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Capability of Information Accesses and Poverty Reduction in Developing Countries: Cross country Empirical Study.

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Abstract
Main objective of study is to show the relationship and effects of information accesses on poverty in developing countries. This study shows that differences of capability of information accesses across the developing countries lead to disparity of poverty among them. Disparities of information accesses among 70 developing countries during 2000-2005 from all regions in the world have significant influences on their national poverty level. This study employs econometric models with OLS estimations and both qualitative and quantitative methodology. This study perceived that the capability of information accesses among selected countries have robust negative influences on level of national poverty (Around 50 %). Government and private investment on information infrastructures in low-income areas have a significant effect on reduction of poverty than traditional consumption expenditures for poverty alleviation. This study also focuses on that the relationship between information accesses and other causes of poverty. Further, this study compares the relative importance of information accesses on reduction of poverty. Women's capability for information accesses has a robust negative effect on poverty in developing countries (65 %). In a comprehensive view, capability of information accesses of developing countries have negative effect on poverty and playing key role in reduction of poverty level.
Key words: Capability, Empowerment, Opportunities, Information Accesses, Information Infrastructures, Information Communication Technology

I. Introduction

In 2000, the World Bank's new strategy for fighting with poverty deal explicitly with the needs of the poor through an approach that focuses on Poor's **opportunities, empowerment and security.** It has been recognized by all multilateral and bilateral donors involved in development assistance that expected outcomes could not be achieved in the area of poverty reduction. Poverty constrains implementation of development initiatives because the poor (the beneficiaries) are not able to participate and contribute effectively in development efforts. How can we increase the participation of beneficiaries in development effort efficiently? This study tries to seek answer of this question by concerning capability of information accesses of poor.

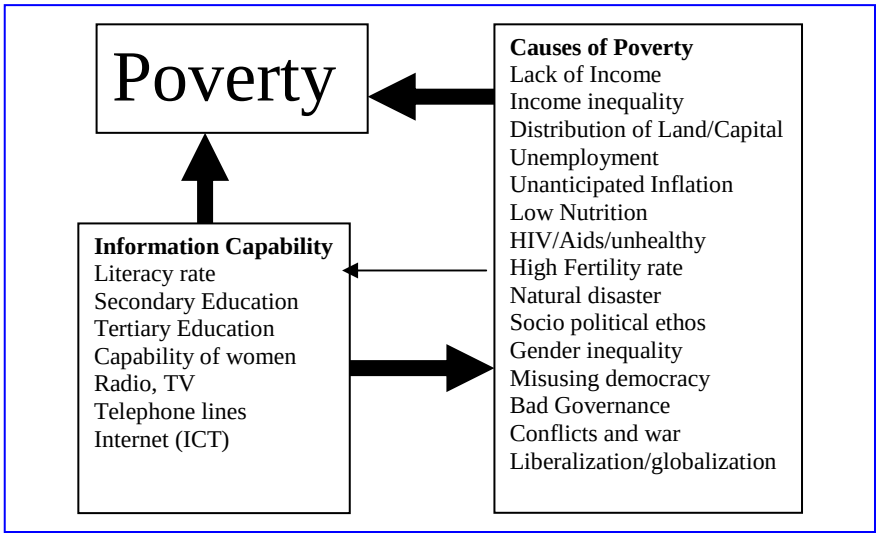
In the past decades, efforts were made to encourage participation of beneficiaries through non-government organizations and community-based organizations. However, this could not be fully achieved because of many factors including illiteracy, lack of access to educational opportunities, and limited access to information and resources by the poor. Media and information infrastructures development is a key ingredient in economics particularly in poverty reduction. Governments have a crucial role to play in promoting information infrastructures development. Any poverty reduction strategy should have, among others, three key elements namely pro-poor economic growth; social development; and good governance. The strategy must clearly state that lack of human capital on information infrastructures is one of the primary causes of poverty. Without access to basic services, such as information accesses including primary education, the poor will have little opportunity to improve their lives and will be unable to contribute to economic growth.

Poor people often live without opportunities that better of the people by taking grants, jobs, credits, roads, electricity, markets for goods and services, and accesses to the school and water, sanitation and health services are essential. This lack of opportunities locks poor people in to life of poverty. How can we open this lock? Providing more and quality information to poor people will make opportunities and reduce poverty. Information accesses can directly and indirectly contribute to income of the people as well as other causes of poverty. Illiteracy combined with lack of information is a barrier in path to good governance and adds to corruption.

Research hypothesis of this study is that the major causes of poverty among the peoples caused by information capability gaps among the peoples. Information accesses have a major role in determining of income and poverty of poor in developing countries in the world. People who have more information accesses are getting more income and come out from the poverty. On other hand the people who have less information

accesses are marginalized from economic activities and lock with life of poverty. Objective of study is to analyze following research questions in the respect of developing countries.

1. Are there any relationship between poverty and capability of information accesses?
2. Does capability information accesses of people have any effect on other causes of poverty?



This study is divided as five parts. Fist one is introduction which highlight the nature of poverty, hypothesis and objective of study. This section further explains that economic and socio political conceptual relationships between capability of information accesses among people and poverty. Second is literature review. Third one is model and data to analyze the problems. Forth one shows empirical evidence on the relationship between capability of information accesses and poverty. Last one is conclusion.

2. Information in Economic literatures.

What does mean by term of capability and information accesses? Michael P Todato (2006) carried the definition of capability in Sen's sense "The freedom that a person has in term of the choice of functioning, given his personal features and command over commodities". Information accesses are a medium of exchange information or knowledge. They are transforming the information from one person to another person or one place to another place. Some information accesses such as television telephone do not require the basic education to access them. Education is basic tool to communicate with other accesses to take a wisely decision in economic activities. Information is a broad sense in economics as well as other field. Generally speaking, we can define information as knowledge of people in economic sense. Information accesses such as formal education, daily news papers, radios, televisions, telephones, fax, internets, telecenters, magazines and journals are providing knowledge to people in various levels regarding socio, politic and economic events which are happening around the people. Some uneducated people also have some information in their working skill in an isolated society. Within such society, the people who have more information may exploit the resources from others who have less information. It can happen in various level such as production, marketing and consumption When an isolated society links with a society which has more information capability, isolated society will be exploited by better informatics society if isolated society have less information accesses. When the information accesses are made by government or private sectors, the less informatics' society will able to increase their capability of information accesses and they empower and become to equalize with other society. If the poor society failed to absorb the information from source of information of government or private sector or if government failed to set up information accesses to less informatics' society, the income gap between two societies will be increased. If the less informatics' society (poor) is accompanied with more informatics' society without any information accesses, the less informatics' society automatically will be pushed into the poverty. In poor countries, the coordination of economic activity rarely works. In isolated rural villages in most developing countries, there are virtually no sources of information regarding market prices and other production-related information. For them, "information is poor, scarce, mal distributed, inefficiently communicated, and intensely valued" (Geertz, 1978).

The main reason is that many people lack access to even very basic communications infrastructure. A vivid symptom of poor information flow is that prices vary widely within a geographic area, even for goods that are readily transported. John K et al (2003) show that investing more in human capital infrastructures, farmers become more willing and more able to bear risk and earn higher real income. Education attainments leads to reduction of conflicts and war which is a cause of poverty. However, we can not come to a final conclusion on that education must have peace. Alam and Jitka (2003) argue that most of terrorist activities in the world took placed by educated personals. A few empirical studies document the spatial dispersion of prices and how effectively or ineffectively price information is transmitted across markets. For example, Badiane and Shively (1998) studied monthly maize prices in Ghana from 1980 to 1993 and found that the estimated time to fully transmit a price shock (from the central market to each of two outlying markets) is about four months. Price adjustments may also be asymmetric; in Ghana, wholesale maize prices for producers in local markets respond more swiftly to increases than decreases in central market prices. Breman (1996) studies the informal economy in a region of India reports that around half the workforce is employed under daily contracts, with little vertical mobility into semi-permanent and permanent jobs. Given this reliance of landless laborers on day-to-day job opportunities, lack of information can severely constrain income opportunities. Often, hours are wasted searching for brief employment opportunities, or worse, workers in one village may stand idle while employers in nearby villages or slightly further removed urban areas are unable to find enough workers. Middlemen often act as intermediaries between agents (e.g., between farmers and consumers, or even between laborers and employers in a distant locale). Middlemen may travel from cities to villages to purchase crops and sell inputs, or they may just have an outpost in a town market.

Many studies find that competition among middlemen constrains the exploitation of customers. For example, Hayamiet al. (1999) report data from a survey indicating that rice marketing in the Philippines (at least in the area studied) is highly competitive, preventing middlemen from exploiting peasants and consumers through monopoly/monophony pricing. The authors estimate that 50 to 70 percent of the consumer price goes to farmers, with the remaining 30 to 50percent marketing margin split among collectors/middlemen (about 5 percent), rice mills (15 percent), and retailers (10percent). In other countries, such as the former Zaire, producers receive only 35 to 41 percent of the wholesale price of several main commodities, although transportation costs account for most of the balance of the price (Minten and Kyle 1999). Middlemen operating in areas of the Brazilian Amazon rain-forest receive 40 to 50 percent of the final prices of fruit and vegetables (Roberts 1995). Uses of information technology to assist women in their current economic activities, including farming, trade, and entrepreneurship, are detailed in the following sections. For instance, women farmers could greatly increase productivity using information on improved technologies, agricultural inputs, weather, and markets. Traders and other entrepreneurs need to find marketing information and disseminate information about their businesses. Jeffrey (2005) shows that internet effect poverty with an empirical study. Dominique M .et al.(2006) found that a positive impact of solar net-village in a isolated society in Honduras on empowerment of people. Information and communication technology have a positive impact to enjoy the benefits of improved commerce, health, education and other social services. Michel K(2005) point outs that knowledge of people positively contributes to a good formation of public policy. Wainaina Mungai (2005) explains that ICTs development in rural of Kenya protect environment and reduce poverty. Richard Ge and Sonja Z(2003) found that ICTs promotes opportunities for livelihoods in Africa. It is strengthening the good governance and assisting for upgrading health of people. Further they show the regional, national environment and global dimensions of ICTs. Simone (2003) indicates that both traditional and modern increase the empowerment, opportunities and security of poor in rural India

3. Methods and Data.

This study investigates the impact of capability of information accesses on poverty by using an econometric model by quantitative methods in this part. Following model is used to investigate the impact of information accesses on poverty

$$\text{Poverty} = b_1\mathbf{N} + b_2\mathbf{A} + b_3\mathbf{Z} + u$$

Poverty means the percentage of people, living under the national poverty level. N is vector for fundamental causes of poverty, A is vector for objective variables of information accesses, Z is vector for control or environment variables and u is error term. N represents three variables: Income level(Y), Unemployment rate(U) and Income inequality (G). A represents five variables for capability of information accesses: Electricity consumption (E), secondary education (SE), Telephones (T), Internet (IN) and information capability of women (ICW).Z represents one variable for external and internal economic environment measured by openness (OP).

Basically, poverty of developing nations and capability of information accesses can be shown by following function.

$$\text{Poverty} = g(Y_t, U_t, G_t, OP_t)$$

$$g_1<0,\ g_2>0,\ g_3>0 \text{ and } g_4<0.$$

$$\text{Capability of Information Accesses (CIA)}_t = f(E_t, SE_t, T_t, IN_t, ICW_t)$$

$$f_1>0,\ f_2>0,\ f_3>0,\ f_4>0 \text{ and } f_5>0.$$

$$\text{Poverty} = g(U_t, G_t, OP_t, CIA_t)$$

$$CIA_t<0$$

Where t cover a period 2000-2004. Not a given year.

Electricity consumption (E) is proxy variable for old information accesses such as radio TV and other electronic information accesses. It is measured by per capita electricity consumption. Secondary education (SE) a capability of education level to access information[1], is measured by enrolments of secondary education as percentage of gross enrolments. Telephones (T) represent a direct measure of new information access measured by fixed and mobile telephones lines per 1000 people. Internet (IN) represents the measure for capability of modern access of information communication technology (ICT) measured by internet users per 1000 people. Women's Information Capability (WIC) is captured to evaluate the information capability of women who are key beneficiaries of poverty alleviation program in developing countries[2]. It is measured by proxy variable, fertility rate.[3]

. We select 70 developing countries from all regions in the world which had less than $3000 per capita income in 2000. The dependent variable poverty is measured by percentage of people under the National Poverty (NP) lines. Latest data for variables, poverty, unemployment and GINI coefficient is taken from world fact book. This is not a data for given year, instead data for a period 2000-2004[4]. Data for capability of information assesses and other economic data are taken from data query of world development index (WDI) of World Bank group. Data per capita measures such as E, T, IN, Y and fertility rate are for year 2004 which is end of period. Secondary education enrollments, openness are taken from average of 2000-2004.

My objective variables for capability of information accesses are measured and tested by each measure of information accesses and we transform them to a single Index for Capability of Information Accesses (ICIA) based on all variables of information accesses. We test this index separately in correlation and regression analysis. We do not use all those information accesses in model with measure, income level of countries which is a key cause of poverty since income is highly correlated with all information accesses. Conflicts and war (CW) which is correlated with capability of information accesses affect the poverty. It is measured by sociopolitical instability during 2000-2004 based on scores of peace building capacity of selected countries, reported in peace and conflict reports 2001, 2003 and 2005.

$$NP_t = B_0 + B_1Y_t + B_2U_t + B_3G_t + B_4OP_t + e_t \quad (1)$$

$$NP_t = B_0 + B_1U_t + B_2G_t + B_3OP_t + B_4E_t + e_t \quad (2)$$

$$NP_t = B_0 + B_1U_t + B_2G_t + B_3OP_t + B_4SE_t + e_t \quad (3)$$

$$NP_t = B_0 + B_1U_t + B_2G_t + B_3OP_t + B_4T_t + e_t \quad (4)$$

$$NP_t = B_0 + B_1U_t + B_2G_t + B_3OP_t + B_4IN_t + e_t \quad (5)$$

$$NP_t = B_0 + B_1U_t + B_2G_t + B_3OP_t + B_4WIC_t + e_t \quad (6)$$

$$NP_t = B_0 + B_1U_t + B_2G_t + B_3OP_t + B_4ICIA_t + e_t \quad (7)$$

$$NP_t = B_0 + B_1U_t + B_2G_t + B_3OP_t + B_4CW_t + e_t \quad (8)$$

[1] We do not take the literacy rate as indicator of educational level for information accesses. Literacy rate is not a perfect measure to assesses information.

[2] WIC is made by transforming higher fertility rate 7.7 to 0 values and transforming low rate 1.2 to 100 value in selected countries.

[3] We dot take literacy rate of women as measure of capability of information accesses to women. In many cases, even women are literacy in developing countries; they are unable to come out of poverty due to the sociopolitical and economic ethos. Fertility rate focus their capability little more.

[4] Data on poverty, unemployment and Gini coefficient are not available in regular year in developing countries. We cover the latest data for those variables during 2000-2004.

4. Empirical results and discussion.

From our data of selected 70 developing countries, we estimate the correlation among the variables and coefficients of variables in regression analysis. Table (1) shows the correlations among poverty and causes of poverty as well as the information accesses. Income level, openness, electricity, secondary education, internet, telephone, women's capability of information accesses and index of capability of information accesses are negatively correlated with nation's poverty level. Unemployment, income inequality, conflicts and war positively correlated with national poverty level. The correlations between index of capability of information accesses and poverty, information capability of women and poverty are higher than correlations between income and poverty, unemployment and poverty, income inequality and poverty. Even income is correlated with information accesses positively; information capability of developing countries is playing an important role in determination of poverty. An important finding in this correlation analysis is that correlation between information capability of women (ICW) and poverty (NP) is very higher than other correlations related with poverty and causes of poverty. Any projects which planed to alleviate poverty must attract the women's improvement of information capability. It will be further emphasized in regression analysis.

Table 1: Correlation Matrix among poverty and causes of poverty.

	NP	Y	U	G	OP	**E**	**SE**	**T**	**IN**	**WIC**	**ICIA**
Y	-0.3754	1									
U	0.4521	-0.2820	1								
G	0.5019	0.0891	0.2352	1							
OP	-0.1342	0.1074	-0.0346	-0.0566	1						
E	**-0.3327**	**0.5371**	**-0.2086**	**-0.2944**	**0.3578**	**1**					
SE	**-0.3645**	**0.4635**	**-0.4468**	**-0.2932**	**0.3694**	**0.6349**	**1**				
T	**-0.3986**	**0.7878**	**-0.3611**	**-0.0030**	**0.2650**	**0.5112**	**0.4763**	**1**			
IN	**-0.3269**	**0.6366**	**-0.1965**	**-0.0731**	**0.1738**	**0.3737**	**0.3263**	**0.8288**	**1**		
WIC	**-0.6564**	**0.4958**	**-0.5602**	**-0.4334**	**0.203**	**0.5704**	**0.7446**	**0.5449**	**0.3522**	**1**	
ICIA	**-0.5205**	**0.7259**	**-0.4492**	**-0.2858**	**0.3526**	**0.7924**	**0.8239**	**0.8278**	**0.7010**	**-0.8166**	**1**
CW	**0.1332**	**-0.4489**	**0.1246**	**-0.3736**	**-0.124**	**-0.1268**	**-0.283**	**-0.5294**	**-0.3840**	**0.3315**	**-0.4067**

Table (2) shows the regression results of equations 1, 2, 3,4,5,6, and 7. Regression (1) indicates the effect of basic causes of poverty, unemployment, and income inequality and income level on poverty. They have robust significant effect on poverty. It is similar to findings of previous studies and theories. From regression (2) to (7) show effects of our objective variables, information accesses on national poverty. The accesses Radio, TV measured by electricity consumption, secondary education and telephones have a negative impact on national poverty but they do not have statistical significant effect. Internet has negative and significant effect on poverty. Both measures, information capability of women and overall capability of information accesses measured by ICIA have a negative and robust significant effect on national poverty. Conflicts and war has a positive effect on national poverty with lower significant. The key finding of this regression analysis is that women's information capability is very important determinant of poverty in those selected developing countries. Further, Information communication technology measured by internet users is also playing major role in reduction of poverty in comparing other information accesses. The place of computer age combined with information technology in development; especially in poverty alleviation is playing a key role in modern development strategy.

Table 2
Impact of capability of information accesses on poverty in LDCs
(Dependent Variable: Percentage of people under the national poverty)

In ,Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constants	14.69	5.205	16.57	10.36	10.70	41.55*	24.48**	-1.567
	(1.36)	(0.376)	(1.16)	(0.91)	(0.98)	(2.88)	(1.94)	(0.12)
U	0.423*	0.560*	0.484**	0.431**	0.366**	0.308**	0.351**	0.475*
	(2.81)	(3.09)	(2.42)	(2.55)	(2.26)	(1.96)	(2.2)	(2.98)
G	0.701*	0.642**	0.603*	0.653*	0.727*	0.475**	0.550**	0.755*
	(3.28)	(2.42)	(2.56)	(2.88)	(3.24)	(2.23)	(2.53)	(3.09)
OP	-0.031	0.093	-0.026	-0.013	-0.054	-0.015	0.0021	-0.033
	(0.47)	(0.186)	(0.35)	(0.18)	(0.75)	(0.23)	(0.029)	(0.45)
Y	-0.007*							
	(2.95)							
E		**-0.0027**						
		(1.06)						
SE			**-0.1377**					
			(1.29)					
T				**-0.016**				
				(1.55)				
IN					**-0.069****			
					(2.12)			
ICW						**-0.374***		
						(3.42)		
ICIA							**-0.378***	
							(2.63)	
CW								**4.494**
								(1.179)
R^2	0.4599	0.390	0.387	0.386	0.416	0.488	0.438	0.372
Observations	49	42	46	49	48	49	50	50

Variables explanations are in above. Regressions are estimated by ordinary least squares. Significant levels are indicated by *, ** and ** which donate 1 percent, 5 percent and 10 percent respectively. t- Statistics are in parentheses.

Those empirical findings are consistent with my qualitative arguments. But, the important concern is that the poverty reduction or alleviation in developing countries must not depend on traditional thinking such as improvement of primary and secondary education alone, instead policy makers must concentrate on increasing capability of poor, especially women by increasing information infrastructures, comprised with information communication technology. Capability of women's information accesses is playing important role in poverty alleviation. A series of factors, including literacy and education, language, time, cost, geographical location of facilities, social and cultural norms, and women's computer and information search and dissemination skills constrain women's access to information technology. Increasing of women's access to information and communication technologies in developing countries involves increasing availability of communication in areas where women live, since most women in developing countries live in presently underserved areas. Extension of infrastructure, particularly wireless and satellite communications, to rural areas and sub-urban areas is crucial to increasing women's capability to reduce poverty.

5. Conclusion

In this cross country study, we have tested that capability of information accesses among people in developing countries have an impact on their national poverty. Capability of information accesses has a negative relationship with national poverty level. Among them, the information accesses based on information technology have robust negative effect on poverty. Capability of women's information accesses a powerful determinant of poverty. Improvement of capability of women's information accesses challenges in developing countries due to the sociopolitical and economic factors. Empowerment, opportunities and ability of women are very closely related with capability of information accesses. Government and non government organization can alleviate or reduce the poverty through the enhancement of women's capability of information accesses. Information and

communication technology is playing a sound role in this development. Education with information technology to poor alleviates poverty in developing countries. Investment in information infrastructures in rural areas of developing countries will be a new development strategy for poverty alleviation in 21st century.