

THE CONTRIBUTION OF IT THROUGH MICROFINANCE: ESTABLISHING  
SOCIO-ECONOMIC SUSTAINABILITY IN DEVELOPING ECONOMIES

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by  
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## **ABSTRACT**

### **THE CONTRIBUTION OF IT THROUGH MICROFINANCE: ESTABLISHING SOCIO-ECONOMIC SUSTAINABILITY IN DEVELOPING ECONOMIES**

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In this paper, I explore the economic impact of IT in developing countries through the lens of peer-to-peer (P2P) microfinance. Factors that influence the extent to which P2P microfinance penetrates a country include government regulations, educational standards, IT readiness and economic growth of a nation. The results of a comprehensive content analysis indicate that through P2P microfinance, IT is in fact positively impacting the livelihoods of citizens and economies in developing nations around the world.

## Table of Contents

|   |    |
|---|----|
| ABSTRACT .....  | iv |
| Introduction .....  | 1  |
| Kumri Orifova .....   | 2  |
| Literature Review .....   | 5  |
| Microfinance Overview .....   | 5  |
| Contribution of Microfinance to Socio-Economic Sustainability.....        | 6  |
| Defining a Developing Country. ....                                       | 6  |
| Economic Sustainability. ....   | 8  |
| MicroFinance Regulations: Developing Countries .....                      | 10 |
| Directly Regulated and Supervised Institutions. ....                      | 10 |
| Institutions not Directly Supervised.....                                 | 12 |
| Peer-to-Peer MicroLending.....  | 13 |
| Contribution of IT to Socio-Economic Sustainability .....                 | 14 |
| Millennium Development Goals. ....  | 14 |
| Internet usage: Country Examples. ....                                    | 20 |
| Factors Affecting the Contribution of IT to Economic Sustainability. .... | 22 |
| Research Propositions.....  | 24 |
| Research Methodology .....  | 25 |
| Content Analysis of Peer-to-Peer Lending Sites .....                      | 25 |

|   |     |
|---|-----|
| Country Level Unit of analysis: Contribution of IT to Sustainability..... | 26  |
| Coding schema .....   | 27  |
| Interrater reliability .....  | 27  |
| Countries Represented from Content Analysis .....                         | 29  |
| Discussion .....  | 96  |
| Limitations.....  | 105 |
| Future Research.....  | 106 |
| Conclusion.....   | 107 |
| References .....  | 109 |
| Vita .....  | 121 |

## **Introduction**

Economists have long struggled to find evidence of the economic impact of information technology (IT). Numerous studies were conducted within the United States (U.S.) in the 1980s that found no connection between information technology and positive impacts upon the economy, a situation referred to as the productivity paradox (Brynjolfsson, 1993). Since the mid-1990s, however, many U.S.-based studies have found that the impacts of IT investment on labor productivity and economic growth are both significant and positive (Dedrick, Gurbaxani, & Kraemer, 2003). While studies do show a positive association between innovation and diffusion of information technology and patterns of economic growth in a small group of highly industrialized countries, the relationship between IT and economic impact in less industrialized countries remains unclear (Dosi, Orsenigo, & Sylos-Labini, 2005). Furthermore, most existing studies were conducted within large-scale organizations, where results may not be generalizable to developing countries whose economies rely largely upon the self-employed, small business, and sole proprietors.

Over the past several years, information technology has been used to provide opportunities for individuals to both make loans and borrow money on a micro scale. Peer-to-peer microfinance is person-to-person lending that takes place without the mediation of a financial institution and is facilitated and supported by information technology (Davis & Gelpert, 2010). Peer-to-peer microfinance is a phenomenon that

uses a web-based platform to provide a way for individuals in developing countries to improve their economic condition by borrowing money to open a new business or to purchase equipment or livestock. A review of current literature, however, indicates that peer-to-peer microfinance is an under-researched area, and little is known about its economic impacts.

Given this gap in extant research, the purpose of this study is to address the following research question: What is the contribution of IT to sustaining economies in developing countries through peer-to-peer microfinance? By conducting a comprehensive analysis of peer-to-peer microfinance loans to small businesses, sole proprietors, and the societal members in developing countries, a verdict can be reached regarding the contribution of IT to economic sustainability.

### **Kumri Orifova**

*“Kumri Orifova and her sisters found themselves in this situation when unemployment rose after Tajikistan gained its independence from the U.S.S.R. in the early 1990s. Kumri has a university degree, and before Tajikistan gained independence she had worked for many years as an accountant at a Soviet-run sewing factory. For the most part she enjoyed the work. However, in the early 1990s the Tajik government took over management of the factory, and with a civil war waging, the factory did not receive enough funding or support to continue operating - after several years, the government stopped funding the project altogether. Kumri's husband and her sisters' husbands left to find work in Russia, and Kumri found herself unemployed and responsible for her three children and her husband's aunt.*

*Kumri decided to start her own sewing business, immediately convincing her two sisters to join her in the venture. They started small, borrowing enough money from friends and family to rent a space and a few machines - eventually reinvesting the profits to purchase the machines outright. They were able to find enough work to hire an additional 4 sewers, all of whom were related to the sisters in some way. They have contracts with several local factories to sew uniforms, but are also able to devote some of their time to sewing the national dress for women in their community.*

*The business was successful, so four years ago Kumri decided to branch out. She joined with a few other investors to purchase a weaving factory so that her sewing factory could source fabric at a cheaper price, without having to pay a middleman. They found a factory that employed blind weavers and had suffered a similar fate to her previous employer. Kumri and her business partners were now in ownership of a successful sewing factory and a weaving factory that employed 40 blind men and women.*

*Even with a direct supply of fabric at cost, the full potential for Kumri's enterprise had not yet been reached. The sewing machines she had were old, and Kumri believed they could increase production if they had new machines. Kumri and her sisters received their first business loans through peer-to-peer lending website, Kiva.org. Kumri and one of her sisters each took out loans for \$600, and they used this money to purchase three new sewing machines, phasing out some of the older machines that had become too difficult to use.*

*Even they were shocked by the impact of such a small loan: the factory went from sewing 10 uniforms a day to 50. And after only a few months of this*



*increased productivity, Kumri and her sisters were able to secure more factory contracts and hire three more sewers. More sewers means more contracts. More contracts mean more fabric. And, hopefully, more fabric means more work for the weavers as well” (Kiva, 2011).*

As so succinctly stated by Richard Heeks (2010, p. 22), “What happens when you start to connect the world’s poor into the infrastructure for a digital economy?” Technologically-enabled microfinance provided Kumri Orifova the mechanism through which to sustain not only her own family, but to bring economic benefits to her community and in turn, her country. In a matter of just five years, these extraordinary women were able to construct jobs (not only for themselves) but jobs for others. To these women, acquiring loans through P2P microfinance was not about their own personal profit, but providing sustainable jobs for a community. Kumri Orifova’s story is our first glimpse of how information technology is providing platforms upon which socio-economic sustainability can be reached when opportunities are few. By examining new digital forms of organization, such as *Kiva.org*, we can start to understand the impact of IT in economic exchange and sustainability in developing countries.

## **Literature Review**

### **Microfinance Overview**

Microfinance is a way to bring lenders and borrowers together on a technologically-enabled platform for the purpose of economic exchange. Microfinance provides a way for individuals in developing countries to improve their economic condition. Whether the money is used to open a new business, pay personal expenses or send children to school, microfinance brings sustainability to individuals, families, and entire communities.

In general, Microfinance refers to loans, savings, insurance, and other financial products targeted at the low-income populous (Reno-Weber, 2007). Most of the clients that Microfinance tends to are those with limited or no access to formal financial institutions. Those who patronize Microfinance are largely from rural areas that have many self-employed individuals as either farmers, traders or service providers (Reno-Weber, 2007). In most urban areas, microfinance clients can be shopkeepers, taxi drivers and street vendors (Reno-Weber, 2007). Moving away from small business owners, microfinance includes services to individuals looking for loans for school fees, home improvements, funerals, weddings, and other personal accommodations.

Microfinance has been recognized by countries all over the world since the early 1980s as a way to stimulate economic growth and provide financial opportunities to individuals of extreme poverty (Aubuchon & Sengupta, 2008). However, it was not until the

1990s that Microfinance took real strides in more underdeveloped countries (Marinescu, 2009). Microfinance is based on providing social equity worldwide by creating equal opportunity to individuals to promote economic development and overall sustainability. Thus, many institutions have been developing microfinance programs to help provide access to credit without the need for collateral. Some of these institutions include the Grameen Bank in Bangladesh, Banco Sol in Bolivia, and Bank Rakyat in Indonesia (Hermes & Lensink, 2007).

While Microfinance in general can take several forms, this research is based upon Peer-to-Peer (P2P) microfinance, also known as “social lending,” which provides a platform for individuals to lend and borrow money directly from each other using information technology as the intermediary (just as e-Bay.com allows buyers and sellers to exchange directly). The basis of P2P microfinance has been inspired by the technological and social trends of today (Schneider, 2006). The Internet has formalized a new westernized style to the traditional banking industry. “Technology brings old world lending practices to an entirely new level with the availability of peer-to-peer lending...Peer-to-peer lending uses today’s technologies to bring a similar lending philosophy to a wider group of people via the Internet” (Secor, 2010).

## **Contribution of Microfinance to Socio-Economic Sustainability**

### **Defining a Developing Country.**

A developing country can be defined as “a country with a low standard of industrialization and low level of well being” (UnderdevelopedCountries.com, 2010). Many developing countries also have “low standards of democratic governments, industrialization, social programs, and a poor human rights record. Developing countries largely rely on

primary income sources, such as resource extraction and agriculture”

(UnderdevelopedCountries, 2010). The majority of developing countries lie in Africa, South America, and South East Asia.

The United Nations has comprised a list of 49 countries to be considered a Least Developed Country (LDC) (UN-OHRLLS, 2010). In its latest triennial review of the list of LDCs in 2009, the Committee for Development Policy used the following three criteria for the identification of the LDCs:

- A low-income criterion, based on a three-year average estimate of the gross national income (GNI) per capita (under \$905 for inclusion, above \$ 1,086 for graduation);
- A human capital status criterion, involving a composite Human Assets Index (HAI) based on indicators of: (a) nutrition: percentage of population undernourished; (b) health: mortality rate for children aged five years or under; (c) education: the gross secondary school enrolment ratio; and (d) adult literacy rate; and
- An economic vulnerability criterion, involving a composite Economic Vulnerability Index (EVI) based on indicators of: (a) population size; (b) remoteness; (c) merchandise export concentration; (d) share of agriculture, forestry and fisheries in gross domestic product; (e) homelessness owing to natural disasters; (f) instability of agricultural production; and (g) instability of exports of goods and services. (UN-OHRLLS, 2010).

To be included on the list, a country must satisfy all three criteria. In total, the 49 LDCs contribute a population of nearly 815.16 million people with an average growth rate of 2.37% (UN-OHRLLS, 2010). The United Nations are also aware that the economic growth

has decreased from 8.4% in 2007 to 7% in 2008 with a growth rate in 2009 barely 4% (UN-OHRLLS, 2010). However, foreign direct investments (FDI) have shown to increase from \$4.1 billion (US\$) in 2000 to \$33.1 billion in 2008 (UN-OHRLLS, 2010).

Other problems have been identified with the poverty level of over half of the LDC population making less than \$1.25 per day with 13 of the LDCs classified as being severely affected by high commodity prices and at risk of a major food crisis (unohrills.org, 2010).

Countries that fall within this least developed segment are of interest in the current study, and will be utilized to examine the impact of IT upon economic sustainability.

### **Economic Sustainability.**

Economic sustainability refers to “a continual supply of finance to meet a person/community’s needs” (Vincent, 2004). Based upon this definition, microfinance allows borrowers to post the monetary amount desired and the potential for lenders become limitless. Additionally, microfinance provides financial services at low interest rates making loans favorable at all income levels. By providing the means to sustain basic needs, individuals will eventually (possibly the next generation) have the opportunity to become a consumer on a greater scale.

In addition to loans, microfinance may provide more than just the interface to make monetary transactions. Most programs that provide assistance with the transaction of loans also offer training and networking opportunities (Callaghan, Gonzalez, Maurice, Novak, & Stanley, 2007). With most clients only looking for as little as \$50 to maintain business operations, it is important to provide these small businesses with training programs. The people of these poverty ridden areas will be able to create relationships with others to diversify production, enhance individual infrastructure, and allow for professional education

in the industry one already operates. Inevitably, this will allow individual businesses and surrounding areas to continue to prosper for the long-term.

Microfinance allows individuals and their families to significantly improve the quality of life. Small business owners are able to stabilize cash flows by better managing spending and ultimately generate savings (Vincent, 2004). In terms of providing a better standard of living, microfinance allows for families to have access to housing, nutrition, health and education. This increases self-esteem and in-turn increases productivity and the sustainability of local communities.

Microfinance provides opportunities for those in developing countries to escape the poverty trap. Through the instrument of microfinance, individuals are provided with the opportunity to increase their income, become self-employed and establish market growth as well as improve their economic situation (Swain, 2006). It is important to understand that due to the fact that microfinance allows individuals to borrow money without any tangible collateral, people are able to take advantage of investment opportunities and obtain the ability to promote their own economic welfare. A study conducted by Khandker in 2003, found that microfinance programs raised per capita consumption and gave individuals an increased opportunity to escape the line of poverty. It was also observed that even individuals not utilizing microfinance as a way to borrow money also were able to increase income and ultimately impact local communities as a whole (Swain, 2006). These studies looked at microfinance institutions as a way to help individuals receive loans; however, these studies ignored the internet and peer-to-peer microfinance as a way to endorse financial and economic sustainability.

Most individuals pursuing loan opportunities are looking for money for start-up costs. Many times start-up costs in developing countries are for farmers that need the materials to produce, harvest and sell crops (Vincent, 2004). Microfinance provides the funds necessary to start new industries within communities and bring about economic development. By providing start-up costs to individuals this allows the growth of business; which in-turn, employs individuals within the community and provides income to families in order to be main contributors to the local economy.

### **MicroFinance Regulations: Developing Countries**

The ways in which Microfinance Institutions are regulated are solely based on the country that the MFI resides. From a case study conducted by Meagher in 2002, 12 different developing countries are examined and specific government or non-government policies are identified. Examples of these institutions have been categorized as either directly regulated or not directly regulated with those policies being outlined below.

#### **Directly Regulated and Supervised Institutions.**

Private Financial Fund (PFF): This agency was established in Bolivia in 1995 by the Presidential Decree (Meagher, 2002). The Central Bank and Superintendence of Banks have regulatory authority over the PFFs. Some of these regulations are as follows (Meagher, 2002):

1. PFFs are required to be corporations and to have a minimum paid-up capital equal to \$1 million (US\$).
2. PFFs are subject to the supervision methods as compared to banks and the special methods developed for MFIs (evaluation of the institution's credit methodology, review of sample files, and visits to clients).

MFI Regulatory Structure under the 1996 law: In 1996, Ethiopia constructed specific regulations as defined by the National Bank of Ethiopia (NBE). These regulations are as follows (Meagher, 2002):

1. All MFIs must be 100% Ethiopian-owned, meet minimum capital of \$25,000, and obtain a license from NBE.
2. Licensed MFIs can accept savings, demand, and time deposits as well as, draw and accept transfers within Ethiopia and manage funds for the purpose of lending to peasant farmers and micro entrepreneurs.
3. Only licensed MFIs may accept concessional credits or assistance from foreign organizations.
4. When savings reach \$125,000 (US\$) the institution must re-register.

Micro Deposit-Taking Institutions Bill: This bill was established in Uganda in 2001 and provides a framework for licensing and regulating depository MFIs. These provisions are outlined below (Meagher, 2002):

1. Minimum capital is determined by an adjustable formula with levels set at about \$400,000.
2. Sets minimum capital adequacy at 15% for capital paid by shareholders' equity and 20% for total capital.



3. Donor capital must be converted to subordinated debt and paid down by an equal amount of institutionally-raised reserves.

### **Institutions not Directly Supervised.**

Bangladesh: Microfinance has considerable freedom to operate and innovate free of regulations (Meagher, 2002). However, the Palli Karma Sahayak Foundation (PKSF) plays a substantial role within the industry (Meagher, 2002). This organization was created in order to ensure that NGOS and MFIs were keeping up with certain performance criteria which include: encouragement to recover at least recurring administrative and funding costs from interest income, a minimum interest rate of 16%, and encouragement of MFIs with outside funding sources to set aside reserves (Meagher, 2002). The PKSF also requires that MFIs provide savings services to members and keep most of those savings in the bank (Meagher, 2002).

Peru: Caja Municipal de Ahorro y Credito (CMAC): The CMAC was established in 1980 and revamped in the 1990s. The main purpose of this act of legislation was to provide financial services to persons and enterprises without access to formal financial intermediaries and to decentralize financial intermediation which allowed the flow of funds from rural areas to the capital (Meagher, 2002).

Union Economique et Monetaire Ouest Africaine (UEMOA): In 1996, eight countries came together to standardize a regulatory framework for MFIs (Meagher, 2002). The countries involved with the UEMOA include Benin, Burkina Faso, Ivory Coast, Mali, Niger, Senegal, Togo, and Guinea-Bissau (Meagher, 2002). The main point of this regulatory entity was to ensure that those institutions not registering under common entities will have some sort of cooperative model that will require a mutual structure for MFIs (Meagher, 2002). The

provisions under the UEMOA are of hierarchical supervision and of which they are controlled by mutual's and their unions and federations (Meagher, 2002).

### **Peer-to-Peer MicroLending**

The importance of Peer-to-Peer lending has increased dramatically as social networking sites allow for the masses to collectively reach a common goal and allow individuals to eliminate the middle man. This allows for lower interest rates to individuals and boosts returns for those who lend (Schneider, 2006). The most common form of P2P lending is unsecured people-to-people lending (Butler, 2010). This type of lending utilizes sites such as Zopa.com or Prosper.com where lenders can either give directly to the borrower or invest in a collaborative pooling set-up by the organization (Butler, 2010).

Other models of Peer-to-Peer lending include:

1. **Market Place Model:** This model connects borrowers with lenders through an auction-like process. Through this process, the lender willing to provide the lowest interest rate "wins" the borrower's loan. This process may include other intermediaries who package and resell the loans, but the loans are ultimately sold to individuals or pools of individuals
2. **Family and Friend Model:** This model concentrates on borrowers and lenders who already know each other, as with two friends or business colleagues formalizing a personal loan
3. **Secured People to People Lending:** In this model, lender gives money to the borrower against the strength for the collateral given by borrower. This is different from unsecured people to people lending because unsecured lending does not require collateral in order to obtain a loan

4. Student Lending: This is where students are able to pay off student debt (Butler, 2010).

### **Contribution of IT to Socio-Economic Sustainability**

In Western society commerce and social interaction are largely Internet-dependent. Andy Grove, the former Chair of Intel, said that “by the mid-2000s all companies will be Internet companies, or they won’t be companies at all” (Flew, 2008).

### **Millennium Development Goals.**

In 2000, the world’s leaders came together in order to discuss development opportunities in the poorest of countries. It is seen that nearly half of the world’s population lives on less than \$1.25 a day (United Nations, 2010). This has inspired the United Nations to implement the world’s largest cooperation effort to enhance the lives of individuals around the world. The following goals represent initiatives set-forth by the United Nations (United Nations, 2010). They provide insight to the resources and sustainable strategies necessary to achieve the eight Millennium goals. Many information and communications technologies (ICT) initiatives have been derived from these goals. This is discussed further later in this thesis.

1. Eradicate Extreme Poverty and Hunger: Of the more productive half of the decade, it was seen that those living on less than \$1.25 was reduced from 1.8 billion to 1.4 billion between the time periods of 1990 to 2005. However, with the economic crisis erupting in North America and Europe, growth and development of underdeveloped countries has come to a halt. This is due to declining export prices and reduced trade and investment.

The Millennium Development Report of 2010 shows that the sharpest decline in poverty levels is most prevalent in South East Asia. Poverty levels in China are shown to drop to 5% by 2015. However, the growth of the Sub-Saharan sectors in Africa may not meet this Millennium goal as an effect of the change into a market economy.

Other target goals of this area are to achieve full productive and decent employment and reduce by half the proportion of people suffering from extreme hunger (United Nations, 2010).

2. Quality Education: The target is to ensure that by 2015 children everywhere will be able to complete a full course of primary education. It is seen that the percent of children attending primary education classes has increased to 89%. However, this pace is insufficient to reach the MDG by 2015.

Major advances have been made in some of the poorest regions such as, the sub-Saharan areas. With the abolishment of school fees in Burundi they have seen enrollment increase threefold (United Nations, 2010). In order to expedite progress for school attendance, costs in every region need to be abolished, access to resources must be present, and teachers need to be made available. The UN believes that in order to establish a better life for the generations to come, the opportunity for education needs to be made available.

3. Promote Gender Equality: The target for this goal is to eliminate gender disparity in primary and secondary education. The UN would like to eliminate this disparity at all levels by 2015 (United Nations, 2010). The developing regions as a whole are

approaching gender parity in educational enrolment. In 2008, there were 96 girls for every 100 boys enrolled in primary school, and 95 girls for every 100 boys enrolled in secondary school (United Nations, 2010). In 1999, the ratios were 91:100 and 88:100 for the two levels of education, respectively (United Nations, 2010).

Despite this progress, gender parity in primary and secondary education—a target that was to be met by 2005—is still out of reach for many developing regions. For primary education, the steepest challenges are found in Oceania, sub-Saharan Africa and Western Asia (United Nations, 2010). These extreme poverty levels leave girls at a high disadvantage for attending primary school. It has been documented that 60% of the poorest households are three times more likely to not attend primary school compared to the wealthiest households.

4. Reduce Child Mortality: The target goal is to reduce the mortality rate of children under five by 66% by 2015 (United Nations, 2010). Here are some key facts that have been verified by the World Health Organization (WHO):

- Annual global deaths of children under five years of age fell to 8.8 million in 2008 – down by 30% since 1990
- The percentage of underweight children under five years old is estimated to have dropped from 25% in 1990 to 16% in 2010
- The proportion of births attended by a skilled health worker has increased globally, however, in the WHO Africa and South-East Asia regions fewer than 50% of all births were attended (WHO, 2010).

Even with these great accomplishments, of the 67 countries with high child mortality rates (causes which can be easily treated and prevented) only 10 are on track to meet the MDG (United Nations, 2010).

5. **Improve Maternal Health:** There are two target goals within this category. Target one aims to reduce the maternal mortality ratio by three quarters. Target two aims to achieve universal access to reproductive health by 2015.

Maternal health remains the MDG target for which progress has been most disappointing. Recent academic estimates suggest that maternal mortality has fallen since 1990 though at a pace well short of the annual 5.5% reduction needed to achieve the MDG targets (Hogan, Foreman, Naghavi, Ahn, & Makela, 2010).

Preliminary evidence indicates modest reductions in maternal mortality and improvements in use of skilled attendant at birth in several countries (WHO, 2010). However, because of multiple approaches and models to determine statistics related to maternal mortality, there is an urgent need for better country level data. In turn, there is a need for support to building information systems able to identify and monitor all births and deaths.

6. **Combat HIV/AIDS and Other Diseases:** The United Nations has identified three target goals within this section of the MDGs. First, stop and begin to reverse the spread of HIV/AIDS. Second, achieve universal access to treatment for HIV/AIDS for all those in need. Lastly, halt and reverse the incidence of malaria and other major diseases (United Nations, 2010). Below are a few accomplishments to halt and reverse the spread of HIV/AIDS and other diseases:

- New HIV infections have declined by 16% globally from 2001–2008
- Existing cases of TB are declining, along with deaths among HIV-negative TB cases
- Indications are that 38 countries are on course to meet the MDG target for reducing malaria (WHO, 2010).

The UNDP (United Nations Development Programme) encourages educational incentives and the promotion of development outside of the health sector in order to uphold health related goals. With increase in formal education and access to economic development of an area, health related problems will begin to decrease (UNDP, 2003).

7. Ensure Environmental Sustainability: There are four target goals in order to reach the MDG for this sector. First, integrate the principles of sustainable development into country policies and programs, as well as, reverse the loss of environmental resources. Second, reduce biodiversity loss by 2010 with an emphasis to reduce the rate in which biodiversity is depleting. Third, reduce the proportion of people without sustainable access to safe drinking water and basic sanitation needs by half. Lastly, achieve significant improvement in lives of at least 100 million individuals living in urban slums by 2020 (United Nations, 2010).

The Millennium Goals recognize that environmental sustainability is part of global economic and social well-being. Unfortunately, exploitation of natural resources such as forests, land, water, and fisheries-often by the powerful few-have caused alarming changes in our natural world in recent decades, often harming the

most vulnerable people in the world who depend on natural resources for their livelihood (End Poverty 2015, 2010).

One success story, upheld in Madagascar in 2007, showed that the government established 15 new conservation areas covering over 2.65 million acres of wildlife (End Poverty 2015, 2010). The new parks will protect several threatened ecosystems including wetlands and rain forests.

8. Develop a Global Partnership for Development: There are six target goals to achieve within this particular MDG. First, develop an open, rule-based, predictable, non-discriminatory trading and financial system. Second, address the special needs of the least developed countries. Third, address the special needs of landlocked developing countries and small island developing states. Fourth, deal with the debt problem of developing countries through assistance, access and debt sustainability. Fifth, in cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries. Lastly, in cooperation with the private sector, make available the benefits of new technologies, especially information and communication (United Nations, 2010).

The global partnership for development reveals that Nigeria is using \$750 million in debt savings from 2006 to train and recruit new teachers, while Cameroon is debt savings to launch a national HIV/AIDS plan for prevention, education, testing and mother-to-child transmission abatement (End Poverty 2015, 2010). It is the responsibility of wealthier countries to help support and establish socio-economic sustainably efforts in order to help reach all of the above seven Millennium Development Goals.



Through international cooperation the hope of bringing about socio-economic sustainability is more than achievable. The deadline to meet these goals has been established for 2015. However, these goals will not take the strides necessary without the contribution of the IT community.

As the Internet becomes progressively more sophisticated, the digital divide is growing. For those where the Internet is least available are being left behind. Countries with a wide availability of Internet access can advance the economics of that country on a local and global scale (Flew, 2008).

A Global Digital divide refers to “the divergence of technology access between industrialized and developing societies” (Harris, Palvia, & Palvi, 2007). The digital divide also encompasses social and economic factors where there is a significant gap between information processes in regards to the rich and poor. Some of these factors include, Internet infrastructure, literacy rates, GDP, etc (Harris, Palvia,, & Palvia,, 2007).

#### **Internet usage: Country Examples.**

According to an autumn 2007 Canadian Internet Use Survey, 73% of Canadians aged 16 and older went online in the 12 months prior to the survey, compared to 68% in 2005. In small towns and rural areas, only 65% of residences accessed the Internet, compared to 76% in urban areas. The digital divide still exists between the rich and the poor; 91% of people making more than \$91,000/year regularly used the Internet, compared to 47% of people making less than \$24,000. This gap has lowered slightly since 2005 (McKeown, 2010).

China is the largest developing country in the world and therefore saw their Internet population grow by 20% in 2006 (Spencer, 2006). However, just over 19% of Chinese people have access to the Internet and the digital divide is growing due to factors such as

insufficient infrastructure and high online charges (Central Intelligence Agency (CIA), 2011).

A European Union study from 2005 conducted in 14 European countries and focused on the issue of digital divide, found that within the EU the digital divide is primarily a matter of age and education (European Commission, 2010). Among the young or educated the proportion of computer or Internet users is much higher than with the older or uneducated. It was also found that the digital divide is also higher in rural areas (European Commission, 2010). The study found that the presence of children in a household increases the chance of having a computer and Internet access, and that small business are catching up with larger enterprises when it comes to Internet access. The study also notes that despite increasing levels of ICT usage in all sections of society, the divide is not being bridged (European Commission, 2010).

According to a July 2008 Pew Internet & American Life report, 55% of adult Americans have broadband Internet connections at home, up from 47% who had high-speed access at home last year at this time (2007). This increase of 8% compared to the previous year's increase of 5% suggests that the digital divide is decreasing, though the findings also show that low-income Americans' broadband connections decreased by 3% (Horrihan, 2008). A 2010 report by the Commerce Department confirmed these findings concluding that the divide continues to decrease, but that almost one-fourth of all households do not have a single Internet user (Gaitonde, 2010).

Although Africa is far behind the rest of the world in terms of its provision of broadband Internet, new technologies are finally reaching Africa and slowly closing the digital divide. New undersea cables are being installed, which will not only promote better

broadband Internet access between African countries and other continents, but will also make prices more affordable (Shiner, 2009). The mobile phone industry is rapidly expanding in Africa as well, growing at twice the global rate (CIA, 2010). Technological knowledge is also increasing. Dot Savvy, a digital organization that launches growth-promoting websites for businesses in Kenya, has even made a CD-ROM training course for HIV/AIDS health care providers. Africa is still not technologically on a level with its global neighbors, but it is improving and gradually closing the digital divide (Shiner, 2009).

### **Factors Affecting the Contribution of IT to Economic Sustainability.**

**Technological Access:** This aspect meets significant challenges from income restrictions. For example, in Mexico, providing ICT access to the poorest 20% of the society would require a reduction of access prices ranging from an estimated US\$ 244 per year (in 2007) to an estimated US\$ 35 per year (US\$ 3 per month) (Hilbert, 2007). In Brazil, the poorest 20% of the population has only US\$ 9 per year to spend on ICT (US\$ 0.75 per month) (Hilbert, 2007).

However, projects like One Laptop per Child ([one.laptop.org](http://one.laptop.org)) and 50x15 (50X15 Foundation, 2009) are positive steps in reducing the divide, specifically because they foster competition for the provision of cheaper access equipment. They tend to rely heavily upon open standards and free open source software. For example, the OLPC XO-1 is an inexpensive laptop computer intended to be distributed to children in developing countries around the world to provide them with access to knowledge (BBC News, 2007).

**International Cooperation:** Cooperation amongst governments is increasing, aimed at reducing the digital divide, including a recent agreement between the United States Agency for International Development (USAID) and the Egyptian government. It's a sign of

progress that such attempts at bridging the digital divide are seriously being made (Warschauer, 2010). Other similar endeavors include the United Nations Global Alliance for ICT and Development and the Digital Alliance Foundation (Warschauer, 2010).

**Government Facilitation:** Political measures within the United States have been made in the attempt to lessen the digital divide. In 2009, Congresswoman Doris Matsui introduced the Broadband Affordability Act, which calls for the U.S. Federal Communications Commission (FCC) to install a program that allows low-income citizens to get access to more affordable broadband Internet service (Lee, 2009). More accessibility to broadband service would help close the digital divide between high-income and low-income households. The Broadband Affordability Act models the FCC's Lifeline Assistance program, which offers basic telephone service to low-income households at just, affordable, and reasonable rates. The Act would expand the program to offer discounted Internet service to lower-income consumers living in urban and rural areas (Lee, 2009). The legislation was referred to the House Committee on Energy and Commerce on September 24, 2009, and is awaiting further action (Tech Policy Central, 2009).

While national Internet agendas are led by national telecom authorities, such as the FCC and NTIA, the case of Chile shows that the funds managed by the telecom authority represent less than 5% of the total funds spent by the overall government on ICT-related policies and projects (Hilbert, 2010). Technology authorities continue to play an important part in this challenge, but, as the statistics from Chile suggest, their role is in reality already much smaller than what is generally assumed. The funds available to fight the digital divide throughout the public sector are a large multiple of those spent by technology and

infrastructure authorities alone. Countries do not know which agency manages which kinds of ICT-funds, and do not have the capabilities to track these resources.

### **Research Propositions**

Based upon the intent of this research in conjunction with the above referenced literature, the following research propositions have been formulated:

Proposition #1: Development of IT infrastructure (i.e., telecommunications, Internet/broadband access, etc.) will result in a greater contribution of IT to economic sustainability through peer-to-peer microfinance in developing countries.

Proposition #2: Governmental policies encouraging the use of technology to connect individuals in developed and developing countries will result in a greater contribution of IT to economic sustainability through peer-to-peer microfinance in developing countries.

Proposition #3: Governmental investments in technology-oriented education will result in a greater contribution of IT to economic sustainability through peer-to-peer microfinance in developing countries.

## Research Methodology

### Content Analysis of Peer-to-Peer Lending Sites

A content analysis of Peer-to-Peer lending websites was conducted in order to draw conclusions (Weber, 1990). There are four major advantages to conducting a content analysis as indicated by Krippendorff (1987): it is unobtrusive, it is flexible (ability to be applied to unstructured material), it is context sensitive, and it has the ability to be applied to large amounts of data. However, even with these advantages there are three key areas that need to be addressed before conducting a content analysis. These include, the definition of the website (what kind of websites will be used and how is this determined), the unit of analysis (websites contain an enormous amount of information, so what will actually be gathered from the site) and the method of sampling (how many sites should be taken into consideration) (McMillan, 2000).

In order to address the three key areas, first, the types of peer-to-peer lending sites were determined. The focus of this content analysis looked at P2P sites where lenders directly lent money to the borrowers (also known as *unsecured people to people lending*). It was also determined that as the research interest is developing countries, the sites need not be country specific in order to collect an array of information from multiple countries; therefore, the site need not be country specific but could include a collection of countries.

Based upon these *a priori* data collection criteria, nine Peer-to-Peer lending sites were identified and analyzed over a three week period. See Table below for a listing

and links to the sites used. Please note that these sites are continuously updated and therefore, the information taken from these sites could not be all inclusive.

| Table 1: Peer-to-Peer Lending Sites |  |
|-------------------------------------|--|
| Name of Site                        | Link to Site   |
| Finca                               | <a href="http://www.finca.org">www.finca.org</a>                       |
| Kiva                                | <a href="http://www.kiva.org">www.kiva.org</a>                         |
| Lend With Care                      | <a href="http://www.lendwithcare.org">www.lendwithcare.org</a>         |
| MYC4                                | <a href="http://www.myc4.com">www.myc4.com</a>                         |
| OptInNow                            | <a href="http://www.optinnow.org">www.optinnow.org</a>                 |
| Wokai                               | <a href="http://www.wokai.org">www.wokai.org</a>                       |
| World Vision Micro                  | <a href="http://www.worldvisionmicro.org">www.worldvisionmicro.org</a> |
| Zidisha                             | <a href="http://www.zidisha.org">www.zidisha.org</a>                   |
| DHanax                              | <a href="http://www.dhanax.com">www.dhanax.com</a>                     |

The unit of analysis and coding schema (type of information collected) are described below.

### **Country Level Unit of analysis: Contribution of IT to Sustainability**

Aggregate microfinance loans specific to an individual developing country derived from accumulating individual microfinance loans specific to one developing country is the unit of analysis. The unit of analysis is defined as “aggregated individual loans from a developing country used to sustain self, family, or business.” To address our research question, microfinance loans specific to one developing country were aggregated and used to interpret the contribution of IT to sustainability in developing countries through microfinance, using total microfinance loans as a surrogate measure.

## **Coding schema**

The following data was collected from individual loan transactions:

1. The country in which the borrower resides.
2. Gender of the borrower.
3. Whether the transaction was for business or individual needs.
4. The industry sector (i.e., agriculture, retail, etc) for which the loan would be used.
5. The use for the loan (i.e., supplies, inventory, equipment, etc).
6. Frequency of use (How many times the borrower has asked for a loan).
7. Percent funded at the time the transaction was recorded.
8. The number of people contributing to the individual loan.
9. A notes column was added for any additional information that may be relevant.

## **Interrater reliability**

Interrater reliability is a critical part of content analysis. When established properly, interrater reliability adds a necessary element of validity to the data and interpretations of the data. Neuendorf (2002) notes, “given that a goal of content analysis is to identify and record relatively objective (or at least intersubjective) characteristics of messages, reliability is paramount” (p. 141). Kolbe and Burnett (1991) write that “interjudge reliability is often perceived as the standard measure of research quality,” (p. 235) and Tinsley and Weiss (1975) suggest that ...” (p. 110) intercoder agreement is needed in content analysis because it measures only the extent to which the different judges tend to assign exactly the same rating to each object” (p. 98).

Various indices have been established to gauge interrater reliability. Dewey (1983) has argued that Cohen’s kappa (1960) should be “the measure of choice” and this index is



commonly used in content analysis research in the information systems field. Thus, following Agrawal, Kishore and Rao (2006) and Jarvenpaa and Ives (1990), Cohen's kappa was used as the interrater reliability index in the current study. The formula for Cohen's kappa is as follows, where  $\text{Pr}(a)$  is the relative observed agreement among raters, and  $\text{Pr}(e)$  is the probability that agreement is due to chance (Cohen, 1960).

$$\kappa = \frac{\text{Pr}(a) - \text{Pr}(e)}{1 - \text{Pr}(e)}$$

A minimum of two coders should examine identical phenomena and then evaluate their agreement upon their individual interpretations of the phenomenon. In the current study, one of the coders is a novice researcher, while the second coder has more than 10 years research experience and has engaged in multiple content analysis projects.

Following the practice established by Agrawal, Kishore, and Rao (2006), several steps were taken to prevent data coding from being influenced by researchers' subjective biases. Given the exploratory and explanatory nature of our study, a highly structured coding schema was developed in the context of our research question. Only specific variables of interest were included in the coding schema described above, resulting in a parsimonious data set. The coders coded 10 loans from *WorldVisionMicro.org* and 10 loans from *Kiva.org*. Following Jarvenpaa and Ives (1990), to assess agreement, results of coding were compiled into a matrix and  $\text{Pr}(a)$  and  $\text{Pr}(e)$  were calculated, yielding a kappa ( $\kappa$ ) coefficient exceeding 0.95 for each site. These coefficients well exceed the minimum standards deemed acceptable by Jarvenpaa and Ives (1990) and Agrawal, Kishore, and Rao (2006). As a result of these precautions, the coding is expected to be highly reliable.

## **Findings**

### **Countries Represented from Content Analysis**

From the content analysis, 36 developing countries were represented combining a total IT contribution to economic sustainability of \$1,156,206.08. Once these data were collected, it was evident that additional research of each individual country was necessary to understand underlying factors that went into each individual country's IT contribution. Six major factors have been identified as affecting the contribution of IT in each country. These factors are listed and explained below.

The economic growth is based on the GDP of past years. This metric was utilized in order to see whether or not the individual country has the ability to sustainably develop and grow through the means of government, infrastructure, business industry, and other components of GDP as calculated by the CIA World Fact Book (2011).

The main industry sector of an individual country was determined in order to understand the developing stage of the country. Most developing countries remain largely in the agricultural industry. The primary industry as found on the CIA World Fact Book was then compared to the most commonly found industry within the data collected. This was used to detect the direction of within a particular country.

Internet usage is a key metric when understanding the ability to utilize P2P Microfinance. The Internet usage percent indicates the percent of the population that actually uses the Internet. It is not necessarily the availability of the Internet that promotes ICT readiness, but

rather the amount of the population actually using the Internet as a mean to perform business/personal transaction and communicate socially (InternetWorldStat.com).

The literacy rate component indicates the ability of individuals within a country to utilize and understand information encountered when accessing the Internet. This metric allows one to understand if individuals of a country have the competency to learn, use, understand, and teach a process, such as utilization of the Internet. This becomes a key indicator of ICT readiness.

The ICT Readiness Index was found utilizing the Global Information Technology Report 2009-2010. The network readiness framework is based on environment, readiness and usage components each with subsequent pillars (Dutta & Mia, 2010). These components and pillars are as follows: Environment (market, political/regulatory, and infrastructure), readiness (individual, business, and government) and usage (individual, business & government) (Dutta & Mia, 2010). All of these factors go into reaching an overall index number. The rankings are a compilations of 133 countries (1=most ready and 133=least ready).

ICT government policies are crucial in the development of ICT initiatives. It becomes evident that development, promotion, implementation and follow-up of ICT policies are a key driver in providing individuals with access to training, business opportunities, sustainability of the economy and environment, as well as, significant opportunities to communicate with the world. Without this key component Microfinance, and individuals, would not be able to thrive.

## **Afghanistan.**

### **Economic overview.**

The country GDP stands at \$29.81 billion dollars with a growth rate of 8.9% (down from 22.5% in 2009) (CIA, 2010). In 2008, Afghanistan had an unemployment rate of 35% with 36% of the population below poverty line (CIA, 2010). A key area to note is that as of 2008, the leading industry contributor of this country is service (43%) (CIA, 2010). From the data collected through the content analysis one sees that the service sector was most commonly encountered.

### **Internet access/usage.**

The chart below, from InternetWorldStats.com, shows the trend of Internet users throughout Afghanistan. Also, according to Facebook, there are 52,980 Facebook users as of August 31, 2010.

| YEAR        | Users     | Population | % Pop |
|-------------|-----------|------------|-------|
| <b>2000</b> | N/A       | 22,853,500 | N/A   |
| <b>2006</b> | 300,000   | 27,089,593 | 1.1 % |
| <b>2010</b> | 1,000,000 | 29,121,286 | 3.4 % |

### **Literacy Rates.**

According to Table 1, only 28.1% of the total population actually has the ability to read and write. Just as well, children only remain in school for an average of eight years primary education before no longer attending formal schooling.

### **Government Policies on Technology.**

As of 2003, there are five different ICT initiatives being set forth by government and international organizations. These organizations include, ARTF, UNDP, World Bank,

Ministry of Finance and the Ministry of Communication (UNDP, 2003). However, through the Ministry of Communication there are seven key factors that are being recognized by the government to institute ICT policy. These include:

- Recognizing that information and communication are cross-cutting resource” (UNDP, 2003);
- To create an environment conducive of investment from the private and public sector, keeping in view the important role that the private sector will play in the development of ICT (UNDP, 2003);
- In order to foster the creation of an environment which will allow in the near future the capacity to trade goods and services by electronic means (e-commerce) the GoA will draft appropriate legislation and will establish the necessary mechanisms to create and regulate the sector while protecting the rights of consumers and the interests of operators (UNDP, 2003);
- Recognizing the importance of the development of infrastructure including rural areas within the national territory, the GoA will provide, through a competitive market environment, universal access to information and communication facilities including the Internet to rural areas of Afghanistan (UNDP, 2003);
- The GoA through the MoC, the Ministry of Education and Ministry of Higher Education and associated institutions will support efforts to establish effective ICT training courses at secondary and tertiary level (UNDP, 2003).

- The GoA will support efforts to enhance its effectiveness by using e-government technology and by establishing one or more national data centers (UNDP, 2003).

## Armenia

### **Economic Overview.**

The GDP of Armenia sits at \$17.27 billion dollars with a growth rate of 4.7% (CIA, 2010). Armenia also has an unemployment rate of 7.1% and where nearly 27% of the countries' population lives below poverty line (CIA, 2010). The World Fact book indicates that the majority of the labor force works within the agricultural sector (CIA, 2010).

### **Internet Access/Usage.**

The chart below shows a significant increase in the percentage of population using the Internet. Also, according to Facebook, there are 76,700 Facebook users as of August 31, 2010.

| YEAR        | Users     | Population | % Pop. |
|-------------|-----------|------------|--------|
| <b>2000</b> | 30,000    | 3,002,594  | 0.1 %  |
| <b>2001</b> | 40,000    | 3,000,164  | 0.5 %  |
| <b>2006</b> | 161,000   | 2,950,060  | 5.5 %  |
| <b>2008</b> | 172,800   | 2,968,586  | 5.8 %  |
| <b>2009</b> | 191,000   | 2,967,004  | 6.4 %  |
| <b>2010</b> | 1,396,550 | 2,966,802  | 47.1 % |

### **Literacy Rates.**

Armenians pride themselves on schooling with 99.4% of the population being able to read and write. It can also be seen that most of the population attends primary school for at

least 12 years and at least 3% of the countries' GDP goes towards education expenditures (CIA, 2010).

### **Government Policies.**

The Armenian government announced the development of information and communication technologies (ICT) as a high priority for country development. In 2001, the Government approved the ICT Development Concept Paper and Action Plan prepared by the Ministry of Trade and Economic Development and with the recommendations outlined in the ICT Master Strategy (ISTOK, 2007). Many different programs have been designed by outside organizations and their implementing agencies to make assessments and to support the development of the ICT sector. Among these are: World Bank, European Union, USAID, GTZ, OSI-AF, Eurasia Foundation, UNDP, and TACIS (ISTOK, 2007).

Today, the ICT industry is one of the most successful and fastest growing industries in Armenia. In 2006, the share of the sector in Armenia's GDP was 1.3%, which is comparable to that of India (1.4%) and Germany (1.3%) (ISTOK, 2007). There are over 160 ICT companies in Armenia with a total workforce of over 4,690 (ISOK, 2007). Newly established ICT companies represent 20% of annual growth (ISTOK, 2007).

The major initiatives funded by the Armenia government include embedded systems, semiconductor design and testing, custom software development, accounting and financial applications, security and encryption, artificial intelligence, software development outsourcing, financial applications, multimedia design, industrial automation, Internet applications, web design and development, educational software, management information systems (MIS), computer aided design (CAD), and systems integration (ISTOK, 2007).

## Azerbaijan

### **Economic Overview.**

According to Table 1, Azerbaijan has a GDP of \$90.15 billion with a growth rate of 3.7% in 2010 (down from 9.3% in 2009). The unemployment rate has dropped from 6% in 2009 to .9% in 2010 with nearly 11% of the population living below the poverty line (CIA, 2010). Also, the majority of the country's labor force works within the service sector at 33.1% (CIA, 2010).

### **Internet Access/Usage.**

The chart below shows the percentage of Internet users in regards to population. Also, according to Facebook, there are 198,340 Facebook users as of August 31, 2010.

| YEAR        | Users     | Population | % Pop. |
|-------------|-----------|------------|--------|
| <b>2000</b> | 12,000    | 8,347,200  | 0.1 %  |
| <b>2007</b> | 829,100   | 8,448,260  | 9.8 %  |
| <b>2008</b> | 1,500,000 | 8,177,717  | 18.3 % |
| <b>2009</b> | 2,444,600 | 8,238,672  | 29.7 % |
| <b>2010</b> | 3,689,000 | 8,303,512  | 44.4 % |

### **Literacy Rates.**

Nearly 99.8% of the country's population has the ability to read and write (CIA, 2010). It can also be shown that children attend school for at least 13 years with the government spending nearly 2% of GDP towards education expenditures (CIA, 2010).

### **Government Policies.**

In October of 2005, the President of the Republic of Azerbaijan approved the State Program for Development of Communications and Information Technologies which provides a strategy to implement Internet and technological infrastructure to the country (MCIT,



2005). With this, the major contribution of this program was the creation of special innovation zones on production of information and communication technologies and electronic facilities (Bayramov, 2009). Ali Abbasov, President, states “This is considered an important component for ensuring steady development of the ICT sector in our country, creation of alternative sources of profits, raising attractiveness of local markets for foreign investments as well as the steady development of nonoil sector” (Bayramov, 2009, 24).

## **Benin**

### **Economic Overview.**

The World Fact Book reports that Benin has a GDP of \$14.2 billion with a 3% growth rate in 2010 (an increase from 2.7% the year prior). Unemployment rate is unknown however, 37.4% of the countries’ population lives under the poverty line (CIA, 2010). In 2007, services were seen to be the largest industry sector (CIA, 2010).

### **Internet Access/Usage.**

The chart below shows an increased trend in Internet users as a percentage of population (Miniwatts Marketing Group, 2011).

| <b>Table 5: Internet Access</b> |              |                   |               |
|---------------------------------|--------------|-------------------|---------------|
| <b>YEAR</b>                     | <b>Users</b> | <b>Population</b> | <b>% Pop.</b> |
| <b>2000</b>                     | 15,000       | 6,419,100         | 0.2 %         |
| <b>2006</b>                     | 100,000      | 7,714,766         | 1.3 %         |
| <b>2009</b>                     | 160,000      | 8,791,832         | 1.8 %         |

### **Literacy Rates.**

According to a 2002 census, the World Fact Book shows that 34.7% of the population is able to read and write. The World Fact Book also reports that the average school life expectancy is about 9 years with the government spending 3.6% of its GDP on school expenditures (CIA,2010).

**Government Policies.**

The national policy document is structured in six main parts: the preamble, the summary of the NICT environment in Benin; the policy objectives; the strategic objectives; the action plan; and practical guidelines with a brief look at funding (Lohento, 2003).

The important section of this document refers to the policy objectives which describes the hopes for NICT development by 2025: “it will enable the whole Beninese population to become ‘cybercitizens,’ effectively participating in the management of democracy, having the necessary knowledge and know-how to be involved in globalization, and to bring to the international market innovations of their endogenous genius. It will facilitate strengthening and optimization of all the sectors related to human life in Benin, thus generating a prosperous and competitive economy as well as well-being for individuals and the nation. It will also contribute towards reaffirming national solidarity and solidarity with neighboring countries” (Lohento, 2003, 38).

Five main points have been identified around which these technologies will be developed: institutional and regulatory policy, human resource, infrastructure and sectoral application development, and cooperation (Lohento, 2003). Twenty-two strategies, related to these five main points, are then listed. In particular, “the promotion of professional organizations and associations involved in the area of NICT” (Lohento, 2003, 12); the creation of a support fund; extension of the electrical network; equipment of all schools and universities; development of free software; strengthening administrative information systems; development of regional, African and international cooperation, particularly with Asian countries (Lohento, 2003).

## **Bolivia**

### **Economic Overview.**

According to the World Fact Book, Bolivia holds a GDP of \$47.98 billion dollars in 2010 with a growth rate of about 3.8% (CIA, 2010). The unemployment rate has also increased from 7.7% in 2009 to 8.3% in 2010 with 30.3% of the countries' population living below poverty line (CIA, 2010). It is also seen that 51% of the workforce belongs to the service industry (CIA, 2010).

### **Internet Access/Usage.**

According to InternetWorldStats.com, there are 1,000,000 Internet users as of Dec/2008 which is approximately 10.4% of the population, according to ITU. It is also found that there are 34,000 broadband Internet users as of Dec/2008, 0.4% of the population, according to ITU.

| YEAR        | Population | Users     | % Pop. |
|-------------|------------|-----------|--------|
| <b>2000</b> | 8,476,200  | 120,000   | 1.4 %  |
| <b>2005</b> | 9,073,856  | 480,000   | 5.2 %  |
| <b>2008</b> | 9,601,257  | 1,000,000 | 10.4 % |

### **Literacy Rates.**

About 86.7% of the countries' population has the ability to read and write with the average schooling falling around 14 years (CIA, 2010). The government also spends about 6.6% of its GDP on education expenditures (CIA, 2010).

### **Government Policies.**

The National Strategy for Information and Communication Technology (ETIC) is the organization established to assist Bolivia in implementing the Information and Knowledge

Society (Lopez & Rodas, 2007). The ETIC coordinates, reinforces and integrates the implementation of national and sector programs and projects by public and private actors related to information and knowledge society.

The ETIC has a mission to: “Generate opportunities for the use and exchange of information and ideas through ICT to improve the quality of life of the Bolivians” (Lopez & Rodas, 2007). Just as well, the objective of the ETIC is to: “Develop and execute policies, program, initiatives and proposals for the use of ICT and the development of human capacities applying a participative and inclusive process with emphasis on the low income citizens in peri-urban and dispersed areas” (Lopez & Rodas, 2007).

## **Cambodia**

### **Economic Overview.**

Cambodia holds a GDP of around \$29.46 billion with a growth rate of 4.1% in 2010 (up from -1.5% in 2009) (CIA, 2010). The World Fact Book also reports that the unemployment rate has increased from 2.5% to 3.5% between the years of 2000 and 2007 (CIA, 2010). Also, 31% of the Cambodian population lives below the poverty line (CIA, 2010). Services remain the main contributor of GDP at 45.2% (CIA, 2010).

### **Internet Access/Usage.**

The Chart below shows the Internet trend of the country The chart shows that there is no significant increase in the percentage of the population that utilizes the Internet.

| YEAR | Users  | Population | % Pop. |
|------|--------|------------|--------|
| 2000 | 6,000  | 12,573,580 | 0.05 % |
| 2007 | 44,000 | 15,507,538 | 0.3 %  |
| 2009 | 74,000 | 14,494,293 | 0.5 %  |
| 2010 | 78,000 | 14,753,320 | 0.5 %  |

### **Literacy Rates.**

According to the World Fact Book, 73.6% of the population can read and write. The school life expectancy sits at about 10 years with only about 1.6% of the countries' GDP going towards education expenditures (CIA, 2010).

### **Government Policies.**

The Government under the leadership Prime Minister will:

- Embrace and exploit ICT to increase economic, industry and agriculture growth and to improve the quality of peoples' lives and also to fight poverty, disease and illiteracy in the country (Royal Government of Cambodia, 2010).
- Direct and guide the Ministry of Economy and Finance and discuss with donors to allocate necessary budgetary and human resources for the ICT sector on a sustained basis (Royal Government of Cambodia, 2010).
- Foster and enhance bilateral, regional and international cooperation in the field of ICT (Royal Government of Cambodia, 2010).
- Support special initiatives to encourage public private and civil society partnerships in the ICT sector with an objective to reach every section of the society (Royal Government of Cambodia, 2010).

From this, ICT will help enable the development of entrepreneurship and to facilitate the private sector in taking the lead in economic development.

- Commit to administrative reform by using ICT in order achieves the better outcome and faster development of the country (Royal Government of Cambodia, 2010).
- Ensure and safeguard the national heritage, culture, and traditions and the environment in the process of ICT development (Royal Government of Cambodia, 2010).

## Colombia

### Economic Overview.

Colombia holds a GDP of \$431.9 billion with a growth rate of 4.4% (up from .8% the year previous) (CIA, 2010). However, the unemployment rate stands at 11.2% with 48.8% of the population living below the poverty line (CIA, 2010). Services are the main contributor to GDP comprising of 52.7% (CIA, 2010).

### Internet Access/Usage.

According to InternetWorldStats.com, there are 21,529,415 Internet users as of Dec/2009, 48.7% of the population, according to IWS. Just as well, there are 6,507,132 Internet subscribers as of Dec/2009; of these 4,291,584 is mobile Internet, according to SIUST.

| YEAR | Population | Users      | % Pop. |
|------|------------|------------|--------|
| 2000 | 42,819,600 | 878,000    | 2.1 %  |
| 2005 | 41,242,948 | 4,739,000  | 11.5 % |
| 2006 | 42,504,835 | 6,705,000  | 15.8 % |
| 2007 | 44,379,598 | 10,097,000 | 22.8 % |
| 2008 | 45,013,674 | 17,478,505 | 38.8 % |
| 2009 | 44,977,758 | 21,529,415 | 48.7 % |

**Literacy Rates.**

The literacy rate, according to a 2005 census, shows that 90.4% of the population has the ability to read and write (CIA, 2010). An average school life expectancy is about 13 years with nearly 3.9% of the countries' GDP going towards education expenditures (CIA, 2010).

**Government Policies.**

During the International Congress Andicom 2010, the Colombian Government said that they would launch its Information and Communications Technologies (ICT) Policy, which will lead the country's technological leap (Andicom, 2010). This was confirmed by the Minister of ICT, Diego Molano Vega, who stated that within the government announcements, there is the fiber optic plan to connect all the country and the incentives for the development of mobile applications (Andicom, 2010).

Regarding the fiber optic policy, the Minister stated that "it is a priority that we build information highways to connect most of the municipalities, especially in those regions where the productive machinery of the country is located. It is fundamental that we build fiber optic networks which allow bringing connectivity to all the country" (Andicom, 2010).

**Dominican Republic****Economic Overview.**

The GDP of the Dominica Republic is \$84.91 billion with a growth rate of 4.2% (CIA, 2010). The World Fact Book also reports that the unemployment rate is 14.2% with 42.3% of the population living below the poverty line (CIA, 2010). As of 2010, the services industry contributes to most of the countries' GDP at 67.5% (CIA, 2010).

### **Internet Access/Usage.**

The chart below shows the percentage of users as compared to the overall population as according to the InternetWorldStats.com.

| YEAR | Users     | Population | % Pop. |
|------|-----------|------------|--------|
| 2000 | 55,000    | 8,338,100  | 0.7 %  |
| 2007 | 2,100,000 | 9,260,258  | 22.7 % |
| 2008 | 3,000,000 | 9,507,133  | 31.6 % |
| 2009 | 3,000,000 | 9,650,054  | 31.1 % |
| 2010 | 3,000,000 | 9,823,821  | 30.5 % |

### **Literacy Rates.**

The literacy rate stands at 87% with a school life expectancy per person at 12 years (CIA, 2010). The government also contributes 2.2% of the GDP on educational expenditures (CIA, 2010).

### **Government Policies.**

Santo Domingo, Dominican Republic, through the Dominican Telecommunications Institute (Indotel), intends to implement this year, 2011, the draft National Backbone Fiber Optics, and the creation of a municipal network of broadband rural access (CNSIC, 2011). The Dominican Republic have already held the first meeting to discuss and prepare terms of reference that will serve to engage the feasibility study for the National Backbone Fiber Optics (CNSIC, 2011). Indotel said he is extremely interested “in putting this project out to tender before the end of this year 2011, taking into consideration the importance that the Dominican Republic may have a fiber optic backbone network covering the whole country” (CNSIC, 2011). The plans to institute, across the entire country, broadband and fiber optics by the year end 2030 (CNSIC, 2011).



The executive director of the National Competitiveness Council (CND), Andres Van Der Horst graduate, addressed the issue of information as a strategy for innovation and competitiveness. He talked about “the challenges facing the Dominican State and the challenges we as a country in the area of telecommunications infrastructure.” Van Der Horst also established the possibility that the Dominican Republic to strengthen in doing business based on the use of ICT (CNSIC, 2011).

Executive director, Dr. Joelle Exarhakos, said the main goal pursued as a country is to achieve at least all municipal districts have coverage of broadband Internet (CNSIC, 2011).

## **Ecuador**

### **Economic Overview.**

The GDP of Ecuador is \$114.7 billion with a growth rate of 2.4% (CIA, 2010). The unemployment rate is around 7.6% with 35.1% of the population living below the poverty line (CIA, 2010). The service industry is the main contributor towards the countries’ GDP at 57.7% (CIA, 2010).

### **Internet Access/Usage.**

According to InternetWorldStat.com, there are 1,840,678 Internet users as of Sept/2009 which is 12.6% of the population, according to Supertel.

| YEAR        | Population | Users     | % Pop. |
|-------------|------------|-----------|--------|
| <b>2000</b> | 12,090,804 | 180,000   | 1.5 %  |
| <b>2005</b> | 12,090,804 | 713,277   | 5.9 %  |
| <b>2006</b> | 12,090,804 | 968,000   | 8.0 %  |
| <b>2008</b> | 13,927,650 | 1,109,967 | 8.0 %  |
| <b>2009</b> | 14,573,101 | 1,840,678 | 12.6 % |

**Literacy Rates.**

About 91% of the population is able to read and write with a school expectancy of 14 years (CIA, 2010). The World Fact Book also reports that 1% of the countries' GDP is allocated to educational expenditures (CIA, 2010).

**Government Policies.**

CONATEL, a major organization within Ecuador, has been fighting to sustain technological infrastructure within Ecuador. In December of 2006, an initiative called White Paper was implemented (CONATEL, 2006). The vision offered in the white paper is evidence of effective advocacy by CSOs. It states that public policy should aim to achieve "a country in which all of the population participates in and benefits from the potential of communication and knowledge, without barriers and in equal conditions, through the access, use, capitalization and appropriation of information and communications technologies, to ensure comprehensive development and the improvement of living conditions" (CONATEL, 2006).

**El Salvador****Economic Overview.**

The GDP of El Salvador is \$43.98 billion with a growth rate of 1.2% (up from -3.5% the previous year) (CIA, 2010). The unemployment rate also stands at 7% with 30.7% of the population living below the poverty line (CIA, 2010). The service industry makes up about 59.9% of the countries' GDP as of 2010 (CIA, 2010).

**Internet Access/Usage.**

El Salvador has 975,000 Internet users as of September/09, which is 16.1% of the population, according to ITU. They also have search engine capabilities with such engines as GOOGLE, LANIC and ISTMANIA (Miniwatts Marketing Group, 2011).

| YEAR | Users   | Population | % Pop. |
|------|---------|------------|--------|
| 2000 | 40,000  | 5,963,800  | 0.6 %  |
| 2003 | 550,000 | 6,281,600  | 8.5 %  |
| 2005 | 587,500 | 6,467,548  | 9.1 %  |
| 2008 | 700,000 | 7,066,403  | 9.9 %  |
| 2009 | 975,000 | 7,185,218  | 13.6 % |
| 2010 | 975,000 | 6,052,064  | 16.1 % |

**Literacy Rates.**

The literacy rate of El Salvador is 81.1% for those ages 5 and up (CIA, 2010).

Starting at the age of 5, schooling lasts for about 12 years with government spending 3.8% of its GDP on educational expenditures (CIA, 2010).

**Government Policies.**

Twenty-five public-access Internet centers have opened in various cities and large towns (Ranking in Public Access to the Internet: 40) (Kirkman, Osorio, & Sachs 2002). This movement has added value to the government and Punto.com initiative of providing free e-mail addresses to all citizens (Kirkman, Osorio, & Sachs 2002). Foreign investments have contributed to improved telecommunications networks, providing additional resources to current ICT policy initiatives (Ranking in Effectiveness of Government ICT Programs: 35) (Kirkman, Osorio, & Sachs 2002).

Additionally, competition among ISPs is increasing. Free Internet access providers are starting to appear. However, due to high charges for local telephone calls and a time-metered billing system, frequent Internet users are turning to fixed-price cable packages with higher speeds and lower overall costs (Ranking in Effect of ISP Competition: 37) (Kirkman, Osorio, & Sachs 2002).

## Georgia

### **Economic Overview.**

The GDP in 2010 was \$22.07 billion with a growth rate of 4.3% (up from -3.9% in 2009) (CIA, 2010). The World Fact Book also reports that 16.4% of the population is unemployed and that 31% lives below poverty (CIA, 2010). The majority of the labor force can be found in the agricultural sector at 55.5% (CIA, 2010).

### **Internet Access/Usage.**

The following chart indicates the percentage of the population that uses the Internet (InternetWorldStat.com).

| YEAR        | Users     | Population | % Pop. |
|-------------|-----------|------------|--------|
| <b>2000</b> | 20,000    | 4,389,004  | 0.5 %  |
| <b>2006</b> | 332,000   | 4,389,004  | 7.6 %  |
| <b>2009</b> | 1,024,000 | 4,615,807  | 22.2 % |
| <b>2010</b> | 1,300,000 | 4,600,825  | 28.3 % |

### **Literacy Rates.**

The literacy rate falls at 100% of the population 15 years of age and older with school life expectancy of 13 years (CIA, 2010). The government also spends about 2.9% of the GDP on educational expenditures (CIA, 2010).

### **Government Policies.**

In 2008, Caucasus Online constructed a high capacity undersea fiber optic link between Poti-Varna (total bandwidth of nearly 1.3 Terabits) and Georgia directly connected to the Global Internet network (Kochoradze, 2009).

The main project currently running in Georgia is seen in education with a program called Deer Leap project (Kochoradze, 2009). According to the project, it is planned that 2,300 schools will be connected in 2009 and the ratio of computers to people will drop from its current level of 1:35 to 1:20, with a total of 30,000 computers being supplied (Kochoradze, 2009). Seventy percent of teachers will receive training to support the practical rollout network and hardware rollout (Kochoradze, 2009). A two-phase tender has been launched for the hardware and expertise necessary to ensure successful completion of the project.

## **Ghana**

### **Economic Overview.**

The GDP of Ghana is \$38.24 billion with a growth rate of 4.7% (CIA, 2010). The World Fact Book reports that 11% of the population is unemployed with 28.5% living below the poverty line (CIA, 2010). The majority of the labor force comprise the agricultural sector at 56% (CIA, 2010).

### **Internet Access/Usage.**

Ghana has 997,000 Internet users as of June/09, 4.2% of the population, according to ITU. The following chart reveals the increasing trend of Internet users from 2000 to 2009 (InternetWorldStat.com).

| Table 13: Internet Access |         |            |        |
|---------------------------|---------|------------|--------|
| YEAR                      | Users   | Population | % Pop. |
| 2000                      | 30,000  | 18,881,600 | 0.2 %  |
| 2006                      | 401,300 | 21,801,662 | 1.8 %  |
| 2008                      | 880,000 | 23,382,848 | 3.8 %  |
| 2009                      | 997,000 | 23,887,812 | 4.2 %  |

### **Literacy Rates.**

Of the population 15 years or older, only 57.9% are able to read and write (CIA, 2010). The schooling of an individual is on average 10 years with the government spending about 5.4% of its GDP on educational costs (CIA, 2010).

### **Government Policies.**

In an ICT reform initiative set forth in 2003, the following objectives/strategies were stated: (Republic of Ghana, 2003).

- Transform Ghana into an information and knowledge-driven ICT literate nation;
- Modernize Ghana's educational system using ICTs to: improve and expand access to educational, training and research resources and facilities; improve the quality of education and training and make the educational system responsive to the needs and requirements of economy and society with specific reference to the development of the information and knowledge-based economy and society;
- Create the conditions for Government Ministries, Public and Sector Organizations to train and up-date the skills of their personnel through in-house training, provision of regular refresher courses, study and training leave;
- Promote basic training in ICTs skills in all schools and tertiary institutions;
- Ensure the development of a large pool of ICT professionals with wide range of state of the art ICT skills to meet the manpower needs of the country;

- Encourage the private sector, particularly key industries, to put in place training programs for their workforce;
- Support and facilitate the training of women in key skills required by the information and knowledge economy;
- Encourage life-long learning within the working population to promote on the job training, skills update, further and continuing education and learning with the public and private sector;
- Ensure that all citizens who qualify to enter tertiary institutions in Ghana will benefit from such education;
- Ensure increase in access to technical and vocational education and training to all categories of persons with disabilities and other vulnerable groups;
- Encourage links between the educational and training systems and industry
- Ensure that the traditional apprenticeship system is reformed and strengthened to improve productivity in the informal sector;
- Encourage internships, co-opts and work-study programs at all levels within various institutions;
- Enact laws that provide equal access to physically challenged and vulnerable groups to ICT training and education;
- Ensure that training systems and mechanisms are developed to facilitate coordination and linkage between different sectors of the economy including research institutions and industries;
- Promote and enforce high standards in education, vocational training and lifelong learning to facilitate the development of a globally competitive quality and

professional manpower to support the development of Ghana's information and knowledge-based economy;

- Promote world-class standards, to support nation-wide professional ICT skills accreditation;
- Promote initiatives targeted at re-training and re-skilling of workers within the civil and public service as well as workers in the private sector to provide them with requisite professional skills and expertise to enable them fully and effectively participate in the development of information and knowledge economy.

## **Guatemala**

### **Economic Overview.**

According to the World Fact book, the GDP of Guatemala is \$70.31 billion with a growth rate of 2.2% (up from .6% the year prior) (CIA, 2010). The unemployment rate is at 3.2% with 56.2% of the population living below poverty level (CIA, 2010). The agricultural sector remains a top employer of the country at 50% with services following behind at 35% of the labor force (CIA, 2010).



### **Internet Access/Usage.**

The following chart shows the percent of Internet users in terms of population (InternetWorldStat.com).

| YEAR | Population | Users     | % Pop. |
|------|------------|-----------|--------|
| 2000 | 11,237,196 | 65,000    | 0.6 %  |
| 2005 | 12,328,453 | 756,000   | 6.1 %  |
| 2008 | 13,002,206 | 1,320,000 | 10.2 % |
| 2009 | 13,276,517 | 1,960,000 | 14.8 % |
| 2010 | 13,550,440 | 2,280,000 | 16.8 % |

### **Literacy Rates.**

Of the population 15 years and up, 69.1% are able to read and write (CIA, 2010). The average person attends school for 11 years with the government spending 3.2% of the GDP on educational initiatives (CIA, 2010).

### **Government Policies.**

The Non Traditional Exporters Association and the Guatemalan Chamber of Commerce are promoting the use of the Internet for business, social, and educational development (Echeverria & Lopes, 2003). They have collaborated to form business centers that offer Internet access and videoconferencing for business training and consultation. These groups hope to provide better access to local businesses and to increase access to foreign markets.

However, many of the challenges that prevent broader economic development in Guatemala also hinder adoption of ICTs (Echeverria & Lopes, 2003). Key issues are providing telephone access to the large rural population and developing a legal and regulatory framework conducive to Networked Readiness (Echeverria & Lopes, 2003).

Foreign investment remains restricted as a result of a lack of user-friendly foreign investment laws (Echeverria & Lopes, 2003).

## Haiti

### **Economic Overview.**

Haiti has an estimate GDP of \$11.18 billion in 2010 with a growth rate of -8% (down from 2.9% in 2009) (CIA, 2010). The unemployment rate is unknown at this time however, 80% of the population lives below poverty line as estimated in 2003 (CIA, 2010). Sixty-six percent of the labor force can be found in the agricultural sector of the country (CIA, 2010).

### **Internet Access/Usage.**

Below shows the percent of the population that uses the Internet (InternetWorldStat.com).

| YEAR        | Users     | Population | % Pop. |
|-------------|-----------|------------|--------|
| <b>2000</b> | 20,000    | 7,742,833  | 0.3 %  |
| <b>2002</b> | 150,000   | 7,929,048  | 1.9 %  |
| <b>2006</b> | 500,000   | 8,301,478  | 6.0 %  |
| <b>2009</b> | 1,000,000 | 9,035,536  | 11.1 % |
| <b>2010</b> | 1,000,000 | 9,648,924  | 10.4 % |

### **Literacy Rates.**

According to the World Fact Book, 52.9% of the population is able to read and write with no average duration of time (in years) spent in the schooling system (CIA, 2010). The records show that in 1991 the government contributed 1.4% of GDP to educational expenditures (CIA, 2010).

### **Government Policies.**

After numerous searches, ICT policies were unable to be determined through government, organizational, or independent websites and documents.

## **Honduras**

### **Economic Overview.**

The GDP of Honduras, as of 2010, is \$33.77 billion with a growth rate of 2.5% (up from - 2.1% the year previous) (CIA, 2010). The unemployment rate, as of 2010, is 5.1% with 65% of the population living below poverty (CIA, 2010). As of 2005, the labor force is split with 39.2% working within agriculture and 39.8% working within the service industry (CIA, 2010).

### **Internet Access/Usage.**

Honduras has 958,500 Internet users as of December, 2009, 12.0% of the population, according to the ITU. The following chart shows a trend from 2000 to 2010 (InternetWorldStat.com).

| YEAR        | Users   | Population | % Pop. |
|-------------|---------|------------|--------|
| <b>2000</b> | 40,000  | 6,076,875  | 0.7 %  |
| <b>2005</b> | 223,000 | 6,569,026  | 3.4 %  |
| <b>2008</b> | 344,100 | 7,639,327  | 4.5 %  |
| <b>2009</b> | 958,500 | 7,833,696  | 12.2 % |
| <b>2010</b> | 958,500 | 7,989,415  | 12.0 % |

### **Literacy Rates.**

The literacy rate is 80% with schooling lasting an average of 11 year (CIA, 2010). The World Fact Book also indicates that the government spends approximately 3.8% of its GDP on educational efforts (CIA, 2010).

### **Government Policies.**

The Honduras government, along with other organizations has a major University project being implemented. This is seen as a pilot program to help train and implement this same design in other areas. These initiatives are outlined below.

The project is divided in two parts:

a) UNAH ICT Policy and Master Plan

b) ICT implementation

The initial phase of the project is dedicated to formulate a general and complete design of all ICT services that UNAH requires and a proper strategy for their implementation and support (SPIDER, 2006). The result of this extensive process that involved all UNAH internal stakeholders and external partners is the ICT policy and Master plan documents. These documents shall drive the ICT development at the University (SPIDER, 2006).

The main goal for the ICT implementation phase is defined by the ICT policy and Master Plan. Priority is given to the implementation of the main network infrastructure that will support UNAH point of presence around Honduras (SPIDER, 2006). A set of critical ICT services including e-mail and a web-portal have been included into the most urgent requirements (SPIDER, 2006). Capacity building is a necessary background for the success of the whole project and its future sustainability (SPIDER, 2006).

## **India**

### **Economic Overview.**

According to the World Fact Book, India has a GDP of \$4.046 trillion with a growth rate of 8.3% (CIA, 2010). The unemployment rate remain at 10.8% in 2010 (up from 10.7% in 2009) with 25% of the countries' population living below the poverty line (CIA, 2010). As of 2009 55% of the labor force remains in agricultural areas (CIA, 2010).

### **Internet Access/Usage.**

There are 5,280,000 broadband subscribers as of June, 2009 per ITU. The chart below shows the trend in Internet users from 1998 to 2010 (InternetWorldStat.com).

| YEAR | Users      | Population    | % Pop. |
|------|------------|---------------|--------|
| 1998 | 1,400,000  | 1,094,870,677 | 0.1 %  |
| 1999 | 2,800,000  | 1,094,870,677 | 0.3 %  |
| 2000 | 5,500,000  | 1,094,870,677 | 0.5 %  |
| 2001 | 7,000,000  | 1,094,870,677 | 0.7 %  |
| 2002 | 16,500,000 | 1,094,870,677 | 1.6 %  |
| 2003 | 22,500,000 | 1,094,870,677 | 2.1 %  |
| 2004 | 39,200,000 | 1,094,870,677 | 3.6 %  |
| 2005 | 50,600,000 | 1,112,225,812 | 4.5 %  |
| 2006 | 40,000,000 | 1,112,225,812 | 3.6 %  |
| 2007 | 42,000,000 | 1,129,667,528 | 3.7 %  |
| 2009 | 81,000,000 | 1,156,897,766 | 7.0 %  |
| 2010 | 81,000,000 | 1,173,108,018 | 6.9 %  |

### **Literacy Rates.**

India's literacy rate stands at 61% with the average person attending school for about 11 years. The government contributes about 3.2% of its GDP to school related expenses (CIA, 2010).

### **Government Policies.**

The Information & Communications Technology policy 2010-2015 aims at providing gainful employment to educated rural youth and to ensure an overall balanced socio-economic growth apart from encouraging women in a big way. IT minister Komatreddy Venkat Reddy said the objective of the ICT policy was to reach an export target of Rs 70,000 by 2015 at an annual growth rate of 17% and creation of more than 6.25 lakh jobs (Times of India, 2010).

The IT minister said the areas/sectors that have been identified for active promotion in the present policy, apart from the general IT and ITES industry, are “start-up companies, small and medium enterprises (SMEs), women entrepreneurs, IT product/R&D companies, SC/ST entrepreneurs, animation-gaming-digital entertainment, engineering services, tier II and tier III locations, promotion of women in the ICT sector, electronic hardware (non-hazardous), promotion of IT incubation facilities at engineering colleges, corporate social responsibility and various e-governance initiatives” (Times of India, 2010).

In addition, the government plans to provide industry-grade skill upgrading and training to students to suit the requirement of industry and widen the scope of ICT base by encouraging new verticals such as animation, gaming & digital entertainment, IT products and services in engineering, retail, health management, power and telecom sectors (Times of India, 2010).

## **Jordan**

### **Economic Overview.**

The GDP of Jordan is \$33.79 billion with a growth rate at 3.2% (CIA, 2010). The World Fact book also reports that the unemployment rate is 13.4% with 14.2% of the population living below poverty (CIA, 2010). As of 2007, 77.4% of the workforce belongs to the service sector (CIA, 2010).

### **Internet Access/Usage.**

The chart below shows the Internet growth and population within Jordan

(InternetWorldStat.com).

| <b>Table 18: Internet Access</b> |              |                   |               |
|----------------------------------|--------------|-------------------|---------------|
| <b>YEAR</b>                      | <b>Users</b> | <b>Population</b> | <b>% Pop.</b> |
| <b>2000</b>                      | 127,300      | 5,282,558         | 2.4 %         |
| <b>2002</b>                      | 457,000      | 5,282,558         | 8.7 %         |
| <b>2005</b>                      | 600,000      | 5,282,558         | 11.4 %        |
| <b>2007</b>                      | 796,900      | 5,375,307         | 14.8 %        |
| <b>2008</b>                      | 1,126,700    | 6,198,677         | 18.2 %        |
| <b>2009</b>                      | 1,595,200    | 6,269,285         | 25.4 %        |
| <b>2010</b>                      | 1,741,900    | 6,407,085         | 27.2 %        |

### **Literacy Rates.**

The literacy rate is about 89.9% of the population can read and write with a school life expectancy of around 13 years (CIA, 2010). The government spent, according to 1999 data, 4.9% of its GDP of educational initiatives (CIA, 2010).

### **Government Policies.**

The most significant step towards a realistic goal in developing ICT is the creation of the REACH initiative. The REACH initiative brings together the public and private sectors working together to create a dynamic and workable plan. REACH stands for and embraces actions in the following areas: “1. Regulatory Framework, 2. Enabling Environment and Infrastructure, 3. Advancement of National IT Programs, 4. Capital and Finance, 5. Human Resource Development” (REACH, 2003). The teams who created the document involved leaders in the IT sector under the supervision of the government.

REACH can be viewed as the country’s National Technology Policy as it encompass all the goals the country seeks to accomplish through its ICT sector. “The goals and targets outlined in REACH are ambitious and attainable. By the end of 2004, the country will have

generated 30,000 IT related jobs, will be earning \$550 million dollars per year in exports, and will have attracted \$150 million dollars in foreign direct investment” (REACH, 2003).

The following is a list of tasks assigned by REACH 1.0 and REACH 2.0 that were completed by the time REACH 3.0 was published (September 2002):(REACH, 2003)

- IT Industry Development
- Establish new IT Industry Association
- Regulatory Framework Strengthening
- Streamline Customs Procedures
- Amend Restrictive Provisions of Labor Law
- Enhance Access to JIB Incentives
- Sign IT Agreement and IT Customs Valuation Accord of WTO
- Develop Electronic Commerce Legislation
- Government Support
- Establish Private-Public Council for ICT Services Industry
- Capital and Finance
- Facilitate ICT IPOs on the Amman Stock Exchange
- Infrastructure Development
- Provide Preferential Access to High-Speed Lines

## **Kenya**

### **Economic Overview.**

According to the World Fact Book, Kenya has a GDP of \$65.95 billion with a growth rate of 4% (up from 2.6% in 2009) (CIA, 2010). The unemployment rate is nearly 40% with



50% of its population living below poverty (CIA, 2010). The agricultural sector of the labor force makes up 75% the entire labor force of the country (CIA, 2010).

**Internet Access/Usage.**

Below shows the increase in Internet users from 2000 to 2009

(InternetWorldStat.com)

| Table 19: Internet Access |           |            |        |
|---------------------------|-----------|------------|--------|
| YEAR                      | Users     | Population | % Pop. |
| 2000                      | 200,000   | 30,339,770 | 0.7 %  |
| 2008                      | 3,000,000 | 37,953,838 | 7.9 %  |
| 2009                      | 3,359,600 | 39,002,772 | 8.6 %  |

**Literacy Rates.**

From data reported in 2003, Kenya has a literacy rate of 85.1% with an average school expectancy of 10 years (CIA, 2010). As of 2006, the government spends close to 6% of GDP on educational efforts (CIA, 2010).

**Government Policies.**

Kenya has witnessed significant growth in the ICT sector as demonstrated by the number of telephone lines, Internet Service Providers (ISPs), the number of Internet users, broadcasting stations, and market share of each one of them. The government has liberalized the mobile cellular market and currently, there are two mobile cellular operators (MIC, 2006). These statistics are indicated below.

- 260,000 fixed telephone line subscribers and 3.0 million cellular mobile subscribers by June 2004, translating into fixed tele-density of 0.75 per hundred inhabitants for fixed and 9.75 per hundred inhabitants for mobile against the world average of 19 and 21 respectively (MIC, 2006).

- 73 registered ISPs, 16 of which are active, approximately 1,030,000 users and over 1000 cyber cafes and telephone bureaus by June 2005 (MIC, 2006).
- 16 operational television stations and 24 FM radio stations (MIC, 2006).
- Approximately 11,500 public phones installed throughout the country by the year 2003 (MIC, 2006).
- An estimated 60% of the population has access to television and 90% have access to radio services (MIC, 2006).

Currently, ICT issues are under legislative priority including: The Science and Technology Act, Cap. 250 of 1977, The Kenya Broadcasting Corporation Act of 1988 and the Kenya Communications Act of 1998, which are inadequate in dealing with issues of convergence, electronic commerce and e-Government (MIC, 2006).

## **Kosovo**

### **Economic Overview.**

The GDP of Kosovo is \$5.3 billion with no growth rate reported (CIA, 2010). The unemployment rate falls at 16.6% in 2009 with 39% of the countries' population living below poverty (CIA, 2010). The majority of the labor force works in agriculture at 22.6% and other sectors not being reported (CIA, 2010).

### **Internet Access/Usage.**

According to Internet World Stats.com, 77,000 Internet users as of Dec/2008; which is 20.8% population penetration, per GfK (InternetWorldStat.com). No other information is provided in regards to Internet usage or broadband access.

**Literacy Rates.**

The literacy rate stands at 91.9% with no data collected regarding the average time spend in school (per year) or the amount spent by the government on educational initiatives (CIA, 2010).

**Government Policies.**

In 2008 DIT adapted “Electronic Governance Strategy 2009-2015” (Ahmedi, 2009). The strategy reviews the current situation in all governmental institutions regarding the ICT infrastructure, and recommends a strategy for implementing electronic services to citizens in healthcare, education, justice, and business (Ahmedi, 2009).

Law on Telecommunications No. 2002/7 governs all telecommunications services and all telecommunications service providers in Kosovo, and is responsible for creating a transparent legal and regulatory environment which promotes investments and free competition to meet the requirements of all users of telecommunications services (Ahmedi, 2009).

Law on Information Society Services No. 02/L-23 is another law in the field of ICT. It makes electronic documentation legally equivalent to its traditional counterpart in paper format, in order to facilitate commercial activities (e.g., e-Trade, e-Banking, e-Payment, e-Government, e-Procurement) (Ahmedi, 2009).

Law on The Administrative Procedure No. 02/L-2 regulates the electronic execution of activities of the public administration (Ahmedi, 2009). Also, Law on Copyright and Related Rights No. 2004/4 and Law on Scientific Research Activity No. 2004/42 have been adopted, whereas Law on the Protection of Personal Data and Law on Prevention and Fight of the Cyber Crime have been drafted and are being considered for approval by the government (Ahmedi, 2009).

Further, as part of the legislature building, a number of administrative instructions have been formulated which regulate the use of ICT in government, such as Administrative Instruction on Use of Licensed Software No. 2007/02 – MPS , and Administrative Instruction on Using Official Electronic Mail (Official E-Mail) of Kosovo PISG No. 2005/03 - MPS (Ahmedi, 2009).

The government has also approved the “Telecommunications Sector Policy” as proposed by this ministry in 2007 (Ahmedi, 2009). The policy's main goals are to promote market entry, promote competition and bring about a level playing field (Ahmedi, 2009). As well as, achieve universal access, ensure optimal usage of scarce resources, and establish a more effective legal framework for the monitoring and supervision of the telecommunications sector (Ahmedi, 2009).

## **Kyrgyzstan**

### **Economic Overview.**

As of 2010, the GDP is \$11.85 billion with a growth rate of -3.5% (down from 2.3% in 2009) (CIA, 2010). The unemployment rate is 18% with 40% of its population living below poverty (CIA, 2010). Agriculture is the main industry sector with 48% of the labor force comprising this area (CIA, 2010).

### **Internet Access/Usage.**

The chart below shows the Internet usage in terms of percentage of population (InternetWorldStat.com).

| YEAR | Users     | Population | % Pop. |
|------|-----------|------------|--------|
| 2000 | 51,600    | 5,377,484  | 0.1 %  |
| 2005 | 280,000   | 5,377,484  | 5.1 %  |
| 2007 | 298,100   | 5,436,608  | 5.5 %  |
| 2009 | 850,000   | 5,431,747  | 15.6 % |
| 2010 | 2,194,400 | 5,508,626  | 39.8 % |

**Literacy Rates.**

The literacy rate of those aged 15 and up is 98.7% with the average school life of 13 years (CIA, 2010). The government allocates 6.6% of its GDP towards educational initiatives (CIA, 2010).

**Government Policies.**

In law, Kyrgyzstan does not impose any restrictions on the right to use the Internet. As part of the first telecommunication project funded by the World Bank and the EBRD, Kyrgyztelecom, a joint-stock company, was granted exclusive control of long-distance and international telephone service, but within the framework of this same project, the World Bank required the non-participation of Kyrgyz telecom in communication sectors other than telephone (Kyrgyzstan Development Gateway, 2001).

There are now 10–15 ISPs operating in the Kyrgyz Republic, and the number increases each year (Johnson & McGlinchey, 2005). During the last several years, a range of Internet centers, Internet-cafes, business centers, etc., also opened to provide public access to Internet services (Johnson & McGlinchey, 2005). In addition, NATO financing developed a project to provide ICT and satellite equipment to enable free Internet access for educational institutions, libraries, and hospitals around the country (Ukrainian Times, 2003).

In addition, the state has made efforts to open free Internet centers in rural areas, where more than half of the country's population lives (Johnson & McGlinchey, 2005). The government has also mandated that state ministries and departments develop their own websites (Johnson & McGlinchey, 2005).

## **Lebanon**

### **Economic Overview.**

The World Fact Book reports the GDP to be \$58.65 billion with a growth rate of 7.2% (CIA, 2010). The unemployment rate is unknown however, 28% of the population lives below poverty (CIA, 2010). Services comprise 79% of the countries' GDP and where no information regarding the labor force is present (CIA, 2010).

### **Internet Access/Usage.**

According to InternetWorldStats.com, there are 1,000,000 Internet users as of June/2010 which is 24.2% of the population. The site also reports that there are 1,024,140 Facebook users as of August 31/2010, which is a 24.8% penetration rate (InternetWorldStat.com).

### **Literacy Rates.**

The literacy rate is 87.4% with the average school life expectancy of 14 years (CIA, 2010). Also, the government spends about 2% of GDP on educational initiatives (CIA, 2010).

### **Government Policies.**

The following ICT initiatives have been outlined in a presentation in 2003 by Dr. Raymond Khoury:

- Building National Capacity

- Developing and offering high quality and affordable Internet services
- Supporting national ICT industry and promoting investments
- Enhancing ICT curriculum at all education levels
- Setting up ICT training centers or academies
- Internal Government Training and Capacity Building
  - Promoting ICT knowledge for civil servants
  - Setting up ICT training centers in government institutes
- E-Government O&M Structure
  - Government-wide central O & M unit
  - Ministry and agency specific O & M units
  - Establishing ICT cadre and salary scale in government (Khoury, 2003).

## **Malawi**

### **Economic Overview.**

In 2010, the GDP was \$13.51 billion with a growth rate of 6.5% (down from 7.6% in 2009) (CIA, 2010). The unemployment rate is unknown however, 53% of the population lives below poverty (CIA, 2010). Ninety percent of the labor force falls into the agricultural sector (CIA, 2010).

### **Internet Access/Usage.**

Reports show that there are 716,400 Internet users as of Jun/2010 which is 4.6% of the population, per ITU. There are also 46,660 Facebook users as of August 31/2010 which is determined to be a 0.3% penetration rate (InternetWorldStat.com).

**Literacy Rates.**

The literacy rate stands at 62.7% with a school life expectancy of around 9 years (CIA, 2010). In 2003, the government spent 4.2% of its GDP on educational initiatives (CIA, 2010).

**Government Policies.**

According to the Economic Commission of Africa (ECA), the Malawi NICI policy development process will cover three phases:

- The first phase of the development of Malawi national ICT policy and strategies has been completed in 2002. This phase resulted in the publication of the ICT Policy Framework document that will be used as a basis for the development of the plan and the policy documents. This document was submitted to government officials in June 2002 (ECA, 2003).
- The second phase of the process has started in January 2003 and consultations are underway at the country level based on the ICT Policy Framework document. This phase will be completed by a baseline study on current indicators on ICT-led socioeconomic development issues for Malawi as indicated in the ICT Policy Framework document. The results of the new round of consultations and the baseline study to start the third phase will be available soon (ECA, 2003).
- The third phase will concentrate on activities leading to the development of the ICT policy document. This is expected to start in April 2003 (ECA, 2003).



The policy document, “An Integrated ICT-led Socio-Economic Development Policy for Malawi,” was submitted to the government in July 2003 (ECA, 2003).

These three phases were supposed to be completed by 2006 (ECA, 2003); however, no data has been made available as to the extent to which ICT policy was carried out.

## **Mali**

### **Economic Overview.**

Mali has an estimated GDP of \$16.74 billion as of 2010 (CIA, 2010). According to The World Fact Book, the growth rate is 5.5% in 2010 (up from 4.4% in 2009) (CIA, 2010). The unemployment rate was last estimated in 2004 at 30% with 36.1% of its population living below poverty line (CIA, 2010). Eighty percent of the labor force falls into the agricultural sector (CIA, 2010).

### **Internet Access/Usage.**

Reports indicate that there are 250,000 Internet users as of Jun/2010 which is 1.8% of the population, per ITU. There were also 42,420 Facebook users as of August 31/2010, which shows a penetration rate of 0.3% (InternetWorldStat.com).

### **Literacy Rates.**

The literacy rate is 46.4% with the average school life expectancy of 8 years (CIA, 2010). Also, the government spent 3.8% of GDP on education as of 2008 (CIA, 2010).

### **Government Policies.**

There is no formal national ICT policy in Mali currently. However, following the signature of two Memoranda of Agreements in August 1996 and November 1997, the US Government's Leland Initiative has provided support for the establishment of an Internet hub in Mali (ECA, 2000).

The Société des Télécommunications du Mali (SOTELMA) is the sole operator in the sector. SOTELMA was established by decree of the Council of Ministers, and it reports directly to a Board of Trustees composed of eight members representing key ministries in the country (ECA, 2000). SOTELMA has undertaken a number of projects to modernize the telecommunications sector. These include the following:

- Establishment of a DOMSAT network (réseau national de télécommunications par satellite) which provides digital links to four major towns (Gao, Tombouctou, Kidal and Kéniéba) in the north of the country. The project integrates a complete communications infrastructure, combining telephone, fax, data transfer, and radio and television transmissions (ECA, 2000).
- Establishment of a cellular network in the capital city, Bamako, and its surrounding areas. By the beginning of 1998, the network was catering its services to a total of 2,842 cellular subscribers (ECA, 2000).
- Establishment of a VSAT-based Internet hub by SOTELMA and the four private Internet Service Providers: Bintta SA/MaliNet, Cefib, Datatech, and Spider (ECA, 2000).

These actions have been implemented and completed as of 1997 (ECA, 2000).

## **Mexico**

### **Economic Overview.**

According to The World Fact Book, in 2010 Mexico generated a GDP of \$1.56 trillion with a growth rate of 5% (up from -6.5% in 2009) (CIA, 2010). Unemployment within the country is about 5.6% (CIA, 2010). Furthermore, 18.2% of the Mexican population lives

below poverty line when using a food based definition; however, when utilizing an asset based poverty definition 47% of the population lives below the poverty line (CIA, 2010).

The service industry is the largest industry within the country with 62.9% of the labor force falling into this category (CIA, 2010).

### **Internet Access/Usage.**

The following chart indicates Internet usage according to percent of population from InternetWorldStat.com.

| YEAR        | Users      | Population  | % Pop. |
|-------------|------------|-------------|--------|
| <b>2000</b> | 2,712,400  | 98,991,200  | 2.7 %  |
| <b>2004</b> | 14,901,687 | 102,797,200 | 14.3 % |
| <b>2005</b> | 17,100,000 | 103,872,328 | 16.3 % |
| <b>2006</b> | 20,200,000 | 105,149,952 | 19.2 % |
| <b>2008</b> | 27,400,000 | 109,955,400 | 24.9 % |
| <b>2010</b> | 30,600,000 | 112,468,855 | 27.2 % |

### **Literacy Rates.**

The literacy rate in Mexico is 86.1% with the average school life expectancy of 14 years (CIA, 2010). Also, 4.8% of GDP is used towards educational initiatives (CIA, 2010).

### **Government Policies.**

There are currently four different parts to the National ICT policy of Mexico. These are listed below: (FORESTA, 2009).

- Science, Technology and Innovation Special Program (Programa Especial de Ciencia, Tecnología e Innovación 2008-2012) This policy aims to strengthen the social appropriation of knowledge and innovation, as well as effective coordination of all involved parties to achieve that end.
- Mexico's Great Vision Project 2030 (Proyecto de Gran Visión México 2030)

- National Development Plan 2007-2012 (Plan Nacional de Desarrollo 2007-2012)
- National Infrastructure Program 2007-2012 ( Programa Nacional de Infraestructura 2007-2012)

The policy goals are as follows: (FORESTA, 2009).

- Regular supports that the Federal Government is obliged to grant to stimulate, strengthen, develop and strengthen scientific research, technological development and innovation in general in the country. The restructuring and strengthening of public policy in terms of knowledge and innovation are essential to create conditions for achieving higher levels of economic growth.
- The development socially balanced and sustainable change requires a growing activity with the coordinated participation of all the National Science and Technology (SNCYT), plus a sufficient public and private financing.
- The National Development Plan (NDP) sets out the national objectives, general strategies and development priorities that should govern government action, so that the country has a clear direction and leadership. In this great challenge of working towards common goals, the NDP intends to organize all efforts around five lines of thought and action. In the line 2, "Competitive economy and generating employment," science, technology and innovation play a major role as strategic variables change structural development of the country.
- Establish mechanisms for coordinating activities between departments and agencies of the Federal Public Administration and other institutions involved

in defining policies and programs in scientific, technological and innovation, or carrying out such activities directly.

- Create the bodies and coordination mechanisms with the governments of the states, as well as involvement and participation of the scientific and academic community of higher education institutions, public sector, social and private generation and policy formulation promotion, dissemination, development and application of science, technology and innovation, and to train professionals in these areas.
- Link to the educational, productive and service sectors in scientific research, technological development and innovation.

## **Mongolia**

### **Economic Overview.**

Mongolia is estimated to have a GDP of \$10.16 billion and a growth rate of nearly 7% (up from -1.6% in 2009) (CIA, 2010). The unemployment rate is about 2.8% as of 2008 with 36.1% of the population living below poverty line in 2004 (CIA, 2010). Sixty-one percent of the labor force works within the services industry, making this the largest sector of the country (CIA, 2010).

## Internet Access/Usage.

| YEAR | Users   | Population | % Pop. |
|------|---------|------------|--------|
| 2000 | 30,000  | 2,500,000  | 1.1 %  |
| 2001 | 100,000 | 2,600,009  | 1.5 %  |
| 2007 | 268,300 | 2,601,641  | 10.3 % |
| 2009 | 330,000 | 3,041,142  | 10.1 % |
| 2010 | 350,000 | 3,086,918  | 11.3 % |

### Literacy Rates.

The literacy rate is 97.8% with an expected educational life span of 14 years (CIA, 2010). As of 2007, 5.1% of its GDP was spent on educational expenditures (CIA, 2010).

### Government Policies.

According to the Mongolia Information Development Association (MIDAS), the Mongolian government is still in the development stage of ICT policy. The government has defined a process that was to be completed as of 2010. This process is as follows: (MIDAS, 2001)

- Continue steps towards transferring to the digital technology the countrywide telecommunications basic network placing special attention on rural access;
- Introduce the Internet to social services such as secondary schools, hospitals, universities;
- Start establishing public information resource centers and Internet centers in all cities;
- Start transferring of the Television and Broadcasting systems to the digital technology;

- Establish Techno Park or special zones with a favorable tax and infrastructure environment in order to support the development of export-oriented ICT products and services.

No progress reports are available to see where the Mongolian nation stands on ICT policy as of end year 2010.

## Nicaragua

### **Economic Overview.**

As of 2010 estimates, GDP is \$17.34 billion with a growth rate around 2.8% (up from -1.5% in 2009) (CIA, 2010). The unemployment rate is at 8% with 48% of the countries' population living under the poverty line (CIA, 2010). Services comprise the majority of the labor force at 53% (CIA, 2010).

### **Internet Access/Usage.**

| YEAR        | Users   | Population | % Pop. |
|-------------|---------|------------|--------|
| <b>2000</b> | 50,000  | 5,400,904  | 1.1 %  |
| <b>2005</b> | 125,000 | 5,766,497  | 2.2 %  |
| <b>2008</b> | 155,000 | 5,785,846  | 2.7 %  |
| <b>2009</b> | 600,000 | 5,891,199  | 10.2 % |
| <b>2010</b> | 600,000 | 5,995,928  | 10.0 % |

### **Literacy Rates.**

As of 2003, the literacy rate stood at 67.5% with an education life expectancy of 11 years (CIA, 2010). It was also recorded that 3.1% of GDP was spent on educational initiatives in 2003 (CIA, 2010).

### **Government Policies.**

There are no real policies set-forth by the government of Nicaragua. The problems of establishing a functioning IT infrastructure are outlined below: (Hopmann, 2010)

- Privatization processes are frozen.
- Internet availability and affordability in the country is.
- Internet is out of reach to the majority of the population.
- Tele-centers: Even subsidized, they are for people with money and not for the poor people.

## **Peru**

### **Economic Overview.**

According to The World Fact Book, Peru had a 2010 GDP of \$274.7 billion with a growth rate of 7.8% (up from .9% in 2009) (CIA, 2010). The unemployment rate has dropped from 8% in 2009 to 6.7% in 2010 with 34.8% of the population living below poverty (CIA, 2010). The service industry is the main industry sector of Peru with 75.5% of the labor force comprising this sector (CIA, 2010).

### **Internet Access/Usage.**

| YEAR        | Population | Users     | % Pop. |
|-------------|------------|-----------|--------|
| <b>2000</b> | 25,726,000 | 2,500,000 | 9.7 %  |
| <b>2005</b> | 28,032,047 | 4,570,000 | 16.3 % |
| <b>2007</b> | 28,920,965 | 6,100,000 | 21.1 % |
| <b>2008</b> | 29,180,899 | 7,636,400 | 26.2 % |

### **Literacy Rates.**

As of 2007, the literacy rate stands at 92.9% with a school life expectancy of 14 years (CIA, 2010). Also, The World Fact Book reports that in 2008 2.7% of its GDP was spent on educational initiatives (CIA, 2010).



### **Government Policies.**

Since 2005 the Government has sponsored the ICT Development Fund in joint with the private sector, non-governmental organizations, the civil society and other international or multinational organizations in the ICT sector (Ferrer, 2009). The ICT policy in Peru has been founded on three main objectives: (Ferrer, 2009).

1. Establish Policies and Regulatory Framework: The Government will establish a regulatory and policy framework that facilitates the development of the country's telecommunications and ICT infrastructure and services in order to meet national, regional and international objectives.
2. Promote and Develop New Technologies: The Government will promote the use of new technologies in different sectors of the Peruvian society.
3. Develop the Country's Human Capital: The Government will facilitate the development of human capital in the telecommunications and ICT sector to meet the demands of the economy, serving both local and regional requirements.

## **Philippines**

### **Economic Overview.**

According to The World Fact Book, the GDP of 2010 was at \$351.2 billion with a growth rate of 6.7% (up from 1.1% in 2009) (CIA, 2010). The unemployment rate of the country has stayed constant from 2009 to 2010 at 7.5% and with an estimate of 32.9% of the population living below poverty (CIA, 2010). Services lead the labor force as it comprises 52% of the countries' industries (CIA, 2010).

### **Internet Access/Usage.**

| YEAR        | Users      | Population | % Pop. |
|-------------|------------|------------|--------|
| <b>2000</b> | 2,000,000  | 78,181,900 | 2.6 %  |
| <b>2005</b> | 7,820,000  | 84,174,092 | 9.3 %  |
| <b>2008</b> | 14,000,000 | 96,061,683 | 14.6 % |
| <b>2009</b> | 24,000,000 | 97,976,603 | 24.5 % |
| <b>2010</b> | 29,700,000 | 99,900,177 | 29.7 % |

### **Literacy Rates.**

In a 2000 census, 92.6% were able to read and write with a school life expectancy of 12 years (CIA, 2010). It was also reported in 2007 that 2.6% of GDP went toward the funding of educational programs (CIA, 2010).

### **Government Policies.**

According to the Commission of Information Technology (CICT), the government's efforts to bridge the digital divide are the Community e-Center Program (CeCP). These initiatives are described below: (CICT, 2006).

- Internet in Schools (iSchools) project aims to provide public high schools with computers with broadband Internet connectivity, complemented by educators' training (ICT Literacy/Competency Training for Teachers, Lab Management, and Sustainability), tech support, and monitoring and evaluation.
- eCare Centers are specially designed to provide access and training programs for Persons with Disabilities (PWDs). The target is to establish one eCare Center in each region.

- eLGU CeCs enable local government units to deliver services more efficiently, while providing their respective constituents with access to the Internet and other ICTs. The project also recognizes model websites and best practices in the local government to encourage replication of useful and innovative applications.
- Regional ICT Centers will spur regional development through the use of ICT in education, commerce and governance and spearhead the building of local e-marketplaces or a one-stop-shops for e-commerce, e-learning and e-government services.

The provision of adequate bandwidth is important to ICT development. Government will ensure that adequate bandwidth to support widespread and intensive ICT use is available throughout the country. The targets are as follows: (CICT, 2006)

**Provision of Broadband Connectivity – Number of Public Access Points**

Location: Key cities, municipalities, and urbanized barangays

Target: 100% by 2010, to be undertaken by the private sector

Location: 1st, 2nd, 3rd, and 4th class municipalities

Target: 100% by 2010, to be undertaken jointly by CICT and the private sector

Location: Rural barangays

Target: 55% by 2010, to be undertaken jointly by CICT and the private sector

## **Provision of Broadband Connectivity – Capacity & Quality of Access**

Location: Key cities, municipalities

Target: 200 simultaneous users for each access point; at least five access points by 2010, to be led by the private sector

Location: 1st, 2nd, 3rd, and 4th class municipalities

Target: 100 simultaneous users for each access point; at least 2 access points by 2010, to be undertaken jointly by the CICT and the private sector

Location: Remaining municipalities

Target: 5 simultaneous users for 1 access point by 2010, to be undertaken jointly by the CICT and the private sector

Location: Urbanized barangays

Target: 100 simultaneous users for each access point; at least five access points by 2010, to be led by the private sector

Location: Rural barangays

Target: One user for one access point by 2010, to be undertaken jointly by the CICT and the private sector

Philippines also have initiated a social development program where ICT training at all industry levels will be implemented.

## Russia

### **Economic Overview.**

The GDP of Russia is \$2.229 trillion with a growth rate of 3.8% (up from -7.9% in 2009) (CIA, 2010). The unemployment rate was also seen to improve from 2009 to 2010 from 8.4% unemployment to 7.6% unemployment (CIA, 2010). It is also seen that 13.1% of the countries' population lives below the poverty line (CIA, 2010). The majority of the labor force belongs to the service sector at 58.1% (CIA, 2010).

### **Internet Access/Usage.**

| Table 26: Internet Access |            |             |        |
|---------------------------|------------|-------------|--------|
| YEAR                      | Users      | Population  | % Pop. |
| 2000                      | 3,100,000  | 145,149,035 | 2.1 %  |
| 2007                      | 29,400,000 | 141,377,752 | 20.8 % |
| 2008                      | 38,000,000 | 140,702,094 | 27.0 % |
| 2009                      | 45,250,000 | 140,041,247 | 32.3 % |
| 2010                      | 59,700,000 | 139,390,205 | 42.8 % |

### **Literacy Rates.**

As reported in The World Fact Book, in a 2002 census the literacy rate is 99.4% with a 14 year school life expectancy (CIA, 2010). Also, 3.9% of GDP (2006) was seen to be spent on educational initiatives (CIA, 2010).

### **Government Policies.**

“Electronic Russia 2002-2010” Program was created on January 28, 2002 with the aim “to increase the efficiency of the economy both in the public and private sectors, to make wider use of information technologies in government departments, and transfer much of the state’s work online” (Waylett, 2004).

The following outlines the program in phases. These phases were initially supposed to be fully implemented by 2010. The areas of the act are outlined below:

- 2.6 Billion program intended to boost e-commerce and Internet use in the country
  - Phase 1 - \$230M
  - Phase 2 - \$804M
  - Phase 3 - \$1,595M
- Program addresses 4 key areas in ICT
  - Regulatory environment and institutional framework
  - Internet Infrastructure
  - E-Government
  - E-Education
- Timeline:
  - 2002 – refine the plan, identify necessary feasibility studies and define pilot projects
  - 2003-2004 – Studies and pilot projects conducted
  - 2005 – full implementation expected to begin
- Leadership:
  - Implementation will be under the general management of the Interagency Commission headed by the Minister of Economic Development and Trade of the Russian Federation, German Gref

- The commission will form a Council of Experts made up of executives of IT companies, universities, scientific organizations, the Russian Academy of Sciences, and state and municipal bodies.
- Operational Management and technical support will be supervised by the Ministry of Telecommunications and Information (Waylett, 2004)

## **Rwanda**

### **Economic Overview.**

The GDP has been reported to be \$11.84 billion with a growth rate of 6% (up from 4.5% in 2009) (CIA, 2010). The unemployment rate is unknown at this time; however 60% of the population lives below the poverty line (CIA, 2010). Agriculture is the main industry with a labor force of 90% (CIA, 2010).

### **Internet Access/Usage.**

Reports show that there are 450,000 Internet users as of Jun/2010, which is 4.1% of the population, per ITU. There were also 52,520 Facebook users as of August 31/2010, a 0.5% penetration rate (InternetWorldStat.com).

### **Literacy Rates.**

As of 2003, the literacy rate stands at 70.4% (CIA, 2010). In 2008, it was reported that the school life expectancy was 11 years with 4.1% of GDP going towards educational initiatives (CIA, 2010).

### **Government Policies.**

The Government of Rwanda (GOR) came together in 2000 to construct an ICT policy and strategy to bring about Socio-economic development. These policies and strategies are outlined below: (GOR, 2000)

The ICT-2020 Policy sets out the orientation of the Government's ICT Policy and Strategies within context of the GOR's broad socio-economic development objectives within the Vision 2020 time frame of 20 years.

The Government in formulating its ICT-2020 Policy is guided by the principle that if Rwanda is to take full advantage of the opportunities of the information age and develop a vibrant multi-sectorial information and knowledge economy, it should not as a nation be just a consumer of ICT goods and services but also a producer and developer of the technology.

The GOR as part of its ICT policy and strategy is therefore fully committed to simultaneously pursuing both ICT Exploitation and Production policy involving: the utilization and exploitation of ICTs to support the delivery of government services and the activities of various sectors of the economy as well as the production, development and delivery of ICT products and services.

The GOR will implement this ICT Policy over a period of twenty years up to the Year 2020 through the implementation of four 5-Year NICI Plans with the 1st, 2nd, and 3rd NICI Plans laying emphasis on the exploitation and utilization of ICT products and services to support the delivery of government services and the activities of various sectors of the economy. The 4th NICI Plan will lay emphasis on the production, development and delivery of ICT products and services.



## Senegal

### **Economic Overview.**

Senegal was seen to have a GDP of \$23.86 billion with a growth rate of 3.9% (up from 1.1% in 2009) (CIA, 2010). The unemployment rate, as of 2007, stands at 48% with 54% (2001) living below the poverty line (CIA, 2010). Agriculture is the main industry within this country as 77.5% of its labor force comprises this sector (CIA, 2010).

### **Internet Access/Usage.**

| YEAR | Users     | Population | % Pop. |
|------|-----------|------------|--------|
| 2000 | 40,000    | 10,400,000 | 0.1 %  |
| 2001 | 100,000   | 10,600,009 | 1.0 %  |
| 2005 | 540,000   | 10,842,622 | 5.0 %  |
| 2007 | 540,000   | 11,069,755 | 4.9 %  |
| 2009 | 1,020,000 | 13,711,597 | 7.4 %  |

### **Literacy Rates.**

As reported in 2002, the literacy rate is 39.3% with a school life expectancy in 2008 at about 8 years (CIA, 2010). Also reported in 2008, 5.1% of GDP was spent towards educational needs (CIA, 2010).

### **Government Policies.**

The following bullet points outline the progression and direction that Senegal has taken in ICT policy development from 1999 to 2005:

- A Minister of Communications was appointed, a computer expert by training, who had set up the parliamentary network on ICTs (with help from Acacia) in 1999.

- The President of the Republic suggested that the costs of telephone service should be reduced, and his ICT Counsellor announced that the mobile telephone market would be opened to an independent operator.
- On July 20, 2000, the Prime Minister, Moustapha Niassa, declared the government's intention to use ICTs to communicate more closely with the citizens, and he announced that the process of implementing an administrative information and communication system would be accelerated.
- In September 2000, Minister Diop Decroix announced the main features of a national policy for democratizing access to ICTs.
- The new Constitution of Senegal refers to ICTs, and contains provisions to ensure the confidentiality of electronic correspondence.
- The President of the Republic took part in the 2001 Internet Festival.
- In August 2001, the new Prime Minister, Mame Madior Boye, confirmed the important place of ICTs in sectoral policies.
- In March 2002, the Telecommunications Regulation Agency (ART) was created, as an independent regulatory body responsible for ensuring fair and healthy competition for the benefit of consumers, telecommunications operators, and the Senegalese economy in general, and for accelerating the development of telecommunications. It is interesting that Acacia was quick to suggest and support such a structure, so that universal and democratic access to ICTs could become a reality in Senegal.

- In May 2002, the President of the Republic attended the preparatory meeting, held in Bamako, for the World Summit on the Information Society, planned for 2003 in Geneva and 2005 in Tunis (Sene & Thioune, 2003)

However, even with the above progression, it has been seen that there is a lack of follow through on these initiatives and progression has been stalled (Sene & Thioune, 2003).

### **Sichuan (Province in China)**

#### **Economic Overview.**

The GDP of China is \$9.872 trillion with a growth rate of 10.3% (up from 9.1% in 2009) (CIA, 2010). The unemployment rate stands at 4.8%, however the Sichuan province (a non-urban area) may have as high as a 9% unemployment rate (CIA, 2010). It was also reported that 2.8% live below poverty (CIA, 2010) However, it has been noted that 1.5 million rural population live below the official “absolute poverty” line (approximately \$90 per year); an additional 35.5 million rural population live above that level but below the official “low income” line (approximately \$125 per year) (2007)(CIA, 2010). Agriculture remains the largest segment in China as 39.5% of the labor force falls into this area (CIA, 2010).

#### **Internet Access/Usage.**

No data exists for Sichuan Province at this time.

#### **Literacy Rates.**

The Chinese literacy rate is at 91.6% with a school life expectancy of 11 years (CIA, 2010). Reported in 1999, 1.9% of the GDP was spent on educational initiatives (CIA, 2010).

#### **Government Policies.**

Development within China is extremely uneven, and there is a huge divide in the information and communication technologies (ICTs) sector. The eastern, coastal provinces

enjoy a favorable geographical setting for industry and trade, which has given them an economic advantage over the western, inland regions. As a result, they also enjoy superior educational and technological resources. As China confronts global challenges and domestic needs, the country has struggled to close the gaps, as was seen in its incorporation of technology development into policy since 1980s (Mu, Yuan, Matsunaga, Sheng, & Tseng, 2009). Since then, China has proved itself to be an important player in the global networks.

The development of ICT infrastructure and user access still resides in the following areas: (Mu, Yuan, Matsunaga, Sheng, & Tseng, 2009)

- Freedom of speech and censorship
- Search engine: while Google offers its service in Chinese, Baidu, a mainland China based search engine, tends to generate more comprehensive results, especially when the search is done in simplified Chinese
- Information accessibility: A lot of the projects are initiated by the local governments or private sectors. Information about these projects are scattered (partly due to China's size) and sometimes veiled, thus making it hard to draw a comprehensive picture of China's ICT development in rural area.

## **Tajikistan**

### **Economic Overview.**

The estimate GDP of 2010 is \$14.61 billion with a growth rate of 5.5% (up from 3.3% in 2009) (CIA, 2010). The unemployment rate of 2009 was 2.2% with 60% of the population living below poverty (CIA, 2010). Agriculture is the major industry sector of the country with 49.8% of the labor force comprising this area (CIA, 2010).

### **Internet Access/Usage.**

| YEAR | Users   | Population | % Pop. |
|------|---------|------------|--------|
| 2000 | 2,000   | 6,702,382  | 0.1 %  |
| 2005 | 19,500  | 6,702,382  | 0.3 %  |
| 2009 | 600,000 | 7,349,145  | 8.2 %  |
| 2010 | 700,000 | 7,487,489  | 9.3 %  |

### **Literacy Rates.**

Reported in a 2000 census 99.5% of the population can read and write with a school life expectancy of 11 years (CIA, 2010). In 2008, it was reported that 3.5% of GDP is used towards educational initiatives (CIA, 2010).

### **Government Policies.**

The Presidential ICT Council is coordinating the e-strategy implementation. The different types of licenses for service provision in the ICT industry can be divided into four categories:

- Telematics and data transfer (Internet service license)
- Voice over Internet protocol (VoIP) telephony
- Mobile telephony services, including advanced mobile phone system (AMPS), GSM, CDMA, CDMA2000, 3G
- Fixed telephony services, i.e., public switched telephone network (PSTN) services (Atoev & Ibodova, 2008).

According to ICT legislation, every Tajikistani legal or private entity, regardless of its legal status, is eligible to apply for a license and to be a service provider (Atoev & Ibodova, 2008). These licenses are issued by the State Service on Supervision and Regulation in Communications and Information under the Ministry of Transportation and Communications

(Atoev & Ibodova, 2008). The time it takes for an application to be considered cannot be more than one month (Atoev & Ibodova, 2008).

Some positive changes have resulted from an improvement in ICT legislation in the country. These include doubling the number of communications operators, facilitating the use of ICTs in almost all spheres of life, developing infrastructure, and the implementation of various industrial projects and information programs throughout the country (Atoev & Ibodova).

## **Tanzania**

### **Economic Overview.**

The World Fact Book reports a GDP of %62.22 billion with a growth rate of 6.4% (CIA, 2010). The unemployment rate of the country is unknown; however, as reported in 2002 36% of the population lives below poverty (CIA, 2010). Agriculture is the main industry with 80% of the labor force comprising this sector (CIA, 2010).

### **Internet Access/Usage.**

| <b>Table 29: Internet Access</b> |              |                   |               |
|----------------------------------|--------------|-------------------|---------------|
| <b>YEAR</b>                      | <b>Users</b> | <b>Population</b> | <b>% Pop.</b> |
| <b>2000</b>                      | 50,000       | 14,712,000        | 0.3 %         |
| <b>2002</b>                      | 500,000      | 13,874,610        | 3.6 %         |
| <b>2005</b>                      | 820,000      | 12,247,589        | 6.7 %         |
| <b>2009</b>                      | 520,000      | 41,048,532        | 1.3 %         |

### **Literacy Rates.**

As per a 2002 census, 69.4% of the population has the ability to read and write with a school life expectancy of about 5 years (CIA, 2010). Also, about 6.8% of GDP is spent towards educational initiatives (CIA, 2010).

### **Government Policies.**

According to the Ministry of Communication and Transportation (MCT), the National ICT Policy is aligned to the following vision statement: “Tanzania to become a hub of ICT Infrastructure and ICT solutions that enhance sustainable socioeconomic development and accelerated poverty reduction both nationally and globally” (MCT, 2003).

The Tanzania Development Vision 2025 sees a nation embedded with five main attributes: High quality livelihood; peace, stability and unity; good governance; a well educated and learning society; and a strong and competitive economy capable of producing sustainable growth and shared benefits (MCT, 2003).

Also, this Policy has articulated ten main focus areas in harnessing ICT in Tanzania which include strategic ICT leadership; ICT infrastructure; ICT Industry; Human Capital; Legal and Regulatory Framework; Productive Sectors; Service Sectors; public Service; Local Content; and Universal Access (MCT. 2003).

A list of public access objectives as stated in the 2025 vision are listed below: (MCT, 2003)

- Promote literacy as a platform for digital competencies, awareness and empowerment, while building universal access and broad availability of opportunities in Tanzania;
- Provide citizens with universal access to ICT in order to improve their productivity and to broaden their opportunities for knowledge sharing and for generating local content;

- Provide special incentives for investors to deliver broadband connectivity to hitherto disenfranchised and isolated populations in the country;
- Encourage the use of existing community access points by schools and other learning institutions as part of their curricula and facilitate the construction of such access points within, or in easy reach of, their premises;
- Build awareness that investment in and through ICT in remote areas is a potent means of reducing the cost of rural-urban transactions; and
- Facilitate the creation of grass-roots networks for wealth-creation through trade, both within the country and internationally.
- Put into operation the Rural Telecommunications Development Fund.

## **Togo**

### **Economic Overview.**

The GDP has been reported to be about \$5.927 billion with a growth rate of 3.3% (CIA, 2010). The unemployment rate of this country is unknown; however, as of 1989 (last reported statistic) 32% live below poverty (CIA, 2010). Agriculture is the main industry in Togo with 65% of its labor force comprising this sector (CIA, 2010).

### **Internet Access/Usage.**

There are 356,300 Internet users as of Jun/2010, which is 5.7% of the population, per ITU. There are also 33,260 Facebook users as of August 31/2010, which is a 0.5% penetration rate (InternetWorldStat.com).



**Literacy Rates.**

As of 2003, the literacy rate is 60.9% with a school life expectancy of 10 years (CIA, 2010). Also, reported in 2007, 3.7% of GDP was spent on educational initiatives (CIA, 2010).

**Government Policies.**

After researching on numerous governmental sites, as well as independent articles, the country of Togo has no active ICT policies or regulations.

**Uganda****Economic Overview.**

The GDP is estimated at \$41.7 billion with a growth rate of 5.8% (down from 7.2% in 2009) (CIA, 2010). The unemployment rate of this area is unknown; however, a 2001 census reported that 35% of the population lives below poverty (CIA, 2010). Agriculture remains the largest industry sector with 82% of the labor force comprising this sector (CIA, 2010).

**Internet Access/Usage.**

| YEAR | Users     | Population | % Pop. |
|------|-----------|------------|--------|
| 2000 | 40,000    | 24,400,000 | 0.1 %  |
| 2006 | 500,000   | 28,574,909 | 1.7 %  |
| 2007 | 750,000   | 30,262,610 | 2.5 %  |
| 2008 | 2,000,000 | 31,367,972 | 6.4 %  |
| 2009 | 2,500,000 | 32,369,558 | 7.7 %  |

**Literacy Rates.**

Literacy rate, as of 2002, is estimated to be about 66.8% with a school life expectancy of 10 years (CIA, 2010). It was also recorded in 2009 that 3.3% of GDP was spent on educational initiatives (CIA, 2010).

**Government Policies.**

According to the Ministry of Works, Housing, & Communication (MWHC), the scope of Uganda's National ICT Policy Framework covers information as a resource for development, mechanisms for accessing information, and ICT as an industry, including e-business, software development and manufacturing (MWHC, 2002). The policy looks at various categories of information from different sectors, essentially aimed at empowering people to improve their living conditions. The sectors include: health, education, agriculture, energy, environment, business, and science & technology (MWHC, 2002).

The liberalization of the acquisition, use and application of ICT led to a rapid expansion of the ICT industry in Uganda over the last ten years. Various technologies that have been adopted include: cellular and mobile telephone networks, mobile radio communication, paging services, courier services, multi-purpose community tele-centers (which offer a broad range of communication services such as fax, telephone, computer services, e-mail and Internet, media services, books and other reading materials, etc.) (MWHC, 2002).

The IDRC funded study (1998) on the current status of ICT revealed low coverage and skewed distribution of ICT infrastructure in the country (MWHC, 2002). This was concentrated in urban areas, especially around Kampala. The private service providers have no incentive and lack the requisite infrastructure as well as, appropriate policy and legislative

framework to cater for nationwide coverage. The maintenance and sustainability of the ICT development initiatives also remain a critical challenge (MWHC, 2002).

## **Zambia**

### **Economic Overview.**

As per The World Fact Book, GDP is estimated to be \$20.03 billion with a growth rate of 7% (up from 6.3% in 2009) (CIA, 2010). The unemployment rate has been estimated at 50% in 2000 and 86% of the population in 1993 living below poverty (CIA, 2010). Agriculture is the main industry with 85% of the labor force comprising this sector (CIA, 2010).

### **Internet Access/Usage.**

Reports show that there are 816,000 Internet users as of June/2010, which is 6.8% of the population, per ITU. There are also 56,640 Facebook users as of August 31/2010, a 0.5% penetration rate (InternetWorldStat.com).

### **Literacy Rates.**

Estimated in 2003, the literacy rate is 80.6% with a school life expectancy of about seven years (CIA, 2010). It was also reported in 2008, that 1.4% of GDP was spent on educational initiatives (CIA, 2010).

### **Government Policies.**

The Zambian Government's ICT sector vision is "A Zambia transformed into an information and knowledge-based society and economy supported by consistent development and pervasive access to ICTs by all citizens by 2030" (WIDNet, 2007).

Zambia's National Information and Communication Technology (ICT) Policy was launched on March 28th 2007 at the Mulungushi International Conference Centre in Lusaka,

Zambia under the theme “ICT- For accelerated wealth and job creation” (WIDNet, 2007).

This policy strives to provide access to information to all regions of the country to empower the rural population (WIDNet, 2007),

President Mwanawasa said “the policy set the framework for Zambia’s participation in the global economy and the government, through the policy, intends to bridge the digital divide among Zambians by transforming Zambia into an economy based on information and knowledge, supported by consistent development” (Ministry of Education (MOE), 2007). The actual documentation of this policy could not be tracked down.

## **Discussion**

Without the Internet, government ICT policies, technological learning, and other such areas of IT, Microfinance would not have been made available to help promote socio-economic sustainability in developing economies. Microfinance is not a new concept, as actual MFIs have existed since the late 1970s. However, it has not been until recently that IT has made its way to bridging the gap between the developed and the developing world. Through a content analysis of websites that provide peer-to-peer microfinance services, the contribution of IT to Microfinance in developing economies is unquestionable. By utilizing the aggregate loan amount as a surrogate measure of the contribution of IT, a cross-sectional sample of 847 transactions showed the contribution of IT to be \$1,156,206.08. The following discussion has been separated according to the aforementioned propositions.

**Table 31. Findings from Content and Country Analyses**

| Countries Represented | Total Loan Amount from Content Analysis | Most Common Industry found in Content Analysis | Economic Growth (%) | Main Industry of Country | Internet Usage (%) | Literacy Rate (%) | ICT Gvt Policy (Started-Ended) | ICT Readiness Index |
|-----------------------|---|--|---------------------|--------------------------|--------------------|-------------------|--------------------------------|---------------------|
| <b>Uganda</b>         | \$169,248.96                            | Food   | 5.8%                | Agriculture              | 7.7%               | 66.8%             | 2002-N/A                       | 115                 |
| <b>Ecuador</b>        | \$152,004.90                            | Agriculture                                    | 2.4%                | Service                  | 12.6%              | 91%               | 2006-N/A                       | 114                 |
| <b>Peru</b>           | \$91,249.99                             | Retail   | 7.8%                | Service                  | 26.2%              | 92.9%             | 2005-N/A                       | 92                  |
| <b>India</b>          | \$89,021.04                             | Service  | 8.3%                | Agriculture              | 6.9%               | 61%               | 2010-2015                      | 48                  |
| <b>Mexico</b>         | \$84,505.07                             | Retail   | 5%                  | Service                  | 27.2%              | 86.1%             | 2007-2030                      | N/A                 |
| <b>Rwanda</b>         | \$ 82,891.11                            | Retail   | 6%                  | Agriculture              | 4.1%               | 70.4%             | 2000-2020                      | N/A                 |
| <b>Kenya</b>          | \$75,596.75                             | Agriculture                                    | 4%                  | Agriculture              | 8.6%               | 85.1%             | 2005-N/A                       | N/A                 |
| <b>Nicaragua</b>      | \$60,040.99                             | Personal                                       | 2.8%                | Service                  | 10%                | 67.5%             | N/A                            | 125                 |
| <b>Cambodia</b>       | \$59,599.84                             | Agriculture                                    | 4.1%                | Service                  | .5%                | 73.6%             | 2010-N/A                       | 117                 |
| <b>Lebanon</b>        | \$ 43,650.00                            | Service  | 7.2%                | Service                  | 24.2%              | 87.4%             | 2003-N/A                       | N/A                 |
| <b>Azerbaijan</b>     | \$28,525.00                             | Agriculture                                    | 3.7%                | Service                  | 44.4%              | 99.8%             | 2005-N/A                       | 64                  |
| <b>Tanzania</b>       | \$ 24,671.67                            | Food   | 6.4%                | Agriculture              | 1.3%               | 69.4%             | 2002-2025                      | 120                 |

|                           |             |                |             |             |       |       |           |     |
|---------------------------|-------------|----------------|-------------|-------------|-------|-------|-----------|-----|
| <b>Mongolia</b>           | \$21,909.99 | Agriculture    | 7%          | Service     | 11.3% | 97.8% | 2000-2010 | 94  |
| <b>Kyrgyzstan</b>         | \$20,562.00 | Agriculture    | -3.5%       | Agriculture | 39.8% | 98.7% | 2002-N/A  | 123 |
| <b>Colombia</b>           | \$17,624.95 | Retail         | 4.4%        | Service     | 48.7% | 90.4% | 2010-N/A  | 60  |
| <b>El Salvador</b>        | \$16,475.00 | Retail         | 1.2%        | Service     | 16.1% | 81.1% | 2002-N/A  | N/A |
| <b>Philippines</b>        | \$16,348.83 | Retail         | 6.7%        | Service     | 29.7% | 92.6% | 2006-2010 | 85  |
| <b>Armenia</b>            | \$13,010.00 | Retail         | <b>4.7%</b> | Agriculture | 47.1% | 99.4% | 2001-2006 | 101 |
| <b>Dominican Republic</b> | \$11,449.97 | Clothing       | 4.2%        | Service     | 30.5% | 87%   | 2011-N/A  | 74  |
| <b>Bolivia</b>            | \$11,371.75 | Transportation | 3.8%        | Service     | 10.4% | 86.7% | N/A       | 131 |
| <b>Togo</b>               | \$10,905.22 | Retail/Food    | 3.3%        | Agriculture | 5.7%  | 60.9% | N/A       | N/A |
| <b>Afghanistan</b>        | \$10,875.05 | Service        | 8.9%        | Service     | 3.4%  | 28.1% | 2003-N/A  | N/A |
| <b>Tajikistan</b>         | \$10,772.00 | Agriculture    | 5.5%        | Agriculture | 9.3%  | 99.5% | N/A       | 109 |
| <b>Sichuan</b>            | \$9,326.00  | Retail         | 10.3%       | Agriculture | N/A   | 91.6% | 2009-N/A  | 37  |
| <b>Benin</b>              | \$6,875.00  | Retail/Food    | 3%          | Service     | 1.8%  | 34.7% | 2003-2025 | 111 |
| <b>Honduras</b>           | \$3,790.00  | Retail         | 2.5%        | Agriculture | 12%   | 80%   | 2006-2011 | 106 |
| <b>Senegal</b>            | \$3,001.00  | Retail         | 3.9%        | Agriculture | 7.4%  | 39.3% | 1999-2005 | N/A |

|                  |             |              |      |             |       |       |               |     |
|------------------|-------------|--------------|------|-------------|-------|-------|---------------|-----|
| <b>Ghana</b>     | \$ 2,575.00 | Retail       | 4.7% | Agriculture | 4.2%  | 57.9% | 2003-<br>N/A  | 98  |
| <b>Jordan</b>    | \$ 2,150.00 | Agriculture  | 3.2% | Service     | 27.2% | 89.9% | 2003-<br>N/A  | 44  |
| <b>Mali</b>      | \$ 2,000.00 | Food         | 5.5% | Agriculture | 1.8%  | 46.4% | 1996-<br>1997 | N/A |
| <b>Haiti</b>     | \$1,224.00  | Food         | -8%  | Agriculture | 10.4% | 52.9% | N/A           | N/A |
| <b>Malawi</b>    | \$1,000.00  | School       | 6.5% | Agriculture | 4.6%  | 62.7% | 2002-<br>2006 | 119 |
| <b>Georgia</b>   | \$800.00    | Retail       | 4.3% | Agriculture | 28.3% | 100%  | 2009-<br>N/A  | N/A |
| <b>Russia</b>    | \$ 350.00   | Agriculture  | 3.8% | Service     | 42.8% | 99.4% | 2002-<br>2010 | 80  |
| <b>Zambia</b>    | \$280.00    | Food/ School | 7%   | Agriculture | 6.8%  | 80.6% | 2007-<br>2030 | 97  |
| <b>Guatemala</b> | \$ 275.00   | Food         | 2.2% | Agriculture | 16.8% | 69.1% | N/A           | N/A |
| <b>Kosovo</b>    | \$ 250.00   | Clothing     | N/A  | Agriculture | 20.8% | 91.9% | 2008-<br>2015 | N/A |



**Proposition #1: Development of IT infrastructure (i.e., telecommunications, Internet/broadband access, etc.) will result in a greater contribution of IT to economic sustainability through peer-to-peer microfinance in developing countries.**

The results of this study in terms of proposition #1 were very surprising. The data show that the countries with the greatest contribution of IT to sustaining economies in developing countries through microfinance had the most limited Internet access. Countries with moderate IT infrastructure levels had the greatest contribution of IT to sustaining economies in developing countries through microfinance. For example, Uganda and Ecuador had aggregate contribution amounts of over \$150,000 respectively, yet the Internet penetration into the population of these countries were under 15% according to as indicated in Table 31. However, one factor that helps explain these findings with regard to Ecuador in contributing to a higher aggregate loan amount is that of its literacy rate of 91% (see Table 31). Ecuador has established high educational initiatives for its people, and therefore, Ecuador has the ability to learn and understand how to utilize the Internet at a faster pace than that of lesser educated countries such as Benin, with a literacy rate of about 34% and aggregate loan amount of under \$7,000 (see Table 31). Uganda on the other hand, has established microfinance initiatives through the government by implementing a Micro Deposit-Taking Institutions Bill in 2001. This increases awareness of microfinance and allows the people of this particular country to have easier access to government and outside help in order to establish socio-economic sustainability.

Other factors may be contributing to these surprising numbers. It could be that places like Uganda and Ecuador have other means of gaining access to funding. Or international cooperation is higher in countries such as Armenia and Columbia. One other explanation

could be that the population was not adequately prepared for the increase in Internet access and additional educational initiatives need to be put into place. For example, the country of Russia has an Internet penetration of 42.8%; however, the contribution of IT to sustaining economies in developing countries through microfinance is only \$350.00. One explanation for this low contribution may be the rapid expansion of the Internet. From 2000 to 2010 the access to Internet increased by 40%. Just from the years 2009 to 2010, the increase of Internet access went from about 32% to the now 42.8%.

Patronizing P2P Microfinance sites requires more than simply having access to the Internet; it also requires education to help prepare individuals for the presence of the Internet and how to take advantage of the opportunities it offers.

**Proposition #2: Governmental policies encouraging the use of technology to connect individuals in developed and developing countries will result in a greater contribution of IT to economic sustainability through peer-to-peer microfinance in developing countries.**

It is clear through the results of the content analysis that those countries that have established ICT policies during the rise of the Internet have a greater contribution of IT to sustaining economies in developing countries through microfinance. It can also be shown that these ICT policy initiatives are on-going and changing as the IT world changes to help give the citizens of these countries better opportunities.

For example, Uganda, Ecuador, and Peru established ICT policies between 2002 and 2006. These policies are still being implemented and can be shown through the ICT index ratings referred to in Table 31. The governments with on-going ICT initiatives, and higher

ICT readiness ratings seemed to have a better contribution to Microfinance. Uganda and Ecuador, previously discussed, had contributions over \$150,000 and Peru had a contribution of over \$90,000. The ICT readiness indexes of these countries were 115,114, and 92 respectively.

Countries on the lower end of the spectrum were found to either have no ICT policies at all or had started policies in the 2008-2010 range. For example, Kosovo started ICT policies in 2008 and is projected to have full implementation by 2015 (in line with the Millennium Development Goals). Guatemala, through extensive research, was found to have no ICT initiatives developed at this point. The lack of ICT initiatives can be shown through the contribution of IT to sustaining economies in developing countries through microfinance, as each country had an aggregate contribution of under \$300 respectively.

If a government can help promote ICT initiatives, and give support to its people, then the possibility of individuals utilizing Microfinance in order to help sustain socio-economic development will increase the contribution of IT to Microfinance.

**Proposition #3: Governmental investments in technology-oriented education will result in a greater contribution of IT to economic sustainability through peer-to-peer microfinance in developing countries.**

Technological education becomes the next greatest initiative of governments to help increase the utilization of the Internet. It is one thing to be able to connect to the Internet, but if people are unable to understand how the Internet can be beneficial, then ultimately, the Internet becomes useless. As with the example of Russia, as ICT development and initiatives

become implemented, government needs to simultaneously implement educational/training of such technologies in order to increase individual utility.

One example of educational initiatives comes from India. As seen in table 31, India is ranked in the top five countries in terms of contribution of IT to Microfinance. They have recently passed a new ICT development initiative which specifically includes education/training as a top priority. This initiative truly focuses on industry skill upgrading (starting at a student level) in order to keep up with other countries and promote new ICT services and products. Even though the Internet penetration is only 6.9%, this shows that even with a low penetration (but with a high population) India's people understand technology and are ready to use technology to its highest potential.

While there are many factors that could potentially affect utilization of peer-to-peer microfinance in developing countries, one important and yet unexplained factor affecting use is how a country's citizens become aware of peer-to-peer Microfinance. Technology-enabled peer-to-peer Microfinance is a viable mechanism to help sustain individuals, small businesses, and communities. However, a country's citizens must be aware of its existence in order to take advantage of it. It has been suggested that currently awareness of peer-to-peer microfinance relies largely upon word-of-mouth (Aziz, 2010).

It is feasible that if people had knowledge of peer-to-peer Microfinance sites and were given instructions on how to utilize them effectively, then the contribution of IT to sustaining economies in developing countries through Microfinance would increase dramatically. It could be beneficial for representatives of Microfinance organizations to go out to the countryside to promote their sites. NGOs could help people recognize the Internet as a place to gain access to funds at little risk to themselves; thus, there would be potential

for Microfinance to gain momentum. It was recognized that the average number of transactions on these sites at a given time is about 250. Imagine all of the people in developing countries who might take advantage of peer-to-peer microfinance if they were only unaware of these sites. Marketing, then, is clearly an important tool for increasing the contribution of IT to sustaining economies in developing countries through Microfinance.

## **Limitations**

The limitations of this study are as follows:

1. Since these sites are continuously updated, it was not possible to collect or obtain information on every transaction at every point of time. Therefore, not all transactions could be included within this study.
2. Data were collected over a three-week period for a number of hours each day. As data were not collected over all 24 hours of each day, certain transactions were missed during the data collection.
3. Site such as Zidisha.org and MYC4.com were primarily aimed towards specific regions in Africa and Asia , and therefore, a large sample from multiple countries was not collected on these sites. This may skew the number of transactions per country.
4. Due to governmental transparency issues or simply limited information, certain country data were unavailable.
5. Research focused primarily on positive aspects of microfinance and P2P lending. It is possible that there are negative affects limiting developing economies through microfinance; increasing the digital divide further. This may leave aspects of Internet development and utilization of microfinance unresolved.

### **Future Research**

Future studies should examine on- going government ICT policies, technological programs, and other initiatives to help support the populous in a developing country. While monitoring such activities, Microfinance transactions can be monitored simultaneously over this time period to determine if the contribution increases or decreases in relation to the development of ICT initiatives.

Another topic that can be examined is that of implications of Microfinance. There may be instances where the Internet and Microfinance in general hinder and widen the digital divide between the rich and poor of a country. It would be interesting to study the negative aspects of Microfinance in a developing country.

Additionally, international leaders of the world have determined eight millennium development goals to be accomplished by 2015. It would be interesting to see country comparisons between now and 2015 in order to understand which stage of development countries currently reside and examine the different approaches countries used in order to sustain its government and people.

Lastly, developing countries can be categorized and examined in regards to land locked countries, those countries that border an already developed nation, and other categories that may either hinder or help development of a particular country.

## **Conclusion**

Research examining the economic impacts of information technology is often built upon causal assumptions that give rise to a serious “black box” problem, which may severely limit understanding of the real contributions of IT, particularly in situations where economies are often tied to individual performance. By conducting an exploratory study of peer-to-peer microfinance, this study has shown unequivocally that information technology is providing a positive impact on economies in developing countries. Furthermore, the results from this study provide a foundation for other studies. Researchers wishing to study the contribution of IT to sustaining economies in developing countries through peer-to-peer microfinance will have a foundation upon which to build. This study, while highly exploratory, was able to determine that IT is certainly impacting developing economies. Furthermore, this study gives insight into which countries are benefitting most from the contribution of IT through peer-to-peer microfinance and raised possibilities about why certain countries may be benefitting more than others.

It will be interesting to see the direction Microfinance takes as developing countries become more sophisticated with IT development, or “...when you start to connect the world’s poor into the infrastructure for a digital economy” (Heeks, 2010, p. 22). It is likely that Microfinance will continue to play a major role in developing economies as a way to promote socio-economic sustainability as awareness of this service increases and as Internet becomes more ingrained in the practices of developing populations. We must remember that without information technology, peer-to-peer microfinance would not exist; therefore, this



study has shown that IT is having an unquestionable impact upon economies in the developing world.

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## Vita

Sarah Michele Byers was born in Weymouth, Massachusetts, on October 16, 1987. She grew-up in the small town of Southbury, Connecticut where she attended and graduated from Pomperaug Regional High School in 2006. Sarah pursued secondary education where she graduated from California State University, Monterey Bay with a B.A. in Business Administration and concentrated in the areas of marketing and international management.

In the fall of 2010, Sarah was accepted and attended the graduate program at Appalachian State University where she attained her M.B.A in August of 2011. Sarah has future plans to move to Exton, Pennsylvania where she will work for Bentley Systems, a global engineering and architectural software company, as a part of the event marketing team.