

2016

The use of Sen's capability approach in ICT4D: an exploratory review

Mmabatho Tshivhase

University of Pretoria, mabz@tuks.co.za

Marita Turpin

University of Pretoria, marita.turpin@up.ac.za

Machdel Matthee

University of Pretoria, machdel.matthee@up.ac.za

Follow this and additional works at: <http://aisel.aisnet.org/confirm2016>

Recommended Citation

Tshivhase, Mmabatho; Turpin, Marita; and Matthee, Machdel, "The use of Sen's capability approach in ICT4D: an exploratory review" (2016). *CONF-IRM 2016 Proceedings*. 10.
<http://aisel.aisnet.org/confirm2016/10>

This material is brought to you by the International Conference on Information Resources Management (CONF-IRM) at AIS Electronic Library (AISEL). It has been accepted for inclusion in CONF-IRM 2016 Proceedings by an authorized administrator of AIS Electronic Library (AISEL). For more information, please contact elibrary@aisnet.org.

70. The use of Sen’s capability approach in ICT4D: an exploratory review

Mmabatho Tshivhase
University of Pretoria
mabz@tuks.co.za

Marita Turpin
University of Pretoria
Marita.Turpin@up.ac.za

Machdel Mathee
University of Pretoria
Machdel.Mathee@up.ac.za

Abstract

This paper reviews the use of Sen’s capability approach (CA) in the field of Information and Communication Technology for development (ICT4D). While ICT4D scholars have a high regard for Sen’s CA, there is an apparent lack of knowledge on how to practically apply the CA in ICT4D. This paper investigates the gap between the theory of the CA and its application in ICT4D. It does so by identifying frameworks developed by scholars to operationalise the CA, and thereafter searching through journals with a prominent ICT4D focus to see how the CA has been used in practice. The study reveals four frameworks that have sought to operationalise the CA; however there seems to be a lack of usage of these frameworks where the CA is applied in ICT4D. This calls for further investigation as to why this mismatch exists.

Keywords

Capability Approach, Amartya Sen, Functionings and Capabilities, Impact Assessment, ICT4D

1. Introduction

Amartya Sen’s CA is growing in prominence in the field of development in general and in ICT4D in particular (Thapa & Saebo, 2014). Many scholars have hailed the importance of this approach that not only considers the economic benefits of diffusing ICTs in poor communities in efforts to develop them, but has a holistic consideration of development (e.g. Thapa & Saebo, 2014; Zheng, 2009; Robeyns, 2006; Zheng & Walsham 2008; Hatakka, 2011). Although scholars agree that the CA is a worthwhile approach to use in matters of ICT4D (Heeks & Molla, 2009), there seems to be a lack of knowledge on how to operationalise the approach (Robeyns, 2006; Kleine, 2010; Gigler 2015).

In the ICT4D value chain “impact” can be broken down into outputs, outcomes and development impacts (Heeks & Molla, 2009). As one moves downstream along the value chain, assessment of development becomes difficult and costly, however it also becomes more valuable (Heeks, 2010; Heeks & Molla, 2009). The CA can contribute in the space of downstream impact, but there is no agreed upon manner to practically apply it in ICT4D. That may be because the CA does not have stipulated variables of measurement (Hatakka & Lagsten, 2012) and the perception that it is hard to understand and use in practical terms (Heeks & Molla, 2009). This paper considers various efforts to date to operationalise the CA. It also investigates, by means of a literature review, how the CA has been used in practice in

ICT4D. The literature review is limited to a search through four prominent ICT4D journals. The structure of this paper is as follows. It commences with a brief overview of approaches that scholars have devised in attempts to operationalise the CA. The next section presents the results of a search through four ICT4D journals, to see how the CA was used by ICT4D scholars. A summary is provided of each paper that was found to use Sen's CA, as well as a comparative analysis in tabular format. The paper ends with a discussion of the findings and a conclusion.

2. Attempts to operationalise Sen's Capability Approach

This section discusses work that has been done to operationalise Sen's CA for practical implementation. Four approaches were found in literature, three of which were developed within and for the ICT4D context, while one (by Nussbaum) is general. The frameworks were discovered through an information search on Sen's work in ICT4D, using the combined search terms "ICT4D" and "capability approach". The four frameworks are briefly summarised below, with the discussion limited to presenting the elements of each framework only.

2.1 Central Human Capabilities – Nussbaum (2003)

Nussbaum draws from Sen's CA and creates a list she refers to as the Central Human Capabilities. The premise of her list stems from the conception of the dignity of the human being and she posits that the Central Human Capabilities are the requirements (Nussbaum, 2003). The list comprises the minimum requirements of social justice. Nussbaum claims that a society is not just if it does not guarantee all the items, capabilities, on the Central Human Capabilities list to all its citizens at some appropriate threshold level. The list is as follows: Life, Bodily health, Bodily integrity, Senses, Imagination and thought, Emotions, Practical reason, Affiliation, Engagement with other species, Play, and Control over one's environment. One of the ideas for having such a list is to evoke reaction and drive debate (Gasper, 1997), and as a result refinements to the list has been made over several years (Gasper, 1997; Nussbaum, 2000).

2.2 The Choice Framework – Kleine (2010)

The Choice Framework is Kleine's (2010) attempt to operationalise Sen's CA. It provides a systemic and holistic analysis of development (Kleine, 2010) which can be used to assess development projects. It stems from the notion prominent to the CA that defines development as a process that expands the real freedoms that people enjoy (Sen, 1999: 3) in order to live lives that they have reason to value (Sen, 1999: 293). Development then is understood to be freedom of choice (Kleine, 2010). The framework is derived from the Empowerment Framework, the Sustainable Livelihood Framework as well as the CA. It consists of outcomes, dimensions of choice, agency and structure. "Dimensions of choice" refers to existence of choice, sense of choice, use of choice and achievement of choice. The framework (Figure 1) works backwards from outcomes to structure, agency and choice in order to enable analysis of how outcomes were reached.

2.3 Hatakka and De' (2011)

Hatakka and De' (2011) present a framework for evaluating ICT4D projects. The framework is founded on Sen's writings as well as the work of scholars from different fields who have operationalised Sen's CA (e.g. Alkire, 2002, 2010; Alsop & Heinsohn, 2005; Frediani, 2010; Robeyns, 2005a, 2005b, 2006). The main focus of this framework is the differences between potential and achieved functionings; it also focuses on analysing the ends of technological

interventions and not only the means. The framework consists of the following components: intervention, capability set, achieved functionings, choice and conversions factors. Intervention comprises the technology along with training and support to use that technology. Conversion factors entail the context of an individual, comprising personal, social and environmental factors. These determine whether or not an individual will be able to use the particular technology. Lastly, the framework then evaluates the achieved and potential functionings that the intervention sought to enable. See Figure 2 below.

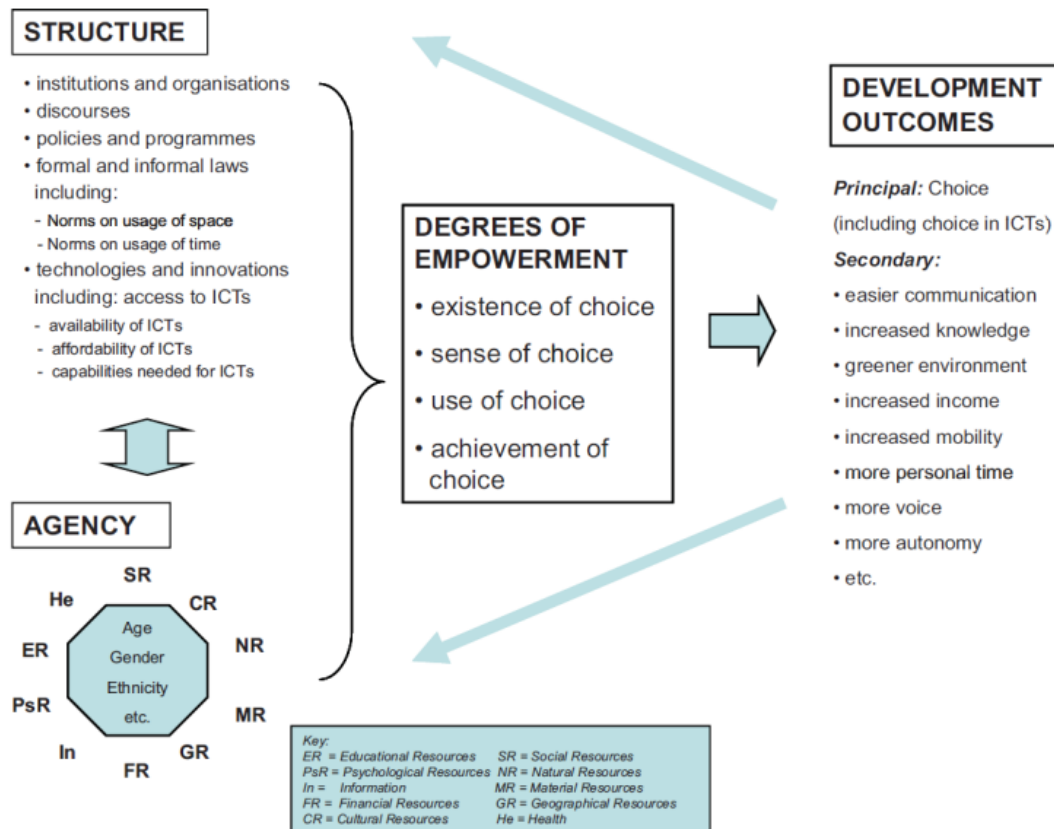


Figure 1: The Choice Framework (Kleine, 2010, p 680)

2.4 Alternative Evaluation Framework – Gigler (2015)

Another framework used to operationalise Sen’s CA is by Gigler. He devised what is called the Alternative Evaluation Framework (AEF) (Gigler, 2004). Its main thrust is that the livelihood resources from the different types of capital dictate to a large extent a person’s or society’s capability to transform valued functionings into realised functionings. The AEF emphasises that the adoption of technologies and the information provided through these ICTs should be contextualised. Gigler argues that simply providing ICT access to the poor will not yield lasting benefits, but in order to reap long lasting and sustainable benefits for their use the ICTs have to be appropriate to the local needs and realities. The framework (see Figure 3) analyses context, livelihood resources, institutional resources, capabilities and livelihood outcomes. It also highlights the stages of ICT programs.

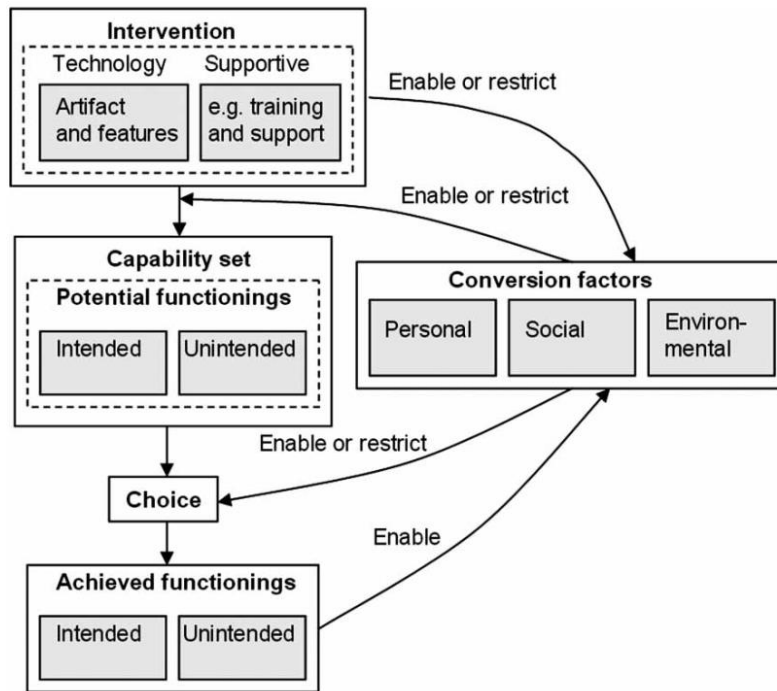


Figure 2: Operationalisation of Sen's Capability Approach (Hatakka & De', 2011)

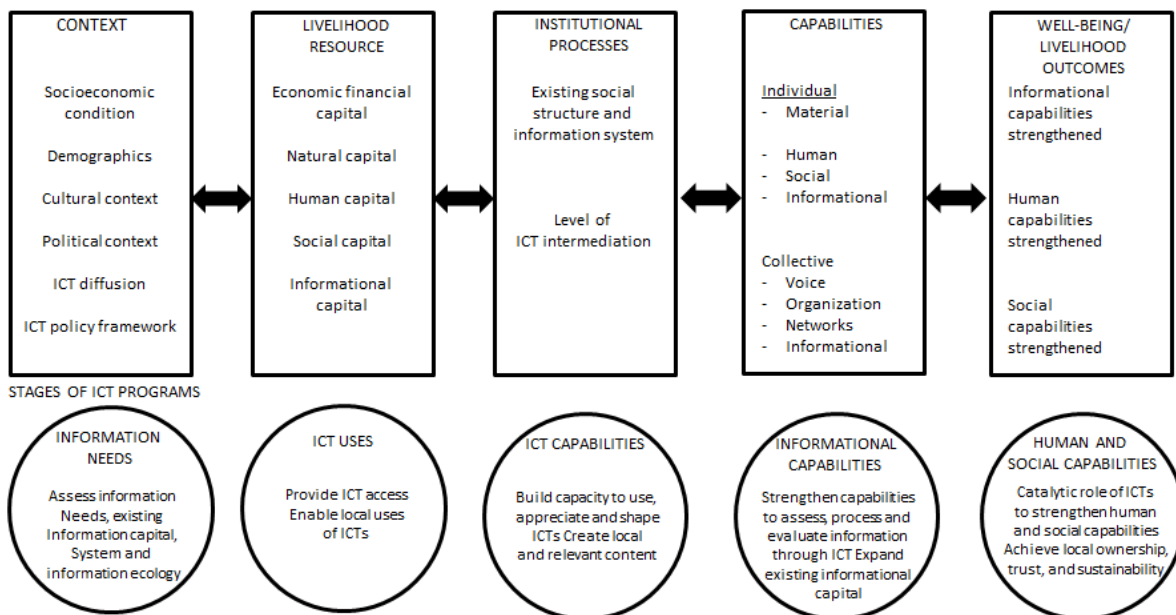


Figure 3: Alternative evaluation framework for the impact of ICTs on well-being (Gigler, 2015, p 32)

3. The application of CA in ICT4D

This section considers the extent to which the various frameworks operationalising Sen have been adopted by the ICT4D community. Four prominent ICT4D journals were searched for applications of Sen's CA. These journals were searched for the full periods that they were

available online, namely: the *Electronic Journal of Information Systems in Developing Countries (EJISDC)*: 2000 - 2015, *Information Technologies and International Development (ITID)*: 2003 - 2015, *Information Technology for Development (ITD)*: 2003 - 2009 and the *Journal of Community Informatics (JoCI)*: 2004 - 2015. Ten papers were found that use Sen's CA. Keywords were used to search for relevant papers through the four journals. The keywords were: capability approach, Amartya Sen, functionings and capabilities. Although many results were retrieved using these keywords, most of them were not selected for this review as they only mentioned Sen's CA in passing. Only the papers in which Sen's CA played a central role were selected. Below, each of these ten papers is summarised showing how the approach was applied. The papers are discussed in order of their publication date. A comparative analysis of the papers can be found in Table 1.

Madon (2004) evaluates the impact of e-governance projects in India using Sen's CA. She uses an evaluation framework that looks at the following four factors: range of ICT-generated applications, what functionings are enabled, what people do with opportunities, and barriers to achieving functionings. Madon carries out a longitudinal case study in the State of Kerala in India looking at the impact of e-government technologies, named AKSHAYA and FRIENDS, on the development of the people in that region. Through semi-structured interviews, observations, studying of reports, websites and various other secondary resources it was found that the functionings that were enabled by AKSHAYA and FRIENDS were: payment of bills without middlemen, increased self-esteem in service officers, better attitudes of citizens towards government because of increased sense of trust resulting from improved service delivery without corruption. Citizens use the opportunities available to them; they frequent the FRIENDS centres instead of department counters reflecting the sustainability of these centres; entrepreneurs have taken the opportunity to be self-starters, relying less on government for ideas; women have become empowered to take part in social clubs and economic activities. Barriers to functionings include: citizens have great expectations from the centre to promote e-government activities; also, there is a suspicion that AKSHAYA is a private sector conspiracy.

Alampay (2006) analyses peoples' capabilities and actual usage of ICTs. The in-depth comparative study was conducted in Carmona and Puerto Princesa looking at individual differences such as age, gender and education that have an effect on their values, capabilities, and unfreedoms. A focus group interview, a literature review and a survey which included concepts adopted from the CA were used to gather data. The study recognised that in order to measure the impact of ICTs it would be important to go beyond access and to evaluate what people do with the opportunity given them of ICTs. Thus it revealed how often people of Carmona and Puerto Princesa used ICTs and what they used those ICTs for. The findings showed that there was occasional phone usage, mainly on personal rather than business purposes which is still important for development as it builds social capital by strengthening networks between people. On the other hand cost, disability, lack of capacity to use and lack of available lines and facilities were some of the reasons for unrealised functionings.

Musa (2006) used a modification of TAM that includes CA concepts to measure the core factors that individuals perceived as influencing their propensity to adopt technology. A survey was conducted on individuals from Kenya and Nigeria. Included in the findings was that a statistically significant relationship exists between perceived negative-impact factors and individuals' perceptions of their socioeconomic environment. This finding was testament to the respondents' feeling of apathy towards the socioeconomic environment in which they struggle to survive. Also, a statistically significant relationship exists between an individual's perception of socioeconomic environment and accessibility of technology. Furthermore,

accessibility of technology did not have a significant direct impact on the perceived usefulness of technology; rather, its influence is mediated by the perceived ease of use of the technology. This is in support of the belief that access to technology alone is not the answer to meaningful adoption. The study suggests that it is the gradual exposure to basic technology over time that shapes and aids one in the adoption process of more advanced forms of technology.

Zheng (2009) looks at the different perspectives of development over time. She uses the CA to highlight an alternative space in which to evaluate ICT4D initiatives. She emphasises that the CA helps in evaluating e-development in a space of “freedoms”, which is a move beyond the narrow measurements of technology diffusion, productivity and cost benefit analysis.

Smith et al. (2011) applied the CA to review what capabilities can be expanded from the use of mobile phones. They posit that mobile phones enable and strengthen economic networks; these pertain to connecting citizens to financial institutions and expand market boundaries. Mobile phones, they say, also enable and strengthen social networks especially for the poor living in rural areas. Lastly, mobile phones enable and strengthen governance networks; such as access to government services, election monitoring and early warning systems. These are the functionings which were not possible at all before or possible but at a high cost but now enabled by mobile phones. The study then shows evidence (from other studies) of places where (particularly in developing countries) mobile phones have expanded functionings within the three networking dimensions.

Hatakka and Lagsten (2012) make an enquiry about the benefits of the CA when evaluating development. They thus apply the approach by evaluating the functionings and capabilities that are enabled by Internet resources as means to development and not the end. They use Hatakka and De’s (2011) operationalisation of the CA to study the use and developmental impact of Internet resources on 34 university students in Sweden who had come from developing regions like South Asia, East Africa and East Asia. To gather data, semi-structured individual interviews with questions based on the CA’s framework (such as background of student, what enables them to use the internet and what they use it for) were conducted. Dialogue seminars were also used. The findings showed that functionings are found on three levels; educational, professional and personal. There were some conversion factors that enabled or restricted the transformation of Internet resources into capabilities. For example economic factors limited their internet use as they had to pay for it when using it outside school. There were also social and environmental conversion factors found. Overall the study found that internet resources can act as means to development, and having the choice to use that resource can be seen as freedom.

Thapa et al. (2012) use a case study to prove that the CA can be used in group contexts as well; their research is used to identify the role ICT can play in building the social capital of communities. They created a theoretical framework that extends the CA by linking ICT to social capital, collective action, collective capabilities, and individual capabilities. The research was conducted in the Nangi and Tikot; two villages in the Nepal mountain region having a population of about 2000 people. These are two of the places where the Nepal Wireless Networking Project (NWNP) was initiated. Semi-structured interviews were conducted on 40 respondents of various ages. Findings revealed that NWNP enhances both individual and collective capabilities, concluding that there is an intricate and mutually reinforcing relationship between the two forms of capabilities.

Adaba and Rusu (2014) use the CA to evaluate the Ghana Community Network (GCNet) initiative in Ghana. GCNet is an EDI-enabled e-trade application that allows for fast and efficient processing of cargo clearance related operations. Thus it facilitates trade through the use of ICTs. The paper uses Madon's (2004) four factors for evaluating e-government initiatives, which are based on Sen's CA. Through the use of secondary sources and interviews, Adaba and Rusu found that the GCNet offers a variety of functionality ranging from enabling the sharing of documents to electronic declaring of imports and exports to allowing for e-payment. The functionings that were enabled by this technology are: it strengthened people's ability to clear consignments in timely manner from one portal without having to visit different agencies; it made the institutional capacity of customs stronger; it improved self-esteem and professionalism of customs officers. This initiative has opened to individuals and business a variety of opportunities: they can take advantage of the e-trade facility and avoid the intermediaries; there's a reduction of face-to-face interaction resulting in reduced corruption; organisational structural changes as a result of the new technology resulting in a new way of working and communicating. Barriers to functionings include: poor access to ICTs in Ghana, especially in remote areas, low ICT literacy and ICT skills across the country, low quality data due to incorrect classification of imports and exports.

Grunfeld (2014) studied the Informatics for Rural Empowerment and Community Health (iREACH) initiative in Cambodia. iREACH operates at two different locations in Cambodia – Kep and Kamchai Mear. It is a community centre that is open to the public and is equipped with computers and community facilitators. The community facilitators assist those with low literacy levels. iREACH offers internet and training in various topics such as agriculture and English. The study, with the help of the CA, looked at the difference that iREACH made in the lives of community members. As a starting point the CA is employed to understand the concept of development, it is then also used as a conceptual framework to inform the design of the research instrument to look at capabilities, sustainability and empowerment resulting from iREACH. Using a series of focus groups the study found that the accessibility of information through the telecentres expanded the capabilities of farmers in a complimentary manner to market-driven approaches to ICT.

Aricat (2015) uses Sen's CA to analyse the idea of freedom and constraints being inherent in adaptation by studying migrants. The study seeks to answer two questions, one looking at the extent to which a migrant's adaptation in a host country, specifically in their mobile ecosystem, is both freedom and a constraint. The other looking at how various strategies of adaptation help migrants achieve development in social, economic and political domains. The study interviewed 50 migrants from India and Bangladesh in Singapore and found that migrant workers' functionings were enhanced by mobile phone use however there were constraints in the improvement of their capabilities, these are constraints brought about by hierarchical organisational structures and internal constraints resulting from overdependence on mobile phones. The study also found that the use of mobile phones by migrant workers did not ensure freedom along a linear path but instead carried along non-freedoms. The study did not use a particular framework to operationalise the CA but used the CA to guide analysis.

Table 1 below contains a comparative summary of the papers that have used Sen's CA.

4. Discussion

While all ten papers discussed above used Sen's CA, only one of them used a framework discussed in this paper, namely Hatakka and Lagsten (2012), who used Hatakka and De's operationalisation of Sen. Two of the papers used Madon's approach for evaluating e-

government projects. Madon (2004) presented a way to apply CA to evaluate e-government projects, which Adaba and Rusu (2014) found useful and applied as well. Musa (2006) developed a framework based on TAM. None of the other papers used any formal framework but instead just applied CA concepts. The papers that did not apply any formal framework used the CA in a pragmatic way by incorporating CA concepts in the design of their data gathering.

Where the three frameworks (Hatakka and De's, Madon's and Musa's approaches) were applied, there was evidence of the respective framework authors' empirical involvement in the research. This implies that these frameworks were empirically informed, and that their authors showed personal commitment to their application.

The fact that the majority of the papers applied the CA concepts pragmatically without applying a formal framework is interesting. This could mean that the authors did not see a need for a framework, or that they were not aware of the existing frameworks, or that they found the existing frameworks inaccessible. Whatever the case, they did manage to operationalise Sen's work for themselves and to find value from the CA in this manner.

Table 1: A comparative summary of papers that used Sen's CA

	Paper	Journal	Usage of Sen's CA	Practical application? Yes/No	Target of assessment on ICT4D value chain	Context	Findings
1.	Madon (2004) Evaluating the developmental impact of e-governance initiatives: an exploratory framework	Electronic Journal of Information Systems in Developing Countries	Madon's (2004) approach for evaluating e-government projects	Yes	Impact	Karela, India	Enablement of real opportunities to payment of bills without middlemen; improved self-esteem in workplace, better attitudes of citizens towards government
2.	Alampay (2006) Analysing socio-demographic differences in the access & use of ICTs in the Philippines using the capability approach	Electronic Journal of Information Systems in Developing Countries	Used as theoretical framework, concepts incorporated in data collection	Yes	Impact	Philippines	There was phone usage, mainly on personal rather than business purposes which is still important for development as it builds social capital by strengthening networks between people
3.	Musa (2006) Making a case for modifying the technology acceptance model to account for limited accessibility in developing countries	Information Technology for Development	Musa's (2004) modified TAM	Yes	Uptake	Nigeria and Kenya	Accessibility of technology did not have a significant direct impact on the perceived usefulness of technology; rather, its influence is mediated by the perceived ease of use of the technology
4.	Zheng (2009) Different spaces for e-development: what can we learn from the capability approach?	Information Technology for Development	Used as theoretical framework	No			A different space for evaluating development from ICTs should be considered
5.	Smith et al. (2011) Mobile phones and expanding human capabilities	Information Technologies & International Development	Evaluates contribution of mobile phones to human capabilities	No	Impact	Various developing countries	Mobiles are making substantial contributions to capabilities and freedoms in economic, social, and governance spheres
6.	Hatakka and Lagsten (2012) The capability approach as a tool for development evaluation – analysing students' use of internet resources	Information Technology for Development	Hatakka and De's (2011) operationalisation of Sen's CA	Yes	Impact	Students from developing regions (East Africa, East Asia, West Africa, Middle East and East Europe) studying in Sweden	Internet recourse can act as means to development, and having the choice to use that recourse can be seen as freedom
7.	Thapa et al (2012) Building collective capabilities through ICT in a mountain region of Nepal: where social capital leads to collective action	Information Technology for Development	Used as theoretical framework extended to include collective capabilities	Yes	Impact	Mountain region of Nepal	There is an intricate and mutually reinforcing relationship between individual capabilities and collective capabilities
8.	Grunfeld (2014) ICT for sustainable development: an example from Cambodia	Journal of Community Informatics	Used as theoretical framework, concepts incorporated in design of study	Yes	Impact	Kep and Kamchai Mear, Cambodia	Accessibility of information through the telecentres expanded the capabilities of farmers
9.	Adaba & Rusu (2014) E-trade facilitation in Ghana: a capability approach perspective	Electronic Journal of Information Systems in Developing Countries	Madon's (2004) approach for evaluating e-government projects	Yes	Impact	Ghana	E-trade facilitation through GCNet has given individuals and businesses the opportunity freedom, and choice to lodge import and exports declarations electronically with a single document.
10.	Aricat (2015) Mobile ecosystem among low-skilled migrants in Singapore: an investigation into mobile usage practices	Electronic Journal of Information Systems in Developing Countries	Used as a guide for analysis of adaptation of migrants into new mobile ecosystem	Yes	Impact	Migrants from Bangladesh and India Singapore	Migrant workers' functionings were enhanced by mobile use however there were constraints in the improvement of their capabilities.

Of the frameworks applied in studies mentioned in this paper, it seems most have the capacity to measure impact of ICTs. In contrast with the other papers, Musa's (2006) modified TAM framework only considers ICT adoption in developing countries; in the ICT4D value chain adoption relates to "uptake" which comes before "impact". Overall it appears that Sen's CA concepts are instrumental in measuring ICT4D impact, but are not limited to an impact evaluation role in the ICT4D value chain.

Eight of the ten papers seem to have done evaluations in the space of downstream impact, with results showing evidence of "outcomes" and outputs". However, there seems to be no evidence of development impact which is impact on the broader development goals. This does not necessarily mean that ICT did not have a development impact, but bears testament to the difficulty of measuring impact and maybe the shortcomings of the operational approaches applied.

The analysis has pointed out a mismatch between the frameworks available to apply the CA in ICT4D, and the way the CA is actually applied by ICT4D scholars, as reflected in prominent ICT4D journals. The reasons for this mismatch require further investigation.

5. Conclusion

This paper set out to compare the frameworks available to apply Sen's CA in ICT4D with the way the CA is practically applied in ICT4D. Through a general search on Sen's work in ICT4D, four frameworks were identified that could potentially be used to apply the CA in ICT4D. To investigate the way Sen's CA was actually applied, four prominent ICT4D journals were searched for papers that made use of Sen's CA. Ten papers were found that applied the CA. Only one of them used a framework that was identified during the framework search. The majority either applied Sen's CA concepts pragmatically, or used another approach, such as Madon's approach for applying the CA in e-government. Since the search was limited to the mentioned ICT4D journals, it does not cover ICT4D applications of Sen's CA published elsewhere.

The mismatch between the available frameworks and the way Sen's CA is applied in studies published in ICT4D journals requires an explanation. Is it because the frameworks are not known to ICT4D researchers, or because they do not find these frameworks relevant or useful? There appears to be a gap between the theoretical work related to CA in ICT4D and what happens at the empirical coal-face. This is an important matter that needs to be addressed. With a clear acknowledgment by many ICT4D scholars of the value of the CA, we would have expected to see more of the operationalised frameworks of Sen's CA applied in ICT4D studies.

This paper contributes to the field of ICT4D by highlighting how the CA has been appropriated by scholars who published in four prominent ICT4D journals. The paper shows that ICT4D scholars apply the CA in different ways than those promoted by the published CA frameworks. Since this review is limited to four major ICT4D journals, there is scope for further research on the use of Sen's CA beyond what is published in the major ICT4D journals. There is also scope for investigating what the authors that applied the CA found useful about the way they applied it. Their experiences might benefit other scholars intending to use the CA.

References

- Adaba, G.B. and L. Rusu (2014) “E-Trade Facilitation in Ghana: a Capability Approach Perspective”, *Electronic Journal of Information Systems in Developing Countries*, (63)5, pp. 1-13.
- Alampay, E. (2006) “Analysing Socio-Demographic Differences in the Access & Use of ICTs in the Philippines Using the Capability Approach”, *Electronic Journal of Information Systems in Developing Countries*, (27)5, pp. 1 – 39.
- Alkire, S. (2002) *Valuing Freedoms: Sen’s Capability Approach and Poverty Reduction*. Oxford:Oxford University Press.
- Alkire, S. (2010) *Human Development: Definitions, Critiques, and Related Concepts*: UNDP.
- Alsop, R., and N. Heinsohn (2005) *Measuring Empowerment in Practice: Structuring Analysis and Framing Indicators*, Washington DC: World Bank.
- Aricat, R. G. (2015) “Mobile Ecosystem among Low-Skilled Migrants in Singapore: an Investigation into Mobile Usage Practices”, *Electronic Journal of Information Systems in Developing Countries*, (68)4, pp. 1 – 15.
- Frediani, A. A. (2010) “Sen's Capability Approach as a Framework to the Practice of Development”, *Development in Practice*, (20)2, pp. 173-187.
- Gasper, D. (1997) “Sen's Capability Approach and Nussbaum's Capabilities Ethic”, *Journal of International Development*: (9)2, pp. 281- 302.
- Gigler, B. (2004) “Including the Excluded- Can ICTs Empower Poor Communities? Towards an Alternative Evaluation Framework Based on the Capability Approach”, *Paper for 4th International Conference on the Capability Approach*, University of Pavia, Italy 5-7 September, 2004.
- Gigler, B. (2015) *Development as Freedom in a Digital age: Experiences of the Rural Poor in Bolivia*, Washington DC: World Bank.
- Grunfeld, H. (2014) “ICT for Sustainable Development: an Example from Cambodia”, *Journal of Community Informatics*, (10)2.
- Hatakka, M. and R. De’ (2011) “Development, Capabilities and Technology – an Evaluative Framework”, *Proceedings of the 11th International Conference on Social Implications of Computers in Developing Countries*, Kathmandu, Nepal, May 2011.
- Hatakka, M. and J. Lagsten (2012) “The Capability Approach as a Tool for Development Evaluation – Analysing Students’ Use of Internet Resources”, *Information Technology for Development*, (18)1, pp. 23 – 41.
- Heeks, R. (2010) “Do Information and Communication Technologies (ICTs) Contribute to Development?”, *Journal of International Development*, (22), pp. 625 – 640.
- Heeks, R. and A. Molla (2009) “*Compendium on Impact Assessment of ICT-for-Development Projects*”, Development Informatics Working Paper Series, No.36/2009. Manchester: Institute for Development Policy and Management.
- Kleine, D. (2010) “Ict4what?—using the Choice Framework to Operationalise the Capability Approach to Development”, *Journal of International Development*, (22), pp. 674 – 692.
- Madon, S. (2004) “Evaluating the Developmental Impact of E-Governance Initiatives: an Exploratory Framework”, *Electronic Journal of Information Systems in Developing Countries*, (20)5, pp. 1- 13.
- Musa, P.F. (2006) “Making a Case for Modifying the Technology Acceptance Model to Account for Limited Accessibility in Developing Countries”, *Information Technology for Development*, (12)3, pp. 213 – 224.

- Nussbaum, M (2000) “Aristotle, Politics, and Human Capabilities: A Response to Antony, Arneson, Charlesworth, and Malgan”, *Ethics*, (111)1, pp. 102 - 140
- Nussbaum, M. (2003) “Capabilities as Fundamental Entitlements: Sen and Social Justice”, *Feminist Economics* (9)2-3, pp. 33 – 59.
- Robeyns, I. (2005a). “The Capability Approach: a Theoretical Survey”, *Journal of Human Development*, (6)1.
- Robeyns, I. (2005b) “Selecting Capabilities for Quality of Life Measurement”, *Social Indicators Research*, (74)1, pp. 191-215.
- Robeyns, I. (2006) “The Capability Approach in Practice”, *Journal of Political Philosophy*, (14)3, pp. 351-376.
- Sen, A. (1999) *Development as Freedom*, New York: Knopf Press.
- Smith, M. L., R. Spence, A. Rashid (2011) “Mobile Phones and Expanding Human Capabilities”, *Information Technologies & International Development*, (7)3, pp. 77 – 78.
- Thapa, D. and O. Saebo (2014) “Exploring the Link between ICT and Development in the Context of Developing Countries: a Literature Review”, *Electronic Journal of Information Systems in Developing Countries*, (64)1, pp. 1-15.
- Thapa, D., M. K. Sein, O. Saebo (2012) “Building Collective Capabilities through ICT in a Mountain Region of Nepal: Where Social Capital Leads to Collective Action”, *Information Technology for Development*, (18)1, pp. 5 – 22.
- Zheng, Y. (2009) “Different Spaces for E-Development: What can we Learn from the Capability Approach?”, *Information Technology for Development*, (15) 2, pp. 66 – 82.
- Zheng, Y and G. Walsham (2008) “Inequality of what? Social exclusion in the e-society as capability deprivation”, *Information Technology & People* (21) 3, pp. 222 – 243.