

## Research Article

# Internet Use and the Building of Social Capital for Development: A Network Perspective

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### **Abstract**

*Guided by the Capability Approach, this study highlights the importance of assessing development in terms of people's engagement in activities they want to do. It moves beyond the emphasis on economic growth and access to new technologies. Situated in the context of Internet use, this study examines how civil society associations and existing bonding and bridging social ties are related to an individual's capability to use the Internet for information seeking, economic transactions, political participation, learning, and entertainment. Drawing from the network perspective of social capital, this study proves the importance of social networks in affecting an individual's capability of using the Internet for specific purposes. The article contributes to the growing literature on the links between ICTs and development. It also highlights the social factors of technology use, providing implications on how to promote Internet use in developing communities.*

There is robust literature on information and communication technologies (ICTs) and development (ICTDs), particularly on the role of ICTs in stimulating political participation, improving health care services, and enhancing opportunities for employment and education (Duncombe, 2007; UNDP, 2011; Waema & Adera, 2011). Much of the literature focuses on access to ICTs and how the technology enables information to be disbursed and captured by different social groups. Less attention has been paid to the social and cultural processes by which ICTs empower communities and individuals to enhance their ability to make strategic choices (Gigler, 2004). Furthermore, much of the evidence linking ICT utilization and social development is anecdotal (Bhatnagar, 2003; Kenny, 2003), suggesting an overly optimistic attitude toward positive outcomes for society (UNDP, 2004).

While there is a relationship between ICTs and development, the link is not necessarily direct. Evidence from developing countries experiencing rapid expansion of newer technologies suggests that the relationship is mediated by many factors and shaped in multidimensional ways. How ICTs facilitate developmental outcomes remains underexamined.

How individuals and their communities can derive transformative benefits from ICTs depends on the ways people integrate ICTs into their daily lives (Gurstein, 2003). This study suggests that how ICTs are incorporated into people's lives for developmental purposes partially depends on the existing social capital in the community. The objective of this research is to examine the role of existing social capital in influencing people's capability to use ICTs. Specifically, this study analyzes how Internet use transforms developmental patterns, using the Capability Approach and a network perspective. Based on the household survey data from 10 African countries, this study highlights the important role of heterogeneous social ties and civil society affiliations in promoting development through meaningful use of ICTs.

### **A People-Centered Approach to Development**

*Development* is a process of expanding an individual's substantive freedom to achieve the life that she or he values (Sen, 1999). This is the core idea of the Capability Approach (CA), a paradigm for human development

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that has stimulated discussions on the relationship between ICTs and human development. As a people-centered approach to development, CA assumes that well-being and agency should be discussed in terms of people's effective opportunities to successfully undertake the actions and activities that they want to engage in and be who they want to be. These doings and beings are conceptualized as *functionings* in the CA, which are states and activities constitutive of a person's being (Sen, 1985b, 1999). Examples of functionings can vary from elementary to complex things, such as being literate, being healthy, and participating in a community for public affairs (Sen, 1999).

*Capabilities* are a set of functionings that allow individuals the freedom to choose to achieve the life they have reason to value (Sen, 1985a, 1985b, 1992). Essentially, *functionings* are about those things a person may value doing or being; whereas *capabilities* are things that a person has actually done, as well as things people can possibly do, with the goods they have access to (Sen, 1999). Different categories of functionings and capabilities can be defined based on the main dimensions of freedom: political freedom, economic facilities, social opportunities, transparency guarantees, and protective security (Sen, 1999, 2002).

As a broad normative framework, CA can be used to evaluate individual well-being and social arrangements or it can be used to design and evaluate policies (Sen, 1999). Prioritizing people's opportunities to realize their valued functionings, CA stands in contrast to other aspects of well-being, which focus exclusively on subjective categories or on material means to well-being. The CA emphasizes people as the means and ends of development (Ibrahim, 2006). However, the CA must be applied in specific contexts of development. This study focuses on using the Internet for different purposes as a way to operationalize capability in the context of ICT use.

### Moving Beyond Access

In the past decade, much attention has been paid to the role of mobile phones and the Internet in promoting development. The United Nations Millennium Development Goals call for a global partnership for development in cooperation with the private sector to maximize ICT benefits (United Nations, 2000). Strong evidence has suggested that ICTs enable some aspects of human capability and lead to positive developmental outcomes (Agüero, de Silva, & Kang, 2011; Smith, Spence, & Rashid, 2011). However, Kang (2010) argues that the links between ICT access and development are based on certain misleading assumptions. Kang calls for the examination of enabling conditions. CA has been suggested as a valuable theoretical framework within which to address this issue.

The application of CA to ICTD signals that ICTD studies should move beyond an access-centric approach, which overlooks the complex relationships among access, usage, and development, to a more robust approach (Kang, 2010). Various activities in ICTD are focused on improving ICT connectivity. There is nothing wrong with delivering ICTs to the developing community, and access is fundamental to technology use. However, the effectiveness of ICT is not about the delivery of services or the number of ICT adoptions. This study uses CA to examine the use of ICTs for various purposes to capture how ICTs are connected to developmental outcomes.

The rationale for examining ICT use in specific contexts is that not any ICT use will bring certain benefits to the developing community (Kang, 2010). Examples of ICT use leading to adverse outcomes have been documented. For example, while Facebook and other social media were arguably important for the Arab revolution, they were also used by the Egyptian government to uncover information about political activists (Smith & Reilly, 2013).

Examining ICT use in relation to developmental needs extends beyond the access-centric approach of ICTD and speaks to CA. CA does not merely focus on the availability of the Internet or computer technology, but rather on how Internet availability fits into larger concerns for Internet use that will ultimately benefit individuals and communities (Gurstein, 2003). ICT use is context-sensitive, because what is effective in one context may not work well in another. This study draws on CA to examine multiple dimensions of ICT use, which are defined in relation to development goals.

CA is composed of multiple dimensions of capabilities, which move beyond an income-based approach and include nonmaterial aspects of well-being and agency freedoms (Gigler, 2011). Literature has identified five

main dimensions of capability. The first dimension is *informational capability*, which is essentially about the freedom to know where to get, inspect, organize, and transmit information (Gigler, 2011). The second dimension is *economic capability*, which posits that wealth and employment are freedom (Heeks & Molla, 2009). The third dimension is *political capability*, which is about freedom of speech and the capability to participate in public affairs (Heeks, 2002). The fourth dimension is *social capability*, which is defined as the freedom to enhance literacy and learning and, thus, provide social opportunities (Heeks & Molla, 2009). The last dimension is *cultural capability*, which is about the capability for entertainment and leisure (Gurstein, 2003).

With regard to these five dimensions of capability, this study examines an individual's capability to use ICTs in the following contexts: information seeking, economic transactions, interacting with the government, online learning and education, and recreational activities (Gigler, 2011; Heeks, 2002). Through an analysis of these five categories, this study examines how ICTs can be incorporated into daily life. Once ICTs are incorporated, they lead to development outcomes that allow individuals to undertake activities they want to engage in (Sen, 1999).

### **Social Capital and ICT Use: A Network Perspective**

The effect of ICTs on development must be understood by examining the dynamics between social context and technological innovation (Castells, 2009). ICT scholars have been developing an impact chain to unpack various indirect effects of new technologies on people's well-being and agency freedom (Gigler, 2004, 2008; Heeks, 2005). This study posits that the interdependencies between ICTs and social context need to be investigated to explain how human capabilities can be achieved. The study introduces the concept of social capital from a network perspective and examines the factors influencing individuals' capability to use ICTs.

*Social capital* is defined as the norms and networks that enable people to act collectively (Woolcock & Narayan, 2000). The importance of social capital can be summarized through this adage: It's not what you know; it's who you know. Building social capital can be illustrated through examples such as spending time talking with neighbors, sharing meals with friends, participating in religious gatherings, or volunteering on community projects.

Applying a network perspective to ICTD studies counterbalances the individualistic focus of CA and highlights the importance of collectivity. Stewart (2005) is critical of CA because it ignores the role of collectivities in affecting individual capabilities. Individual capabilities depend on collective capabilities, as achieving the life a person values might be a collective act (Evans, 2002). Ibrahim (2006) argues that as socially embedded agents, individuals can flourish only by participating in public affairs. Examining human capability from a collective perspective suggests that human capabilities can only be achieved through social interaction (Comin & Carey, 2001). The poor typically have limited access to and possession of capital, which is a barrier to their realization of their individual capabilities. Acting collectively toward similar goals can provide individuals with collective freedoms that constitute a new range of choices only open to them by engaging in collective action. By employing ICTs such as social media or mobile phones, the poor are able to communicate and coordinate resources regardless of economic status and geographical location (Ndung'u & Waema, 2011).

Applying the concept of social capital in development studies is not new. Woolcock and Narayan (2000) provide a comprehensive discussion of the implication of social capital theories for development research and policy. They lay out four distinct approaches: communitarian, networks, institutional, and synergy. This study applies the network perspective and examines the role of social capital in explaining the relationship between ICTs and development. The network perspective of social capital presents the community as the primary unit of analysis and allows the incorporation of different dimensions of social networks, including affiliation with different civil society groups, existing strong ties and existing weak ties (Woolcock & Narayan, 2000).

The network perspective of social capital is concerned with both its up side and its down side. On one hand, social capital highlights the inherent beneficence and self-sufficiency of communities. For example, a community can provide a variety of resources and services such as job referrals, emergency cash, and social support. On the other hand, social capital has a cost. The sense of commitment and obligation resulting from community benefits may curtail the capability of community members to pursue new opportunities (Portes &

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Sensenbrenner, 1993). Cohesive ties have been criticized as barriers to the coordination of complex organizational tasks (Burt, 1992, 1997). People strongly tied to cohesive contacts may have little autonomy to negotiate their roles, thus generating inertia for significant social change (Gargiulo & Benassi, 2000).

The network view of social capital suggests that the sources and consequences of social capital must be differentiated (Woolcock & Narayan, 2000). Literature has focused on how ICTs create and strengthen communities' social capital, which leads to development through analyzing the sociotechnical interaction (Thapa & Sein, 2010; Urquhart, Liyanage, & Kah 2008). How involvement with and participation in civic groups might impact people's ICT use remains an underresearched area.

Development scholars and practitioners have increasingly recognized social capital as a critical resource of the poor (Fox & Gershman, 2000). Communities with diverse social networks are more capable of fighting poverty and taking advantage of new technologies (Isham, 1999; Narayan, 1995). However, where social and institutional conditions are weak, communities are more vulnerable to development problems such as poverty and unemployment (Woolcock & Narayan, 2000).

This study aims to examine how social capital impacts an individual's capability to use ICTs for various purposes. Given that ICT is an umbrella term that includes many technologies, this study focuses on Internet use through mobile phones or computers and examines the following hypotheses.

### **Capability to Use the Internet for Information Seeking**

- H1a: The capability to use the Internet for information seeking is associated with individuals' civic society affiliations within their community.
- H1b: The capability to use the Internet for information seeking is associated with individuals' existing bonding social ties<sup>1</sup> within the community.
- H1c: The capability to use the Internet for information seeking is associated with individuals' existing bridging social ties within the community.

### **Capability to Use the Internet for Economic Transactions**

- H2a: The capability to use the Internet for economic transactions is associated with individuals' civic affiliations within the community.
- H2b: The capability to use the Internet for economic transactions is associated with individuals' existing bonding social ties within the community.
- H2c: The capability to use the Internet for economic transactions is associated with individuals' existing bridging social ties within the community.

### **Capability to Use the Internet for Political Participation**

- H3a: The capability to use the Internet for political participation is associated with individuals' civic affiliations within the community.
- H3b: The capability to use the Internet for political participation is associated with individuals' existing bonding social ties within the community.
- H3c: The capability to use the Internet for political participation is associated with individuals' existing bridging social ties within the community.

### **Capability to Use the Internet for Learning**

- H4a: The capability to use the Internet for learning is associated with individuals' civic affiliations within the community.
- H4b: The capability to use the Internet for learning is associated with individuals' existing bonding social ties within the community.
- H4c: The capability to use the Internet for learning is associated with individuals' existing bridging social ties within the community.

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1. *Bonding social ties are social relationships between individuals in core networks (Putnam, 2000).*

### ***Capability to Use the Internet for Entertainment***

- H5a: The capability to use the Internet for entertainment is associated with individuals' civic affiliations within the community.
- H5b: The capability to use the Internet for entertainment is associated with individuals' existing bonding social ties within the community.
- H5c: The capability to use the Internet for entertainment is associated with individuals' existing bridging social ties within the community.

## **Method**

This study uses the household survey data collected by Research ICT Africa (RIA). The survey<sup>2</sup> "delivers nationally representative indicators on household, individual and small business level" (RIA, 2012, p. 1). Datasets are used from these 10 countries: Botswana, Cameroon, Ethiopia, Ghana, Namibia, Nigeria, South Africa, Tanzania, Rwanda, Uganda. The hypotheses discussed in this article were tested using the household ICT survey data on Internet use, either through mobile phones or computers.

## **Measurement**

### ***Capability to Use the Internet***

The capability to use the Internet was operationalized along five dimensions, which were all coded as binary (0 = Never used the Internet for certain activities; 1 = Used the Internet for certain activities). This measurement moved beyond a focus on access to Internet use and suited the capability in specific contexts of meaningful Internet use. *Capability to use the Internet for information seeking* was measured by asking whether the respondents had ever used the Internet to get information about goods, health services, or government organizations. *Capability to use the Internet for economic transactions* was measured by asking whether they had used the Internet to purchase goods or services or for Internet banking. *Capability to use the Internet for political participation* was measured by asking whether the respondents had used the Internet to interact with government organizations. *Capability to use the Internet for learning* was measured by asking whether they had used the Internet for education or learning purposes, including to participate in formal education or distance learning, get information for school-related work, or access free educational content. *Capability to use the Internet for entertainment* was measured by asking whether they had used the Internet to play or download games, movies, television programs, or music.

### ***Existing Social Capital***

To capture the multidimensional aspects of social relations in communities, three measures were used to assess existing social capital. *Affiliation with civil society organizations* in the following social groups was measured as binary: religious groups, trade unions, organized cultural/political groups, farmers' associations or cooperatives, saving clubs/microfinance groups, recreational groups, and decision-making groups at any administrative region. The respondents were asked whether they agreed with the following statement: "Most of the people I know live near me and know each other." Bridging social ties were linked to weak ties, reflecting the overall network heterogeneity. The survey respondents were asked if they agreed with this statement: "I know many people who have different backgrounds to me." The answers were coded as 0 = Disagree or 1 = Agree.

### ***Control Variables***

Demographic variables were used as control variables in this study, including age, gender (1 = Male, 0 = Female), education (total years of schooling), and monthly disposable income (in U.S. dollars). Because the data were collected from different countries, 10 dummy variables were created to measure citizenship. The effect of citizenship was interpreted using the Ethiopian respondents as the reference group, which had the lowest Internet use among the sampled countries.

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2. The survey is called "RIA 2011 e-Access & Usage Survey." Details on the survey design and sampling techniques can be found at <http://www.researchictafrica.net/home.php>. The RIA survey was conducted before this study was designed.

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Table 1. Number of Respondents from Each of the 10 Countries.

Country	Number of respondents	Number of Internet users
Botswana	919	282
Cameroon	1,200	195
Ethiopia	1,608	98
Ghana	1,203	150
Namibia	967	270
Nigeria	1,552	316
Rwanda	1,200	101
South Africa	1,589	521
Tanzania	1,201	68
Uganda	1,200	187
Total	12,639	2,188

### Analysis

Logistic regression analyses were conducted to examine the equation  $\alpha = 0.05$ . The analysis was conducted in the following order. First, civic associations, existing bonding ties, existing bridging ties, and demographics were tested as variables that influence an individual's capability to use ICTs for information seeking. The same procedure was conducted on the other four dimensions of capability (economic capability, political capability, social capability, cultural capability). To summarize the hypothesized relationship between dependent and independent variables, the equation is stated as:

$$\begin{aligned} \text{Log}(\text{Capability to use ICTs}_{it}) = & \\ & \beta_0 + \\ & \beta_1 X_1(\text{civic association}_{it}) + \\ & \beta_2 X_2(\text{existing bonding ties}_{it}) + \\ & \beta_3 X_3(\text{existing bridging ties}_{it}) + \\ & \beta_4 X_4(\text{demographics}_{it}) \end{aligned}$$

### Social Capital Influencing Capability to Use ICTs

This section presents descriptive findings to characterize Internet users and usage in the 10 selected African countries. In the sample of all the datasets ( $n = 12,639$ ; see the number of respondents from each country in Table 1), 20.72% had used the Internet. Among these 2,619 Internet users, 64.7% first used the Internet on a computer and 34.4% on a mobile phone. Of the 2,619 interviewed, 2,188 revealed their citizenship. The average age of all the Internet users was 33.81 ( $S.E. = 14.93$ ). The ages ranged from 15 to 103. The first quartile of the distribution was under age 24 years old, the second quartile was under age 30, and the third quartile was under age 40. Among all respondents, 55.3% were male. The average years of schooling was 13.90, and 84.2% of these Internet users reported they were located in urban areas. On average, their disposable monthly income was \$107.01 ( $S.E. = 182.83$ ).

More than 80% of the Internet users reported that they used the Internet at least once a week. On average they spent about 10.70 hours per week socializing face to face with friends ( $S.E. = 16.41$ ). Most respondents (76.7%) were affiliated with religious groups; 16.8% were affiliated with trade unions; 22% were affiliated with organized cultural or political groups; 9.2% belonged to farmers' associations or cooperatives; 24.9% belonged to saving clubs, microfinance groups, or burial societies that offered loan services; 35.9% were affiliated with recreational social groups based on common interests; and 15.7% participated in decision making at either the village or municipal level.

The frequency of general Internet use was high among all the sampled Internet users. Of the sampled Internet users, 52.2% reported that they used the Internet every day or nearly every day; 31.0% used it at least once a week; 10.6% used it at least once a month; and 6.1% used it less than once a month. However, a diverse use pattern exists among them. Of the sampled Internet users, 77.7% indicated they used the Internet for learning purposes; 73.7% used it for information seeking; 72.5% used it for entertainment; 35.2% used it for economic transactions; and 33.9% used it for online political participation.

## Information Seeking

The models predicting an individual's capability to use the Internet are summarized in Table 2. The model predicting the likelihood of an individual to use the Internet for information seeking was significant at the  $\alpha$  level of 0.01 ( $\chi^2 = 161.11$ ,  $df = 22$ ,  $p < 0.001$ , Cox & Snell  $R^2 = 0.12$ , and Nagelkerke  $R^2 = 0.17$ ). For all the binary variables, groups with a value of 0 were used as the reference category. Affiliation with certain social groups was a strong predictor of ICT use for information seeking, such as trade unions ( $B = 0.78$ ,  $S.E. = 0.26$ ,  $p = 0.003$ ) or recreational groups ( $B = 0.41$ ,  $S.E. = 0.16$ ,  $p = 0.008$ ). These results indicate that, holding all other variables constant, affiliation with a trade union group increased the log-odds that an individual will use the Internet for information seeking by 0.78, or increases the odds by  $\exp(0.78) = 117.9\%$ . Similarly, affiliation with a recreational group increased the log-odds by 0.41, or the odds by 50.3%. However, the effect of affiliation with religious groups, organized cultural or political groups, farmers' associations or cooperatives, finance-related groups or decision-making groups was not significant. H1a received some support.

The effect of bridging social ties was not significant; neither was the effect of bonding social ties. Bonding social ties was negatively related to online information seeking, indicating that if an individual had a higher proportion of friends who lived nearby and knew each other, she or he would be less likely to use the Internet for information seeking. Bridging social ties was positively related to the dependent variable. Neither effect achieved statistical significance. H1b and H1c were not supported.

Age, gender, total years of schooling, and monthly disposable income were included in the model to predict an individual's use of the Internet for information seeking. Age and education were positively correlated with online information seeking. Holding all other independent variables constant, each year's increase in age increased the odds of using the Internet for information seeking by 2.5% ( $B = 0.03$ ,  $S.E. = 0.01$ ,  $p = 0.001$ ). Each year's increase in schooling increased the odds of using the Internet for information seeking by 9.2% ( $B = 0.09$ ,  $S.E. = 0.02$ ,  $p = 0.000$ ). The effect of monthly disposable income was close to significant ( $B = 0.001$ ,  $S.E. = 0.00$ ,  $p = 0.059$ ), indicating that with US\$1 increase in the monthly disposable income, the likelihood of using the Internet for information seeking increased 0.1%. The effect of gender was not significant ( $B = -0.03$ ,  $S.E. = 0.14$ ,  $p = 0.849$ ). The effect of citizenship was found to be significant only in Ghana ( $B = 1.49$ ,  $S.E. = 0.48$ ,  $p = 0.002$ ), showing that compared to citizens in Ethiopia, being a citizen of Ghana increased the odds of using the Internet for information seeking by 345.2%.

## Economic Transactions

The model predicting online economic transactions was significant ( $\chi^2 = 279.54$ ,  $df = 22$ ,  $p < 0.001$ , Cox & Snell  $R^2 = 0.20$ , and Nagelkerke  $R^2 = 0.27$ ). Among different dimensions of civic affiliation, belonging to a farmers' association or cooperative was the most significant factor ( $B = 0.60$ ,  $S.E. = 0.27$ ,  $p = 0.025$ ). This showed that, holding all other variables constant, affiliation with this type of social group increased an individual's odds of using the Internet to purchase goods or services online by 80.4%. Affiliation with trade unions was close to significant at the  $\alpha$  level of 0.05 ( $B = 0.38$ ,  $S.E. = 0.20$ ,  $p = 0.056$ ), indicating that affiliation increased the odds by 46.4%. Affiliation with any of the other civil society organizations was not a strong predictor of economic capabilities. H2a received some support.

The effect of bonding social ties was significant ( $B = -0.38$ ,  $S.E. = 0.17$ ,  $p = 0.028$ ), indicating that if individuals agree with the statement "Most people I know live near me and know each other," this decreased their odds of using the Internet for economic transactions by 31.61%, which was derived from  $[\exp(-0.38) - 1]$ . The effect of bridging social ties was not significant ( $B = 0.32$ ,  $S.E. = 0.18$ ,  $p = 0.075$ ). H2b was supported; H2c was not supported.

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Table 2. Logistic Regression of Capability to Use ICT for Specific Purposes.

Variables	Informational		Economic		Political		Social		Cultural	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Age	.03***	.01	.03***	.01	.02**	.01	-.03***	.01	-.05***	.01
Male	-.02	.14	.26!	.14	.30*	.14	-.17	.15	.51***	.14
Education	.09***	.02	.07***	.02	.11***	.02	.12***	.02	.05*	.02
Income	.001!	.00	.003***	.00	.00	.00	.00	.00	.00	.00
Religious groups	-.08	.16	-.01	.17	.12	.17	.32!	.17	.16	.17
Trade unions	.78**	.26	.38!	.20	.68***	.19	.36	.24	-.09	.22
Organized cultural/political groups	.20	.20	.24	.18	.42*	.17	.07	.21	-.01	.20
Farmers associations/ cooperatives	.26	.34	.60*	.27	.28	.27	.43	.34	.64*	.30
Finance groups	-.12	.19	-.02	.17	.29	.17	-.27	.19	-.43*	.17
Recreational groups	.41**	.16	.26	.15	.27	.15	.48**	.17	.46**	.16
Decision making groups	.23	.25	-.10	.22	.60**	.21	.37	.25	-.14	.22
Bonding social ties	-.02	.17	-.38*	.17	-.21	.18	.08	.18	.03	.18
Bridging social ties	.18	.19	.32	.18	.50**	.18	.59**	.21	.70***	.20
Uganda	-.45	.37	2.79**	1.05	-.30	.46	1.81***	.47	1.88***	.42
Tanzania	-.19	.48	2.73***	1.09	.61	.57	1.73**	.56	2.20***	.57
Rwanda	.67	.53	3.58***	1.09	.43	.57	1.96**	.68	1.59**	.57
Ghana	1.49**	.48	3.25**	1.05	.65	.45	1.33***	.41	1.87***	.42
Cameroon	.43	.36	2.84**	1.05	.93*	.42	.91**	.35	.57	.34
Nigeria	.55	.35	3.42***	1.03	1.29***	.40	.99**	.34	.92**	.33
Namibia	.29	.36	4.34***	1.04	1.92***	.40	1.97***	.39	2.39***	.39
South Africa	-.25	.30	3.76***	1.02	.55	.38	.73*	.29	1.01***	.30
Botswana	.38	.34	3.42***	1.03	.87*	.40	1.10***	.33	1.35***	.33
Constant	-1.43**	.46	-6.37***	1.08	-4.32***	.52	-1.12*	.45	-.19	.44
Chi-square	161.11		279.54		253.92		165.46		202.55	

Note: !  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The effect of demographics on online economic transactions was also significant, particularly for age, education, and monthly disposable income. Age was a positive predictor ( $B = 0.03$ ,  $S.E. = 0.01$ ,  $p = 0.000$ ), indicating a year's increase in age increased an individual's odds of using the Internet for economic transactions by 3.1%. Education was also a positive predictor ( $B = 0.07$ ,  $S.E. = 0.02$ ,  $p = 0.001$ ), indicating each additional year of schooling increased the odds of using the Internet for economic transactions by 7.2%. The effect of disposable monthly income was also a positive indicator ( $B = 0.003$ ,  $S.E. = 0.000$ ,  $p = 0.000$ ), indicating that every one U.S. dollar increase in monthly disposable income increased the odds of using the Internet for economic transactions by 0.3%. Gender was close to significant ( $B = 0.26$ ,  $S.E. = 0.14$ ,  $p = 0.061$ ), showing that being a male increased the odds of using the Internet for economic transactions by 29.6%. The effect of citizenship was stronger for online economic transactions, compared to online information seeking. Compared to being a citizen of Ethiopia, citizenship in any of the other countries increased the odds of using the Internet for economic transactions.

### Political Participation

The effect of existing social capital in predicting the capability of using the Internet for political participation was significant ( $\chi^2 = 253.92$ ,  $df = 22$ ,  $p < 0.001$ , Cox & Snell  $R^2 = 0.18$ , and Nagelkerke  $R^2 = 0.26$ ). The strongest predictor was affiliation with a trade union ( $B = 0.68$ ,  $S.E. = 0.19$ ,  $p = 0.000$ ), followed by affiliation with decision-making groups ( $B = 0.60$ ,  $S.E. = 0.21$ ,  $p = 0.004$ ) and organized cultural/political groups ( $B = 0.42$ ,  $S.E. = 0.17$ ,  $p = 0.016$ ). The findings indicated that, holding all other variables constant, affiliation with trade unions increased the odds by 96.4%, affiliation with decision-making groups increased the odds by 82.2%, and affiliation with an organized cultural/political group increased the odds by 52.2%. The effects of all other affiliations were not significant. Furthermore, all the factors of civic association were positively related to online political participation, indicating that individuals engaging with civil society activities were more likely to use the Internet to interact with the government. H3a received some support.

The effect of bridging social capital on an individual's capability to use the Internet for political participation was significant ( $B = 0.50$ ,  $S.E. = 0.18$ ,  $p = 0.005$ ), increasing the odds by 64.4%. H3c was supported. Bonding social capital was negatively related to the capability to use the Internet for political participation, while the effect was not significant. H3b was not supported. Online political participation was also positively predicted by age, education, and gender. The effect of monthly disposable income was not significant. Compared to citizens of Ethiopia, being a citizen of the following countries increased the chances of using the Internet for political engagement: Botswana, Cameroon, Namibia, and Nigeria.

### Online Learning

The model predicting online learning was significant ( $\chi^2 = 165.46$ ,  $df = 22$ ,  $p < 0.001$ , Cox & Snell  $R^2 = 0.12$ , and Nagelkerke  $R^2 = 0.18$ ). Looking at the social capital measures, the effect of belonging to recreational groups was significant ( $B = 0.48$ ,  $S.E. = 0.17$ ,  $p = 0.004$ ), suggesting that affiliation with social groups based on common hobbies increased the odds of individuals using the Internet for learning and education purposes by 61.4%. Participating in recreational groups is more than socializing with community members. The effect of affiliation with religious groups was close to significant ( $B = 0.32$ ,  $S.E. = 0.17$ ,  $p = 0.060$ ), increasing the odds by 37.2%. Effects of all other affiliations failed to achieve statistical significance. H4a received some support.

The effect of bridging social ties in predicting online learning was significant ( $B = 0.59$ ,  $S.E. = 0.21$ ,  $p = 0.005$ ). The effect of bonding ties was not significant. H4b was not supported; H4c was supported. Age and education were also strong predictors in this model. The effect of age on using the Internet for educational purposes was the opposite of other dimensions of Internet use. Younger people were more likely to use online educational resources and to take online courses ( $B = -0.03$ ,  $S.E. = 0.01$ ,  $p = 0.000$ ), indicating every one-year decrease in age increased the odds by 25.92%. Furthermore, the more years in school, the higher the probability of using the Internet for education ( $B = 0.12$ ,  $S.E. = 0.02$ ,  $p = 0.000$ ). This indicated that every additional year of schooling increased the odds by 12.5%. The effects of gender and monthly disposable income were not significant. The effect of citizenship was found to be significant on all the country variables,

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indicating that compared to the respondents from Ethiopia, being a citizen of the other nine countries increased the odds of using the Internet for educational purposes.

### Online Entertainment

The model predicting an individual's capability of using the Internet for entertainment was significant ( $\chi^2 = 202.55$ ,  $df = 22$ ,  $p < 0.001$ , Cox & Snell  $R^2 = 0.15$ , and Nagelkerke  $R^2 = 0.21$ ). Among all measures of social affiliation, the strongest predictor was belonging to a recreational group ( $B = 0.46$ ,  $S.E. = 0.16$ ,  $p = 0.004$ ), which increased the odds by 59%. Affiliation with farmers' associations or cooperatives was also a strong and positive predictor ( $B = 0.64$ ,  $S.E. = 0.30$ ,  $p = 0.034$ ). Affiliation with finance-related groups was a strong but negative predictor ( $B = -0.43$ ,  $S.E. = 0.17$ ,  $p = 0.014$ ), which decreased the odds by 34.95%. The effect of affiliation with any other civil society group was not significant. H5a received some support.

Bonding social capital was positively related to an individual's use of the Internet for entertainment but its effect was not significant. Bridging social capital was a significant positive predictor ( $B = 0.70$ ,  $S.E. = 0.20$ ,  $p = 0.001$ ), indicating that the more heterogenous a person's friendship network, the more likely that person would be to use the Internet for entertainment. H5b was not supported; H5c was supported.

Gender, education, and age were all strong predictors of an individual's capability to use the Internet for entertainment. Being male increased the odds by 66.2% ( $B = 0.51$ ,  $S.E. = 0.14$ ,  $p = 0.000$ ). Every additional year of schooling increased the odds by 5.2% ( $B = 0.05$ ,  $S.E. = 0.02$ ,  $p = 0.014$ ). Every one-year increase in age decreased the odds by 4.78% ( $B = -0.05$ ,  $S.E. = 0.01$ ,  $p = 0.000$ ). The effect of monthly disposable income was not significant. Compared to citizens of Ethiopia, being a citizen of any of the other countries except Cameroon increased an individual's odds of using the Internet for entertainment.

### Discussion

The objective of this study was to examine how social capital impacted an individual's capability to use the Internet. Logistic regression was used to analyze the survey data collected from 10 African countries. Moving beyond the focus on access to technologies, CA was applied to understand the relationships between ICTs and development outcomes. In this study, the capability to use the Internet was operationalized as a binary variable to reflect use and non-use of the Internet for specific purposes. Five dimensions of capability to use the Internet were measured as dependent variables by asking the survey participants whether they used the Internet for the following activities: information seeking, economic transactions, political participation, online learning, and entertainment. The findings from logistic regression (summarized in Table 3) were interpreted using a network perspective of social capital. Implications for combining the network perspective and CA in ICT4D studies are provided in this section. Social implications of Internet use were also drawn from the significant effect of social capital and demographics.

One item worthy of note is, given that the sampled respondents were all Internet users, non-use in the context of this study does not mean the respondents lacked the ability to use the Internet. It indicates that they chose not to use the Internet for certain activities, possibly due to personal preferences. A critical view thus has been applied to the discussion. CA indicates that the capability to use the Internet for different purposes depends on personal choices (Alkire, 2002; Sen, 1999). To some individuals, sending money online is possibly less relevant if the family or friends live nearby. Some people may prefer talking to government organizations in person rather than using ICTs to engage in conversation with them. Therefore, the findings from the models are interpreted with caution.

### General Trend of Internet Use

The Internet has enabled the survey users to access online education resources, affording developing communities the opportunity to gain education despite limited capital to pay for formal education. Online education has been seen as a primary mechanism through which ICTs can empower developing communities (Hosman, 2010). Literature has emphasized the value of ICTs for education purposes (Farrell & Isaacs, 2007). The respondents also reported their capability of using the Internet for leisure. They used the Internet to access music and

Table 3. Summary of the Effects of Demographics and Social Capital on Capability.

Factors	Capability to Use ICTs for Activities				
	Informational	Economic	Political	Social	Cultural
Religious groups	– ns	– ns	+ ns	+ !	+ ns
Trade unions	+ **	+ !	+ ***	+ ns	– ns
Organized cultural/political groups	+ ns	+ ns	+ *	+ ns	– ns
Farmers' associations/cooperatives	+ ns	+ *	+ ns	+ ns	+ *
Saving clubs/microfinance groups	– ns	– ns	+ ns	– ns	– *
Recreational groups	+ **	+ ns	+ ns	+ **	+ **
Decision-making groups	+ ns	– ns	+ **	+ ns	– ns
Bonding social ties	– ns	– *	– ns	+ ns	+ ns
Bridging social ties	+ ns	+ ns	+ **	+ **	+ ***
Male	– ns	+ !	+ *	– ns	+ ***
Age	+ ***	+ ***	+ **	– ***	– ***
Years of schooling	+ ***	+ ***	+ ***	+ ***	+ *
Monthly disposable income	+ !	+ **	+ ns	+ ns	+ ns
Botswana	+ ns	+ ***	+ *	+ ***	+ ***
Cameroon	+ ns	+ **	+ *	+ **	+ ns
Ghana	+ **	+ **	+ ns	+ ***	+ ***
Namibia	+ ns	+ ***	+ ***	+ ***	+ ***
Nigeria	+ ns	+ ***	+ ***	+ **	+ **
Rwanda	+ ns	+ ***	+ ns	+ **	+ **
South Africa	– s	+ ***	+	+ *	+ ***
Tanzania	– ns	+ ***	+ ns	+ **	+ ***
Uganda	– ns	+ **	– ns	+ ***	+ ***

Note: Significant positive predictors are denoted by +. The strongest predictors are denoted by \*\*\*, indicating significance levels of  $p < 0.001$ ; \*\* indicates significance levels at  $p < 0.01$ ; \* indicates significance levels at  $p < 0.05$ ; ! indicates  $p$  values close to 0.5 (ranging from 0.51–0.60). Factors negatively associated with the dependent variable are denoted by –. Nonsignificant predictors are denoted by “ns.”

movie resources and to play video games. This study also found that individuals were able to engage in online information seeking, either for daily consumption or for government information. However, awareness was low for using online platforms for economic transactions without the mediation of brokers. Furthermore, awareness of using the Internet to access government websites or directly communicate with government organizations could be enhanced.

### The Significant Effect of Social Capital

The relative importance of civic affiliations differed by type of Internet activity. Belonging to trade unions had a strong and positive relationship to an individual's capability to use the Internet for information seeking, economic transactions, and political participation. Affiliation with organized cultural or political groups and to decision-making groups were both found to have a significant and positive effect on an individual's capability to use the Internet for political participation. Belonging to a farmers' association or cooperative had a significant and positive relationship to an individual's capability for online economic transactions and entertainment. Affiliation with recreational groups was a significant and positive predictor for three of the five categories of capability: information seeking, online learning and education, and recreational activities. Affiliation with microfinance groups had a significant and negative effect on online entertainment. The effect of an affiliation with religious groups was significant for online learning.

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Regarding existing social ties, the effect of bonding social capital was significant and negative for an individual's capability to use the Internet for economic transactions. Bonding social capital was negatively correlated with all but two dimensions: online learning and entertainment. Bridging social capital was a significant and positive predictor for three dimensions of capability to use the Internet: interacting with the government, online learning and education, and recreational activities.

Given that logistic regression did not provide sufficient evidence for causality, the significant correlation between civil society affiliations and an individual's capability to use the Internet could indicate that members of certain social groups are more likely to use the Internet for capability building, possibly through the social influence of their peers' technology use. Civil affiliation may enhance their chances of exposure to new technologies and, thus, lead to adoption of these technologies due to social pressure embedded in these social networks. The significant correlation between civil society affiliation and capability could also indicate that people who use the Internet for certain activities are more likely to join social groups. In either case, the affiliation with civil society organizations plays an important role in explaining the relationship between Internet use and capability building.

The same rationale applies to the significant and positive correlation between the heterogeneity of social networks and an individual's capability to use the Internet. It could be the case that Internet use diversifies social circles or that heterogeneous social circles enhance an individual's capability to use the Internet, which emphasizes the importance of bridging social capital in both technology use and capability building.

The network perspective of social capital, which emphasizes the interconnectedness and social relations among collectivities, suggests that civil society sectors should be leveraged to promote the potential of Internet use for developmental purposes. Specifically, recreational groups, political groups, trade unions, farmers associations and cooperatives, religious groups, and decision-making groups should be engaged to raise the awareness of meaningful Internet use in developing communities. Different organizations can frame the importance of Internet use in terms of how it facilitates access to specific forms of information and resources that an individual would not otherwise have access to, at least ready access.

In some circumstances, being part of a social group only provided transient instrumental functions, such as saving clubs, burial societies, and microfinance groups. The benefit was not sustained long enough to support long-term development goals. This might explain why belonging to these groups was negatively related to capabilities. As mentioned earlier, the network perspective of social capital also captures the downside of social relationships. This finding provided some evidence.

### Significant Effect of Demographics

The effect of demographics was strong, particularly for age and education. The effect of age varied by specific contexts of Internet use. On one hand, the older a person was, the higher the likelihood that she or he would use the Internet for instrumental purposes such as information seeking, economic transactions, or political participation. On the other hand, the younger generation tended to use the Internet to engage in online education and entertainment. The effect of education was consistent across all five dimensions of Internet use: the more years of schooling, the higher the likelihood of Internet use. Although no clear causality can be concluded from the analysis, it suggests that improving literacy is of great importance because of its positive correlation with an individual's capability to use the Internet.

The effect of gender was significant for three dimensions of ICT use. Males were more likely to use the Internet for economic transactions, political participation, and entertainment. Although females were more likely to use the Internet to access online educational resources and to seek information, the correlation was not significant. In promoting Internet use, efforts should be aimed at reducing gender inequality in technology use.

The citizenship variable also generated significant findings, using respondents from Ethiopia as the reference group. Respondents from Uganda were less likely to use the Internet for economic activities and learning. Respondents from Rwanda, South Africa, and Tanzania were more likely to use the Internet for economic transactions, online learning, and entertainment. Respondents from Ghana were more likely to use the

Internet for information seeking, interaction with the government, online learning, and entertainment. Respondents from Cameroon were more likely to use the Internet for economic transactions, political participation, and online learning. Respondents from Botswana, Namibia, and Nigeria were more likely to use the Internet for economic activities, political participation, online learning, and entertainment.

## Limitations and Future Research

The study has several limitations. First, the measures of bonding and bridging social ties have only one item each in the survey. This might affect the scale's reliability. The measurement of bonding ties captured whether respondents agreed that strong ties existed in their social circles. The measurement of bridging ties captured whether respondents perceived their social circles as heterogeneous. Further study will incorporate more items to measure these two variables. Specifically, more concrete instruments will be used to measure social capital to reflect trust embedded in social networks.

Second, all the questions on civil association were binary, asking the respondents if they were affiliated with a certain social group. However, association with a social group did not equal an active commitment to networking. In future research, the quality of participation will be measured to better capture social capital, such as the frequency of event participation in the community. Future research will also measure how much support and trust individuals receive from the community.

Third, the logistic regression used in the study did not validate the causality between the dependent variables and independent variables. Significant findings were interpreted with caution to reflect the correlation among the variables, as the possible direction of causality in these significant relationships could go either way. Further research should look at what types of capabilities have been enhanced by ICT usage and how the capabilities have been enhanced. Data from future research will be collected from Internet users and non-users to capture the level of capability from the context of Internet use and also independent of Internet use.

## Conclusion

In this study the combination of a network perspective with Sen's Capability Approach provides a rich theoretical base by which to better understand the impact of effective Internet use on developmental outcomes. CA provides a model by which we can understand the processes of how social and demographic factors relate to an individual's capability to use the Internet for information seeking, economic transactions, political participation, learning, and entertainment. By examining how civil associations, bonding social capital, and bridging social capital relate to people's choices on ICT use toward meaningful purposes, this study highlights the value of social capital in explaining the links between ICTs and human development.

Findings show that it is important to understand the institutional and contextual factors which enable people to or constrain them from attaining their human development goals. Findings also show that ICTs are important in mediating development. Affiliation with different social groups is more than simply socializing. The network perspective of social capital helps us better understand the nature of social ties and how human capabilities to use ICTs are enhanced where institutional factors provide an enabling environment for increased social interaction on these specific goals. When the environment is constraining (such as when tensions or conflict within the social groups limits development of these ties), then capabilities to make beneficial use of ICTs are undermined. In certain models, the effect of demographics is stronger than social capital. For example, the effects of education and age were stronger for online information seeking, economic transactions, and online learning. The effect of education was strongest in its correlation with online learning. These findings suggest that efforts should be directed toward improving education, reducing gender imbalance, and engaging multiple generations.

This study contributes to the empirical study of ICTD. First, the application of CA helps us understand the relationship between human development and technology use by moving beyond a focus on access and connectivity to technologies. ICTD is about technology but not necessarily all about technology. CA conceptualizes human development as the expansion of freedoms and capabilities, which can be assessed through the use of ICTs for specific development purposes. Furthermore, CA captures human development from multiple

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dimensions, which is different from the hegemonic view that development is mainly about economic growth (Unwin, 2007). Guided by these arguments, this study concluded that when analyzing the relationship between ICTD and development, people's freedom to choose also needs to be taken into account.

Second, the network perspective helps address how technology use is influenced by social factors and, thus, calls for development partnerships between government sectors and civil society sectors. This study found that affiliation with religious groups, farmers' associations or cooperatives, trade unions, recreational groups, or decision-making groups is strongly associated with how individuals use the Internet to achieve a life they value. In the network perspective, development is not only about economic growth. It is more about how social groups in the developing community can cohere to increase their political and economic bargaining power through ICT use (Elder, Emdon, Fuchs, & Petrazzini, 2013). Institutional forces such as civil society organizations should be leveraged to raise the awareness of new technologies' role in development. ■

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