



## Conference Draft

# **Virtual Bazaar: An E-Commerce Model to help Microtrade in Least Developed Countries**

Farid Shirazi, Ryerson University

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# Virtual Bazaar: An E-Commerce Model to help Microtrade in Least Developed Countries

Farid Shirazi, Ryerson University

## Abstract

This empirical study investigates the impacts of Information and Communication Technology (ICT), educational attainment, the rule of law and other determinantal variables on the growth of Gross Domestic Products (GDP) among 35 Less Developed Countries (LDCs) in Africa and Asia regions. The results of this empirical analysis on archival data from 1997 to 2007 show that while ICT expansion in LDCs has positive impacts on GDP growth in these countries, however, the differences between countries in terms of the level of citizens' educational attainment, the rule of law, governmental intervention in economic activities and the level of Foreign Direct Investment (FDI) can both enhance and restrict the relationship between ICT and GDP growth. This study proposes an e-commerce model called Virtual Bazaar. The model is adapted to the existing level of ICT infrastructure in LDCs in order to enable the micro-trade owners to sell their products directly to potential customers across the globe, hence increasing their level of incomes.

**KEYWORDS:** *Micro Trade, Digital Divide, Virtual Bazaar, Economic intervention, FDI, ICT, Institutional democracy, Institutional resistance*

## I. Introduction

The declaration of the World Summit on the Information Society (WSIS) reaffirmed the 2003 WSIS Geneva summit in that ICT applications can support sustainable development in the areas such as public administration, business, education and training, health, employment, environment, agriculture and science. The 2005 WSIS also emphasized that governments in developing countries "should take action, in the framework of national development policies, in order to support an enabling and competitive environment for the necessary investment in ICT infrastructure and for the development of new services"<sup>1</sup>. According to UNCTD<sup>2</sup> ICTs provide opportunities for people in developing countries to promote development and economic growth by fostering innovation and improved productivity. In this context developing countries, and especially small, medium and micro sized enterprises (SMEs), can gain development through the use of ICTs to bring impressive gains in employment, gender equality, and standards of living.

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<sup>1</sup> WSIS (2005). World Summit on the Information Society. Available at: <http://www.itu.int/wsis/tunis/index.html>

<sup>2</sup> UNCTAD (2004). "South-South Investment Flows - A Potential for Developing Country Governments to tap for Supply Capacity Building", Background Paper No. 3 prepared by the UNCTAD secretariat, Doha, Qatar, December 5-6.

However, in today's networked society and information economy, developing countries face the challenge to develop affordable information and communication network infrastructure and applications for building the information economy<sup>3</sup>. As such, ICTs provide the opportunities to achieve sustainable development that has never been offered before<sup>4</sup>. These opportunities include but not limited to creating, accessing, utilizing and sharing information and knowledge with others as principles of achieving the full potentials in promoting sustainable development and improving the quality of life. According to Brown et al<sup>5</sup> it is expected that ICTs and in particular the Internet will have positive educational benefits for disadvantaged sectors of South African society, living primarily in high density urban and rural areas where there is poverty, lack of resources, and lack of educational facilities.

The benefits of ICTs in different segments of societies in providing opportunities for economic growth<sup>6</sup> have required many developing countries to make a significant effort to invest in their ICT infrastructure. From 1997 to 2007, on average the total ICT expansion in 35 LCDs has increased by 13 fold. This increase in the use of ICT tools and services is mainly due to ICT investment in these countries during the above period.

Many scholars in IS<sup>7</sup> research<sup>8</sup> and international organizations<sup>9</sup> shed light on the importance of ICT adoption in developing countries from the perspective of knowledge management and institutes

This paper investigates the extent to which ICTs can help citizens in 35 LCDs in Africa and Asia regions to improve their living condition by introducing an e-commerce model called Virtual Bazaar. This study investigates three prominent and interrelated issues in these countries: (1) the extent of the contribution of ICTs to GDP growth and (2) the impact of institutional resistance to ICT expansion, and in turn, transparency and accountability and (3) in what extend Internet application such as Web 2.0 applications can be used to improve the living conditions of citizens in LCDs.

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<sup>3</sup> UNCTAD (2006). Information Economy Report 2006: The development Perspective. Available at: <[http://www.unctad.org/en/docs/sdteecb20061\\_en.pdf](http://www.unctad.org/en/docs/sdteecb20061_en.pdf)>

<sup>4</sup> UNDP (2004). National ICT Strategy for Socio-Economic Development in Syria, Available at: <[http://www.undp.org.sy/publications/national/E-Strategy/ICT\\_Strategy\\_en.pdf](http://www.undp.org.sy/publications/national/E-Strategy/ICT_Strategy_en.pdf)>

<sup>5</sup> Brown, I., Collins, T., Maleka, B., Morrison, D., Muganda, N., and Speight, H. (2007). Global Diffusion of the Internet XI: Internet Diffusion and Its Determinants in South Africa: The First Decade of Democracy (1994-2004) and Beyond, *Communications of the Association for Information Systems*, 19(2007), 142-182.

<sup>6</sup> Avgerou, C. (2008). Information systems in developing countries: a critical research review. *Journal of Information Technology*, 23(3), 133-147.

<sup>7</sup> In the context of business organizations, this study views ICTs as the infrastructure of Information Systems and a subset of it. Therefore scholarly researches in IS are applicable to ICT issues as well.

<sup>8</sup> Avegerou, C. (2010). Discourse on ICT and information, *Information Technologies and International Development*, 6(3), 1-18. See also:

Walsham, G., Sahay, S. (2006). Research on Information Systems in Developing Countries: Current Landscape and Future Prospects. *Information Technology for Development*, 12(1), 7-24.

<sup>9</sup> UNCTAD (2006). The Digital Divide Report: ICT Diffusion Index 2005, New York and Geneva, 2006. See also: UNCTAD, Information Economy Report 2006, The Development Perspective and; World Investment Report 2006: FDI from Developing and Transition Economies: Implications for Development, UNDP (2006). "Human Development Reports, Statistics of the Human Development Report." Available at: <<http://hdr.undp.org/en/statistics>>

To investigate these issues, a robust regression method was applied on the panel data for the period of 1997-2007.

## **II. ICTs and Economic Growth: Empirical Analysis**

A growing number of scholars argue that investment in ICT, particularly in machinery, equipment, infrastructure and software will contribute to economic growth<sup>10</sup>. For example, Hamilton<sup>11</sup> shows that investment in basic telecommunication in Africa had a positive impact on economic, political and institutional development.

### **A. Empirical Analysis of Panel Data**

What does ICT expansion contribute to GDP growth in these countries and to what extent the rule of law, education, FDI inflow and institutional resistance impact such growth? To investigate the above questions the following hypotheses has been applied on panel data to test the relationship among these variables.

*H1: ICT positively impacts the growth of GDP in LCDs. As the level of ICT expansion increases it will provide opportunities for citizens in LCDs to promote development and economic growth by fostering innovation and improved productivity.*

ICTs in form of Web 2.0 applications, mobile cell phone networks, e-mails and so on have provided SMEs the opportunity to effectively and efficiently participate in business activities across the globe in a cheaper, faster and yet more effective manner. Scholarly research has argued that investment in ICTs is positively correlated with growth in economic, labor productivity and demand for skilled workers. For example, ICT has played a vital role in advancing economic growth at regional, national, and global levels, and that there is enormous promise for the future<sup>12</sup>.

While earlier studies on developing countries do not show the significance of ICT investment on economic growth, the results from recent empirical studies are rather mixed and inconclusive<sup>13</sup>. While in the last two decades, ICT investment has played a significant role in economic growth by increasing productivity in emerging economies in the Asia-Pacific region, such as China, Malaysia, Thailand, Vietnam, and the Philippines, due to political and economic reform<sup>14</sup> its impacts in other developing countries are

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<sup>10</sup> DeLong, J.B. and Summers, L.H. (1991). Equipment Investment and Economic Growth, Quarterly Journal of Economics, 106(2), 445-502.

Correa, L. (2003). "The Economic Impact of Telecommunications Diffusion on UK Productivity Growth", Working Paper 492, Department of Economics at Queen Mary, University of London.

<sup>11</sup> Hamilton, J. (2000). "Institutions, Competition and the Performance of Telecommunications Infrastructure in Africa", PURC working paper, University of Florida, Gainesville.

<sup>12</sup> Guislain, P., Qiang, Z.C., Lanvin, B., Mingos, M. and Swanson, E. (2006). "Information and Communication for Development", Global Trends and Policies, The World Bank.

<sup>13</sup> Ko, M. and Osei-Bryson, K-M. (2002). "An Exploration of The Impact of Information Technology Investments in the Healthcare Industry: A Regression Splines Based Analysis", In Proceedings of 8th Americas Conference on Information Systems, August 9-11, Dallas, Texas, USA.

<sup>14</sup> Pipe, G. R. (2003). Vietnam Promotes ICT to Accelerate Development, I-WAYS, The Journal of E-Government Policy and Regulation, 26(1), Amsterdam: ISO press.

Quynh, N. (2006). "Digital Review of Asia-Pacific 2005/2006: Vietnam" Available at: <<http://www.digital-review.org>> .

mixed and a matter of debate in literature<sup>15</sup>. For example the empirical study by Osei-Bryson and Ko<sup>16</sup> (2004) shows that ICT investments has a positive statistically significant impact on productivity and growth only when it exceeds a threshold value. In other words ICT investment has to surpass some minimum value before it can be expected to have a statistically significant impact on productivity. The empirical study conducted by Ko and Osei-Bryson shows that investment in ICTs can maximize productivity when such an investment is integrated with investments in non-IT labor and non-IT capital.

*H2: The level of populace educational attainment is positively correlated with ICTs. The more educated the population in each country, the more demand for ICTs will increase, in turn having a positive effect on economic development and growth.*

According to UNCTAD the higher education tends to be associated with higher labor productivity, greater ease in finding formal sector employment, and higher income. As such we can expect that there is a strong correlation between ICT expansion in a country and the level of its income as measured by GDP per capita and the level of education of its citizens. In today's economy education is a core component of the transition of each country towards participation in the global information society according to ITU<sup>17</sup> 2007 report. According to Brown ICTs and in particular the Internet will have positive educational benefits for disadvantaged sectors of South African society, living primarily in high density urban and rural areas where there is poverty, lack of resources, and lack of educational facilities. The results of empirical study conducted by Ssewanyana<sup>18</sup> with regard to ICT access and poverty in Uganda show that a combination of ICTs with improved citizens' educational attainment is associated with lower incidence of poverty.

*H3: The rule of law in which agents have confidence in and abide by the rules of society is positively correlated with ICT development which in turn positively correlated with the growth of GDP.*

The rule of law and the existence of independent judiciary are relevant to ICT expansion and the growth of GDPP because national policies can either enhance or hold back diffusion of a technology, depending on the approach to regulating mechanisms,

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Tan, Z. (2004). Evolution of China's Telecommunications Manufacturing Industry: Competition, Strategy and Government Policy, Communication & Strategies, No 53.

<sup>15</sup> Walsham, G. and Sundeep, S. (2006). Research on Information Systems in Developing Countries: Current Landscape and Future Prospects, Information Technology for Development, 12 (1), 7-24.

Morawczynski, O. and Ngwenyama, O. (2007). Unraveling the Impact of Investments in ICT, Education and Health on Development: An Analysis of Archival Data of Five West African Countries Using Regression Splines, Electronic Journal of Information Systems in Developing Countries. 29(5), 1-15.

Nwagwu, E. W. (2006). Integrating ICTs into the Globalization of the Poor Developing Countries, Information Development, 22(3), 167-179.

<sup>16</sup> Osei-Bryson, K-M. and Ko, M. (2004). Exploring the relationship between information technology investments and firm performance using regression splines analysis, Information & Management, 42 (2004), 1-13.

<sup>17</sup> ITU (2007). Measuring The Information Society 2007: ICT Opportunity Index and World Telecommunication/ICT Indicators, Geneva: ITU Publication.

<sup>18</sup> Ssewanyana, J., K. (2007). ICT Access and Poverty in Uganda, International Journal of Computing and ICT Research, 1(2), p. 10-19.

privatization, and free competition outlined in such policies<sup>19</sup>. The rule of law in which agents have confidence in and abide by the rules of society is the cornerstone of any business activities. It is clear that citizens living in countries with progressive rule of law have better opportunities to engage in business. Since the quality of the rules of society including the contract enforcement, property rights, the law enforcement and the courts ensure a harmonious and stable society in which people can engage in business activities without fear of aggression from others including government and elites in power.

*H4: FDI flow in LCDs and in particular investment in ICT infrastructure has a positive impact on economic growth as measured by GDP.*

There is a mutual and positive correlation between ICT expansion and the intensity of FDI flow in developing countries. There is a mutual relationship between FDI flow and ICT expansion. On one hand those developing nations that successfully invested in their ICT infrastructure were also able to attract more FDI flow into their economies. On the other hand ICTs require not only heavy investment but also necessary skills and knowledge to implement and maintain such an infrastructure, therefore foreign direct investment is considered as a major source of ICT financing, R&D resources and other knowledge-based services.

FDI flow in LCDs has never been small compared to other countries including the developing nations. A review of UNCTAD dataset shows that even this small value was subject to further decrease from 1987 to 2007. For example, in 1987 the FDI flow into LCDs (Africa, Asia and Haiti) was estimated as 0.644% of the total global FDI flow (see table 1 in Appendix A). This value decreased to 0.550% and 0.539% respectively in 1997 and 2007. This decrease is in particular noticeable considering the growth of population in these countries. The population of least developed countries in Africa, Asia and Haiti was estimated as 9.3% of the world's population in year 1987. This value increased to 10.4% and 11.7% of the total global population in 1997 and 2007 (see table 2 in Appendix A).

According to Shirazi et al<sup>20</sup>, there has been a significant amount of FDI flow from developed nations in other developed countries the so called North-North investment or into developing countries (North-South investment). In recent years a new tendency has been emerged regarding FDI namely the South-North investment, where some of the developing and transitional economies are investing in developed countries and/or in other developing countries including LCDs (South-South investment). This is in particular noticeable with regards to ICT investments. For example some of the well developed ICT nations in the Middle East (e.g., UAE, Qatar, Kuwait) are actively

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<sup>19</sup> Shirazi, F., Higon, D. A. and Gholami, R. (2010). Do FDI and Trade Openness Explain the Digital Divide between Asia Pacific and Middle East', expected to appear in Journal of Global Information Management (JGIM), 18(3).

<sup>20</sup> Shirazi, F., Higon, D. A. and Gholami, R. (2011). ICT diffusion and Foreign Direct Investment: A Comparative study between Asia-Pacific and the Middle Eastern Economies, in Tan, B. F. (ed.) International Comparisons of Information Communication Technologies: Advancing Applications. IGI Publication.

engaged in telecom investment particularly in mobile telephone systems in some of the Sub-Saharan African countries.

*H5: Institutional resistance in the economy will negatively impact the expansion of ICT.*

Institutional resistance in the form of government involvement in business activities and the imposed regulations on businesses is considered as a barrier for the private sector and individuals to participate in fair and transparent business activities. According to Miles et al.<sup>21</sup> the degree of freedom to operate a business is strongly related to the low regulatory burden imposed by governments. They argue that countries must maintain an open environment for business activities since extensive burdensome regulations provides an environment in which private sectors cannot operate without the fear of bureaucracy and corruption in political establishment. The private sector should not only be able to invest in an ICT infrastructure but also use ICTs as a means of competitive advantage to conduct business.

While much of the empirical literatures in regards to economic growth in developing countries are focused on the impact of ICT investment or the degree of such an investment in conjunction with other infrastructure investments (e.g., roads, health, education) on the economic growth, a less focus and attention have been paid to view economic freedom as a fundamental human rights matter as outlined in the United Nations' *Universal Declaration of Human Rights (UDHR)*. For example the second column of UDHR (Articles 12-17) has paid close attention to the rights of the individuals in civil and political society. In particular, Article 17 emphasizes on the property rights of individuals and/or in association with others. As such heavy governmental control in business activities and/or elites in the power, in particular the military remain not only the main obstacles to economic growth and development but also these activities are in violation of UDHR declaration as described above.

## **B. Data Collection**

The index of rule of law (variable *law*) was collected from the World Bank's database. This institute rates each country's adherence to the rule of law on a scale of -2.5 to 2.5 (-2.5 being the worst legal environment and 2.5 as the most progressive). For the purposes of this study, a rescaling and conversion of this index was performed to indicate one as the lowest legal environment and 100 as the highest.

The ICT index is composed of four main indicators including main telephone lines, mobile cellular phones, Internet users and the number of PCs per 100 inhabitants. These were mainly collected from ITU data.

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<sup>21</sup> Miles, A.M., Holums, R.K. and O'Grady, A.M. (2006). *The 2006 Index of Economic Freedom*, Washington, DC: The Heritage Foundation.

The education index was collected from UNDP, The World Bank and ITU. To emphasize on higher education as a means of accessing ICT tools and service the formula  $education = (\text{primary} + 2 \times \text{secondary} + 3 \times \text{tertiary}) / 6$  introduced by ITU-Orbicom (2005), was used in this study. This index (variable *edu*) scores each country's educational performance for the period of 1997 to 2007.

The government intervention index (variable *resist*) by Heritage Foundation and Wall Street Journal is composed of variables such as government consumption as a percentage of the economy, government ownership of businesses and industries, share of government revenues from state owned enterprises and government ownership of property and economic output produced by the government. A score of one indicates the least institutional resistance and a score 100 indicates the highest level of resistance.

The Gross Domestic Product per capita (variable *GDPP*) is used as a means of measuring each country's level of economic development.

### C. Regression Analysis

Following the literature review, the regression model shown in equation (1) was constructed as follows:

$$gdp_{it} = \alpha_0 + \alpha_1 ict_{it} + \alpha_2 edu_{it} + \alpha_3 law_{it} + \alpha_4 resist_{it} + \alpha_5 fdi_{it} + \varepsilon_{it} \quad (1)$$

where *i* indexes the 35 countries in this study,  $\alpha_0$  is a constant,  $\alpha_1$  through  $\alpha_4$  are variable coefficients and  $\varepsilon_{it}$  is the error term. The dependent variable  $gdp_{it}$  denotes the growth of GDP in each country, while independent variables such as  $ict_{it}$ ,  $edu_{it}$ ,  $law_{it}$ ,  $fdi_{it}$  and  $resist_{it}$  represent the level of ICT expansion, educational attainment, the existence level of legal institute, the intensity of institutional resistance in business activities and the flow of FDI flow in each country for the period of 1997-2007.

To better understand the mutual relationships among variables and in particular the relationship between ICT as dependent variable and GDP growth, education, FDI flow the index of law and institutional resistance the following regression model was constructed:

$$ict_{it} = \alpha_0 + \alpha_1 gdp_{it} + \alpha_2 edu_{it} + \alpha_3 law_{it} + \alpha_4 resist_{it} + \alpha_5 fdi_{it} + \varepsilon_{it} \quad (2)$$

Also, to identify the eventual linear relationships among dependent and independent variables the model was tested for issues such as multicollinearity and heteroskedasticity. The first problem was to identify the multicollinearity issue among variables. This problem is mainly linked to a high level of correlation among independent variables that may cause a swing in parameter estimation due to small changes in data. To test for multicollinearity the model's Variance Inflation Factor (VIF) was estimated. As depicted in table 1, the VIF values for equations 1 and 2 are reported as 1.16 and 1.23 respectively which are far from the VIF critical value of 30 (server multicollinearity).



To handle the issue of heteroskedasticity a robust regression analysis was applied on panel data. According to White<sup>22</sup>, the heteroskedastic error occurs when the error term  $\varepsilon_{it}$  appear to be a function of independent variables.

### III. Regression Analysis

Table 1 below shows the results of regressions against on panel data for equations 1 and 2 with a confidence interval of 95%. Also, figure 1 reports correlation matrix among variables as depicted in equations 1. The conditions for analyzing the results of the regression analysis of the panel data was to reject the hypothesis if  $P>|t|>0.05$  otherwise accept the claim.

Table 1: Regression results for equations 1 and 2

Equation (1)					Equation (2)				
Number of obs = 385 F( 5, 379) = 44.73 Prob > F = 0.0000 R-squared = 0.3902 Root MSE = .1764					Number of obs = 385 F( 5, 379) = 36.06 Prob > F = 0.0000 R-squared = 0.2951 Root MSE = 6.5415				
<i>gdpp</i>	Coef.	Robust Std. Err.	t	P> t	<i>ict</i>	Coef.	Robust Std. Err.	t	P> t
<i>ict</i>	0.0117	0.0014	8.31	0.000	<i>gdpp</i>	16.0711	1.7699	9.08	0.000
<i>edu</i>	0.0034	0.0009	3.86	0.000	<i>edu</i>	0.0626	0.0301	2.08	0.038
<i>law</i>	-0.0068	0.0009	-7.77	0.000	<i>law</i>	0.1722	0.0418	4.12	0.000
<i>resist</i>	-0.0003	0.0007	-0.44	0.660	<i>resist</i>	-0.0492	0.0288	-1.71	0.089
<i>fdi</i>	0.0432	0.0111	3.91	0.000	<i>fdi</i>	0.6500	0.3130	2.08	0.039
cons	2.5595	0.0924	27.69	0.000	cons	-38.4012	5.4801	-7.01	0.000
VIF	1.16				VIF	1.23			

As table 1 indicates:

1) The regression results for equation 1 shows a  $p$ -value lower than 0.05 for all variables except for *resist*. Therefore, the hypothetical condition to reject the hypotheses if ( $H=P>|t|>0.05$ ) is fulfilled. Furthermore, the  $t$ -values indicate that all variables are statistically significant at a level of 95%. However the impact of institutional resistance on dependent variable GDPP is reported as statistically insignificant.

2) The coefficients of variables *ict*, *edu* and *fdi* show positive values in regards to variable *GDPP* indicating their positive impact on GDPP in LCDs. Thus the results of our regression support the claims described in hypotheses H1, H2, and H4. Figure 1 shows the correlation matrix among these variables. Furthermore the results of regressions analysis for equations 2 supports the claim that educational attainment is positively correlated (H2) with the expansion of ICTs.

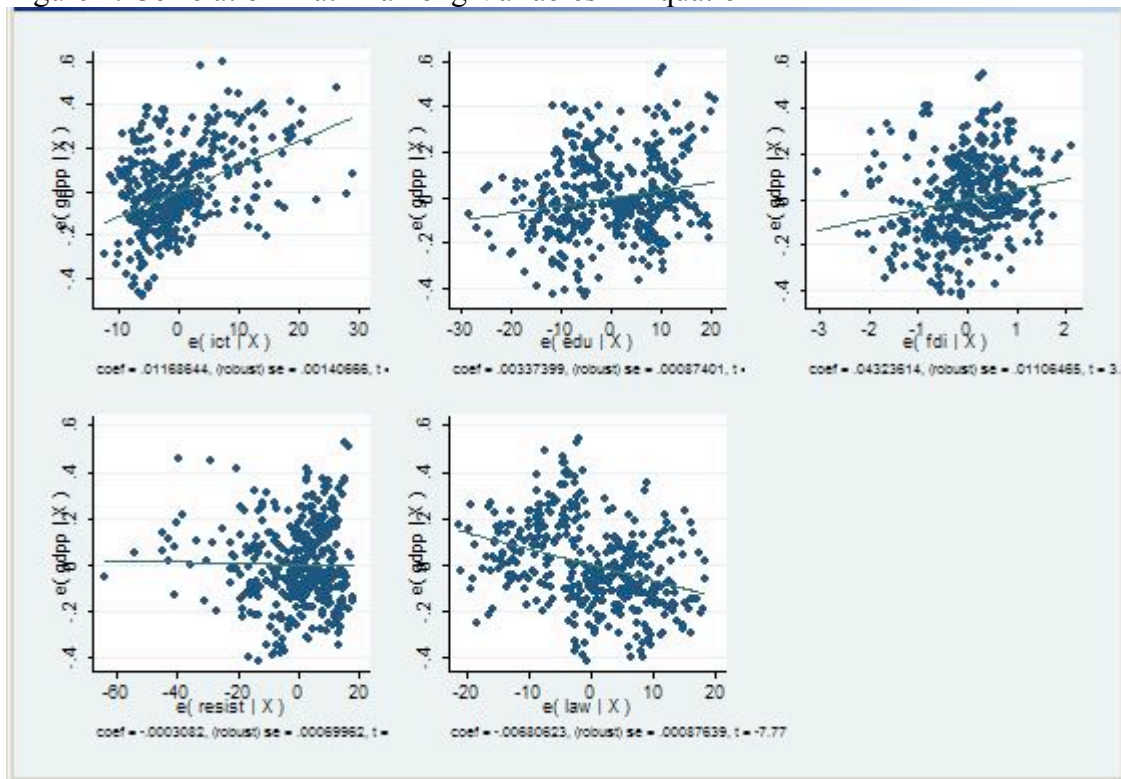
<sup>22</sup> White, H. (1980). A Heteroskedastic-consistent Covariance Matrix Estimator and a Direct Test of Heteroskedasticity, *Econometrica*, 48 ,817-838.

3) The coefficient of variable *law* shows a negative value with regards to dependent variable GDPP indicating that the existing level of rule of laws in these countries remains as the main barrier toward economic development and growth as measure by GDPP.

4) Despite the fact that FDI flow in LCDs constitutes a very small amount of the total global FDI flows, its impact on both GDPP growth and ICT expansion is reported positive and this impact is statistically significant. In particular investment in ICT infrastructure as described in equation 2 can positively impact the future expansion of ICTs and as a consequence contribute to the growth of GDPs in these countries. Thus we can conclude that the hypothesis H4 is supported by both regressions.

5) As mention earlier variable *resist* shows a value larger than 0.05 indicating its insignificant impact of independent variable GDPP. Therefore the claim presented in hypothesis H5 is rejected. Two main reasons for such an insignificance report may be explained as: 1) the important investment role that governments in these countries can play in investing in infrastructure (e.g., investments in roads and bridges, water system, education, healthcare and so on) as a foundation for development and economic growth; 2) the lack of strong local private enterprises in these countries.

Figure 1: Correlation Matrix among Variables in Equation 1



As mentioned above the results of regression analysis on panel data show that ICT has a positive impact of GDP growth and the increase in GDP will ultimately increase the demand for ICT products and services. However, the differences between countries in terms of the level of citizens' educational attainment, the rule of law, governmental intervention in economic activities and the level of FDI flows in these countries can both enhance and restrict the relationship between ICT and GDP growth. In the following section an e-commerce model based on the existing level of ICT infrastructure in LCDs will be discussed.

#### **IV. Virtual Bazaar an E-commerce Model for Micro-trade in LCDs**

According to Lee<sup>23</sup>, trade based micro-based economic development can break the cycle of poverty in least developed nations. By trading small units of material to international firms – this system of trade produces financial success for LDCs because it permits small business owners from these countries to sell their products directly to others including retailers without using a third party or a middleman. One way to achieve this goal is the pricing of products in an open global market. The e-commerce model called Virtual Bazaar (VB) is adapted to the level of ICT infrastructure in LDCs. VB enables the micro-trade owners to sell their products directly to the end consumer internationally. As depicted in figure 1 the model provides a reduction in transaction costs by advertising and selling the end products directly to customers and other businesses/organizations across the globe. As a result, micro-trade owners are able to bring in extra income, pour money into the economy and as a consequence contribute to country's GDP growth.

As discussed above the high cost of access to ICT services in LCDs remains of the main barriers in designing an effective customer-to-customer (C2C) e-commerce model for micro-trade owners in these countries. In recent years the digital divide gap between the most developed ICT nations and LCD countries increased drastically. One way to measure this gap is to consider the cost of ICT access among citizens in these countries. For example, according to ITU<sup>24</sup> 2009 and 2010 dataset the ICT price basket between 35 LCDs and 25 well developed ICT increased from 42 fold in year 2008 to almost 70 fold in year 2010. According to ITU the price basket index is calculated as the average price of three main ICT components namely the fixed telephone lines, mobile cellular phones and fixed broadband Internet access as percentage of each country's Gross National Income (GNI) per capita. Therefore it is important to consider the cost of ICT access in LCDs.

Figure 2 below provides a simplified e-commerce model based on Lee's volunteerism with international trade model in which it takes the above issues into account.

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<sup>23</sup> Lee, Y.S. (2009). Theoretical Basis and Regulatory Framework for Microtrade: Combining Volunteerism with International Trade Towards Poverty Elimination. *Law and Development Review*, 2(1), pp. 367-399. Available at SSRN: <<http://ssrn.com/abstract=1524185>>

<sup>24</sup> ITU (2009). *Measuring the Information Society: The 2009 ICT Development Index*, Geneva: ITU Publication

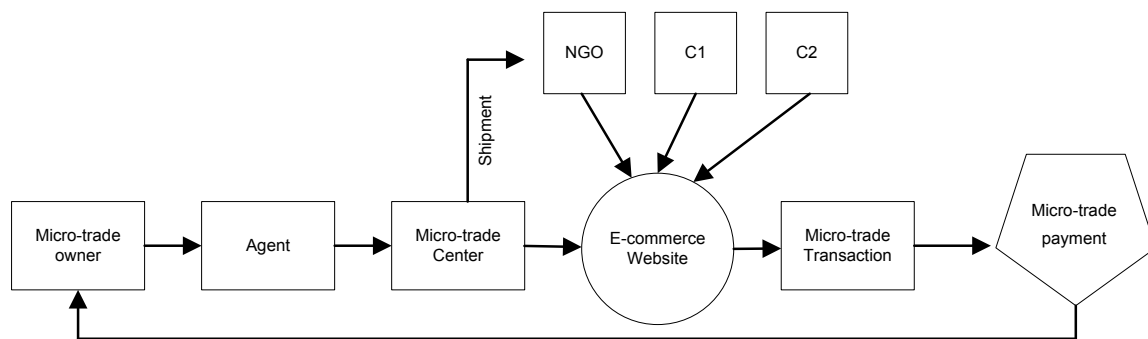
ITU (2010). *Measuring the Information Society: The 2010 ICT Development Index*, Geneva: ITU Publication

At the heart of this model is an e-commerce website which is a collection of other web pages from each LCD. The site provides microtrade owners the opportunity to present their products whether they are arts (paintings, music), handwork (carpet, textile), Jewelry and accessories or any non-perishable items they desire to sell online.

The site provides the shopping cart options for potential customers across the globe. These customers can be volunteer organizations similar to the Canadian “Ten Thousand Nations”, NGOs, or other individual interested in buying micro-trade products. The customers pay for the selected items by initiating an electronic transaction to a centralized micro-trade institute where micro-trade owners have their accounts there.

The next important component of this system is the microtrade center in each country or province of a country. The micro-trade center provides web services to both local people and the centralized e-commerce web site. These centers as depicted in figure 6.1 are also the link between microtrade owners and the customers for shipping the items. The agents of these centers are in contact with micro-trade owners. The owners provide necessary information about the product including the materials used and related pictures to be posted on the web. The agent does not necessary need an Internet access (this is the case of many rural areas) for submitting the above information to microtrade center. The agent can use any means of storing information offline to be uploaded to the website later. It is important that the agent has a face-to-face contact with trade owner for verifying the quality of items and being the main contact person with the local trade center.

Figure 2: A snapshot of Virtual Bazaar Model



One of the key issues in implementing the above model is the legal institutional support from both local and international community. The international trade agreements, laws and regulations should consider microtrade support as an opportunity for improving the living condition of people in LCDs. In addition local governments should provide enough support to microtrade owners in their countries in promoting their products on a global scale. As the results of the regression analysis of this study shows the legal environment has direct impact on the success on microtrade activities. Unfortunately the existing level legal environments in these countries are not in favour of fair and transparent trade activities and therefore require major reforms. There are also other barriers that impede the development of micro-trade business in LDCs including but not limited to the level of literacy, political instability, monetary policy, restrictive trade barriers, the lack of

effective entrepreneurship programs that directly and indirectly impact the success of microtrade programs in these countries.

## **V. Conclusion**

This study analyzed archival data on 35 Less Developed Countries from 1997-2007. The results of this empirical study show that there is a high correlation between ICTs economic growth as measured by GDP, education, and FDI flow in these countries. The results also show that the existing level of the legal environment is not favorable for economic development including the micro-trade. ICT price basket in LCDs is one of the main barriers toward public access to ICT resources including the Internet. Following the results of regression analysis, the study proposed a C2C business model for supporting microtrade activities in LCDs. The model was adapted to the existing level of ICT infrastructure and considering the high price of ICT products and services in these countries. The success of model is conditional to the improvement of the legal environment in LCDs, governmental support for microtrade activities as well as an active support from international communities to support microtrade owners in LCDs to sell their products directly to interested customers across the globe.

## Appendix

Table 1: FDI inflow 1987-2007

<b>FDI inflow (Millions \$US)</b>	<b>1987</b>	<b>1997</b>	<b>2007</b>
<b>World</b>	1337186	4456951	17849168
Developing economies	418461	1115840	4441301
Developed economies	918725	3311524	12729483
Developing economies: Asia	283542	712468	2872130
Eastern Asia	213366	441268	1687088
LDCs: Africa and Haiti	7786	17284	76745
LDCs: Asia	821	7243	19513
<b>LCDs Africa, Asia and Haiti</b>	<b>8607</b>	<b>24527</b>	<b>96258</b>
<b>The share of FDI flow into LCDs as % of World</b>	<b>0.644</b>	<b>0.550</b>	<b>0.539</b>
<b>The share of FDI flow into LCDs as % of Developed</b>	<b>0.937</b>	<b>0.741</b>	<b>0.756</b>
<b>The share of FDI flow into LCDs as % of Developing</b>	<b>2.057</b>	<b>2.198</b>	<b>2.167</b>

Source: UNCTAD

Table 2: Population growth 1987-2010

<b>Population (Thousands)</b>	<b>1987</b>	<b>1997</b>	<b>2007</b>
<b>World</b>	5039478	5887260	6661637
Developing economies	3821018	4606098	5329089
Developed economies	907537	952552	1007833
Least developed countries	470622	614789	779273
LDCs: Africa and Haiti	280808	370101	485740
LDCs: Asia	188640	243217	290629
Total Population Africa, Asia and Haiti	469448	613317	776369
<b>The share LCD population as % of the World</b>	<b>9.315</b>	<b>10.418</b>	<b>11.654</b>

Source: UNCTAD