice. Drawing on the models set forth by economic and political changes, social movements have also discovered the opportunity for ICTs to make an impact in civil society. While there have been many advantages, social movements have been utilizing ICTs from an instrumental standpoint, perhaps based on deeply rooted cultural ideals, instead of utilizing the technology from a rights based approach. Whatever the case, the use of ICTs by social movements has created a new class of social movement. Like those opportunities created in the economic and political sectors, the development of technology has show the developing face of the modern social movement in Latin America. A prime example of this, the Zapatista movement has created what sociologists have coined the "Zapatista effect."[38] With reformed efforts to concentrate on economic issues, use of nonviolent protests, and utilizing new methods with a more global approach, the Zapatistas have become a model of how social movements can effectively use ICTs to foster development. This sort of barrier blind linkage is deemed by social movements to be superfundamental because it allows members to leave the immediate neighborhoods and raise consciousness around the world.

Conclusions

The explosion of information communication technologies in recent years has brought technology to the forefront of development. The Internet and other ICTs has revolutionized all facets of human existence, from social interactions to business transactions. Now more than ever, the world is moving towards a global marketplace and a globalized society. While the promise of growth exists in Latin America in the

[38] Claire Mercer, "Engineering civil society: ICT in Tanzania," Review of African Political Economy, 31, no. 99, (2004): 49-64.

reduction of transaction costs, increases in efficiency, diffusion of technology, fostering of human capital, Latin America's late entry into the world of ICTs puts the region at a disadvantage. As shown though, Latin America is catching up at a rapid pace, and seemingly at a lower cost. The capacity to catch up is not merely dependent on economic development or infrastructure, but also relies on such things as education, strength of government, access to credit, and government transparency. In order for Latin America to succeed in the new digital world, it is obvious that we must bridge the Digital Divide.

Reducing the divide requires a multidimensional approach and consideration of the four main components of ICT building: connectivity, content, capacity building, and policy. Each of these specifically address the Four A's of ICT implementation and promote sustainable implementation of ICTs. Connectivity is concerned with facilitating information access to ICTs, either through affordable costs or compatibility of hardware. In Latin America this translates to shared access through community kiosks, cybercafés, and technologies like mobile phones. In order that content be significant and make a substantial impact, the content must be locally relevant and provide timely, high quality information. Skills should be developed and the capacity to innovate and harness the power of ICT should be promoted by both society and state, through lowering of the barriers to ICT integration and establishment of pro-ICT policies.

Bridging the Digital Divide in Latin America is not a matter of possibility. Research suggests that the growth of ICTs in Latin America can play a significant role in reforming economies, driving local issues, and promoting development region wide. However, the fact remains that the majority of ICT users, especially Internet users, remain in the elites and continue to widen the gaps between rich and poor by joining in

the world exchange of information, ideas, and goods. Much more research is needed to provide concrete data that the Digital Divide will eventually leave developing countries and regions in a new Dark Ages, far behind the curve in the new knowledge based global economy. It is clear that training and education, policy making, pro-ICT incentives, and most of all, recognition for the vast implications of integrating ICTs are necessary to continue the impressive uptake of ICTs in Latin America. Without the needed attention, Latin America will be facing the same problems many decades from now. One development worker said it best, "Without computers and the internet, we are fighting 21st century…problems with 19th century tools."[39]

[39] Shyama Kuruvilla, Joan Dzenowagis, Andrew Pleasant, et. al., "Digital Bridges Need Concrete Foundations: Lessons from the Health InterNetwork India," British Medical Journal, 328, (2004): 1193-1196.
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