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# What Theory of Change Can Contribute to Capability Approach: Towards Evaluating ICT-Enabled Interventions

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**Abstract:** Sen's Capability Approach (CA) has emerged as holistic lenses for theorising development within Information and Communication Technology for Development (ICT4D) discourses. There is ongoing research on operationalising CA for ICT, with a number of frameworks having been developed. However, there seems to be minimal usage of these frameworks when CA is applied on ICT4D studies. This paper explores lessons that can be advanced from Theory of Change (TOC) approach to strengthen the methodology and operationalisation of CA, in relation to evaluating ICT-enabled interventions. We give an overview of the two approaches and their application. Three areas are discerned, where TOC can contribute to CA: Methodologically, by providing steps that are more accessible and clearer to the public; by providing an avenue for evaluating personal decisions; and by providing a diagrammatic way of presenting results from an evaluation, in addition to the narrative. This is a far more powerful communication tool compared to having the narrative alone.

**Keywords:** Sen's Capability Approach, Theory of Change, ICT4D, Evaluation, Development Outcomes.

## 1. Introduction

Information and Communication Technology for Development (ICT4D) is a field that relates to the adoption and use of ICTs to realise development outcomes [1, 2, 3]. It is synonymous to ICTD, ITD or Development Informatics; with informatics representing a continuum from Computer Science, through Human Computer Interaction (HCI) to Information Systems [3]. Research based on ICT4D focusses on ICT artefacts, infrastructure building and implementation of ICT services [4, 5], impact evaluation of ICT interventions [6], linking ICT and Development [7] and digital divide [8].

Heeks and Molla [9] decry that only minor impacts on remote communities can be identified in spite of the massive investments in ICT development projects by public, private and Non-Governmental Organisations. Existing research shows how numerous projects involving application of ICT innovations have not always been successful in achieving their anticipated benefits [10, 5], with many examples of failure or partial failure [11].

Despite the significance and huge potential of ICT4D, it is still not clear, to what extent ICTs are contributing to development, especially that of the relatively poor members of the society [1, 12, 13]. Scholars have called for more research on theorising the relationship between ICT and Development in a compelling way, leading to further understanding of the

'D' aspect of ICT4D [1, 2, 14]. Avgerou [15] on the other hand emphasises that despite remarkable theoretical capabilities, ICT4D research remains weak in forming convincing arguments on IT enabled socioeconomic development.

Capability Approach (CA), developed by Amartya Sen, has since emerged as holistic lenses through which ICT4D can be theorised. This is because it conceptualises development not as resource-based, income-based or utility-based, but as expanding people's real opportunities and freedoms to pursue livings (beings and doings) that they have reason to value. Despite the potential that CA has towards theorising ICT4D, it has been criticized as being under-theorised [16]. Sen's deliberate refusal to 'fill all the blanks' has led to calls for operationalisation of the CA [9, 17, 18, 19].

Furthermore, despite the development of a number of frameworks to operationalise CA within the ICT, Tshivhase et al [20] decry of a lack of their usage in prominent ICT journals where CA is applied in IC4D.

In developing the concepts of CA, Sen makes propositions in certain elements and deliberately leaves others. It is upon the practitioners to make choices on them [21]. This style within CA has attracted criticism because it makes the process unclear and inaccessible to the public. Evaluating a personal decision in CA is also problematic because people tend to be untruthful on issues so personal as their decisions while others will be uncomfortable to let anyone into this personal space [22]. CA seems to be curtailed by its vocabulary in the use of non-intuitive phrases such as 'functionings' or 'doings and beings' [22]. This may hinder communication and dissemination of results from a CA-based study. There is an opportunity of complimenting CA with another theory in order to address these challenges. This paper proposes looking at the TOC to seek lessons for CA.

## **2. Objectives**

The goal of this paper is to explore the lessons that TOC can contribute to strengthen the methodology and operationalisation of CA. We aim to find ways in which TOC can help stepping down CA from being overly abstract, so that practitioners and policy makers in ICT can easily use it, while still maintaining its conceptual richness.

The results from this study will contribute methodologically to the operationalisation process of CA. This will be beneficial to ICT policy-makers. It will help them to empirically evaluate the contributions of existing ICT-enabled interventions towards development outcomes. Factors and conditions that enable or restrict conversion of valuable capabilities will be identified for either enhancement or rectification. Since the evaluation will be end-user centric, achievement of more valuable functionings for end-users is expected. The academia, donors, civil society, and other practitioners in ICT-enabled interventions will also benefit from the new knowledge generated by this study.

## **3. Methodology**

For this paper, an exploratory study and analysis is conducted on CA and its evaluative frameworks for ICTs. An analysis of the TOC approach is also conducted, with the aim of making recommendations towards the development of a framework, which ICT practitioners and policy-makers find familiar and accessible. One that better communicates the findings of an evaluative exercise. Empirical data will not be collected and analysed at this stage.

## **4. Capability Approach**

The Capability Approach (CA) is a normative theoretical framework for the evaluation and assessment of individual well-being and social arrangements. Its core idea is that social arrangements should aim to expand people's capabilities (their freedom to promote or

achieve valuable beings and doings). It evaluates a person's achievements in terms of his or her actual ability to do the different things a person has reason to value doing or being.

The present form of CA has been pioneered by the economist and philosopher Nobel Laureate Amartya Sen [23, 24, 25, 26] and significantly further developed by the philosopher Martha Nussbaum and other scholars.

Sen [26, p. 75] defines functionings as "the various things a person may value doing or being". They are essentially valuable states (beings) and activities (doings) that make up people's well-being such as a healthy body; being safe; being calm; working; resting; having a warm friendship; being nourished; being confident; being able to travel or take part in political decisions. They are related to resources (goods and income), but they focus on what a person is able to do or be as a result. When a person's need for food (a commodity) is met, they enjoy the functioning of being well-nourished.

Sen [25, p. 40] posits that capability "represents various combinations of functionings (beings and doings) that the person can achieve. Capability is, thus, a set of vectors of functionings, reflecting the person's freedom to lead one type of life or another...to choose from possible livings". Put differently, capabilities are "the alternative combinations of functionings that are feasible for [an agent] to achieve," they are the "substantive freedoms he or she enjoys to lead a kind of life he or she has reason to value" [26, p. 87]. The freedom has to be real and not hypothetical, and the capabilities are limited to functionings of value and exclude evil or harmful functionings.

What is of importance is that people have the freedoms or valuable opportunities (capabilities). Once they effectively have these substantive opportunities, they can choose those options that they value most. CA focuses on capabilities rather than functionings because functioning could be expanded by force, coercion or domination. Some deprivations can also be chosen in order to enjoy another kind of fulfilment. A person who is fasting is in a state of under-nutrition, which may be a similar state to a person who is starving. But in one case, the fasting person could eat and chooses not to; whereas the starving person would if she could.

CA highlights the difference between means and ends of well-being and development. Only ends have intrinsic value. The means on the other hand have instrumental value; they facilitate reaching the goal of increased well-being, justice and development. Some ends are simultaneously also means to other ends, for example, the capability of being in good health is an end in itself, but also a means to the capability to work.

According to CA, the ends of well-being, justice and development should be conceptualised in terms of people's capabilities to function. Resources (for example a bicycle) are considered an output, but their value depends upon individual's ability to convert them into valuable functioning (such as bicycling), which depends on their individual's personal, psychological, social norms and/or physical environment.

## **5. Why Capability Approach?**

### *5.1. Income, Resources, Utility or Freedom*

Other philosophical approaches suggest that development and social arrangements should maximise income, expenditure, consumption, commodities or people's happiness (utility). CA on the contrary argues that focussing on freedom is a more accurate way to build what people really value. Much conventional economics is based on the utilitarian approach. It assumes that the most desirable action is the one that increases people's psychological happiness or desire-fulfilment the most. Sen argues that our mental utility states may not track in predictable fashion the things we really value. If we only measure utility, there are important questions and distortions which we will miss.

The non-utility information that is excluded by utilitarianism could be a person's additional physical needs due to being physically disabled, but also social or moral issues, such as the principle that men and women should be paid the same wage for the same work. This does not mean that Sen thinks that mental states such as happiness, are unimportant and have no role to play; rather, it is the exclusive reliance on mental states that he rejects.

There is a problem with an approach that focusses on resources or income rather than functionings. The same amount of rice (or other goods) will be converted into radically different levels of physical vigour for a child, in the case of a disabled teenager, as against an agricultural worker, or an elderly person. We are interested in what persons are actually able to do or be (their functionings), and not how many pounds of rice they consume. In CA, a good has certain characteristics, which make it of interest to people, for example, we are not interested in a bicycle because it is an object made of certain materials but because it can take us to places where we want to go and in a faster way than if we were walking.

Another problem is that there are things people value other than increased resources. The process of maximising resources may have social costs (changes in culture and lifestyle) which people have good reason to reject.

### *5.2. Should We Measure Capabilities or Functionings?*

During evaluations, there are cases and situations where it makes more sense to investigate people's achieved functionings directly, instead of evaluating their capabilities. For example, if we are focusing on the capability of bodily integrity, we will not be concerned with a boxer who deliberately puts his body at danger of being beaten up. He has the capability of not being attacked, but chooses to fight. On the other hand, as far as domestic violence is concerned, we can use the very plausible assumption that no one wants to be beaten up by another person in the household.

Some people, like young children or the mentally disabled, might not be able to make complex choices, which should make the evaluation of their well-being in terms of achieved functionings often a sensible thing to do.

A person may own or be able to use a bicycle (a resource). By riding the bicycle, the person moves around town, and may value this mobility (a function). If the person is unable to ride the bicycle (because perhaps, she has no sense of balance) then having a bicycle won't create this functioning of mobility. But in our case, the access to the bicycle (resource) coupled with the person's own characteristics (balance, legs), creates the capability for the person to move around town when he or she wishes. If by riding the bicycle, the person can do another thing that she enjoys, then having this capability contributes to their happiness or utility.

The focus on functionings sets the CA off from other approaches of evaluation of well-being. Sen acknowledged that these alternative approaches to well-being are relevant (Sen 1985). Sen's claim is that alternative approaches fail to provide an adequate conceptual basis for social evaluation. He argues that functionings taken together with freedom, provide such a basis.

### *5.3. Remedies that Capability Approach Offers*

CA attempts to address various concerns that Sen had about contemporary approaches to the evaluation of well-being. First, individuals can differ greatly in their abilities to convert the same resource into valuable functionings (beings and doings). For example, a person with disability may need specific goods to achieve mobility. Therefore, evaluation that focuses on means, without considering what particular people can do with them is insufficient.

Secondly, people can internalise the harshness of their circumstances so that they do not desire what they can never expect to achieve. This is the phenomenon of 'adaptive

preferences' in which people who are objectively very sick may still declare and believe that their health is fine. Therefore, evaluation that focuses on subjective mental metrics is insufficient without considering whether that matches with what a neutral observer would perceive as their objective circumstances.

Thirdly, whether or not people take up the options they have, the fact that they do have valuable options is significant. For example, the nutritional state of a person who is fasting. Therefore, evaluation must be sensitive to both actual achievement (functionings) and effective freedom (capability).

Finally, reality is complicated and evaluation should reflect the complexity rather than take a shortcut by excluding all sorts of consideration in advanced. Therefore, evaluation of how well people are doing must seek to be as open as possible.

## 6. Frameworks for Operationalising Capability Approach in ICT4D

Several scholars have developed frameworks that have been used to operationalise CA. These frameworks have been used for evaluation of ICT-enabled interventions. Table 1 summarises the different frameworks.

*Table 1: Frameworks used to Operationalise CA in ICT4D*

Framework/ Author	Focus	Area of Application	Title of Paper
Capability Approach Framework; Hatakka & De' [27]	Difference between potential and achieved functionings and importance of context	Bangladesh Virtual Classroom - Interactive distance education using mobile phones and TV	Development, Capabilities And Technology – An Evaluative Framework
Zheng and Walsham [28]	Capability deprivation; Well-being & agency freedom	Health Information Systems in South Africa and China	Inequality of what? Social exclusion in the e-society as capability deprivation
Choice Framework; Kleine [19]	Dimensions of Choice aspect for human agents; structure and agency	Telecenters in rural Chile	ICT4What? - using the Choice Framework to operationalise the capability approach to development
ICT4D Evaluation Model; Kivunike et al. [29]	ICT Characteristics, conversion factors, opportunities (capabilities), and achievements (choice, personal or community goals, and achieved functionings)	Online learning environment in Makerere University - Uganda	Towards a Structured Approach for Evaluating the ICT Contribution to Development
Alternative Evaluative Framework ; Gigler [30]	Informational Capabilities & Informational Capital:	Bilingual and Inter-Cultural Education Project from Venezuela; & Internet access in Peru	Including the excluded – can ICTs empower poor communities? Towards an alternative evaluation framework based on the capability approach
Bass et al. [31]	Uses institutional theory to understand the social drivers that may inhibit or enable individuals from taking full	Ethiopian Higher Education Sector	A Framework Using Institutional Analysis and the Capability Approach in ICT4D



	advantage of ICT resources		
CES virtuous spiral framework; Grunfeld et al [21]	Empowerment; Sustainability	Community owned ICT Network in Cambodia	Challenges in operationalising the Capability Approach for evaluating the contribution of the Cambodian ICT4D project, iREACH, to capabilities, empowerment and sustainability

## 7. Theory of Change

Theory of Change (TOC) defines long-term goals of a program and then maps backwards (in time) to identify changes that need to happen earlier (pre-conditions). The identified changes are mapped graphically in causal pathways of outcomes, showing each outcome in logical relationship to all others [32]. Interventions, which are activities and outputs of any sort, are mapped to the outcomes pathway to show what stakeholders think it will take to effect the changes, and when.

A given TOC identifies measurable indicators of success as a roadmap to evaluation. TOC is both process and product: the process of working out the theory, mainly in group sessions of practitioners and stakeholders led by a facilitator; and, as product of that process, a document of the change model showing how and why a goal will be reached.

TOC is used both for planning and for evaluation. As a planning tool, it helps organisations to ask important questions about their work. TOC originated as an evaluation tool, and as such, it explains the pathways of change that lead to the long-term goal and the connection between activities, outputs and outcomes that occur at each step along the way. The clarity of purposes, results, and strategies that TOC delivers sharpens interventions and evaluation designs and strengthens the ability of practitioners to take credit for outcomes that were predicted in their theory.

### 7.1. Outcomes Pathway

The basic structure of the TOC is called an “outcomes pathway”. It is a set of graphically depicted building blocks ordered and connected through a causal chain. The outcomes along the pathway are preconditions to those above them. An outcomes pathway therefore represents the change logic and its underlying set of assumptions, which are spelled out in the rationales given for why specific connections exist between outcomes, and in the theory narrative. Only when the pathway has been developed is it time to consider which interventions will best produce the outcomes in the pathway.

A trained external facilitator is best to lead the group to consensus and specificity in the process of identifying workable long-term goal and outcomes. Those that the initiative can realistically achieve and that everyone involved understands.

The group then considers “what outcomes must be brought before we can achieve the long-term outcome?” These outcomes (shorter-term preconditions to the long-term outcome) are then placed directly underneath the long-term outcome. The process continues, drilling down the pathway by posing fundamental questions such as: “what has to be in place for this outcome to be achieved?” and “are these preconditions sufficient for the outcome to be achieved?”

In these sessions, participants may use markers, sticky notes and chart paper to identify and organize outcomes, surface assumptions, develop indicators, and so on. The messy

group work is then usually captured by the facilitator in digital form, where the content can be expanded, edited, printed, shared and otherwise managed as the theory continues to be developed.

Coupling monitoring and evaluation to TOC can bring a better understanding of how to improve the design and implementation of ongoing activities, and how to scale initiatives up or out. Depending on the intended use, TOC can begin at any stage, before, during or after the lifetime of an initiative. TOC can be developed retrospectively by reading program documents, talking to stakeholders and using evaluation data. This is done during evaluations for a reflective process of learning about what has worked and why, in order to understand the past and to plan for the future.

## *7.2. Basic Components of TOC*

Outcomes are the building blocks of TOC. They represent changes in condition of some kind (whether a policy, law, behaviour, attitude, knowledge, state of the environment) among people, institutions and environments. Outcomes include long-term outcomes, and intermediate short-term outcomes. The term “impact” is often reserved for the ultimate goal of an initiative, but is not a measurable outcome of that initiative alone. The impact level is distinguished from the long-term outcome and its preconditions by an “accountability ceiling”, which may be drawn in the form of a dashed line. The accountability ceiling can be moved up or down as the group developing the TOC gathers more knowledge about the opportunities and limits of the work.

All outcomes needed to get to the long-term outcomes in the outcomes pathway are preconditions to the long-term outcome and the impact. Preconditions define what has to change if the ultimate goal or impact is going to be achieved. Preconditions (which are also outcomes) are mapped backwards in pathways from the long-term outcome to the present and near future.

Every outcome needs to be observable in some way. Stakeholders need to know whether an outcome has been reached. Indicators which refer to measurable and observable phenomena, furnish evidence of achievements. Stakeholders choose the best indicator(s) for each outcome, often with the help of their evaluator. An indicator can be quantitative or qualitative.

Once the outcomes framework is complete or at least connected in rudimentary pathways, it is time to identify and explain interventions. Interventions are the work undertaken within an initiative or program undertaken that lead to the desired outcomes. Intervention may refer to single activities or whole programs. Interventions can be located on an outcomes framework by means of symbols positioned along the connectors between the outcomes, illustrating that the intervention can begin once outcome A is realised, and that its successful completion is necessary to producing outcome B.

TOC allows proponents and stakeholders the means to continually challenge their assumptions and, in doing so, refine and sharpen their strategies for greater success. In considering a given outcome, one might ask “what would happen if this outcome does not come about?” if its absence leaves a hole in the logic, or points to a “missing middle” where the outcome pathway seems to take a leap over necessary steps, you will have identified a gap in the model. You will need to work to understand and identify what is necessary to fill in the missing steps.

Narrative is a summary of the TOC that explains the overall logic, highlights major assumptions, and presents a compelling case as to how and why the initiative is expected to work. The purpose of the narrative is twofold:

1. To convey the major elements of the theory easily and quickly to others.
2. To communicate how the elements of the theory work as a whole. The narrative is the natural companion to the visual elements of the theory as they reinforce each other.



Figure 1 shows an application of TOC depicting its different components as discussed above.

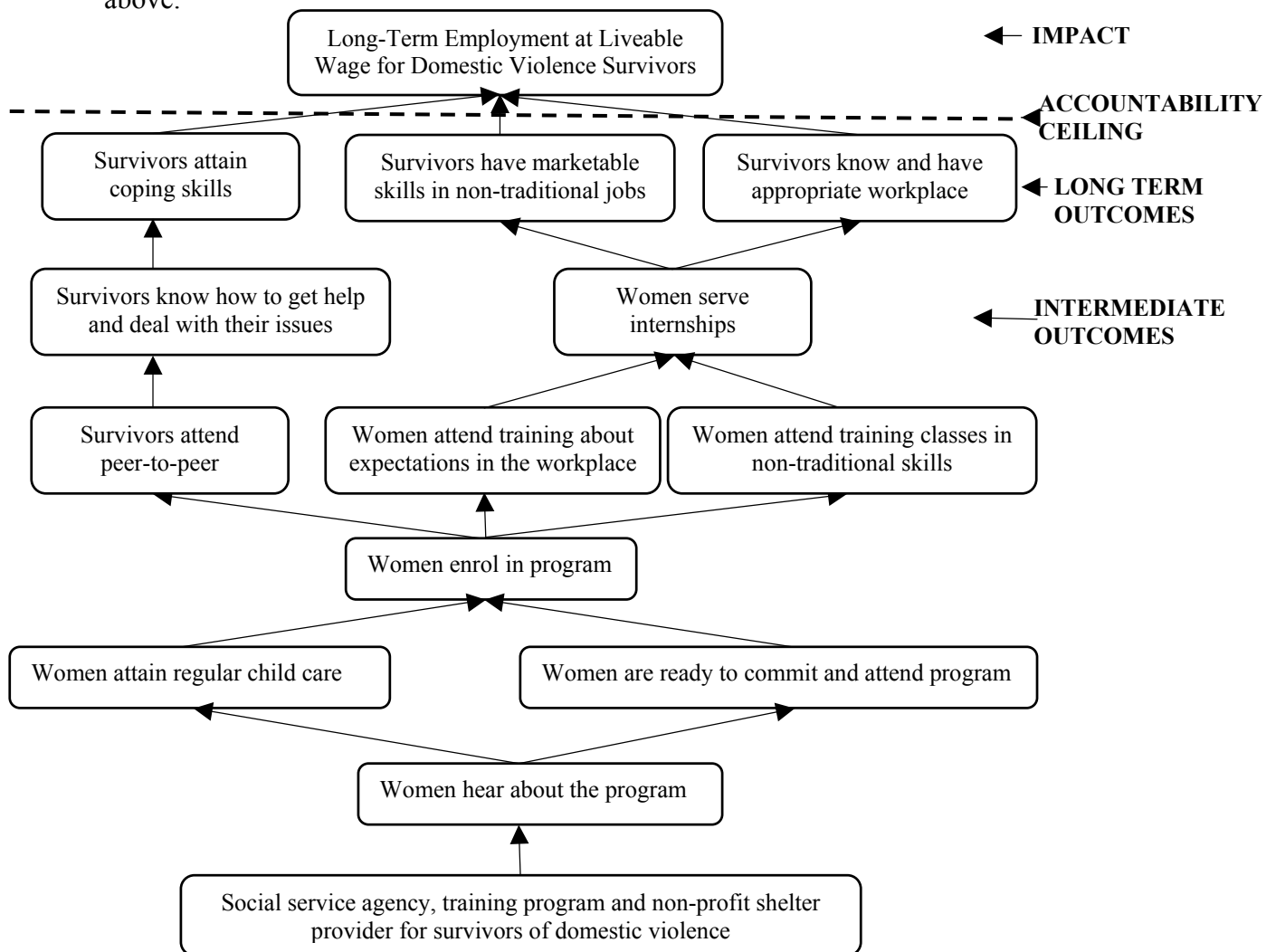


Figure 1: An example of applying TOC, Source: Adapted from Center for Theory of Change [33]

In linking the TOC to evaluation, the task of evaluation is to determine whether and in what ways the actual outcomes of the work reflect the outcomes forecast in the TOC, and whether assumptions underlying the theory about what will work were correct. If the initiative succeeds, having a TOC behind it lends support to attribution. Success also confers predictive power on the theory, making it useful to any effort to replicate or scale up.

Posing theory based evaluation questions may help focus evaluation efforts on key concerns. As well, there may be a need to pick the right indicators from among the many available, and one can use “monitoring questions” to select the indicators that will be most helpful and expedient. The process of choosing indicators to use and how to operationalise them should also be participatory.

## 8. Discussion

In developing the concepts of CA, Sen makes propositions in certain elements and deliberately leaves others. It is upon the practitioners to make choices on them [21]. This style within CA has attracted criticism, however, there is consensus on the need to make the entire process more accessible and clearer to the public. It is on such a stance that CA can

learn from the democratic and participatory methodology followed in coming up with outcomes, assumptions and indicators in the TOC. The steps followed in TOC can also be followed in eliciting valuable capabilities from end-users in the evaluation of an ICT-enabled intervention.

All the capabilities of end-users will be elicited first, creating a list. From the list, those capabilities that the end-users will find to be related in any way to the ICT-enabled intervention will then be identified. A backward mapping from the capabilities to the ICT-enabled intervention will be done; identifying conversion factors that enhance or inhibit the conversions. Decision mechanisms of settling on particular capabilities will also be factored in the analysis.

To evaluate a personal decision is problematic because people tend to be untruthful on issues so personal as their decisions while others will be uncomfortable to let anyone into this personal space [22]. In order to put into question these decisions and subsequent experiences, the methodology in TOC can be explored in CA. this will provoke narration among participants in the democratic, participatory focus group. It will therefore bring to light what would otherwise go untold.

CA may seem to be curtailed by its vocabulary in the use of non-intuitive phrases such as ‘functionings’ or ‘doings and beings’ [22]. This may hinder communication and dissemination of results from a CA-based study. This also reduces accessibility and clarity to the wider public. TOC (which is widely used by state agencies, non-governmental organisations and foundations) [32], is quite familiar among practitioners and policy-makers, hence its infusion into CA will be from known to unknown for them. The diagrammatic representation of different concepts and how they relate will be a powerful communication tool, reinforcing the narrative section from the case description.

## 9. Conclusion and Recommendations

From the review and findings of this study, there are three areas where TOC can contribute to CA: Methodologically, by providing elicitation steps that are more accessible and clearer to the public; by providing an avenue for evaluating personal decisions; and by providing a diagrammatic way of presenting results from an evaluation, in addition to the narrative.

We recommend further synthesis of the frameworks so as to consolidate the theories and concepts advanced by the two approaches. There is need to develop a suitable framework for evaluating ICT enabled interventions from an end-user perspective. One that will be more accessible and usable to practitioners and policy-makers in the ICT4D field.

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