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Can a Process Approach Improve ICT4D Project Success?

MATTHEW WALTON & RICHARD HEEKS

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Institute for Development Policy and Management
University of Manchester, Arthur Lewis Building, Manchester, M13 9PL, UK
Tel: +44-161-275-2800/2804 Email: idpm@manchester.ac.uk
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Matthew Walton & **Richard Heeks**
Centre for Development Informatics
IDPM, University of Manchester
Manchester, M13 9PL, UK
Email: matthewcwalton@gmail.com

Centre for Development Informatics
IDPM, University of Manchester
Manchester, M13 9PL, UK
Email: richard.heeks@manchester.ac.uk

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Abstract

In studying ICT4D one may develop a sense of scepticism towards the topic, fuelled by high failure rates that have plagued ICT4D practice and the subsequent lack of developmental impacts that such failure implies. It seems that if the impacts of ICT4D are to be realised, changes must be made to the way it is approached and delivered.

Simultaneously, in studying development, one may notice the process approach as a significant alternative to traditional, top-down management; and notice a connection between elements of the process approach and reactions to failure highlighted in the ICT4D literature. This paper thus sets out to answer the question: "Can a process approach increase the likelihood of success in ICT4D projects?"

Through analytical study of four successful ICT4D projects, it finds the presence of the five key elements of a process approach: beneficiary participation; flexible, phased implementation; learning from experience; institutional support; and programme management. Pushing the use of a process approach further, we find that "success" and "failure" should not be used as single, cross-sectional, final judgements. Instead, they should be seen as multiple, contingent and passing; and as a basis for learning.

From this perspective, ICT4D projects should look for successes – solution relevance, opportunities for capacity-building, and sustainability. Those can be delivered by taking a dynamic, holistic view – summarised in the ICT4D Process Approach Wheel – that frames ICT4D management as an ongoing interconnection of the five process elements.

The paper ends with some specific recommendations for ICT4D project practice.

Introduction

In this paper, we explore the relationship between ICT4D success and the process approach. Specifically, we examine the concept of success as it relates to ICT4D through a framework developed by Bond & Hulme (1999) but adapted to include ICT4D literature. Using this framework as an analytical tool, we examine four ICT4D case studies for an indication of best practices. This research is intended to highlight a notion that the process approach may provide a suitable perspective for delivering ICT4D. The remainder of this section outlines our intentions and the research objectives of this paper.

ICTs have been referred to as the "new paradigm for development" (UNCTAD 2008, p.4). As such, they are believed to improve livelihoods, education, and spark economic growth. For many development practitioners, the ICT paradigm represents an opportunity to embrace new solutions to development challenges and ultimately contribute to more equitable human development.

Despite the high expectations of ICT4D, attempts to deliver such initiatives have met with high levels of failure (Heeks 2002b). It is difficult, if not impossible, to single out a sole reason for these failures, however there are many criticisms that point to the human side of ICT interventions, mainly in our approach as ICT4D practitioners. For example: an incomplete understanding of social context (ibid); holding a Western-rationalistic viewpoint (Avgerou 2000); and failing to incorporate the local population (Gurstein 2006), to name but a few. These criticisms suggest that there is room in the ICT4D field to consider an alternative approach to the common ICT4D models of project design, management and delivery.

As an alternative to top-down interventions, Bond and Hulme (1999) advocate a process approach to development initiatives. This is a long-term approach that incorporates flexibility and experimentation throughout the project, while actively embracing risk as a learning opportunity (Rondinelli 1993). Through the process approach, development is not seen as a problem that needs to be fixed, but more as a complex social system that needs to be understood over time and incorporated into an evolving solution (Bond & Hulme 1999). Given the bottom-up, people-oriented and systematic nature of the process approach – which seems consistent with the criticisms of the ICT4D literature – we will explore the idea that a process approach could be used to improve the delivery of ICT4D and increase the likelihood of success.

Although the scope of ICT4D stretches far beyond the capability of a single study, this paper focuses on the approaches that are used to deliver ICT4D, in an examination of best practice. Given that the aim of this paper is to inform projects of the future, looking at the past is a good place to search for guidance. In this paper, we examine the approaches that have been used in ICT4D projects and programmes for resemblance to an ICT4D process approach and conceptualise their successes through this perspective. This analysis is intended to provide a new

perspective on ICT4D practice and to inform a new direction in the way ICT4D is delivered. In summary, this study will focus on the following research question:

- Can a process approach increase the likelihood of success in ICT4D projects?

It would be extremely ambitious to suggest that a better approach is the only factor required to ensure success. Since many aspects contribute to the overall effectiveness of development initiatives, this is not the intention of this research. Aspects such as the interests of various stakeholders, the funding structure, laws, national policies and other government actions are normally beyond the control of ICT4D managers anyway. Therefore, the intention of this research is not to suggest a quick fix for ICT4D, but to offer an alternative way of perceiving and managing in a manner that reduces some of the unknowns and generates more contextually appropriate and adaptive ICT4D systems.

Section A begins by critically reviewing the current literature on ICT4D and development planning, as they relate to the process approach. This discussion facilitates the development of a theoretical framework, which informs the basis of the study. Section B initially outlines and justifies the research methods and secondly presents findings from analysis of a set of ICT4D case studies against the framework. Section C serves to link the findings to the relevant literature, proposing a new notion of ICT4D project success and offering a model that relates the process approach to this notion of success. Lastly, we provide a practical perspective, linking the theory and findings of this paper with recommendations for practice.

A. Reviewing Past ICT4D and Development Practice

This section serves to critically review the current body of literature in relation to the research question posed in the previous section. We begin with an exploration of ICT4D in practice by examining the key causes of project failure. We then present the concepts of the Process Approach Framework and analyze its suitability to deal with generalised causes of ICT4D project failure.

A1. Root Causes of ICT4D Project Failures

ICT4D is often delivered in a top-down manner, which may not be the most suitable approach for effective development (Avgerou & Walsham 2001; Heeks 2005). Solutions to complex development problems originate from, or are designed by, people who have little connection to the local context and are limited in their ability to produce appropriate solutions (Avgerou 2000). What seems important in achieving ICT4D project success is an informed approach that is able to derive contextually relevant and appropriate solutions. This section identifies five key causes of ICT4D project failure on the basis of past experience: lack of beneficiary participation; overly-rigid approach to project planning; a failure to learn; lack of involvement with local institutions; and lack of project leadership.

Failure to involve beneficiaries and users

A significant issue plaguing ICT4D initiatives is the design—reality gap whereby project design mismatches local realities and fails to deliver once implemented (Heeks 2002b). Incorporating the intended users and beneficiaries of the system into the design phases can address this problem, meaning the project will be more contextually relevant and better suited to local conditions (Carroll & Rosson 2007; Mursu et al. 2000; Srinivasan 2006; Turk & Trees 1998). As seen through developments with mobile technologies, users in poor countries are quite capable of generating ideas and designs that can initiate social change (Donner 2005). However, based upon the wide range of criticisms (Ashok & Beck 2007; Etta 2003; Gurstein 2006; Heeks 2005) such participatory approaches seem to be a rare occurrence.

Many authors (Antin 2005; Ashok & Beck 2007; Carroll & Rosson 2007; Gurstein 2006; Heeks 2008; Rohitratana 2000; Srinivasan 2006; Turk & Trees 1998) recognise the importance of mainstreaming beneficiaries into the project, for several reasons. First, beneficiaries and users are valuable resources that can contribute their knowledge of the context into the design of the system. Not only can this help minimise initial design—reality gaps, but it may also help to overcome unforeseen challenges. Secondly, involvement in a project contributes to an increased sense of ownership, which can improve the likelihood of project sustainability. Thirdly, beyond the overall design of ICT4D systems, appropriate, localised content is also essential to ensure continued use of new technologies (Heeks 2002a).

Therefore throughout the life of an ICT4D initiative, efforts towards localisation should incorporate stakeholders as much as possible. To achieve this, there are many design methodologies that provide varying levels of stakeholder participation and influence within ICT4D initiatives (Antin 2005; Ashok & Beck 2007; Carroll & Rosson 2007; Checkland 2000; Korpela et al. 2000; Turk & Trees 1998). Deciding upon a methodology, just like deciding upon a design, is a decision that should be influenced by the context and the people who comprise it (Korpela et al. 2000).

Rigidity in project delivery approach

ICT4D projects are often designed around a relatively structured project management approach (Macapagal & Macasio 2009). This is hardly surprising given that they represent the intersection of two domains known for their structured approaches: information systems with methodologies such as Structured Systems Analysis and Design Methodology, and development with methods such as the LogFrame. However, there is reason to question the suitability of a rigid planning approach, especially where little is known of the context prior to conducting the initiative, as is often the case with ICT4D (Heeks 2002b). According to a quantitative study that examined 448 different projects, the investment into the front-end of projects in the planning stage, would be better spent instead on improving reactionary capabilities throughout the life of the project, where changing plans can be better accommodated (Dvir & Lechler 2004). This suggests that time would be better spent adapting to changing requirements over the life of an initiative, rather than focusing on establishing and sticking to a rigid plan early on. This is exemplified in a relatively unsuccessful Jordanian e-government case study that attributes its failure to a lack of adaptiveness (Mofleh 2008).

Hence, words such as flexibility, improvisation (Heeks 2002b), bricolage (Ali & Bailur 2007), and adaptiveness (Antin 2005; Walsham 2000) all emerge from the ICT4D literature as guiding principles for how ICT4D *should* be delivered. In addition, rather than taking a rigid, up-front orientation to set goals, many authors suggest that ICT4D projects should focus on establishing a dynamic approach, where goals and design remain flexible and adaptive to emergent strategies (Antin 2005; Ali & Bailur 2007; Heeks 2002b; Malling 2000; Macome 2003; Mofleh 2008; Rohitratana 2000). Such an approach enables the design to evolve beyond the outputs of the initial planning phase as resources, information and skills become available over time.

Failing to learn from errors

According to Korten (1980), typical top-down initiatives have three organisational responses to error, to: deny it; externalise it; or embrace it. These practices become embedded in cultural norms so that organisations can be categorised as self-deceiving, defeated, or as learning organisations respectively (ibid). Embracing error, a characteristic of a learning organisation, requires an approach much different from that of top-down initiatives that have dominated ICT4D. Without organisational norms that consider the local values and traditions, implementation

of ICT4D systems run the risk of becoming self-deceiving and may ultimately experience failure (Avgerou & Walsham 2001).

Such was the case with the implementation of a materials requirement planning system in a Thai food company (Rohitratana 2000). Members of the firm, in accordance with Thai values, refused to offer criticisms of the system, which limited the scope of learning, problem solving and decision making with respect to improvements. This led to limited system use and continuation of a parallel manual system, which the management refused to acknowledge as a failure.

This case illustrates a more generic aspect found in ICT4D project failures: the need to learn about local context and values. This has also been seen, for example, in the attempted application of geographic information systems in developing countries where there has been a lack of knowledge-building to help overcome low usage rates that arose from a mismatch between information systems design and local cultural realities. (One instance being the application of GIS in India, where what is required is some level of learning about local context given that maps are not generally used in the same way they are in 'the West' (Walsham 2000).)

To avoid such problems, ICT4D projects must embrace a learning approach that aims to continually extract information from the environment in which it operates, in order to facilitate necessary and ongoing adaptations (thus linking to the previous failure issue). This represents a fundamentally different approach from typical top-down ICT4D initiatives.

Ignoring local institutional capacities

Among the different types of ICT4D failure identified are "sustainability failures" (Heeks 2002b), which start up successfully but then close down after some time. Telecentre projects in the 1990s and early 2000s seemed to fall into this category relatively often (Heeks 2008). Analysis of the problem shows one strand relating to a failure to build local capacities and/or a failure to use existing local capacities. For example, the SARI (Sustainable Access in Rural India) project set up a series of telecentres in Southern India in the first years of the 21st century (Best & Kumar 2008). Where the telecentres for this project tapped into the capacities of local NGO, the Dhar Foundation, they continued to run. Where they did not, the vast majority did not sustain.

As well as utilising existing institutions and their capacities, ICT4D projects may also help build those capacities; again increasing the likelihood of project sustainability. 'Enabling the local' (Gurstein 2006) population extends well beyond allowing people to participate in an ICT4D project. What seems more important than providing a ‘front-end’ service for the poor is the increased capacity that local institutions develop in the 'back-end' during their creation of such services (Heeks 2005). This concept can enable 'per-poor innovation,' where ideas are generated from the poor themselves (Heeks 2008). In this light, the ICT4D agenda becomes a source of funding that encourages local institutions to participate in ICT activities, thereby

strengthening their organisational and innovative capacities so they can be productive elsewhere as well (Cecchini & Raina 2004). In other words, development can arrive through the processes of implementation, as well as through the initial design.

Ineffective leadership

Organising each of the four previous elements – participation, adaptability, learning and local capacitation – requires effective project management. Yet such management has often been missing from ICT4D projects, leading to failure (Gichoya 2005). For example, the Swedish International Development Agency supported a number of ICT projects in universities in a dozen developing countries. Problems on these projects, in part, "can be attributed to poor project management skills" (Greenberg & Muchanga 2006, p.28).

Effective management is thus a necessary part of effective ICT4D projects. Indeed, implementing such projects may require more than just management – it may require leadership in order to drive the institutional changes that sustainability demands. To facilitate this requires a leadership structure that is willing to devolve decision making to allow the freedom to manage at the appropriate project level (Bada 2002).

Summarising ICT4D project lessons

We have presented a review of ICT4D problems that have emerged from past experience on some projects. We do not claim this to be an exhaustive review; either in terms of projects reviewed or in terms of the possible causes of failure. Nonetheless, we feel confident about the validity of the problems identified, which can thus offer insight into how ICT4D projects can be delivered in the future, to reduce the possibility of future failures. Each of these themes translates into a lesson that can inform the management of ICT4D projects:

1. facilitate participation of intended beneficiaries and users;
2. maintain a flexible approach;
3. focus on continuous learning;
4. utilise and strengthen local institutions; and
5. provide good leadership that is sensitive to local realities.

Next, we will examine the process approach as a potential delivery mechanism for integrating these lessons learned into ICT4D projects.

A2. The Process Approach to Development

The traditional approach to development planning is often referred to as the blueprint or rational approach (Bond & Hulme 1999). This development paradigm utilises a rigid planning structure and is generally carried out linearly through several distinct project phases. Many authors have questioned the suitability of the

blueprint approach for dealing with complex development problems (Bond & Hulme 1999; Easterly 2006; Gow & Morss 1988; Korten 1980; Mosse 1998; Rondinelli 1993). It seems that the eagerness to achieve quick development results is often the instigator of speedy solutions which, ironically, are more likely to fail to deliver those results (Gow & Morss 1988).

The process approach has emerged as a reaction to the shortcomings of the blueprint approach and its inappropriateness for dealing with complex scenarios (Bond 1998). It is fundamentally a flexible and adaptive approach that focuses heavily on organisational learning through risk taking and experimentation (Bond & Hulme 1999; Korten 1980). The process approach sets out a guideline for development project managers to interact with and adapt to the given context over longer periods of time: ten to twenty years, instead of two to three (Bond 1998). It aims to study the "dynamics of the development process" so that an initiative can react to the unexpected social changes that it triggers; aspects which are difficult to plan for (Mosse 1998, p.10).

Given that we already find clear echoes of the proposed solutions to ICT4D project problems, can we link the process approach more clearly to the five lessons learned? Table 1 suggests we can. It summarises the process approach using a framework adapted from Bond & Hulme (1999) that divides the approach into five components; components that are highly resonant with our earlier analysis of ICT4D projects.

Table 1. A Summary of Process Approach Components and Descriptions

Process Approach Component	Description
Beneficiary participation	With an intimate knowledge of the context, engaging local people is crucial for appropriate project planning and problem analysis, resource mobilisation, project monitoring and evaluation. Engagement in this change process can also encourage empowerment and knowledge transfer.
Flexible, phased implementation	Development initiatives should start small and adapt solutions based on feedback and experimentation. This requires longer time frames from 10-20 years.
Learning from experience	Projects should experiment and take risks on potential solutions, but focus on organisational learning as an outcome of failures and taking risks.
Institutional support	Utilise local institutions to establish local participation and to improve the capacities of local organisations.
Programme management	Maintain a flexible, creative, professional, motivated and well-qualified leadership. This will ensure retention of qualified staff and support a learning and adaptive environment where employees are able to contribute their full expertise.

Adapted from Bond and Hulme (1999)

So far, then, the process approach seems to offer a framework that addresses the problems identified and lessons learned from ICT4D projects. Making this connection more substantive is best served through examination of evidence from real-world ICT4D projects and their use of elements from the process approach. The following section will do just that.

B. ICT4D Project Case Analysis

In order to address the question posed in the beginning of this paper, we now examine four case studies of 'successful' ICT4D projects for evidence of best practice that might relate to a process approach. The first sub-section outlines the method of content analysis employed to examine these cases, as well as the criteria used for selecting them. The second section summarises the cases and presents the evidence each case offers to support a process approach to ICT4D projects.

B1. Research Methodology

Qualitative content analysis is a research method that uses a "systematic, theory-guided approach to text analysis using a category system" (Kohlbacher 2006, p.18). Although content analysis is often associated with a more quantitative approach involving analysis of the frequency of words, themes, and meaning within a range of media, the method has recently adopted a more qualitative approach (Neuendorf 2002). Qualitative content analysis allows the researcher to summarise text through interpretive analysis of: categories, informed by theory; cumulative comparative analysis; and the formation of coded types or a coding schema (ibid). According to Kohlbacher (2006), qualitative content analysis is a good fit with case study research that is aimed at the study of social phenomena. For this research paper, a qualitative content analysis technique was used to analyze ICT4D case studies.

For the purpose of coding the texts we used the deductive category application method where coding categories are finalised before conducting the research and are derived from theory (Mayring 2000). These categories are then used as guidelines for analyzing and categorising the text (ibid). Each deductive category was assigned an explicit definition, examples and coding rules, which determined how each case study was interpreted. These categories were derived from the process approach framework, adapted from Bond and Hulme (1999) demonstrating the connection between the methods and the literature that supports this study (see Annex 1 for the coding schema). This method helps to ensure the reliability, validity, generalisability and applicability of the analysis (Neuendorf 2002).

Each case study was examined with the coding table for references to the process approach, and in an inductive manner for examples of success. References from every case study were summarised and categorised according to this method. The information in this table was used to examine the research question posed in this

study and informed the analysis presented below (see also the summary provided in Annex 2).

In order to make a general claim about how ICT4D should be delivered, a diverse set of data must be drawn upon which reflects the disparate nature of the subject. Individual case studies provide a rich understanding of an individual context, but will only provide relevance to a general claim when used in unison with other case studies (Eisenhardt 2002). Given the abundance of case studies from the ICT4D literature, we selected a set of four distinct cases which represent a relatively broad range of ICT4D topics and context. This diverse data set contributes to the notion of making a more generalised claim about ICT4D, strengthened by the use of multiple sources for each case. The cases and their sources are presented in Table 2 below.

Table 2. A Summary of Selected Case Studies

Case Study Name	Sources Used	Country of Origin	Sector	ICT4D Project Type
CDI	(Albernaz 2002; Batchelor et al. 2003; Ferraz et al. 2004)	Brazil	NGO	Community computer schools
e-Choupal	(Annamalai & Rao 2003; Bhatnagar et al. 2003; Bowonder et al. 2002)	India	Private	Agriculture information kiosks
Grameen Phone	(Aminuzzaman 2002; Knight-John 2008; Molina 2006)	Bangladesh	Private	Mobile phone sharing
M-PESA	(Hughes & Lonie 2007; Morawczynski & Miscione 2008; Vaughan 2007)	Kenya	Private/NGO	Mobile banking platform

Utilising case studies as data for research presents challenges concerning the validity of the findings. As a data source, case studies are only as reliable as the interpretations of their authors (Eisenhardt 2002). Given varying degrees of motivations, perspectives and opinions of different writers, it is difficult to openly accept every case study as valid and impartial (Hardy & Bryman 2004). To mediate this challenge, where available, we selected case studies that have been published in peer-reviewed journals and that could be triangulated through a selection of several papers written by different authors.

In accordance with the intentions of the research, the case studies have been selected based on their perceived success (though this is a term we will interrogate further) which can then be analysed through the lens of the process approach framework in order to address the research question posed. To help provide a more robust analysis, the data set contains case studies which vary in many respects: geographically to reflect the international nature of ICT4D; by project type and technology; and by sector.

B2. Case Background

Merriam (2002) argues that a key component to the trustworthiness of qualitative research is in the rich description of cases. Of course the full richness is only to be found in the source literature and cannot be reproduced here. However, we can provide a relatively detailed summary for each of the cases including a description of the model for delivering the technology; and comments on the successes and failures of the initiative. The subsequent section provides results of the textual analysis of the five process approach components and the extent to which they are found in the four case studies.

CDI

The Committee to Democratise Informatics (CDI) was founded in 1995 by Rodrigo Baggio Barreto, a Brazilian IT worker (Albernaz 2002). This non-profit NGO works in partnership with community based organisations (CBOs) to provide computer training to disadvantaged Brazilians and at-risk youth. CDI provides the hardware and software to open computer schools and provides training and curriculum for the trainers (Batchelor et al. 2003). As a model for attentive participation, each student is required to pay a token fee for the course as an indication of their commitment to learning. The CDI programme is intended to promote social inclusion and to act as a tool for citizen's rights and development in Latin America.

CDI acts as an intermediary between a host of private sector donors, funding agencies and the CBOs who actually initiate and run the schools (ibid). The CBOs contact CDI and request their assistance in opening a new school. If they meet the requirements of being in a disadvantaged area and demonstrate the potential to operate a school, CDI makes arrangements for donations of refurbished computers, which are set up and installed in the space provided (ibid). The head office manages the monitoring and evaluation of programmes and schools through collaboration with CBOs. CDI acts to empower and teach the communities to work for themselves through their interactive training model.

By December 2003, after eight years of operations, CDI had opened 833 schools and had trained over half a million students in 11 countries (Ferraz et al. 2004). Such a significant expansion has enabled Internet access and digital inclusion for people who would otherwise be unable to connect, thus creating a sense of empowerment amongst students. Although the reach of the school is significant and intrinsic benefits aplenty, the prevalence of students finding employment after graduating is low (Albernaz 2002). Rare cases of employment are usually when students become trainers in the CDI schools.

e-Choupal

Indian Tobacco Corporation (ITC) began e-Choupal as a means to simplify the agriculture supply chain for rural farmers. As it was, farmers had to travel long distances with their crops to intermediary markets where prices and the prospect of

selling were uncertain (Bowonder et al. 2002). This extra burden on the farmers cut into their incomes as travel expenses, low prices and added travel time reduced their margins. ITC introduced Internet enabled kiosks into rural villages where farmers were able to obtain useful farming information such as market prices of their crops, weather forecasts and supplier information (Annamalai & Rao 2003). At the kiosk, the informed farmer is able to negotiate the sale of their crops and arrange its transport from the farm directly to the food processor, ITC, in a mutually beneficial transaction.

With a simplified and more efficient supply chain, both the farmer and the food processor are able to improve their profitability and increase their capacity (Bowonder et al. 2002). The system is facilitated through local intermediaries, called 'sanchalaks', who operate the kiosk and interface with the farmers. Each kiosk, including PC and Internet connection installed at the sanchalak's house, is paid for by ITC and pays for itself within one year of operation (Bhatnagar et al. 2003). Each farmer can access the service free of charge and the sanchalak receives a commission for each transaction that occurs.

Through the simplified supply chain, farmers selling their crops through e-Choupal receive a price that is roughly 2.5% higher than they would otherwise negotiate at the government mandated regional markets (Annamalai & Rao 2003). Similarly, ITC benefits from 2.5% lower procurement costs of their crops than they would through the traditional supplier channels. Although still growing, the programme provides the services to over 1 million farmers in 11,000 villages across India (Bhatnagar et al. 2003). Through increased access to information, e-Choupal makes the Indian agricultural industry more competitive and enables local farmers to make informed decisions about what is best for them.

Grameen Phone

Bangladesh has had one of the lowest telephone penetration rates in the world with less than 3 fixed and mobile lines per 1000 people in the mid-1990s (Aminuzzaman 2002). After recognising a market need for improved communications, Grameen Telecom (a non-profit rural telephone company) and Grameen Phone (a for-profit mobile operator) initiated a plan to expand the telecommunications infrastructure of Bangladesh in 1997 (Knight-John 2008). In collaboration with several partners, namely the Grameen Bank microfinance institution, the organisation provides mobile phone services across Bangladesh through a unique mobile reseller model.

Consistent with the bottom of the pyramid marketing principles associated with the microfinance industry, the company incorporates corporate strategy into a development plan which targets the poor population (Molina 2006). By building on the presence and expertise of its parent company Grameen Bank, small loans are given to Village Phone Operators (VPOs) so that they can purchase the equipment required for re-selling usage on their mobile phones, effectively acting as mobile rural pay-phones. The overall strategy is the shared access or reseller model, where one phone provides access to multiple users. Each operator sells their services for

profit, which enables them to make payments towards their small loans. The programme has created successful livelihoods for over 250,000 VPOs across the country (Knight-John 2008).

By the end of 2005, Grameen Phone had provided telecommunications access to 45% of the villages in Bangladesh (ibid). Maintaining repayment rates of 98% on small loans to VPOs, the Grameen Phone programme remains a significant contributor to Grameen Bank's overall success in the country and an increasing rate of telecommunications penetration. The VPO programme is also quite profitable for Grameen Phone, accounting for only 3.85% of its subscriber base, while providing 15.5% of its total revenues.

M-PESA

M-PESA is a mobile banking platform on the Safaricom wireless network in Kenya. It allows customers to pay-in money deposits, withdraw savings, pay bills and transfer money to other M-PESA customers all through their mobile phones. Since 73% of the Kenyan population does not have access to formal financial services (Vaughan 2007), this platform was recognised both as a business opportunity and with the potential for significant human development. Not only does this service facilitate safer and cheaper remittances to family members, it also overcomes significant obstacles, which prevent the poor from obtaining financial services such as savings security, micro-credit loans and insurance.

The platform was launched through a unique partnership between Safaricom, the Kenyan wireless distributor, Vodafone, an international telecommunications corporation and DFID, the UK's national development agency (ibid). Vodafone, having driven the initiative, originally had difficulty justifying the project's expense to its shareholders, as a return on investment would be a long time coming (Hughes & Lonie 2007). DFID realised the potential in the initiative and provided the necessary funding to get the project started. Safaricom utilises their existing system of independent mobile distributors to provide the interface for client transactions (Morawczynski & Miscione 2008). This model is essential to the widespread geographic coverage that this service offers. There are over 2000 active M-PESA agents in Kenya, compared with only 600 ATMs found throughout the country.

The service was launched in March 2007 and within the first year had signed-up over 2 million customers (ibid). Total transfers sent over the network were calculated at 9 billion Ksh (approx. $131 million USD), indicating significant usage. Researchers immediately noticed interesting usage patterns with the service, where money is transferred on behalf of others who may not own a mobile phone or are illiterate, and where funds transfers are sent in return for services (Vaughan 2007). M-PESA was declared winner of the 2008 Stockholm Challenge for excellence using ICTs for economic development (Stockholm Challenge 2008). Despite the positive outcomes so far, the service has an even larger potential as additional services such as microfinance, international money transfers and point of purchase transactions are expected to grow.

B3. Analysis of Texts

This section presents the findings from analysis of the four ICT4D case studies as explored through the ICT4D Process Approach Framework, shown previously in Table 1. Each subsection examines, in detail, one element of the framework with respect to its prevalence within the four case studies. For a summary of this analysis and the resources it draws from, see Annex 2.

Beneficiary participation

Analysis of these four case studies suggests that there are three types of beneficiary roles that emerge, all of which engage local people through the respective projects. These roles, consistent with the process approach framework, can be grouped into project phases: design; implementation; and monitoring and evaluation. There is no evidence of an end-to-end participation chain where individual beneficiaries are explicitly involved in the project through each of these phases; however the cases do demonstrate active involvement of locals during each of the phases independently. Apart from hiring local people in the project, which all cases suggest that they do, engagement of beneficiaries can be described through: trial groups (design); re-sellers or decentralised distributors (resource mobilisation and implementation); and end-users (contributing to monitoring and facilitating empowerment).

In all cases, there is evidence that suggests important contextual information is derived through local populations and incorporated into project design; both in the initial planning stages and throughout project monitoring. For M-PESA and e-Choupal, beneficiary participation was incorporated into project design through trial groups and volunteer focus groups. E-Choupal also hired local experts to contribute to design and planning for their knowledge of the local markets and conditions.

Interestingly, it seems that engagement of local people is most evident through project implementation and resource mobilisation. In every case study, a select group of beneficiaries are used to oversee and manage the distribution of their respective system. For instance, M-PESA and Grameen use a network of independent service resellers to distribute access to their services all across the country. These participants provide client interfacing on behalf of the organisations, and are rewarded through transaction fees and commissions. e-Choupal and CDI also take a similar approach, but the central management organisation seems to maintain more direct control over each of the distribution centres. As part of the two systems, each trains beneficiaries to manage the rural telekiosks and technology schools respectively.

Finally, engaging local people in the monitoring of projects is most evident when end-users are paying customers of the projects' products and services. If only through market research and responding to customer demands, beneficiaries as customers have implicit participation in project monitoring. Although there is

evidence from M-PESA and e-Choupal, Grameen Phone seems to demonstrate the most explicit example of treating beneficiaries as customers through their "bottom of the pyramid" marketing strategy. This means that "users/beneficiaries are seen as customers who represent a market and benefit from 'information empowerment' through affordable communications" (Aminuzzaman 2002, p.171). This strategy, adopted in three cases, appears to have contributed significantly to the rapid and widespread diffusion of each service and ultimately the empowerment of participants through a self-motivated decision to participate.

Flexible, phased implementation

As defined in the coding schema, evidence of a flexible, phased implementation from project case studies should demonstrate any of two characteristics: elements of an adaptable approach which incorporates contextual factors into the project; and/or sufficient testing on pilot groups before widespread project implementation. The following is a summary of these characteristics as they were found within these case studies.

The M-PESA case provides explicit mention of the use of experimentation prior to the widespread rollout of their system. The project invited a group of clients in Nairobi to participate in a trial of the service, where they were able to test their platform for relevance and usability (Hughes 2007; Hughes & Lonie 2007; Morawczynski & Miscione 2008) What this early trial revealed was that there was a reluctance on the part of money agents to hand out cash. For a typical shopkeeper in Nairobi, now acting as a money agent, they were accustomed to more common business transactions where they exchanged money for goods. The M-PESA system was fundamentally quite different, as money agents were expected to simply hand out money, relying on the system to compensate them later. This problem was remedied through additional training and provision of separate cash floats to money agents for conducting their M-PESA transactions. This example demonstrates the value that early trials can have on the contextual appropriateness of system design. A further analysis of the text indicates the continued flexibility that M-PESA has maintained in order to respond to subsequent findings.

Similarly for e-Choupal, the business uses a pilot strategy for rolling out new services so that their design can be tested and adapted to the respective contexts. "The implementation is characterised by 'rational experimentation', internally called 'roll out, fix it and scale up'" (Bowonder et al. 2002, p.10). New services such as credit and insurance services for farmers are prepared for launch through pilot testing at 50-100 existing sites before a complete system roll-out. Maintaining an open and flexible design phase allows the incorporation of contextual information into the project before it launches on a large scale.

CDI also demonstrates a model that incorporates flexibility into their operations, enabling the development of a contextually appropriate project through piloting and experimentation in the early stages, and ensuring that project staff were able to stay abreast of new technologies and embrace emergent strategies. The management

approach has also helped. For instance, the central role of CDI is merely to provide tools and training required to start up partner schools, thus empowering the local CBOs to be flexible in the types of educational activities they conduct. Thus, when teachers were provided with the technical knowledge and proper training facilities, they had the ability to address local issues, relevant to their students such as teen pregnancy and job skills applicable for the local market. Therefore, CDI is enabling flexibility through a decentralisation of some key decision making.

Learning from experience

M-PESA represents a young organisation, having only begun the initial stages of product development in 2005 and launching two years later (Hughes & Lonie 2007). As seen through its aggressive testing and research, it has adopted a learning strategy that has a major impact on its services and the way they are marketed. For example, M-PESA originally had trouble with customers losing their SIM cards (ibid). They discovered that customers were using two SIMs, one for their M-PESA account, and the other for their original mobile number, switching them on the go depending on the service they intended to use on their mobile at a given moment. This caused many SIM cards to be lost and services inconvenienced (ibid). In response to this problem, Vodafone incorporated new technology into their M-PESA product. Using SIMEX cards, they were able to transfer the customer's original phone numbers to their M-PESA account, so that both services could be accessed through a single SIM card (Hughes & Lonie 2007). It was only through their focus on monitoring and continued learning that they were able to discover this social pattern and make necessary improvements to ensure project relevance.

Similarly, as an established organisation and leader in microfinance, Grameen was able to draw upon its experience in providing services for the poor and translate these lessons into success with their new Grameen Phone programme (Knight-John 2008). Ultimately, Grameen demonstrates value in treating the poor as customers so that they are able to design products that are appropriate for them, while still remaining profitable. In terms of learning, there is an important distinction between treating beneficiaries of an ICT4D project as customers vs. poor people who need help. Learning in this case occurs by drawing on past experience and responding to market demand (Molina 2006).

Likewise, e-Choupal aims to gain competitive advantage through their learning strategy, which is to recruit informed locals and continually conduct research (Annamalai & Rao 2003). The organisation values knowledge generation through research as "innovative inputs to be incorporated into the strategies" (Bowonder et al. 2002, p.8). Through this strategy, ITC has been able to recognise and make changes which improved the e-Choupal system through a more localised user interface; by providing better connectivity and electricity in remote areas; and with a smart card farmer identification system.

These cases demonstrate that learning and knowledge generation are not just important inputs prior to implementation of ICT4D projects, but are important

throughout the entire project lifecycle. By remaining responsive to emerging technologies and aware of beneficiary needs, projects can continually be informed of their relevance and applicability. By actively seeking out such information and acting upon it, these ICT4D projects demonstrate how a continual approach to learning has a positive effect on project success.

Institutional support

The key elements of institutional support are demonstrated through varying degrees of decentralising project activities, as well as capacity building through strategic partnerships with local institutions. To varying degrees, these elements are evident in all four cases. Of course these two elements are not mutually exclusive as can be seen through the various types of partnerships and resulting impacts demonstrated in these cases.

Managing institutional support through a decentralisation strategy is particularly evident in CDI's organisational model. This model is managed centrally as new schools are identified, resourced and opened through the central unit. However, once each school has been successfully established through training and capacity building, authority is transferred to the satellite units for continued operation. This phased decentralisation strategy seems to be effective for CDI, as it addresses entrance barriers (financial, resource and capacity), presumably felt by any new school.

M-PESA and Grameen Phone demonstrate institutional support by decentralising some aspects of their operations and supporting the institutions where decentralisation occurs. Both organisations utilise a network of independent service distributors to provide services and support to end-users. This arrangement is mutually beneficial for the organisations and the independent service distributors. Each independent distributor is provided, both implicitly and explicitly, with the tools and capacity required to engage end-users. This capacity is particularly valuable to the individuals involved as they develop valuable business skills and gain exposure to the marketplace. Even in the absence of either M-PESA or Grameen, it seems that the network of independent distributors would continue to benefit from the skills developed through the projects.

E-Choupal provides evidence of institutional support through demonstration of strategic partnerships. For many of its operational units, E-Choupal relies upon existing companies' specialisation in farming supply and meteorological surveys to provide agricultural and information services for their network of farmers (Bowonder et al. 2002). This arrangement seems to benefit all parties as E-Choupal does not need to develop these skills in-house and the external institutions benefit from increasing the capacity of their business, both financially and through increased exposure to their field.

Many of the complexities of delivering ICT4D, especially technical specialties, can be alleviated when hiring local institutions and individuals to provide functions. The

main benefit however, lies in the capacity building that this institutional support implies. Although this strategy may be more difficult to manage in the short term, the long term benefits are more conducive to developmental objectives.

Programme management

Although programme management emerges from the document analysis as the least explicit element of the process approach, it does seem to represent one of the most important aspects of the framework. For it is only through competent leadership of an ICT4D project that the other four elements of the process approach can be successfully encouraged and supported. Hence, while it is not always easy to find explicit discussion of process approach management and leadership, it is there implicitly given that the cases provide evidence of the management, promotion and encouragement of the four other process approach elements.

There is also further evidence of effective management and leadership. For M-PESA, the entire programme at one point was in jeopardy of never getting off the ground. Management realised early on that success would require taking significant risks in creating a long-term project; a move away from typical corporate conventions (Hughes & Lonie 2007). Their belief in the potential of this initiative and realisation that success would be achieved only in the long term, resulted in a project reminiscent of the process approach.

The result of this high-level leadership was that the people who were granted responsibility for the initiative adopted an approach that would allow the context to influence the outcome. According to Hughes & Lonie (2007, p.69) [Hughes is an executive at Vodaphone]:

> Sitting in a comfortable office in England and deciding what Africa needs is an approach doomed to failure..... For this project to be successful, Vodafone needed someone on the ground in Kenya, ensuring that the team properly understood the environment in which the service needed to work, and the detailed product requirements.

Similarly, CDI leadership demonstrates flexibility through a willingness to re-evaluate its management strategy and continually make improvements (Ferraz et al. 2004).

The creation of managerial sub-units also emerged from the analysis. This is seen when the initiative creates an independent, self-motivated institution that has the freedom to make micro-level decisions and provide feedback to the upper levels of management. This decentralisation is evident in: M-PESA and Grameen Phone through their reseller models; e-Choupal through independently managed, and sometimes owned, rural kiosks; and CDI through training and capacity building of CBOs to manage their own ICT schools. These examples all demonstrate some form of management decentralisation and empowerment of individuals at the lower end of the hierarchy.

B4. Summary

As described above (and summarised in Annex 2), each of these successful ICT4D projects has demonstrated the presence of the five process approach components. In addition, several themes emerged from this analysis, which offer interesting insight into how ICT4D can be delivered through the process approach. For instance, the use of financial incentives adds an interesting element to ICT4D initiatives by creating a self-sustaining model that encourages participation, both from beneficiaries as well as institutions. This seems to work in conjunction with the process approach as a means for delivering contextually appropriate solutions; a necessary step for ICT4D and the process approach. Also, each of the elements of the process approach appears to work in unison with the others. In other words, the process approach represents a holistic set of elements that enable practitioners to examine problems in detail and over longer periods of time. These themes will be discussed in more detail in the next section and will contribute to the arguments that relate to the original question posed in the Introduction.

C. Conclusions & Recommendations

This section further develops the notion of an ICT4D process approach and what this approach means to practitioners. The discussion begins with an examination of success and the notion that it looks different when viewed from a process approach perspective. Next, we examine how the process approach has contributed to this new notion of success by summarising the extent to which it contributed to the positive outcomes of the case studies. Wrapping up the conclusions, we present the process approach as a holistic framework that can guide ICT4D project managers as they navigate the complexities of development contexts and strive for greater successes. Finally, we provide some practical recommendations to ICT4D project planners and programme managers so that they can begin to incorporate the process approach into their ICT4D initiatives.

C1. Conclusions

Understanding success and failure

Success looks different when examined through a process approach lens. Therefore it is important to address these differences and build an understanding of what a process approach for ICT4D can actually do. In a traditional project, success is achieved when the objectives are completed as originally planned. If these objectives are met on time and within the budget, the project is successful. From a process and learning perspective, though, "success" merely contributes to a wider understanding of the systems that make up a particular context, which can always be improved upon further. This notion is reflected in the ongoing nature of the process approach. There are rarely plans to stop, only to constantly evolve. Indeed, a view

of project finality sits very uneasily with the reality that most ICT4D projects are ongoing, and ongoing within ever-changing environments.

Since the process approach is not so strongly shaped by objectives, time, or money, a traditional claim of success does not necessarily apply. A "successful" ICT4D project, such as the M-PESA mobile banking platform, is only the first step in obtaining development impact. Its true value will be seen only in the long run through continued improvements to the system and with the addition of complementary services targeted at the poor. This is achieved through a strategy that is continually looking to improve. With an emphasis on flexibility, continual learning and participation, the process approach ensures continuous improvements by building on an initiative's *successes*.

Success' evil brother – failure – is just as important as success within the process approach. From a process perspective, failure is not some disastrous end point. Instead, it can be useful when an organisation has the wherewithal to incorporate the realisation of failure into its systems and learn from mistakes. For instance, CDI experiences low employment rates for its graduates, which does not imply that we should everlastingly categorise the initiative as a failure. On the contrary, the process approach views such experiences as valuable information, which can provide learning and guidance for improvements. As a result of this lesson, CDI has decided to stop expanding and to try and understand how they can improve their existing centres and their graduates' employability; an indication that they are willing to learn from temporary failure and look towards the long-term. From the perspective of the process approach, true failure would be an inability to learn, adapt and meet the changing needs of beneficiaries.

"Success", as seen from the case studies, seems like an overly-ambitious phrase, implying a sense of finality that is more conducive to temporary projects. However, through the process approach, *successes* and *failures* must be seen as contingent and passing, providing incremental lessons which generate feedback to ICT4D practitioners. This information is especially valuable for projects dealing with complex development systems, as the case studies do. Adoption of the process approach and acknowledgment of *successes* and *failures* helps create systems with long-term effectiveness and solutions that are contextually appropriate so as to maximise the potential developmental impacts.

The process approach: contribution to successes

In order to present the process approach as a viable framework for improving the successes in ICT4D projects, there needs to be evidence to support the notion that the process approach results in positive outcomes. In light of this new perspective of success identified above, it is relevant to identify the extent to which the process approach has contributed to this success in the cases presented.

The findings, as summarised in Annex 2, illustrate the presence of elements from the process approach in all four case studies. However, in order to answer the question

posed earlier, we need to go further into this, to identify causal linkages between the process approach and the subsequent positive outcomes found in these ICT4D projects.

There are some common outcome areas where elements of the process approach have contributed to increased successes and appear to have further implications with respect to ICT4D lessons. These areas are: an increased **relevance** in the ICT4D solution, ensuring more contextually appropriate designs; improved opportunities for **capacity building** of local population; and an increased likelihood of creating a project that is **sustainable** in the long-run. These factors are not exclusive to process approach projects, but since the process approach addresses these factors more explicitly in ICT4D project planning, the likelihood of them occurring becomes much greater.

We can look back at the ICT4D lessons and consider how the process approach addresses these lessons and contributes to successes. Table 3 outlines for each element of the process approach, how it addresses the lessons found within ICT4D literature and ultimately contributed to the successes of the ICT4D projects.

Table 3. Lessons, Successes and the ICT4D Process Approach

Process Approach Component	ICT4D Lesson	Process Approach Contribution to Successes
Beneficiary participation	**#1**: facilitate participation of intended beneficiaries and users, to increase ownership of the project, gain contextual insights and provide a learning opportunity for project beneficiaries;	Collecting knowledge from beneficiaries contributes to a better understanding of the context and ensures more **relevant** project outcomes, while participation results in opportunities for **capacity building** and sustainability through **ownership**.
Flexible, phased implementation	**#2:** maintain a flexible approach to incorporate emergent themes and lessons into the project plan;	Maintaining a flexible approach ensures incorporation of emergent information, which results in more **relevant** ICT4D projects and ultimately more **sustainable** initiatives (as they can continue to be relevant).
Learning from experience	**#3**: focus on continued learning to ensure continued relevance and applicability;	Together with flexibility a focus on learning ensures ICT4D projects remain **relevant** and appropriate to the context. Participation of beneficiaries in organisational learning may also have implications for **capacity building**.
Institutional support	**# 4**: utilise and strengthen local institutions by including them and integrating them into ICT4D projects while encouraging capacity building of key stakeholders;	Incorporating local institutions and individuals into ICT4D projects as a strategy increases the likelihood of **capacity building** and contributes to local development as well as creating a more **sustainable**, non-temporary initiative.
Programme management	**#5**: provide good leadership that is sensitive to the realities of the development context.	Having managers and project staff who are sensitive to the complexities of development will contribute to the **relevance** of ICT4D towards realisation and attainment of development goals.

However, there is one final aspect of the process approach that emerges through Table 3 as well as through the analysis of this paper. This is the interrelatedness of the process approach and the notion that each element works in conjunction with the others.

The process approach as a holistic framework

The process approach provides a holistic framework of interrelated elements, which enables the generation of bottom-up, contextually appropriate solutions that address complex development scenarios. It appears that the holistic nature of the process approach has a reciprocal effect on the overall continued successes of ICT4D initiatives. In other words, working as an integrated whole, each of the individual elements works more effectively when used together, contributing to greater overall successes.

Through the findings and analysis of the previous section, it is evident that each element of the process approach not only addresses shortcomings found in some earlier ICT4D projects, but also works in conjunction with all other elements of the framework. As elements of the process approach emerged from the texts there was a sense of overlap, such that we could not find evidence of one element without getting a sense of contribution to the other elements. For instance, maintaining a flexible approach is beneficial when combined with an emphasis on learning from experience. It seems that once something has been learned, an initiative that maintains a flexible approach is best suited to incorporate that experience into the system. Thus, when M-PESA discovered the flaw with SIM cards they were able to incorporate that knowledge into the programme (Hughes & Lonie 2007). Similarly, beneficiary participation is facilitated and used most effectively when management is willing to adopt more of a bottom-up approach as ITC did with e-Choupal. These findings suggest that the process approach is not series of independent modules, but a holistic framework that managers can use to plan, monitor and evolve their initiatives.

For ICT4D project and programme managers, the process approach offers a perspective that is comprehensive and sympathetic towards contextual realities while helping to avoid rationalistic tendencies. It is a framework that enables the emergence of bottom-up system design with ongoing support and maintenance, such as the unique reseller model presented in Grameen's VPO programme. Since working with complex development problems implies constant changes to the environment, the approach to be employed should match this reality. As a holistic framework that implies an interpretive approach, it seems that the process approach is well suited for dealing with such complexities.

The holistic approach of M-PESA: a specific example

Perhaps M-PESA serves as the most appropriate case to demonstrate the holistic concept as it appeared the most explicit and exemplary in use. In an attempt to illuminate the interconnectedness, an abridged version of its holistic approach can be found in Table 4. Here, we pick one element of the process approach framework – learning from experience – and summarise evidence on the way in which it connects to all the other framework elements; thus showing how all elements are linked together. For example, an emphasis on reflective learning is seen in the programme management of M-PESA as they sought to better understand the usage of its technology. Similarly, beneficiary participation as well as the other elements of the framework, play a central role in the continued learning strategy of M-PESA. This logic of interconnection is applicable to the entire framework shown in Annex 2.

Table 4. M-PESA: Sample Indication of Process Approach Holism

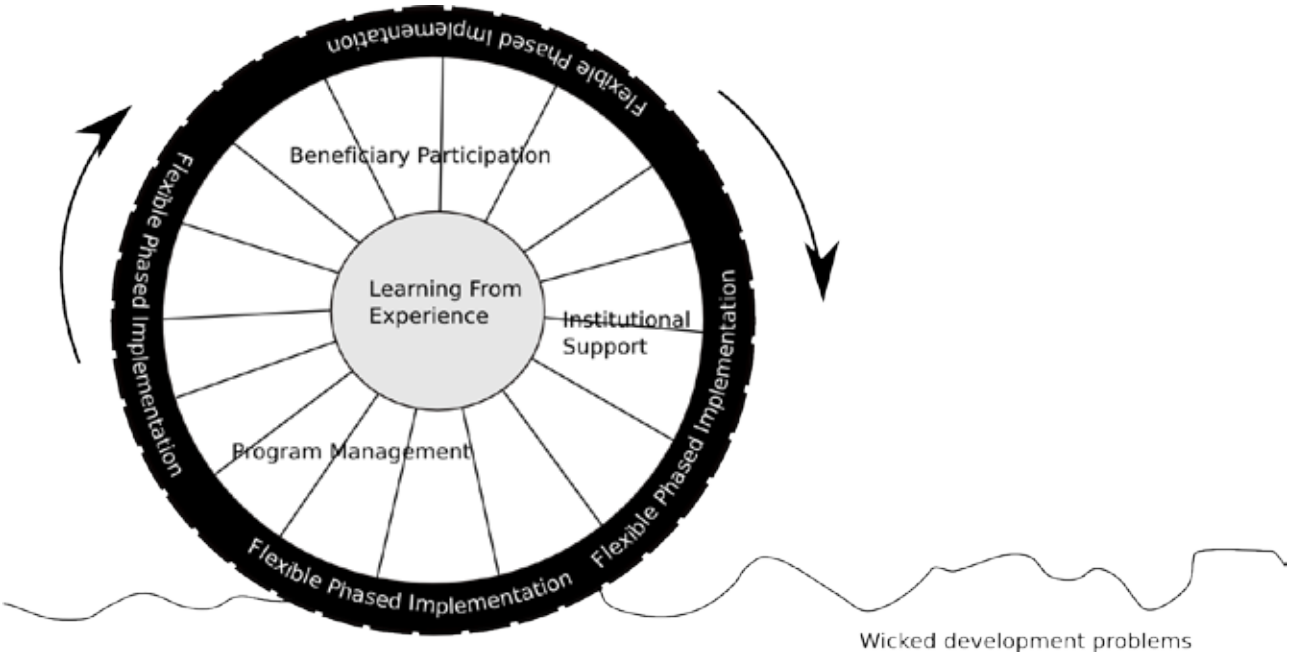
	Beneficiary Participation	**Flexible, Phased Implementation**	**Learning from Experience**	**Institutional Support**	**Programme Management**
Learning from Experience	Learning about SIM card flaw created a more contextually relevant system that encouraged more use and participation (Hughes & Lonie, 2007).	Learning from Safaricom mobile reseller model proved a valuable lesson informing expansion of a flexible M-PESA distribution channel (Vaughan, 2007).	x	Experience with Safaricom mobile reseller model informed M-PESA distribution channel through partnerships with entrepreneurial agents (Vaughan, 2007).	Ad hoc monitoring of usage patterns prompted formal investment in third party research project to better understand usage of M-PESA technology (Vaughan, 2007).

Table 4 and Annex 2 demonstrate the holistic nature of the ICT4D process approach. Of itself, this interconnectedness might suggest a static set of relations. Yet we also know that there is a dynamic here. M-PESA has built an ongoing set of successes and it seems that the holistic nature of the process approach acts to perpetuate development of such successes in ICT4D systems. This notion extends beyond M-PESA and is discussed in more detail in the section that follows. Expanding on this finding, below, we present a tool for conceptualising the ICT4D process approach and promoting it in practice.

The ICT4D Process Approach Wheel

The interconnectedness of the framework and the dynamic environment in which ICT4D projects operate can be represented with a simple analogy. Below, in Figure 1, is a modification of the preliminary ICT4D process approach framework presented earlier in Table 1. Its analogy relates the holistic nature of the process approach to the components of a rolling wheel.

Figure 1. The ICT4D Process Approach Wheel



Source: Bond & Hulme (1999)

Envision a wheel rolling along bumpy terrain. Like that rolling wheel, each component of the ICT4D process approach, within an ICT4D initiative, works in harmony with the rest to absorb the bumps (contextual problems) and continue its long (perhaps endless) journey to prosperity and wellbeing. Sometimes the bumps may be so severe that the process wheel has to reverse and try an alternate route, just as the process approach experiments and learns from failure.

Just as the wheel rolls ever-onward, so the process approach is intended to be a continual process with relative permanence, or at least without plans to stop. Just as M-PESA, e-Choupal, Grameen and CDI represent organisations or systems with permanent intentions, the wheel is constantly moving. These organisations believe that failure is tolerable and should be treated as a lesson to be learned, only to proceed forward with the new knowledge gained.

The wheel, like the process approach, is composed of several integral components which are all essential to its composition and work in unison with one another. These components are: the tyre; the axle; and the spokes. The tyre is analogous to flexible, phased implementation. Just as the tyre flexes to absorb the bumps, so maintaining flexible, phased implementation allows for contextual information to be incorporated into the initiative throughout every stage of its implementation. Just as M-PESA revisited their SIM card technology and CDI decided to halt opening new schools to re-formulate their strategy, the flexible tyre is always present and continuously able to adapt to whatever bumps (contextual realities) it may encounter.

As the axle plays a central role to the functionality of the wheel, learning from experience is central to the process approach. As demonstrated in this paper, a development framework with a central focus on learning has been shown to contribute to the creation of contextually appropriate ICT4D solutions. ITC demonstrates this through their focus on learning, whereby they incorporate the inputs of many stakeholders into continual development of the e-Choupal system. Learning is facilitated through a flexible system, similar to how the tyre absorbs the bumps to ensure the smooth turning of the axle.

The final components of the wheel are the spokes, which give it the strength and substance required to function. Without all of the spokes, the wheel would of course not function as it would cease to be a wheel. Similarly, the process approach is held together by empowering the various stakeholders to participate and contribute to the ICT4D system. Effective programme management that is non-authoritative and sympathetic towards the realities of development, works to facilitate the participation of beneficiaries and increase the capacities of local institutions through a contribution to the ICT4D system. Both of these groups contribute essential contextual information to the ICT4D initiative's design, as well as promoting uptake and local ownership of the system. This combination of framework elements is evident in the Grameen case study as the visionary Mohammad Yunus was able to empower village phone operators as private institutions who promoted and evolved a system of affordable communication services to the poor. The infrastructure was established through incentive models, which made bottom-of-the-pyramid marketing attractive to investors, thus contributing to the widespread technological adoption by the poor (Knight-John 2008).

The wheel and its components represent the interconnectedness of the ICT4D process approach elements, within a permanent initiative that is always learning, improving and adapting. Through this perspective, the process approach offers a strategy for ICT4D managers to plan for effective projects and further increase the likelihood of positive results.

C2. Recommendations for ICT4D Practitioners

It would be naive to suggest that the process approach can be a drop-in replacement for traditional planning models such as the project management methodology. These models are deeply embedded within the organisational structures of those funding and implementing ICT4D. Nonetheless, the process approach at least offers a fresh perspective for all, and in at least some situations can provide a set of guidelines enabling ICT4D managers to deal more effectively with the complexities of inserting technology into a development context.

For example, during the planning stages of an ICT4D project (or programme), team members could frame a discussion around the process approach; asking the following questions:

- Beneficiary Participation
    - What is the role of the local population in this project?
    - What information has been and will be collected from beneficiaries?
    - How can we better collaborate with beneficiaries of the project?
- Flexible, phased implementation
    - What is the process for changing the project plan should something unforeseen occur?
    - How will we monitor for emergent ideas/behaviour/findings?
- Learning from experience
    - What is our approach towards organisational learning?
    - How will we deal with negative findings? (things we are doing wrong)
    - How can we ensure learning turns into action?
- Institutional support
    - Are there local institutions we can utilise within our project?
    - What type of capacity building is required to develop the necessary skill-sets amongst the local population to help deliver the project?
- Programme management
    - How can we lead better?
    - How does my perspective differ from others?

These questions are intended to lead to concrete plans, schedules and roles which incorporate the lessons of the process approach into future ICT4D activities. The questions act to guide a contextualisation of the framework ensuring relevance across different directives. However, these questions mainly provide the necessary perspective that some ICT4D projects are currently lacking and, as demonstrated in this paper, can increase the likelihood of success.

C3. Final Thoughts

It is beyond the capacity of one working paper to demonstrate the uncontestable necessity of a new development paradigm and new management methodology for ICT4D. Nor was it the intention of this research to make such a claim. The overall objectives of this study were to conduct an exploration of ICT4D practice from a different perspective (the process approach) and analyze whether there is room to suggest an alternative approach. Although it may be beneficial to narrow the scope of this research to a particular context, technology or case study, the findings present an initial exploration of the wider topic. In general, it appears that there is room for a new way of thinking, in terms of the approaches that are used in ICT4D practice. As seen from the evidence, the process approach offers a reasonable alternative to the traditional methodology that is typically associated with ICT4D, but also infuses a necessary perspective that is currently lacking in some ICT4D projects and programmes.

In summary, this study found that the ICT4D process approach framework provides a holistic tool and critical perspective for designing, managing and maintaining successes in an ICT4D initiative. This is not to suggest that the framework is the solution for fixing all of ICT4D; it merely suggests an alternative approach, one that maintains more of a contingent stance towards problem solving and management. However, in practice, appropriate application of the ICT4D process approach would depend upon the context, the technology and the intentions of the organisers, therefore these suggestions remain modest. We have tried to mediate this uncertainty by providing evidence from a variety of ICT4D initiatives and from a range of technologies. However there are many other types of solutions in many other contexts which may not fall under the scope of this research. Nevertheless, the evidence presented in this paper suggests that the ICT4D process approach is worthy of consideration for informing new practices of ICT4D.

Recall that the main research question of this study asked: how does the process approach impact the success of ICT4D initiatives? Harnessing the newly established concept of success is the persistent and holistic nature of the ICT4D process approach framework. Like a rolling wheel, all of the elements work together to continually re-evaluate and learn while maintaining flexibility so as to incorporate the contextual terrain. The ICT4D process approach provides a holistic methodology, acting reciprocally to support itself and improve the likelihood of ICT4D successes over longer periods of time.

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Annex 1— Process Approach Framework: Document Coding Schema

Category (adapted from Bond & Hulme 1999)	**Definition** (adapted from Bond & Hulme 1999)	**Examples** (adapted from Mayring 2000)	**Preliminary Coding Rules** (adapted from Mayring 2000)
Beneficiary participation	Initiative should actively involve the local beneficiaries as much as possible throughout the entire project.	"While Akshaya provided a standard set of services which the sites could provide, it also encouraged entrepreneurs to develop locally appropriate services" (Antin 2005, p. 15)	1) should imply a bottom-up approach; 2) should indicate representation from wide range of stakeholders;
Flexible, phased implementation	Initiatives should not be focused on immediate results, but should implement solutions that adapt over time. Once solutions are realised they can be scaled up.	"the current pilot implementation in Malappuram is just the first stage in a much larger implementation throughout Kerala state" (Antin 2005, p. 17)	3) should imply an adaptive solution that incorporates contextual information; 4) should imply sufficient testing on small isolated groups before proceeding with full implementation;
Learning from experience	Projects should experiment and take risks but focus on organisation learning as an outcome of failure and risk.	"Given the demands of its local setting, a branch of the bank had to find ways to accommodate some of the idiosyncrasies of its local context" (Bada 2002, p. 83)	5) a focus on lessons learned within implementations; 6) focus on knowledge management;
Institutional support	Utilise local institutions to establish local participation and capacity building.	""Umbrella Ladies" simply set up at the side of the road with a lawn chair, a mobile, and some shade from the sun; informal resale of individual calls are common throughout the continent." (Donner 2005, p. 2)	7) implies a preference for using established institutions; 8) avoids creating unnecessary in-house capabilities that are reliant on the project;
Programme management	Maintain a flexible, creative, professional, motivated and well-qualified leadership.	"He encourages spontaneous communication of the personnel and customers" (Volkow 2000, p. 61)	9) implies a non-authoritative leadership; 10) sensitive to the realities of development and respectful of contextual differences.

Table format adapted from Mayring (2000)

Annex 2— Summary of Case Study Analysis

Category and Coding Rules	CDI	e-Choupal	Grameen VPO	M-PESA
Beneficiary participation 1) should imply a bottom-up approach 2) should indicate representation from wide range of stakeholders	1) The grassroots CBOs (community centres, churches, etc) are used as schools and responsible for management of programmes (Ferraz et al. 2004; Albernaz 2002) 2) Successfully reaches and interacts with a diverse range of disadvantaged people (Batchelor et al. 2003)	1) e-Choupal empowers farmers and considers their localised interests in system design and improvements (Bhatnagar et al. 2003) 2) The interests of the farmers are embedded into the system such that it increases profits and access to information (Annamalai & Rao 2003)	1) 2) Through incentives such as lower transaction costs as demanded by consumers, the model ensures participation of intended beneficiaries (VPOs) as clients and partners (typically women) who provide affordable communication to end-users (Aminuzzaman 2002)	1) 2) Tapping into established market need for banking services for the poor as only 27% of Kenyan population has access to formal banking system. Services are piloted with and targeted at all Kenyans, including the poor, with additional consideration for micro-banking services (Vaughan 2007)
Flexible, phased implementation 3) should imply an adaptive solution that incorporates contextual information 4) should imply sufficient testing on small isolated groups before proceeding with full implementation	3) Local adaptations are part of CDI's model, where partner CBOs address needs specific to local community (Albernaz 2002) 4) "It is the replication of the model, from CDI headquarters to regional offices to local educators, that enables the model to grow and impact local communities" (Batchelor et al. 2003, p. 12)	3) Programme rolled out through a gradual process that pilots the programme in a variety of contexts before scaling it up to cover wider areas (Bowonder et al., 2002) 4) Pilot stage is tested on 50 centres before being scaled up to 1500 to extract relevant contextual information (Bhatnagar et al. 2003)	3) "Bottom of the pyramid" marketing indicates an approach which is responsive to consumer's needs (the poor themselves) (Molina 2006, p. 30) 4) Model evolved through lowering transaction costs, which entrepreneurs were able to exploit through microfinance loans and thus promote wider adoption (Knight-John 2006)	3) Maintains an open platform which incorporates contextual information that arises, such as marketing for researched usage patterns, improvements to ease of use and implications to processes (Hughes 2007; Morawczynski& Miscione 2008) 4) Ran a small pilot trial of M-PESA in Nairobi with small number of agents and clients (Hughes et al. 2007)
Learning from experience 5) a focus on lessons learned within implementations 6) focus on knowledge management	5)Lessons are often built around local requirements such as lessons around pregnancy or using Excel to plan budgets (Albernaz 2003) 6) Shows significant interest in understanding success, clients and context by hiring research firm that specialises in social development (Batchelor et al. 2003)	5) Experiences of workers in remote villages are used as "innovative inputs to be incorporated into the strategies" (Bowonder et al. 2002, p. 8) 6) Through an employment strategy that incorporates local professionals, ITC ensures they are connected with client requirements (Annamalai & Rao 2003)	5) Conducts research and development initiatives with focus on the poor and local conditions, to target product development to local conditions (Molina 2006) 6) Draws upon many lessons learned through experience with microfinance business (Knight-John 2006)	5) Closely monitors activities of agents and clients for information that could improve overall system design (ibid) 6) Hired research firm to compile information relating to system usage patterns (ibid)

Category and Coding Rules	CDI	e-Choupal	Grameen VPO	M-PESA
Institutional support 7) implies a preference for using established institutions 8) avoids creating unnecessary in-house capabilities that are reliant on the project	7) Works in collaboration with established local community groups in identified, vulnerable areas, increasing their local capabilities to run a school (Batchelor et al. 2003; Albernaz 2002) 8) (not found)	7), 8) ITC currently partners with Meteorological Dept., agri-universities, regional markets and farming supply companies and has intentions to partner with finance and insurance firms to improve system efficiency and increase capacity of all players (Bhatnagar et al. 2003; Bowonder et al. 2002)	7) A well designed institutional framework comprising many levels of partnership, contributes to the successful penetration of this service (Aminuzzaman 2002; Knight-John 2006; Molina 2006) 8) Works as an independent institution as part of the Grameen family of organisations (ibid)	7) Partners with existing Safaricom airtime resellers by offering commissions per transaction that facilitate widespread penetration of services (Hughes 2007) 8) Platform designed to allow easy integration of additional financial services through existing third party institutions such as microfinance (ibid)
Programme management 9) implies a non-authoritative leadership 10) sensitive to the realities of development and respectful of contextual differences	9) Maintains Rodrigo Baggio Barreto's original vision and demonstrates a willingness to re-evaluate its management strategy to make improvements (Ferraz et al. 2004) 10) (not found)	9) The leaders from ITC have conceded authority through "distributed leadership" (Bowonder et al. 2002, p. 11). 10) Enables the power of the small-scale entrepreneur to drive the initiative through a bottom-up approach (ibid)	9) System aims to empower entrepreneurs at the lower level (Molina 2006) 10) Through a "bottom of the pyramid" approach, they are able to bridge the gap between development and interests of multinational corporations (ibid)	9) Acknowledges importance of contextual appropriateness of the system through extensive participative research (ibid) 10) "At the core of these initiatives is a willingness to find more effective ways of delivering assistance—a hand up, not a hand out" (Hughes 2007, p. 65)