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Impact Assessment of ICT-for-Development Projects: *A Compendium of Approaches*

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Impact Assessment of ICT-for-Development Projects:
A Compendium of Approaches

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Abstract

Billions of US dollars are invested each year by the public, NGO and private sectors in information-and-communication-technologies-for-development (ICT4D) projects such as telecentres, village phone schemes, e-health and e-education projects, e-government kiosks, etc.

Yet we have very little sense of the effect of that investment. Put simply, there is far too little impact assessment of ICT4D projects.

In part that reflects a lack of political will and motivation. But in part it also reflects a lack of knowledge about how to undertake impact assessment of ICT4D.

This Compendium aims to address that lack of knowledge. It presents a set of frameworks that can be used by ICT4D practitioners, policy-makers and consultants to understand the impact of informatics initiatives in developing countries.

The Compendium is arranged into three parts:
- Overview – explains the basis for understanding impact assessment of ICT4D projects, and the different assessment frameworks that can be used.
- Frameworks – summarises a series of impact assessment frameworks, each one drawing from a different perspective.
- Bibliography – a tabular summary of real-world examples of ICT4D impact assessment.

Compendium Overview

1. An Overview of Impact Assessment for ICT4D

As with any investigative process, two questions drive ICT4D impact assessment:
* What do we not know, that we need to know?
* How are we going to find that out?

Specifically, impact assessment of ICT4D projects can be based around six questions (see Figure 1):
* *Why*: what is the rationale for impact assessment?
* *For whom*: who is the intended audience for the impact assessment?
* *What*: what is to be measured?
* *How 1*: how are the selected indicators to be measured?
* *When*: at what point in the ICT4D project lifecycle are indicators to be measured?
* *How 2*: how are impact assessment results to be reported, disseminated and used?
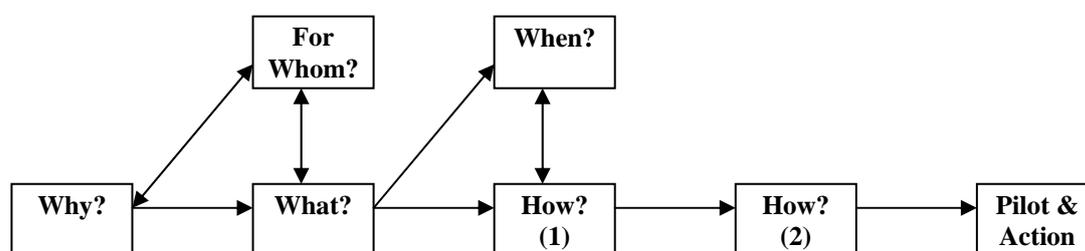

Figure 1: ICT4D Project Impact Assessment – Planning Overview

In more detail:
* *Why* – this can include both the externally-stated rationale, and the internal purpose for the organisation(s) driving the impact assessment. In most cases, the external rationale will be one or more of: a) retrospective achievement – post-hoc assessment of what has been achieved from investments to date; b) prospective priorities – pre-hoc assessment of future development project investments; c) accountability – enabling agencies to be held to account for their ICT4D spending.
* *For whom* – typical audiences are a) ICT4D investment decision-makers; b) ICT4D policy decision-makers; c) ICT4D project decision-makers; d) ICT4D project users/beneficiaries; e) other ICT4D stakeholders.
* *What* – a mixture of the indicators the key audience will best consume, the indicators it is most feasible to measure, and the indicators the assessment team is most familiar with. This may also include identifying the conceptual framework guiding the impact assessment; the focus of this Compendium.
* *How 1* – alongside the specific measurement issues, a key element here will be the extent of participation of project users in measurement (and in more upstream processes such as selection of indicators).
* *When* – the classic impact assessment failure has been to assess ICT4D pilots rather than fully-scaled-up projects; and to assess too early in the project's history.
* *How 2* – probably the most important and the most overlooked element in the whole process, with some impact assessments being conducted but having little impact. Includes questions on whether indicators are reported "as is", or communicated via causal models, case sketches, stories, etc.

1A. Guiding Model – The ICT4D Value Chain

The basis for understanding the assessment of ICT4D projects is the ICT4D value chain, shown in Figure 2.
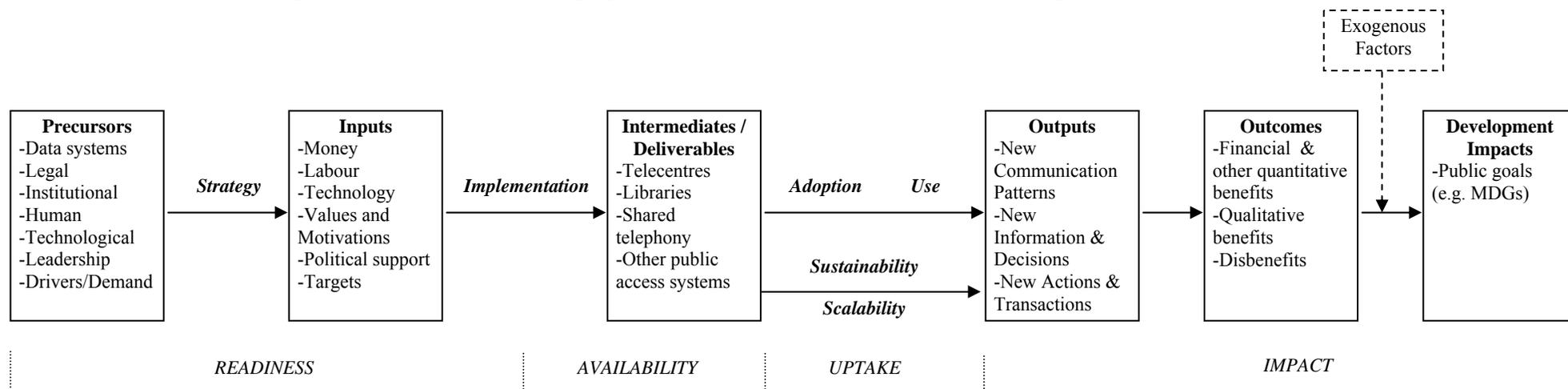
Figure 2: The ICT4D Value Chain

This builds on a standard input—process—output model to create a sequence of linked ICT4D resources and processes. It is divided into four main targets for assessment:

- *Readiness*: "e-readiness" assessment typically measures the systemic prerequisites for any ICT4D initiative e.g. presence of ICT infrastructure, ICT skills, ICT policies, and so on. One could also assess the strategy that turns these precursors into project specific inputs, and the presence/absence of those inputs.
- *Availability*: implementation of the ICT4D project turns the inputs into a set of tangible ICT deliverables; one can assess the presence and availability of these intermediate resources.
- *Uptake*: assessment typically measures the extent to which the project's ICT deliverables are being used by its target population. Broader assessment could look at the sustainability of this use over time, and at the potential or actuality of scaling-up.

- *Impact*: as the name suggests, only this focus actually assesses the impact of the project and we can divide it into three sub-elements:
  - o *Outputs*: the micro-level behavioural changes associated with the ICT4D project.
  - o *Outcomes*: the specific costs and benefits associated with the ICT4D project.
  - o *Development Impacts*: the contribution of the ICT4D project to broader development goals.

To some extent – and particularly in relation to outputs, outcomes, and development impacts – as you move from right to left along the value chain, assessment becomes more difficult, more costly but also more valuable. That move also represents something of a chronology. Thus, as indicated in Figure 3, interest in assessing different aspects of the ICT4D value chain has changed over time, with the strong diffusion of ICT4D projects now creating most particular interest in assessment of impacts, as opposed to uptake, availability or readiness. In this Compendium, the main focus is on assessment of impacts rather than other value chain stages.
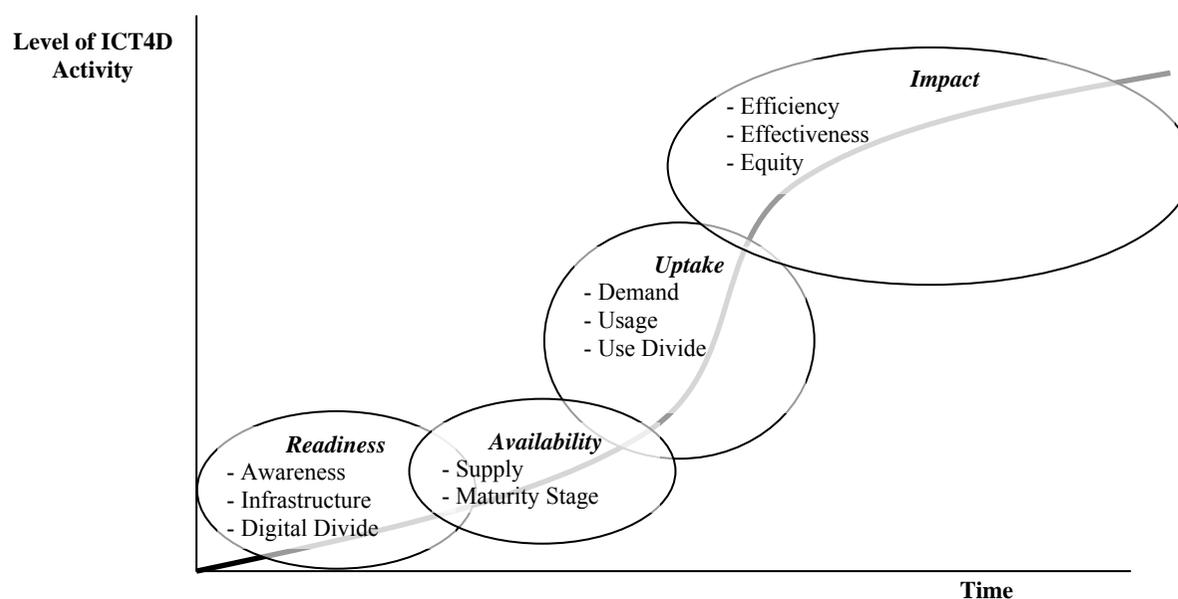
Figure 3: Changing Focus of ICT4D Assessment Over Time

1B. Classifying the Overall Impact of an ICT4D Project

We can classify the overall impact of an ICT4D project into one of the five following categories:

- ***Total failure***: the initiative was never implemented, was implemented but immediately abandoned, or was implemented but achieved none of its goals.
- ***Largely unsuccessful***: some goals were attained but most stakeholder groups did not attain their major goals and/or experienced significant undesirable outcomes.
- ***Partial success/partial failure***: some major goals for the initiative were attained but some were not and/or there were some significant undesirable outcomes
- ***Largely successful***: most stakeholder groups attained their major goals and did not experience significant undesirable outcomes.
- ***Total success***: all stakeholder groups attained their major goals and did not experience significant undesirable outcomes.

Major goals are the main objectives a group wanted to achieve with the ICT4D project (which might typically relate to outputs and/or outcomes and/or development impacts); undesirable outcomes are unexpected outcomes that a group did not want to happen but which did happen.

2. An Overview of ICT4D Project Impact Assessment Frameworks

Section A provided an overview of ICT4D impact assessment but gave no specific guidance on how to undertake such an assessment. The main role of this Compendium is to provide such guidance: not so much in terms of specific data-gathering methods, but in terms of "frameworks": ways of understanding ICT4D projects and organising knowledge about them.

We can classify impact assessment frameworks into six categories (summarised in Figure 4):
* *Generic*: general frameworks usable in assessment of any development project.
* *Discipline-Specific*: assessment drawing from a particular academic discipline.
* *Issue-Specific*: assessment focused on a particular development goal or issue.
* *Application-Specific*: assessment focused on one particular ICT4D technology.
* *Method-Specific*: assessment centred on a particular approach to data-gathering. (None of these is included in the current Compendium of frameworks, but examples of literature are included in the Bibliography).
* *Sector-Specific*: assessment centred on an individual development sector. (None of these is included in the current Compendium of frameworks, but examples of literature are included in the Bibliography).
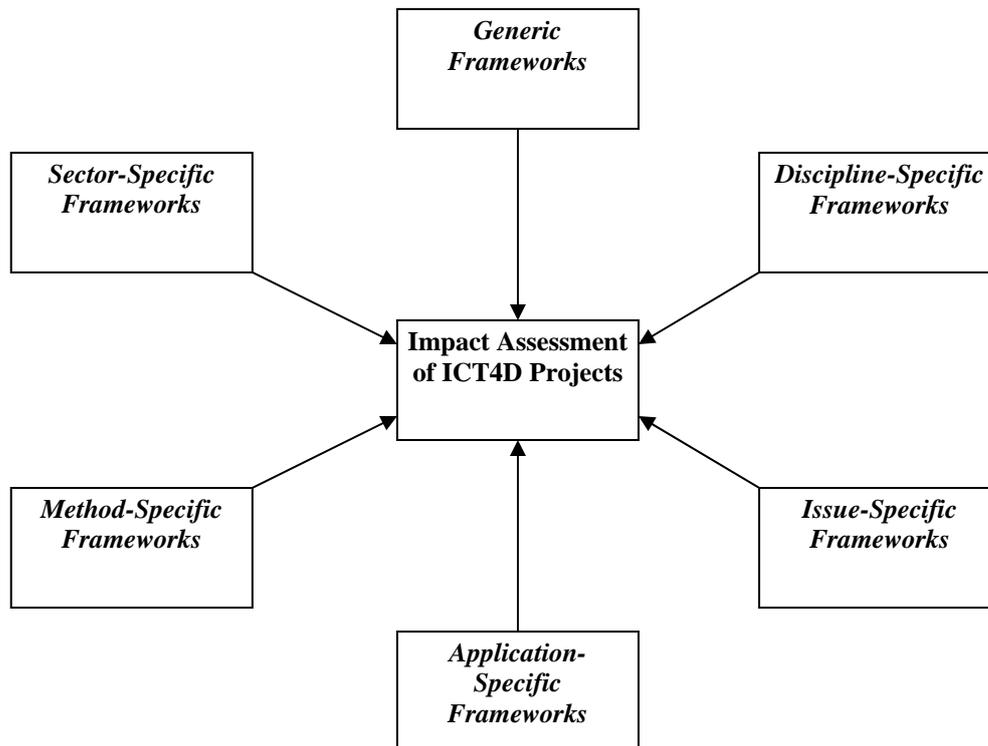
Figure 4: ICT4D Project Impact Assessment Frameworks Overview

The Compendium offers a synopsis of frameworks within four of the six categories, as summarised in Table 1.

Type	Sub-Type	Focus	Compendium No.
GENERIC		*Cost-Benefit Analysis*	1
		Project Goals	2
DISCIPLINE-SPECIFIC	Communication Studies	*Communications-for-Development*	3
	Development Studies	*Capabilities/Sen*	4
		Livelihoods Framework	5
	Information Science	*Information Economics*	6
		Information Needs/Mapping	7
	Sociology	*Cultural-Institutional*	8
ISSUE-SPECIFIC		*Enterprise (Growth)*	9a (Variables) 9b (Relations) 9c (Value Chain
		Gender	10
APPLICATION-SPECIFIC		*Telecentres*	11

Table 1: ICT4D Impact Assessment Frameworks in Compendium

For each of the frameworks, the Compendium entry covers:
- *Summary*: a one-paragraph overview of the framework.
- *The Framework*: an explanation of the origins and content of the particular approach, explaining how it would organise ICT4D impact assessment data and knowledge.
- *SW Analysis*: a summary of the perceived strengths and weaknesses of this approach to impact assessment.
- *Methodological Summary*: an overview of the nature and requirements of data-gathering using this framework.
- *Method Recommendations*: good practice notes on applying the framework.
- *References*: literature sources referred to in the entry.
- *Bibliography*: additional key literature sources, where found.
- *Variants*: variations on the main framework that may be used in ICT4D impact assessment.
- *Examples of Use*: summarised examples of applying the framework to ICT4D project assessment.

2A. Comparing IA Frameworks By Method

Table 2 summarises the various Compendium entries in terms of the nature and requirements of their data-gathering methods. These are:

- *Primary/Secondary?*: whether primary data from the field is required or impact assessment can make use of existing secondary data sources.
- *Data-Gathering Methods?*: what methods (interviews, focus groups, observation, document analysis, etc.) are used? In practice, almost all frameworks can use multiple methods.
- *Participatory?*: to what extent can the framework be used in a participatory manner that involves ICT4D project recipients beyond a role just as data subjects.
- *Quasi-Experimental?*: can the framework be applied in a controlled, experimental manner, e.g. comparing impacts on one group that was vs. one group that was not involved in the project?
- *Quantitative/Qualitative?*: are the data gathering and analysis methods mainly quantitative, mainly qualitative, or some mixture?
- *Multi-Disciplinarity?*: does the framework allow for a mixing of different disciplinary perspectives?
- *Timing?*: does impact assessment using this framework have to be cross-sectional in timing, or longitudinal, or can it be either?
- *Level?*: does impact assessment using this framework mainly focus at the micro (individual) or meso (e.g. community) or macro (e.g. national) level?
- *Audience/Discipline?*: does the disciplinary foundation of the framework create a particular likely audience for impact assessment results?
- *Resource Requirements?*: typically, how costly is ICT4D impact assessment using this framework in human and financial terms?
- *Generalisability From One Project?*: to what extent can you generalise about the impact of ICT4D from the assessment of one project using this framework?
- *Comparability Across Projects?*: if you are using this framework to assess impact of several ICT4D projects, to what extent can you compare the results between projects?

Table 2 can be used in various ways. Just picking a few examples:

- If you are committed to participatory methods, you can select a framework that allows such an approach.
- If your impact assessment team is multi-disciplinary, you can select a framework that is appropriate to this mixture.
- If your resources are constrained, you can avoid the high-requirement frameworks.
- If you are undertaking a multi-project assessment, you can select a framework that provides at least some degree of comparability.

	1 *Cost-Benefit Analysis*	2 *Project Goals*	3 *Communications-for-Development*	4 *Capabilities (Sen) Framework*	5 *Livelihoods Framework*	6 *Information Economics*	7 *Information Needs/Mapping*	8 *Cultural-Institutional Framework*	9a *Enterprise (Variables)*	9b *Enterprise (Relations)*	9c *Enterprise (Value Chain)*	10 *Gender*	11 *Telecentres*
Primary/Secondary?	Mixed	Primary Typically Required	Primary Typically Required	Primary Required	Primary Required	Primary Required	Primary Required	Primary Required	Primary Required	Primary Required	Primary Required	Primary Required	Primary Required
Data-Gathering Methods?	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Interviews Plus	Multiple	Multiple
Participatory?	Not likely	Possible	Rarely	Possible	Possible	Not likely	Possible	Possible	Possible	Rarely	No	Typical	Possible
Quasi-Experimental?	Possible	Possible	Typical	Possible	Possible	Possible	Not likely	Rarely	Possible	Possible	Rarely	Rarely	Possible
Quantitative/Qualitative?	Quantitative	Either	Either	Either	Either	Both	Mainly Qualitative	Typically Qualitative	Both	Both	Both	Both	Mixed
Multi-Disciplinarity?	Not	Possible	Limited	Possible	Possible	Limited	Unlikely	Possible	Possible	Possible	Unlikely	In Theory	Possible
Timing?	Either	Either	Either	Either	Either	Longitudinal	Preferably Longitudinal	Either	Either	Either	Quasi-Longitudinal	Either	Either
Level?	Typically Meso	Mainly Micro	Micro	Mainly Micro	Multiple Micro/Meso	Typically Meso	Micro and/or Meso	Micro or Meso	Micro	Micro	Micro and/or Meso	Micro and/or Meso	Multiple Micro/Meso
Audience/Discipline?	Multiple	Any	Communications for Development	Development Studies	Development Studies	Economics	Information Systems	Varied	Business Studies	Business Studies	Business Studies	Gender Studies	Varied
Resource Requirements?	High	Variable	Variable	Variable	Variable	High	Relatively High	Variable	Variable	Moderate-to-High	Relatively High	Relatively High	Varied
Generalisability From One Project?	Possible	Limited	Fairly Good	Limited	Limited	Moderate	Limited	Poor	Modest	Limited	Moderate	Moderate	Possible
Comparability Across Projects?	Possible	Limited	Some	Variable	Variable	Rather Limited	Possible	Poor	Fair	Fair	Moderate	Fair	Possible

Table 2: Methodological Overview of ICT4D Impact Assessment Frameworks

Impact Assessment Frameworks

ICT4D Impact Assessment Frameworks Compendium: Entry 1
1. Cost-Benefit Analysis (CBA)

Identifies and quantifies the costs and benefits of ICT4D projects and offers a logical and consistent framework of data analysis that facilitates assessment, decision-making and cross-project comparison. By making explicit link between inputs and outcomes including assumptions, it adds rigour to impact evaluation. Should probably be used more than it is in ICT4D IA, though probably as one part of a more comprehensive assessment approach.

The Framework
CBA can be used to conduct ex-post financial evaluation of implemented projects and/or ex-ante evaluation of alternative investments. Its basic tenet (especially in the context of ex-post evaluation) is to assess the financial sustainability and cost-effectiveness of ICT4D projects. The CBA framework uses traditional financial analysis and summary tools such as net present value, discounted cash flow or breakeven point to demonstrate the worth of ICT4D projects once they are implemented. It is both a decision making (such as continuity, scalability) and communication tool. The following figure summarises the generic process of a post-hoc cost-benefit analysis
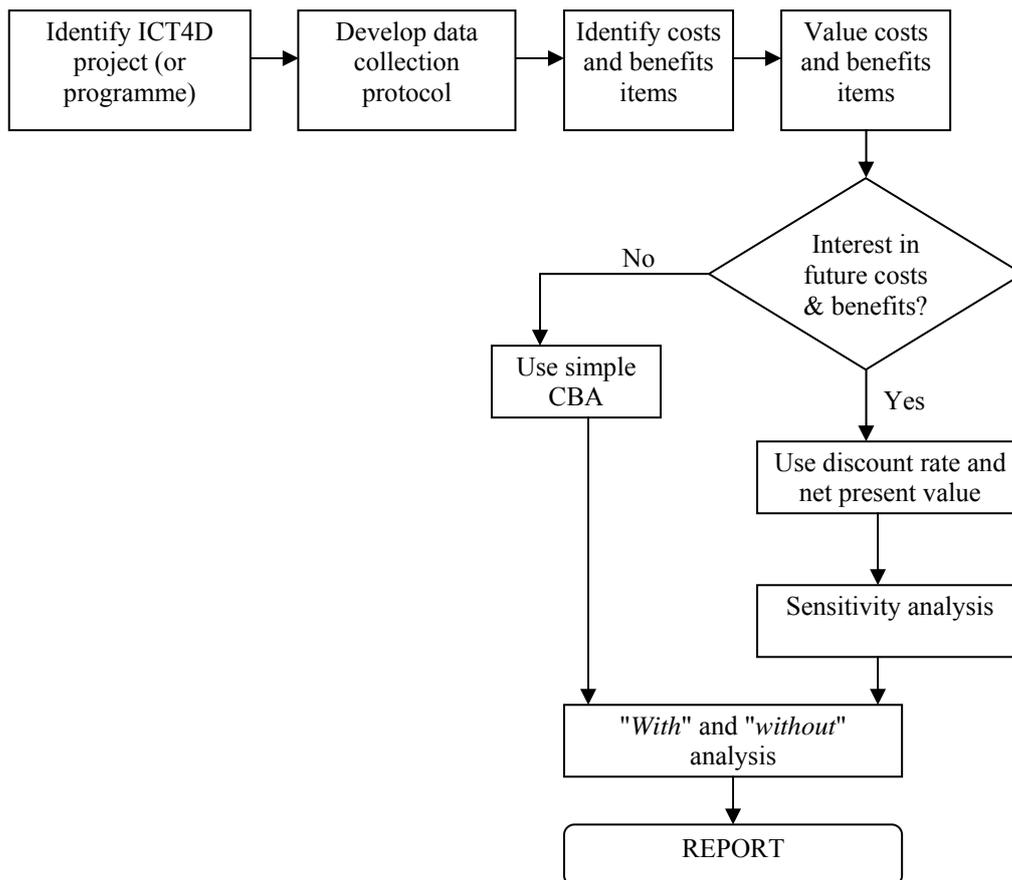
The basic elements in CBA therefore are:

Cost item identification and valuation: identify the one-off (initial) and recurring (variable) expenses related to the ICT4D project under assessment:

- Examples of one-off costs might include ICT hardware and software, building renovation, other physical infrastructure costs, initial training, set-up costs, etc.
- Recurring costs can be Internet subscription, stationery and other consumables, maintenance, phone connection costs, utilities, staff salary, etc.
- In addition, there may be disbenefits associated with ICT4D such as loss of income/financial benefits for particular groups. These would include opportunity costs – the income-/benefit-generating activities stakeholders could have been undertaking if they had not invested their time in the ICT4D project.
- All of these costs are tangible but there are also intangible costs such as time invested by unpaid stakeholders e.g. by villagers in learning about and using the ICT (though opportunity cost calculations may cover some of this); and even less quantifiable disbenefits such as the ability to access pornography, or perceived negative changes to communication patterns within a community.

Benefit item identification and valuation: itemised monetary values of the direct and indirect gains (both tangible and intangible) as a result of the expenditure. Direct benefits tend to fall into two camps:

- Income generated either from using and/or selling the services of the ICT4D.
- Time/money saved from using the ICT4D.

These can be used to calculate *consumer surplus* value (see Variant 5 below). Indirect benefits are impacts on the wider community such as empowerment, equity, participation, feeling of inclusion, skills upgrade, etc related to the outcome of the project. To identify indirect (and often intangible) benefits, explore (identify and value) if the project has made the following opportunities possible.

- *Value linking*: benefits that are received in communities outside the main target of the project. This helps to capture the effects of network externalities.
- *Value acceleration*: benefits brought on more quickly as a result of a project (for example literacy).
- *Value restructuring*: benefits received by restructuring the efforts of direct beneficiaries from lower-to-higher value activities (social outsourcing).

These two activities provide the foundation for a comparison of costs and benefits. Beyond these basics, some CBA may use other techniques. The following are particularly used where there is an interest in <u>future</u> costs and benefits:

- ***Discount rate***: if there is a concern to include future costs and benefits, then an adjustment – the discount rate – can be used to convert all future costs and benefits into present-value terms. Normally, this rate is determined by the prevailing bank interest rate (for an example, see Kumar 2004). It represents the opportunity cost that will be foregone if the capital had been invested at least in an interest bearing bank account.
- ***Decision rule***: a number of models can be used to provide a summary of cost-benefit analysis and aid decision. For example:
  - *Payback period*: refers to the time it takes for a project to break even and cover its costs. It is a simple ratio of total cost to total benefit for a given period. Ex-post pay-back can be calculated.
  - *Net present value*: expresses the net worth of a project in present value. To estimate this, future benefits (cash flows) will be adjusted by the discount rate and the initial investment is deducted from the total discounted cash flow. A positive NPV indicates that the project is economically sustainable.

For further details and other methods, see CoA (2006a and 2006b).

- *Sensitivity analysis*: future estimates of costs and benefits cannot be known for certain. To account for such risks, a sensitivity analysis (for example, see Kumar 2004) can be undertaken, which models various "what if" scenarios looking at different possibilities (e.g. what if fewer clients pay for the service than anticipated? What if maintenance costs are higher than anticipated?).

One can also include:
- *"With" versus "without" analysis*: to better understand the impact of an ICT4D project using CBA, one can undertake a "*with"* versus "*without"* analysis. This compares the ICT4D project with its counterfactual, i.e. seeing the impact of the project as the difference between what the situation looks like with and without the ICT4D intervention (for an example, see Kumar 2004).

SW Analysis

Strengths
- Provides a simple, quantified and (though see below) relatively objective summary of ICT4D project impact. Analysis results are easy to interpret and communicate.
- Useful for evaluating the financial performance and/or sustainability of ICT4D projects. Particularly relevant where ICT4D is associated with income generation – e.g. clients pay a fee for services, or ICT4D directly enables income-generating enterprise.
- Provides clear guidance for typical post-assessment decisions. On sustainability, guides on whether project is and/or will be financially self-sustaining. On upscaling, guides on value and cost of rolling out similar projects. On redesign, guides on areas to reduce costs and maximise benefits.
- CBA principles and practice are well established. Substantial guidance and free on-line tools for doing generic CBA are available.
- CBA can also be used for ex-ante evaluation of projects.

Weaknesses
- CBA indicates only the financial (or financialisable) performance of ICT4D projects and is not generally appropriate for evaluating social, political, institutional and technological issues. Partly as a result, it is a technique – in ICT4D value chain terms – that is better at assessing outcomes than final developmental impacts.
- Identifying cost and benefit items and quantifying them is often very difficult and sometimes very subjective (especially for intangible costs and benefits).
- Although the types of impacts included as costs and benefits can be identified and estimated based on the specific content and context of the project, CBA is a rigid framework that does not readily lend itself to participation or adaptation.
- Behind the façade of objectivity, CBA can be quite subjective in what it includes/excludes and in its valuations. It can thus make assessment and related decisions a game of number-crunching that is out-of-touch with the complexity of the project and the lives of those it touches. CBA can also be misused to serve vested interests, such as those to continue or discontinue funding an ICT4D project.

Methodological Summary

Cost-Benefit Analysis		
Primary/Secondary?	Mixed	Very simple CBA might be assessable from secondary data, but primary will be required for any full assessment that includes the full range of costs and benefits (including intangibles and disbenefits)
Data-Gathering Methods?	Multiple	Market data, historical data, business transaction documents, outputs from accounting systems, focus group, interviews, and survey are all used
Participatory?	Not likely	Although community can participate in the identification and estimation of the monetary values of cost and benefit items, mostly CBA requires expert assessment
Quasi-Experimental?	Possible	"With" or "without" analysis is possible although not often used (see Lobo and Balakrishnan 2002)
Quantitative/Qualitative?	Quantitative	Analysis of CBA is quantitative although qualitative data collection techniques can be used in cost and benefit identification and estimation
Multi-Disciplinarity?	Not	Predominantly economic
Timing?	Either	Longitudinal or cross-sectional
Level?	Typically Meso	Tends to be assessed at ICT4D project (or programme) level
Audience/Discipline?	Multiple	Widely understood by project managers, governments and decision makers
Resource Requirements?	High	Requires competency and experience in financial modelling and analysis
Generalisability From One Project?	Possible	Even if analysis is specific to a project, findings can be generalised to other projects that share the same cost and benefit structure
Comparability Across Projects?	Possible	By making the links between inputs and outcomes explicit, it facilitates cross-project comparison.

Method Recommendations
- Develop a thorough understanding of the ICT4D project cause and effect chain.
- Identify all the positive and negative aspects of a project and group them into similar categories.
- Gather data, estimate and quantify in monetary terms the cost and benefit items identified.
- In addition to experts and historical data, involve beneficiaries in the evaluation of the value of benefits and costs (disbenefits) accrued to them as a result of the project.
- Avoid double counting. For example if an appropriate cost is allocated against the time invested by unpaid stakeholders, there should not also be an opportunity cost counted for that time.
- When costs are measurable in terms commensurate with benefits, use cost-benefit analysis. Otherwise, use cost-effectiveness analysis as per Variant 1
- Identify stakeholders and allocate costs and benefits to them – one should always ask "A cost for whom?"; "A benefit for whom?".
- Differentiate internal and external CBA (see Variant 3).
- Overall, a very useful part of ICT4D impact assessment.

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  >> Provides a comprehensive framework for evaluation of ICT4D telecentre project costs but does not cover the benefits side of the equation.
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  >> Provides (p307) a checklist for telecentre costs (start-up and operating) and revenues

Variants

1. *Cost-Effectiveness Analysis*. This is a technique used where costs can be measured but it is hard to assign a financial value to benefits. Cost-effectiveness analysis measures the cost of delivering a particular impact; typically comparing the costs of different approaches (e.g. with or without ICT4D). For example, Khelladi (2001) – see summary below – compares the cost effectiveness of five different alternatives for connecting two million mid/low-income Salvadorians to the Internet. The alternatives range from a basic 10-PC telecentre up to a full-service 20-PC telecentre. They share some fixed costs but then vary on other setup costs. On this basis, calculates that the full-service 20-PC telecentre will be most cost-effective in terms of cost per PC. See also Potashnik & Adkins (1996) – see Bibliography above.

2. *Quasi-Experimental Approach*. This compares the costs and benefits – as per the with/without analysis suggested above – of those involved with the ICT4D projects versus those not involved. A cut-down example is that of Lobo & Balakrishnan (2002), which focuses only on benefits not costs. It compares benefits (e.g. time taken for service, quality of service, user satisfaction) between groups served versus non-served by an e-government service kiosk scheme. See summary below.

3. *Internal and External CBA*. This separates out two different CBA calculations. The internal CBA looks at the costs and benefits from the perspective of the ICT4D application – e.g. the costs of setting up a telecentre vs. the income it generates. The external CBA looks at the costs and benefits from the perspective of ICT4D users – e.g. the time/financial costs vs. the time/financial savings plus income generated from using the ICT4D.

4. *C- or B-Only*. Some impact assessment studies focus only on the costs and not the benefits (e.g. Shakeel et al 2001 – see Bibliography above). Others focus only on the benefits and not the costs (e.g. Lobo & Balakrishnan 2002 – see summary below).

5. *Consumer Surplus*. Consumer surplus is the difference between what a user actually pays for an ICT4D service and what they would have been willing to pay. It typically relies on calculating the true financial value/benefit through some alternative means other than price. For example, the consumer surplus for communicating information (e.g. via phone or email) is often calculated by assuming the true value is represented by the cost of the journey for which that communication substitutes. That true value is calculated in terms of the wages lost (because of the time taken for the journey) and the actual cost of transportation. The consumer surplus (i.e. additional value/benefit) of communication is then = Cost of wages foregone + Cost of transport – Price paid for communication. See Richardson et al (2000) – Appendix 11.

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  http://www.telecommons.com/villagephone/finalreport.pdf

Alemayehu Molla & Richard Heeks

Examples of Use – *Cost-Benefit Analysis*

Cost-Benefit Analysis Example 1: *Khelladi*	Comment	Reference
	Fairly detailed lists of direct cost and benefit items. A simple report and estimation of revenues and costs and calculation of future profits. A rather premature ex-post evaluation of the cost-effectiveness of introducing telecentres (infocentros).	Khelladi, Y. (2001) *The Infocentros Telecenter Model*, World Resources Institute, Washington, DC http://www.nextbillion.net/files/Infocentros.pdf Impact assessment report; Open Access; 24 pages

Focus and Level	Method	Framework Application
• Application – telecentres in El Salvador that aim to increase mid/low-income users' access to the Internet • Impact level – ICT4D project	• Research Resource – No clearly specified method of data collection and data source. • Primary – Some interviews with infocentros officials. • Secondary – Transaction and performance records from five infocentros. • Other – Cross-sectional; Quantitative (in terms of cost comparison and revenue estimation); Not participatory	• *Emphasis*: ex-post assessment • *Cost identification and valuation*: only direct and tangible costs • *Benefit identification and valuation*: only revenue streams from providing service • *Discount rate*: not applied • *Decision rule*: a simple cost analysis and comparison with revenue • *Sensitivity analysis*: not included • *With versus without analysis*: not undertaken

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
Very limited detail on how to collect data, how to identify costs and benefits and how to value them. Fair on the summary of data to show cost estimation.	Simple link of ICT4D to selling ICT services. Very weak link to show the actual values of using the infocentros from the beneficiaries' perspective. Makes claim that project was instrumental in building human capacity and creating technological awareness.	• Infocentros are economically sustainable and would break even in 18 months. • Premature evaluation of the project (five months after implementation) did not enable observation of outcomes and social development impact of the infocentros on the user community. • There is a time-lag factor to observe ICT4D impacts. • Community-based content and service and public-private partnership are critical for the financial sustainability of infocentros. • Income generating (cost-recovery) ICT4D projects should have a sound revenue model beyond access charges to make them financially sustainable.
Baseline/Counterfactual	**Value Chain Stage(s)**	
No baseline and no with/without counterfactual analysis.	Main focus is on Output (facilities and services) and Outcome (economic rents generated for the infocentros as a result of communities' use of the centre's outputs) rather than impact of ICT4D projects.	

Cost-Benefit Analysis Example 2: *Kumar*	**Comment**	**Reference**
	A very good analysis of the potential for the sustainability of village-internet kiosks (eChoupals) in India. Note ideas on triangulation and validation of cost and benefit estimates and necessary assumptions. Very good consideration of discount rates and application of sensitivity analysis.	Kumar, R. (2004) eChoupals: a study on the financial sustainability of village Internet centers in rural Madhya Pradesh, *Information Technologies and International Development*, 2(1), 45-73 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752043971161 Refereed journal article; Open Access; 29 pages
Focus and Level	**Method**	**Framework Application**
• Application – village Internet kiosks in rural India supporting trading of soybeans • Impact level – ICT4D project	• Research Resource – One independent researcher for 19 days • Primary – Formal and informal interviews with owning company personnel and managers, eChoupals operators, farmers, traders and villagers using the eChoupals. Group discussions in social places. • Secondary – Transaction data from eChoupals • Other – Cross-sectional; Quantitative and qualitative; Not participatory	• *Emphasis*: ex-post sustainability evaluation • *Cost identification and valuation*: direct and tangible costs • *Benefit identification and valuation*: only uses transaction cost savings and improvement in procurement quality benefits • *Discount rate*: both base and risk adjusted discount rate applied • *Decision rule*: net present value and payback period • *Sensitivity analysis*: the effect of several risk elements on the profitability of the project is analysed • *With versus without analysis*: compares the cost of transactions (trading) with and without the project •
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
One page on data collection and triangulation procedure. Good detail on assumptions as well as calculations of revenues. No appendix of interview protocol.	An indirect link of ICT benefits (through enabling soybean trading) to economic sustainability. Weak link to social development of beneficiaries.	• Village internet kiosks (eChoupals) are economically sustainable and can reduce trading costs. • Source of economic sustainability lies in the value-added services they offer (i.e. integrating ICT in the process of agricultural product trading rather than from the ICT alone). • Prevailing socio-cultural and political structures of a community can mediate the social and developmental impact of financially sustainable telecentres.
Baseline/Counterfactual	**Value Chain Stage(s)**	
Compares the cost of transactions with and without using the project to show the benefit (impact) of the project.	Main focus is on Output (facilities and services) and Outcome (economic rents generated for the eChoupals and the owning company) rather than impact on the lives of farmers and villagers.	

Cost-Benefit Analysis Example 3: *Lobo & Balakrishnan*	**Comment**	**Reference**
	Not cost-benefit analysis but just benefit analysis, of which this is a very good example related to e-government services via kiosks. Detailed description of report card methodology in user benefits analysis. Rather narrow definition of benefits. Does not quantify (value) all benefit items. A good example for conducting quasi-experimental work.	Lobo, A. & Balakrishnan, S.(2002) *Report Card on Service of Bhoomi Kiosks: An Assessment of Benefits by Users of the Computerized Land Records System in Karnataka*, Public Affairs Centre, Bangalore. http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN015135.pdf Impact assessment report; Open Access; 14 pages

Focus and Level	**Method**	**Framework Application**
• Application – E-government services via computerised kiosks in rural Karnataka, India • Impact level – Individual beneficiaries, and ICT4D project	• Research Resource – A paid (by World Bank) research team from a commercial market research agency; unclear how long taken • Primary – Surveys and interviews of users and non-users (control group) of Bhoomi Kiosks. 198 users from six districts and 59 non-users from four districts. Utilises report card approach to obtain user feedback. 12 structured interviews. • Secondary – None stated • Other – Cross-sectional; Mainly quantitative but interviews have helped for qualitative interpretation; Not participatory.	• *Emphasis*: ex-post sustainability evaluation • *Cost identification and valuation*: not applied • *Benefit identification and valuation*: tangible and intangible benefits identification. Not all benefits are converted to a common monetary value. • *Discount rate*: not applied • *Decision rule*: not applied • *Sensitivity analysis*: not applied • *With versus without analysis*: compares users and non-users of the project

Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
A paragraph summary of study design. A well detailed description of report card methodology. Provides instruments used for collecting the data.	Assumes a direct link between ICT4D usage and user outcomes (benefits).	Use of this ICT4D project has: • Saved users significant time (both in waiting and frequency of visit) for getting land certificates . • Facilitated direct access to services which has significantly reduced the need for paying bribes. • Increased transparency which has also reduced corruption. • Improved the accuracy and quality of service to citizens. • Reduced the complexity involved in accessing government services.
Baseline/Counterfactual	**Value Chain Stage(s)**	
Compares users and non-users of project to demonstrate benefits derived from ICT4D project.	Main focus on Outcomes and Development Impacts for users.	

ICT4D Impact Assessment Frameworks Compendium: Entry 2
2. Project Goals

Assesses the ICT4D project against the particular goals that were set for that project. Therefore very sensitive to the particular priorities and context of an individual project, but giving no specific guidance on methods and poor in terms of cross-project comparison.

The Framework
The "framework" as such is painfully simple:

1. Identify ICT4D Project Goals	→	2. Identify Indicators to Measure Goal Achievement	→	3. Identify Appropriate Methods to Measure Indicators	→	4. Measure Indicators and Assess Goal Achievement
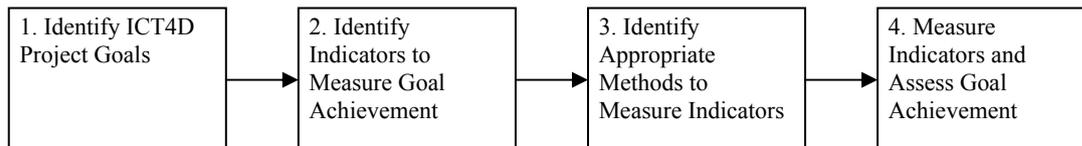
1. Project goals will be found in project documentation, though one may also broaden this to discuss with project stakeholders what their pre-project goals were.
2. Indicators may also have been pre-determined. If not they are created by the assessors, possibly drawing on other project cases and/or participative discussion.
3. Appropriate methods can be identified from the literature (see e.g. Batchelor & Norrish 2005).

SW Analysis

Strengths
- Single-minded concern with ICT4D project impact
- Simple, clear approach
- Matched to the priorities and focus of each individual ICT4D project
- Flexibility in methods used
- Can help provide a consistent approach across a cluster of same-programme ICT4D projects if the programme has some overarching goals

Weaknesses
- Of itself provides little guidance on methods
- Limited comparability across projects
- Only as good as the specification of project goals
- May exclude some significant project impacts if they were not specified project goals

Methodological Summary

Project Goals Framework		
Primary/Secondary?	Primary Typically Required	In order to judge the achievement of specific goals
Data-Gathering Methods?	Multiple	Not pre-determined – depends on project goals
Participatory?	Possible	Could include discussion of stakeholder goals and indicators, including meta-analysis of goals
Quasi-Experimental?	Possible	E.g. compare community ICT4D users vs. non-users
Quantitative/Qualitative?	Either	Not pre-determined – depends on project goals
Multi-Disciplinarity?	Possible	Not pre-determined – depends on project goals
Timing?	Either	But typically cross-sectional at some point after project delivery
Level?	Mainly Micro	Not pre-determined – depends on project goals
Audience/Discipline?	Any	Not pre-determined – depends on project goals
Resource Requirements?	Variable	Not pre-determined – depends on project goals
Generalisability From One Project?	Limited	Necessarily because of the project-specific nature of the approach
Comparability Across Projects?	Limited	Necessarily because of the project-specific nature of the approach

Method Recommendations
- Consider for ICT4D projects funded under a single programme.
- Plan timing carefully: too soon after project implementation and true impacts/sustainability have not yet emerged; too long after project implementation and may be growing number of exogenous influencing factors.
- Overall, of limited value for most multi-project assessments. Much more appropriate for single project assessment.

References
- Batchelor, S. & Norrish, P. (2005) *Framework for the Assessment of ICT Pilot Projects*, InfoDev, World Bank, Washington, DC http://www.infodev.org/en/Publication.4.html

Variants

1. *Broadening of Goal Analysis*. To provide some greater consistency, one can broaden out the assessment of impact to cover a defined set of wider goals. Batchelor & Norrish (2005) provide an example of this. Alongside assessing achievement of project purpose (i.e. goals), they also ask "research" questions – first in terms of achievement of wider (Millennium Development) goals; second in terms of likely scalability of the ICT4D project.
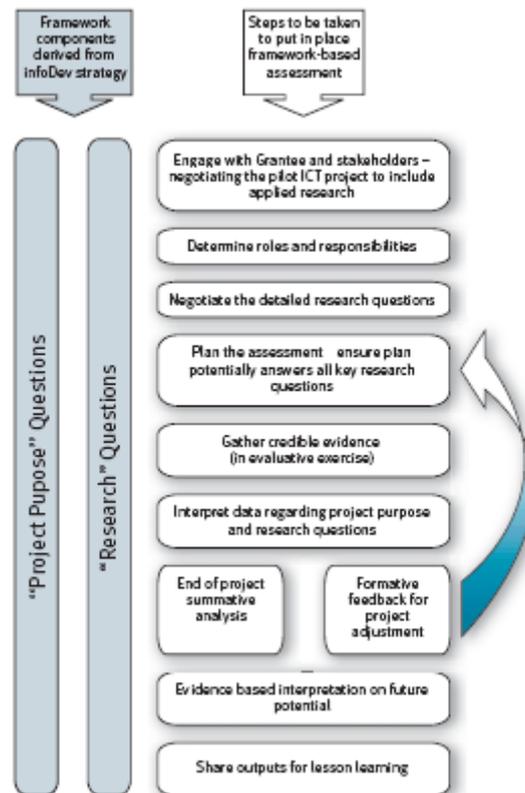
2. *Meta-Analysis of Goals*. This stands back and asks not just whether or not the specific ICT4D project goals have been achieved, but whether or not those were the right goals to set in the first place (and, perhaps also, how those goals came to be set). Can be undertaken in a participatory manner with project stakeholders.

Richard Heeks

Examples of Use – *Project Goals*

Project Goals Example 1: *Ballantyne*	Comment	Reference
	A very clear example of assessing an ICT4D project against its goals. Provides more an example rather than any good practice guidance, and notes difficulties of assessing post hoc when goal indicators and data-gathering methods have not previously been thought through.	Ballantyne, P. (2004) *Evaluation of Swedish Support to SchoolNet Namibia*, SIDA, Stockholm http://www.sida.se/sida/jsp/sida.jsp?d=118&a=3077&language=en_US Impact assessment report; Open Access; 54 pages

Focus and Level	Method	Framework Application
• Application – impact of Internet access provided to 350 schools in Namibia, urban and rural • Impact Level – individual users and schools	• Research Resource – One paid research consultant for three weeks • Primary – Interviews with 26 project staff plus observation and discussions in 9 schools. • Secondary – Project documentation • Other – Cross-sectional; Qualitative and (a little) Quantitative; Not participatory	Draws out four project goals as stated in project documentation: a) installing basic (Internet connected) LANs in secondary schools, b) reaching a high level of Internet usage by learners and teachers, c) enhancing basic computer skills of learners and teachers, and d) create a recruitment pool for IT technicians and professionals. Also assesses performance on broader development goal: e) improve the preconditions for education and for the gathering of knowledge and participation in a democracy for the country's youth through broadened horizons and a higher level of knowledge by using the possibilities of cheap and simple communication that ICT offers

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
Limited – about one page. No research instruments provided.	Goals are largely about access, skills and usage not impacts of ICTs, so causal link is to project not to ICTs.	Assessment of goal achievement: a) Network connections: about one-third of target connected but preconditions exist for many more connections. b) Internet usage: quite wide variations with some schools at high level; need more training and more Internet-oriented school activities. c) Basic computer skills: many are being trained but only where an enthusiastic individual is helping, not due to SchoolNet project d) Create IT recruitment pool: some young people to have IT skills; more training is needed but this goal may not be a core task for SchoolNet project e) Education, knowledge and democracy: a vague goal with unclear indicators and only limited evidence available about progress Recommends clearer project goals with explicit indicators.
Baseline/Counterfactual	**Value Chain Stage(s)**	
No consideration of counterfactual or comparators. No significant coverage of baseline except implicitly as foundation on which project goals improve.	Main focus on Inputs (skills), Availability (access) and Use; not on Impacts (which were hard to judge given lack of clarity and data on impacts sought).	

Project Goals Example 2: *Batchelor & Norrish*	**Comment** Not assessment of an individual project, but description of an assessment framework for ICT4D pilot projects. The approach is quite generic, with relatively little that is ICT4D-specific, but would provide a useful overall framework.	**Reference** Batchelor, S. & Norrish, P. (2005) *Framework for the Assessment of ICT Pilot Projects*, InfoDev, World Bank, Washington, DC http://www.infodev.org/en/Publication.4.html Guidance report; Open Access; 78 pages
Focus and Level	**Method**	**Framework Application**
• Application – ICT pilot projects in general, not any specific project (though Annex 7 provides hypothetical application to ICT project for women in Indian community) • Impact Level – variable depending on project	• Research Resource – Not applicable (variable) • Primary – Not applicable (but would generally be required) • Secondary – Not applicable (though Annex 7 example is done via secondary sources) • Other – Not applicable (could be any)	As described in variant 1, this takes a core focus on achievement of project goals – which are grouped into four types (Enabling environment; Take-up/provision of ICTs; Service delivery efficiencies; and Direct livelihoods effect) – but broadens that in two ways. First, by also asking about broader issues around project goals: • Other impacts: both longer-term and unintended • Relevance: of project goals to stakeholders' needs • Sustainability: of delivering goals • Causes: of delivery of project goals in terms of processes and context Second, by asking broader "research" questions on • MDG delivery: impact both on MDGs and on deeper changes in economic growth and governance • Scalability: or replicability of project
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Six pages of discussion about different methods that could be applicable within the framework for evaluating impact on four main project goal types: enabling environment; take-up/provision of ICTs; service delivery efficiencies; and direct livelihoods effect. Annex 9 provides a detailed checklist of ICT4D project assessment questions.	Not considered in particular detail.	Not provided since this is a framework rather than assessment of an individual project.
Baseline/Counterfactual	**Value Chain Stage(s)**	
Does recommend specific investigation of baseline (and is relatively weak on suggesting how to handle situations without baseline data).	Main focus on Impact, with some consideration of Implementation and Uptake issues (esp. Sustainability and Scalability)	

ICT4D Impact Assessment Frameworks Compendium: Entry 3
3. Communications-for-Development

Conceptualises a clear and direct relationship between the information communicated by an ICT4D project, and changes in development-related individual behaviour. Mainly undertaken using a positivist, survey-based approach that requires identifying users who have different levels of exposure to communicated information. Overall, a strong contender for a core model in understanding the micro-level impact of ICT4D projects.

The Framework
If there is a typical communications studies framework then, at least from the mass communications literature, it is some variant on the ICT4D value chain that makes up the "Communications-for-Development" (C4D) model (adapted from Bertrand et al 2006):
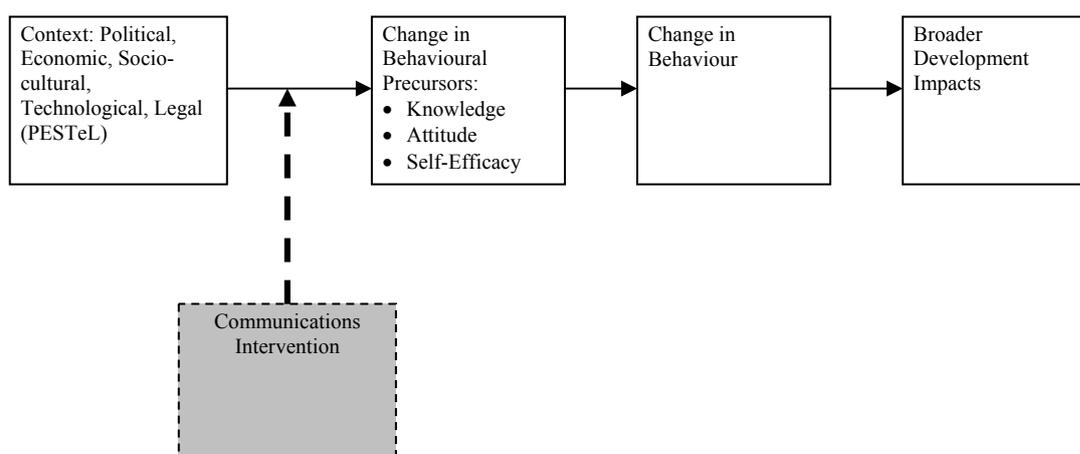
The main cause-effect line acts as follows:
- Independent variable: Communications intervention
- Intermediate variables: Behavioural precursors
- Dependent variable: Behaviour

Impact assessment therefore involves studying how variations in the independent variable (i.e. different levels of exposure to communication of information) impact the dependent variable (e.g. in terms of different behaviours such as health, agricultural or educational practices).

Of course, this could be a generic model for testing the impact of any type of intervention. However, it is particularly applicable to (mass) communications-oriented projects because such projects often develop content that has the specific intention of altering behavioural precursors: of increasing knowledge; of changing attitudes; of improving perceived self-efficacy.

The core, then, is the notion that communication of information (e.g. via ICT4D projects) can change the behaviour of recipients.

Extending the Framework
We can then connect this more directly to information, communication and behaviour using the DIKDAR model (adapted from Heeks 2005). This is a reminder that communication alone is insufficient to cause behavioural change. In addition to communication of data, ICT4D project users need:
- **Information Resources**: Data, not information, is communicated. To turn the communicated data into useful information and then into behavioural precursors, ICT4D

project users need money, skills, motivation, confidence, trust and knowledge in order to access, assess and apply the processed data they get from the ICT4D system.

- *Action Resources*: Behaviour means human decisions and actions. ICT4D project users require hard resources such as money, technology and raw materials plus soft resources like skills and empowerment in order to turn their decisions into actions.

A communications-for-development assessment approach may thus also investigate the presence or absence of those information and action resources, and the extent to which the ICT4D project has or has not helped develop those resources.
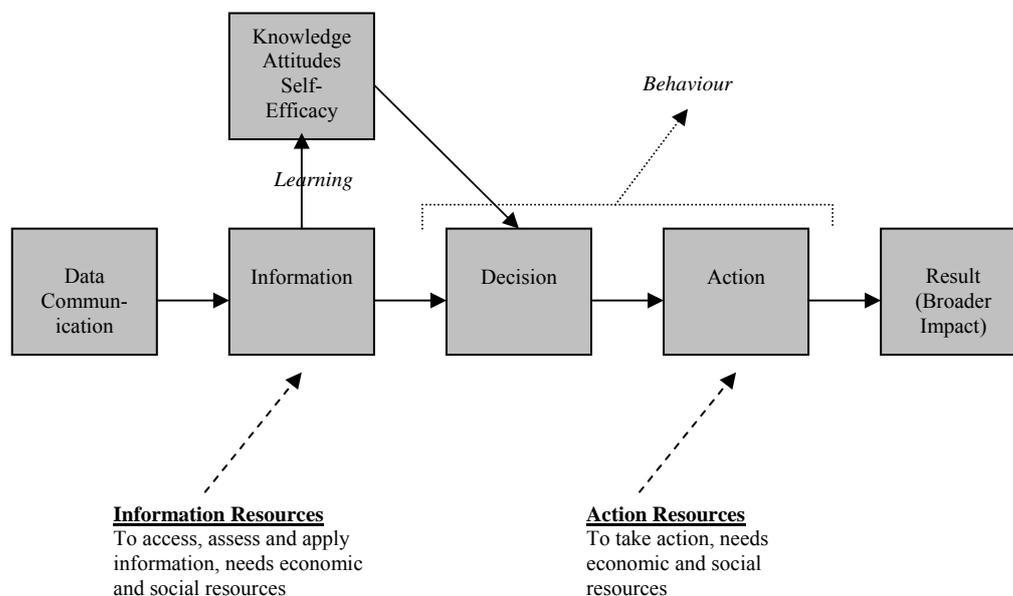
SW Analysis

Strengths
- Simple model with clear connection between information and development
- Avoids dangers of techno-centrism by focusing on information/communications, not on technology
- Readily usable with positivist survey approach (though also usable with other epistemologies and methods) that provides rigour and generalisability
- Forces a focus on what difference in human behaviour the ICT4D project is seeking

Weaknesses
- Main application to date has been mass communications (i.e. mass, multiple media) campaigns rather than ICT4D projects
- Main application to date has focused on health-related behaviour rather than all MDG- or broader development-related behaviour
- Ideally needs presence of different groups with different levels of exposure to communication
- Difficulty of eliminating conflating causes, and of directly measuring some behaviour changes
- Top-down and pre-determined in its interests, and may thus fail to understand deeper political and sociological aspects to communication

Methodological Summary

Communications-for-Development Framework		
Primary/Secondary?	Primary Typically Required	In order to judge changes in individual behaviour
Data-Gathering Methods?	Multiple	Most studies use surveys, but all other methods could be incorporated
Participatory?	Rarely	Could be potential but appears little used so far in practice except in Variant 2
Quasi-Experimental?	Typical	Strong emphasis in many studies on comparing those exposed vs. not exposed to communication
Quantitative/Qualitative?	Either	But most studies to date are quantitative
Multi-Disciplinarity?	Limited	Most work draws from the psychological tradition underpinning the models above
Timing?	Either	But typically cross-sectional at some point after project delivery
Level?	Micro	Because of focus on changes in individual behaviour
Audience/Discipline?	Communications for Development	Meaning there is a receptivity within development studies/agencies and also from ICT/information systems
Resource Requirements?	Variable	But typically fairly significant when adopting survey approach
Generalisability From One Project?	Fairly Good	Because of positivist, survey approach underpinning most work
Comparability Across Projects?	Some	Depends on consistency of the behaviours studied

Method Recommendations
- Use the control/quasi-control approach that identifies groups with/without exposure to communications (see Chesterton 2004), or with different levels of exposure to communications (see Meekers et al 2005).
- Multiple-method approaches (see Chesteron 2004) increase validity.
- Where possible, try to identify direct measures of behavioural change rather than indirect (e.g. self-reporting). Thus, for example, observational elements in data-gathering could help.
- Timing is critical with assessment of specific communications initiatives – assessment that is months or years later creates difficulties for respondents in recalling communication, behaviour changes, and any connection between the two.
- See also Bertrand et al (2006) (e.g. p593-594) on practice in design of communications impact assessment studies.
- Overall, a valuable model for assessing the impact of the communication of information in ICT4D projects.

References

- Bertrand, J.T., O'Reilly, K., Denison, J., Anhang, R. & Sweat, M. (2006) Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviors in developing countries, *Health Education Research*, 21(4), 567-597 http://her.oxfordjournals.org/cgi/reprint/21/4/567
- Heeks, R.B. (2005) *Foundations of ICTs in Development: The Information Chain*, Development Informatics Group, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/index.htm#sp

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- Myers, M. (2005) *Monitoring and Evaluating Information and Communication for Development (ICD) Programmes*, DFID, London http://www.dfid.gov.uk/pubs/files/icd-guidelines.pdf
  >>A very clear guide on the steps in both formative assessment (pre-project baseline and ongoing process evaluation) and summative assessment (post-project) of C4D projects, with brief reviews of different possible approaches and methods.
- Danida (2005) *Monitoring And Indicators For Communication For Development*, Danida, Copenhagen http://webzone.k3.mah.se/projects/comdev/_comdev_PDF_doc/Danida_ComDevt.pdf
  >>Particularly useful in suggesting measurement indicators for different types of communication project

Variants

1. ***Communication as a Process***. The C4D model focuses on ICT4D project actors as recipients of communicated data. However, ICT4D projects can also be assessed by seeing actors as communicators who are themselves transmitting data. There are two main ways this can be done:

- Functionalist: looking particularly at the way in which ICT4D changes the quantitative and qualitative nature of the communication process. For example, Jagun et al's (2007) study of mobile telephony's impact in reducing communication costs and risks, but reinforcing existing structures of communication.
- Sociological: seeing communication as a performed practice within a social context. For example, Mosse & Nielsen's (2004) study which sees communication as functional but also as symbolic (performed "to present and legitimize a rational organization to external constituencies") and ritualistic (performed as a means to reinforce membership of a particular community). (See also Compendium entry on Cultural-Institutional Framework.)

2. ***Participatory/Social Change Approach***. The C4D model outlined above comes from the "behavioural change" tradition of communications-for-development. However, there are many other strands to C4D (Eldis n.d.; Waisbord 1999). In particular, there is a participatory, social change strand that sees the behavioural change approach as narrow, top-down, paternalistic and individualistic. This strand instead seeks empowerment for communities as collectives to define what information they require, to seek out appropriate communications channels, and ultimately to control, own and manage their communication processes (Figueroa et al 2002). Being a much more bottom-up, participatory approach, its approach to impact assessment is in a similar vein. A set of very clear guides on impact assessment is available from Communications for Social Change:

- Figueroa et al (2002): provides indicators and questions for assessing seven key elements of social change: Leadership; Degree and equity of participation; Information equity; Collective self-efficacy; Sense of ownership, Social cohesion; Social norms
- Parks et al (2005) (abridged version – Byrne et al 2005): provides a full guide to the rationale and practice of participatory M&E in assessing communications projects

References
- Byrne, A., Gray-Felder, D., Hunt, J. & Parks, W. (2005) *Measuring Change: A Guide to Participatory Monitoring and Evaluation of Communication for Social Change*, Communication for Social Change, South Orange, NJ http://www.communicationforsocialchange.org/pdf/measuring_change.pdf
- Eldis (n.d.) *AIDS Communication Approaches*, Eldis http://www.eldis.org/index.cfm?objectId=0AFB67F0-0968-F6B3-F3C256364D594D3D
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http://www.communicationforsocialchange.org/pdf/familytree.pdf

Richard Heeks

Examples of Use - *Communications*

Communications Example 1: *Chesterton*	Comment	Reference
	Assesses impact of data communicated via traditional not digital ICTs. Strongest element is comparison of exposed vs. non-exposed groups. Does provide good detail on methods.	Chesterton, P. (2004) *Evaluation of the Meena Communication Initiative*, UNICEF, Kathmandu http://www.unicef.org/evaldatabase/files/ROSA_2004_800_Meena_Comm_Initiative.pdf Impact assessment report; Open Access; 106 pages
Focus and Level	**Method**	**Framework Application**
• Application – multi-channel (radio, TV, adverts, etc) initiative in Bangladesh, India, Nepal, Pakistan based around a young girl, Meena, and focused on improving rights, skills, treatment and status of girls • Impact Level – individual recipients	• Research Resource – One paid research consultant for overview report, but research teams in each country for main data • Primary – Structured household surveys of more than 12,000 respondents plus focus groups, interviews, workshops • Secondary – Project documentation • Other – Cross-sectional; Quantitative (surveys) and Qualitative (other methods); Not participatory (though production of Meena materials has participative element with users, and media/UNICEF staff participated in development of survey)	There is no explicit communications model but the C4D model can be seen implicitly in the measuring of changes in knowledge, attitudes and behaviour ("life skills practices"). Latter measured indirectly by self-report rather than by direct observation or measurement.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Several pages of details. Includes a checklist of issues (though impact aspect makes up only a few lines). No instrument but example questionnaire can be found at: http://www.un.org.np/reports/UNICEF/2003/Evaluation_of_the_Meena_Communication_Initiative-2003.pdf	Recognises problems of potential conflation of causes given other parallel projects, thus relies on respondents perceptions of the specific impact of the initiative.	• Varied awareness of project messages – highest for hygiene (e.g. hand-washing); lowest for rights-related (e.g. dowry control) • Ongoing importance of human advocates (parents, teachers, friends, etc) in acting as sources of messages (and thus in mediating impact of communication). Little direct evidence of project as source of changing knowledge/attitudes. • Self-reported behaviour changes as a result of project mainly around hygiene. • Some (small) evidence of greater attitude and behaviour change reported among exposed compared to non-exposed populations. • Supports the DIKDAR model in finding non-communication resources (poverty, culture, security) prevent conversion of communication to behaviour change (Also draws conclusions about the cost-efficiency and enabling/constraining factors of implementation. Recommends need to involve advocates, customise for specific audiences, and act on broader resources.)
Baseline/Counterfactual	**Value Chain Stage(s)**	
No baseline survey conducted. Limited data on exposed vs. non-exposed participants, but does exist.	Relatively even focus on Implementation, Uptake (inc. Sustainability), and Impact (mainly behavioural Outputs)	

Communications Example 2: *Meekers et al*	**Comment** A good model for rigorous analysis of communications impact using a positivist, mass before-and-after survey model, which also measures impact of different independent variable (level of communication) on typical C4D intermediate (attitudes, beliefs) and dependent (behaviour) variables.	**Reference** Meekers, D., Agha, S. & Klein, M. (2005) The impact on condom use of the "100% Jeune" social marketing program in Cameroon, *Journal of Adolescent Health*, 36, 530.e1-530.e12 Refereed journal article; Restricted Access; 12 pages
Focus and Level	**Method**	**Framework Application**
• Application – multi-channel (radio, magazine, advertisement, peer education show) adolescent reproductive health communication initiative ("100% Jeune") in Cameroon • Impact Level – individual recipients	• Research Resource – Dozens of paid researchers working over a period of c.2 x two weeks • Primary – Before and after household-based surveys of several thousand young people • Secondary – None • Other – Longitudinal (before and after); Quantitative; Not participatory	Implicitly based on the C4D model. Looks at both behaviour predictors (beliefs and attitudes about risks associated with sex, efficacy of condoms and self-efficacy) and actual behaviours (condom use). Predictors measured by attitude questions. Behaviour measured indirectly by self-report. Overall exposure levels calculated by defining high levels of exposure for each of four initiative elements (radio drama, radio call-in, magazine, peer educator) e.g. high = 10 or more shows listened to for radio drama. High exposure overall means high on two or more elements; Medium means high on one; Low means high on none.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Two pages on research methods, mainly about how to measure behaviour predictors and behaviour. No instrument but details of many questions provided.	Relatively good causal understanding generated by considering both before-and-after, and impact of differential levels of exposure to communications.	"Data for both males and females show that high levels of exposure to "100% Jeune" is associated with reduced shyness to obtain condoms, increased confidence in knowledge of correct condom use, and increased discussion of AIDS and other STIs with friends, even after controlling for other factors. Hence, it is likely that the "100% Jeune" program contributed to the trends in these predictors." (p530.e10)
Baseline/Counterfactual	**Value Chain Stage(s)**	However, no statistical link between exposure to communications and beliefs that condoms are effective for AIDS prevention, and actions such as use of condoms with casual sex partners. Thus somewhat contradictory assessment of communications impact except for self-efficacy and discussion of issues.
Baseline survey conducted before communications project. Counterfactual proxied by analysing impact of differing levels of exposure to project communications.	Main focus on Outputs (changed attitudes and behaviours).	

Communications Example 3: *Bertrand et al*	**Comment**	**Reference**
	Not assessment of an individual project, but a review of 24 other communications impact assessment studies. Useful in making the C4D model explicit, and in offering guidance on good practice in C4D impact assessment.	Bertrand, J.T., O'Reilly, K., Denison, J., Anhang, R. & Sweat, M. (2006) Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviors in developing countries, *Health Education Research*, 21(4), 567-597 http://her.oxfordjournals.org/cgi/reprint/21/4/567 Refereed journal article; Open Access; 31 pages
Focus and Level	**Method**	**Framework Application**
- Application – not an individual study, but a meta-review of 24 other studies of impact of (mass) communication projects on HIV-relevant behaviour in developing countries - Impact Level – individual recipients	- Research Resource – Unclear for individual surveys but must involve research teams working for some days/weeks - Primary – Before and after surveys of hundreds or thousands - Secondary – None stated - Other – Longitudinal (before and after); Quantitative; Not participatory	Explicit use of C4D model for this study. Measurement of three behaviour predictors ("psychosocial factors"): Knowledge about HIV transmission; Perceived risk of contracting; Self-efficacy on protection. And measurement of four behaviours: Discussion with others; Abstinence from sex; Reduction in high-risk sexual behaviour; Condom use. Where stated, individual studies use some variant of the C4D model based on communications leading to change in behaviour and its predictors/precursors.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Just a paragraph summary for each of the 24 studies on design, not methods. No instrument provided.	Relatively good causal understanding generated by considering both before-and-after, and impact of differential levels of exposure to communications.	"On most of the outcomes examined across studies, we found no statistically significant impact. Among those that did show significant impacts, the effect sizes—while often statistically significant—were typically small to moderate in size. However, on two of the seven outcomes, at least half of the studies did show a positive impact of the mass media: knowledge of HIV transmission [this increased significantly e.g. knowledge that you can't get HIV from using clothes or cups of a person with AIDS] and reduction in high-risk sexual behavior. [e.g. reduction in number of sexual partners]" BUT they note weak designs in some of the studies reviewed and the studies "do not capture the current state-of-the art for mass media campaigns for HIV/AIDS prevention....The current analysis did not include a single study that evaluated what communication experts would consider a comprehensive behavior change program: one that uses the full gamut of media"
Baseline/Counterfactual	**Value Chain Stage(s)**	
Studies were selected on the basis that a) they undertook both pre- and post-communication project surveys, and b) they made use of some control group or groups with different levels of exposure to analyse impact of different exposure to communications.	Main focus on Outputs (changed knowledge, attitudes, self-efficacy, and behaviours).	

ICT4D Impact Assessment Frameworks Compendium: Entry 4
4. Capabilities (Sen) Framework

Offers a way into human development paradigms (as opposed to those focusing on wealth-as-development), to help see how ICTs can contribute to freedom and empowerment. Quite a dense set of ideas that can be hard to understand and translate into practical evaluation terms.

The Framework
Development is the expansion of individual freedoms: "what the person is free to do and achieve in pursuit of whatever goals or values he or she regards as important" (Sen 1985: 203). What a person is free to do represents their *capabilities*; what they actually achieve represents their *functionings*. There are five areas of capabilities – of freedoms to achieve

- Economic: e.g. wealth is a freedom; employment is a freedom
- Political: e.g. democratic participation or freedom of speech
- Social: e.g. literacy or computer literacy or knowledge
- Informational: Sen calls this transparency but can see as capability to access information
- Security: freedom from crime and violence, and social safety net to prevent misery, starvation, death
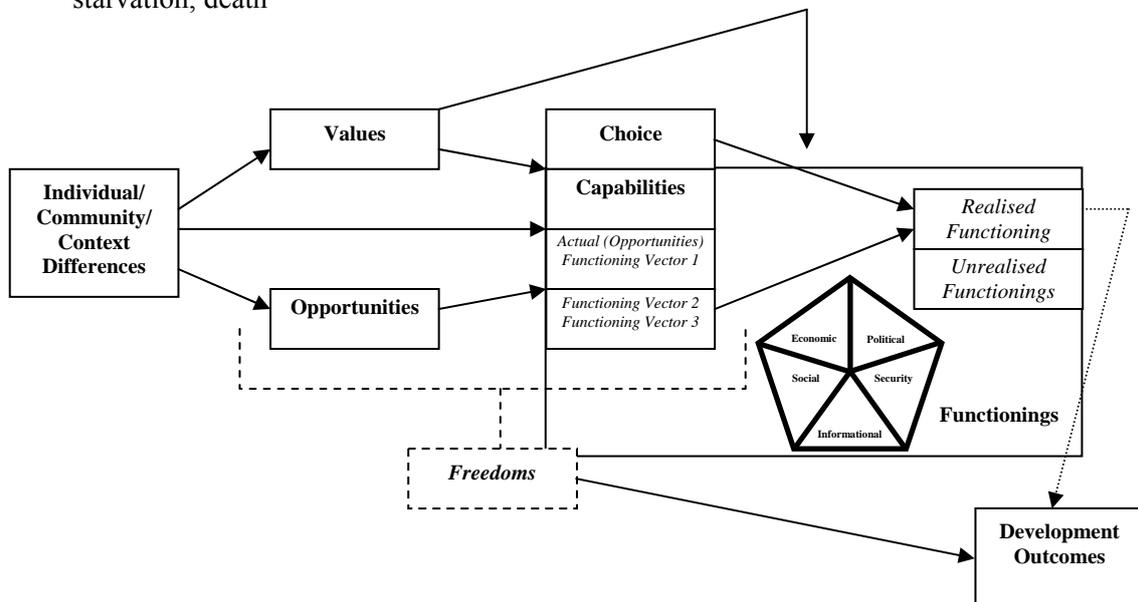
The formation of capabilities is shaped by:
- Differences: of the individual (e.g. age, gender, health) and the community and context in which they live (e.g. its institutions and other structures)
- Values: the individual's preferences and values
- Opportunities: such as ability to access government services, technology, finance, etc.
Conversion of capabilities into realised functionings is shaped by individual choice (which, in turn, is shaped by values and differences)

ICTs and Capabilities

Not explicit within Sen's work but can interpret ICTs as a commodity (a good or service) with a value only in terms of what it helps individuals to do or to be (adapted from Zheng & Walsham 2007, from Robeyns 2000):
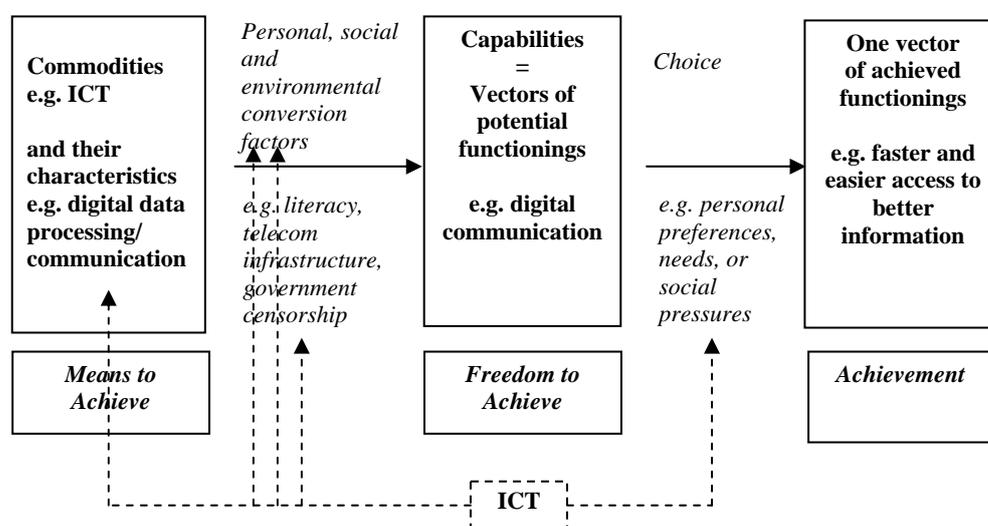
ICTs therefore have general characteristics (processing and communicating digital data) but the link to actual achievements is mediated at two stages:

- Conversion of ICTs' characteristics into capabilities for an individual is shaped by factors that may be personal (e.g. dis/ability, age, gender); social (infrastructure such as health, education; institutions of formal policies and informal norms/values; and relationships of social capital and power); and environmental (climate, disease, pollution, topography). So a telecentre will create different capabilities for, say, a woman in a rural area compared to a man in an urban area.
- Conversion of ICT-based capabilities into actual functionings is shaped by individual choice (a mix of personal preferences, specific needs, and social norms). So a telecentre might give you to capability to email your local mayor, but few might turn that into an actual achievement.

But, ICTs – as well as being a commodity – can fit in four other ways:

- Conversion factor: ICTs can help convert characteristics of other commodities into capabilities (e.g. adding a mobile phone enables the characteristics of a weavers' frame to be converted into more capabilities; e.g. same idea adding an Internet link to a community radio)
- Non-conversion factor: ICTs may constrain certain capabilities and choices (e.g. via cyber-surveillance
- Conversion factor enabler: ICTs can develop other conversion factors e.g. helping to change personal skills, or bringing out new social norms.
- Choice developer: ICTs can change perceptions of personal needs and preferences

For evaluation, then, we could consider:

- Characteristics of ICT4D application
- New capabilities created for user population (directly by ICT, indirectly by enabling other commodities, and indirectly by enabling other conversion factors)
- Existing capabilities now constrained for user population
- Actual achieved functionings (including ways ICTs may have altered choices)
- The value placed on those freedoms (esp. capabilities)
- Potential ICT capabilities that are not converted due to constraints/unfreedoms

SW Analysis

Strengths
- Provides an original perspective on evaluation
- Recognises each individual person: their aspirations, needs and choices
- Avoids both social and technological determinism: recognises that technology can create new freedoms but also explains why same technology leads to different outcomes in different situations
- Framework is well-recognised by development agencies and practitioners
- Useful focus on non-usage (unrealised functionings) and on constraints to action (unfreedoms)

Weaknesses
- Limited usage of framework to date for ICT4D projects, so no consistent approach for IA
- Requires interpretation to apply for ICTs: original framework says nothing explicit and is quite "academic" and flexible (i.e. unclear)
- Requires definition (e.g. participative) of what aspects of freedom are valued; e.g. ICTs often provide the freedom to access pornography. Is that a developmental freedom?
- Requires understanding of the potential freedoms NOT chosen, as well as the actual freedoms chosen
- Complexity that capabilities are both inputs to and outputs from any ICT4D project
- Potential for just adding a complicated foundation to otherwise simple issue of how ICT4D users actually use and don't use the technology

Methodological Summary

Capabilities (Sen) Framework		
Primary/Secondary?	Primary Required	In order to access individual circumstances
Data-Gathering Methods?	Multiple	But must reach down to the individual via survey, interview, observation, etc.
Participatory?	Possible	Indeed, desirable to identify what freedoms are valued/not valued
Quasi-Experimental?	Possible	E.g. compare community ICT4D users vs. non-users
Quantitative/Qualitative?	Either	Equally amenable to either type of data
Multi-Disciplinarity?	Possible	Could combine, though no clear examples as yet in ICT4D realm
Timing?	Either	Longitudinal or cross-sectional
Level?	Mainly Micro	Focus on the individual, though can (just about) aggregate to household, group or community level
Audience/Discipline?	Development Studies	Including, possibly, development economists given Sen's background
Resource Requirements?	Variable	But likely to be on the more rather than less intensive side, and does require fair level of competencies to understand and apply framework
Generalisability From One Project?	Limited	Essence of framework is specificity to particular context, community, even individual. But could generalise types of impact seen.
Comparability Across Projects?	Variable	Depends if consistent definition of capabilities elements and of methods is used across projects

Method Recommendations
- Worth further investigation for ICT4D IA work, particularly if there are interests in human development/empowerment issues of individuals and/or in non-usage or failure to deliver of ICT4D
- Include consideration of both constraints to usage and non-usage of ICTs.
- Good work requires relatively in-depth data-gathering from individuals.
- Of three literature items, Alampay provides most in-depth usage but Zheng & Walsham provide clearest model.
- Overall, requires more precursory work to be done to develop a clear ICT4D IA methodology from this framework.

References
- Robeyns, I. (2000) *An Unworkable Idea or a Promising Alternative? Sen's Capability Approach Re-examined*, Discussion Paper 00.30, Center for Economic Studies, University of Leuven, Belgium
  http://www.econ.kuleuven.ac.be/ces/discussionpapers/Dps00/DPS0030.pdf
- Sen, A. (1985) Well-being, agency and freedom, *The Journal of Philosophy*, LXXXII(4), 169-221
- Sen, A. (1999) *Development as Freedom*. New York, Knopf

Bibliography
- Madon, S. (2004) *Evaluating E-Governance Projects in India: A Focus on Micro-Level Implementation*, Working Paper no.124, Information Systems Dept, LSE, London
  http://is2.lse.ac.uk/wp/pdf/WP124.PDF
  >>Uses Sen's concepts (freedoms, opportunities, capabilities, functionings) to colour an evaluation of Kerala projects FRIENDS and Akshaya; but provides no framework or systematic usage

Variants

1. ***Combined Livelihoods/Capabilities Framework***. Gigler (2004) provides such a framework, which basically substitutes capabilities idea for livelihood strategies in the SL framework. (Arguably, capabilities are more akin to the interaction of assets and structures/processes, with functionings being the actual strategies adopted.) Gigler distinguishes between individual capabilities (with six dimensions: informational, psychological, social, economic, political and cultural) and group/community capabilities (with six dimensions: informational, organisational, social, economic, political and cultural). Each of these is linked to a set of outcome indicators that could be measured according to ICT impact.

CONTEXT	LIVELIHOOD RESOURCES	INSTITUTIONAL PROCESSES	CAPABILITIES	LIVELIHOOD OUTCOMES
Socio-Economic Conditions	Economic/financial capital	Existing social structures	Individual - Psychological - Social - Economic - Informational	Informational Capabilities strengthened
Demographics <=>	Natural capital <=>			
Cultural Context	Human capital	Level and degree of	- Political - Cultural	Human Capabilities strengthened
Political Context	Social capital	ICT intermediation	Collective - Social	
ICT diffusion	Informational capital		- Economic - Political	Social Capabilities strengthened
ICT policy Framework			- Organizational - Cultural - Informational	

Stages of ICT project

Existing Information Systems and Environments	Assess Information needs Informational capital	Community ICT Access Local and relevant content Capacity-Building	Local Appropriation and Use of ICTs	Ownership Sustainability

INFORMATION   ICTs   IMPACT

References
- Gigler, B.-S. (2004) Including the excluded: can ICTs empower poor communities?, paper presented at *4th International Conference on the Capability Approach*, Pavia, Italy, 5-7 Sept http://www.unipv.it/deontica/ca2004/papers/gigler.pdf
  >>Paper describes framework but does not really apply it in any clear way to two selected case evaluations.

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Examples of Use - *Capabilities*

Capabilities Framework Example 1: *Alampay*	Comment	Reference
	A detailed piece of survey work, shaped by capabilities ideas, though not in a deep sense. Focuses mainly on phone rather than other ICT use. Treats capabilities as mix of inputs and outputs. Includes both usage and non-usage.	Alampay, E. (2006) Analysing socio-demographic differences in the access and use of ICTs in the Philippines using the capability approach, *Electronic Journal of Information Systems in Developing Countries*, 27(5), 1-39 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/204/182 Refereed journal article; Open Access; 39 pages
Focus and Level	**Method**	**Framework Application**
• Application – public and private ICT in two relatively poor locations in the Philippines, encompassing urban, peri-urban and rural • Impact Level – individual users	• Research Resource – One independent research coordinator plus small team of field researchers for ?a few weeks? • Primary – Individual survey questionnaires applied at home of c.2 x 250 respondents. • Secondary – To provide basic telecomms/ICT availability data • Other – Cross-sectional; Quantitative and (some) Qualitative; Not participatory (though focus group used to develop questionnaire)	Focuses on five elements of main capabilities framework: a) Individual Differences: e.g. gender, age, which affect b), c) & d) b) Values: individuals' preferences for and valuation of ICT, which affect c) & d) c) Capabilities: whether or not individuals are capable of using different ICTs plus their access to ICT through private ownership or public facilities, which lead to d) d) Realised Functionings: actual use that individuals make of ICTs e) Unrealised Capabilities/Functionings: unfreedoms/constraints that prevent capability development or use
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Quite detailed (3 pp) on method and sampling used. Several pages on development of survey questionnaire. Survey questionnaire available from Richard Heeks	Clear and direct in terms of usage of ICTs, but capabilities seen as both cause and effect relating to ICTs.	Capabilities framework elements impact: • Values: Level and nature of perceived needs for ICT (phone) e.g. c.40% want home phone for emergency use (plus payment option and call vs. text preferences). • Capabilities: Self-perceived capabilities to use different ICTs (from 75% landline phone to 28% PC to 7% email)(urban more capable than rural; educated more capable than less educated; younger more capable than older; richer more capable than poorer)) plus Access to ICTs (from 85% radio to 8% PC ownership; plus higher levels of access via public facilities or use of social contact-owned ICT)
Baseline/Counterfactual	**Value Chain Stage(s)**	
No baseline or counterfactual (but arguably not that relevant to Capabilities approach)	Main focus on Readiness (esp. different individual characteristics and values), Uptake (both access and use/non-use) and Outputs (ICT usage patterns)	• Realised Functionings: phone usage is mainly occasional, mainly local and more for personal than business purposes • Unrealised Capabilities/Functionings: 33% non landline users (because of distance to phone, lack of line, lack of people to call, and cost); 51% non mobile phone users (because of cost, lack of capability to use, and lack of motivation to use)

Capabilities Framework Example 2: *Zheng & Walsham*	**Comment** Focuses on failures to convert ICTs into capabilities. Helpful in focusing on and understanding why and how ICT4D projects can partly fail to deliver.	**Reference** Zheng, Y. & Walsham, G. (2007) *Inequality of What? Social Exclusion in the e-Society as Capability Deprivation*, Working Paper no.167, Information Systems Dept, LSE, London http://is2.lse.ac.uk/wp/pdf/WP167.PDF Working paper; Open Access; 19 pages
Focus and Level	**Method**	**Framework Application**
• Application – two different cases (two rural hospitals in South Africa; overall healthcare system in China) • Impact Level – individual users	• Research Resource – One independent researcher for several months • Primary – Participative observation, focus group of 15 people, interviews with c.12-15 people, and questionnaires. • Secondary – Newspaper reports on China health SARS issue • Other – Cross-sectional; Qualitative; Not participatory	Uses the ICTs and Capabilities framework but a) adds in the notion of Agents (i.e. what stakeholder groups have/lack capabilities); and b) focuses on capability deprivation more than capability development. Main framework, then of five elements: • Commodities: e.g. ICTs • Conversion Factors: personal, social, environmental • Agents • Capabilities: divided into "well-being freedom" (freedom to be – e.g. educated, healthy, respected) and "agency freedom" (freedom to do – e.g. to participate politically or socially)
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
One paragraph on each case. No instruments.	Precursors cause ICTs NOT to have an effect on capability development	Lack of appropriate conversion factors (personal and organisational "Information Literacy" (South Africa) or organisational and national "Information Freedom" (China)) meant ICT commodity was NOT converted into capabilities of effective information handling and usage or effective communication.
Baseline/Counterfactual	**Value Chain Stage(s)**	
Strong focus on baseline (as cause of non-impact of ICTs). No counterfactual as ICTs not really used.	How Readiness (esp. Human and Institutional and Legal and Data systems Precursors) absence means Deliverables are not adopted or used	

Capabilities Framework Example 3: *De'*	**Comment**	**Reference**
	Uses Sen's five-way categorisation of freedoms as a moderately-useful checklist for ICT4D impacts. Doesn't make use of the capabilities concept or wider aspects of the capabilities framework.	De', R. (2007) The impact of Indian e-government initiatives, *Regional Development Dialogue*, 27(2), 88-100 http://www.apdip.net/projects/e-government/capblg/casestudies/India-De.pdf Refereed journal article; Open Access (for pre-publication version linked above); 19 pages
Focus and Level	**Method**	**Framework Application**
• Application – seven Indian e-government projects, mainly delivered via kiosks, but capabilities analysis focuses only on Bhoomi project • Impact Level – individual users	• Research Resource – One independent researcher. • Primary – Yes but unclear • Secondary – Previous case analyses used • Other – Cross-sectional; Quantitative and Qualitative; Not participatory	Uses Sen's (1999 book pp38-40) categorisation of five freedom types to create questions: • Political Freedoms: did ICTs increase political participation in setting policy/governance agenda? • Economic Facilities: did ICTs help users access economic resources such as credit, markets? • Social Opportunities: did ICTs improve access to education, health, justice, information? • Transparency Guarantees: did ICTs improve transparency of citizen dealings with government? • Protective Security: did ICTs enable security against natural disasters?
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
One sentence only.	Discusses how exogenous factors hamper ability to turn ICT outcomes into broader impacts	Impact of Bhoomi ICT4D project on freedoms: • Political Freedoms: no citizen involvement in project design; some shift in political access away from village accountant to local government office • Economic Facilities: shows little actual knock-on improvement in access to credit; and limited evidence of better access to markets
Baseline/Counterfactual	**Value Chain Stage(s)**	• Social Opportunities: kiosks do not provide access to broader services but users were more ICT-literate and a very few had used their Bhoomi certificates to help with education or justice services • Transparency Guarantees: some reduction in corruption but some continuing, and broader lack of transparency not affected • Protective Security: some improved access to insurance, but stories of "land sharks" using system to identify vulnerable farmer and buy up their land Overall suggests marginal impact on marginalised groups (women and landless/poor farmers), and some possible negative impacts.
Some discussion of baseline situation, but no pre-ICT data gathered. No counterfactual discussion	Focus on Outcomes and knock-on into broader Development Impacts	

ICT4D Impact Assessment Frameworks Compendium: Entry 5
5. Livelihoods Framework

Strongly rooted in development studies, and recognised by development practitioners, the livelihoods framework provides an all-embracing framework for assessing the impact of ICTs on individuals and communities: context, assets, institutions, strategies and outcomes. It is less a specific IA method than a "big picture" scaffold into which particular data-gathering techniques would need to be slotted.

The Framework
The livelihoods framework (often known as the sustainable livelihoods/SL framework) developed from the pro-poor and participatory ideologies arising within the development field in the 1980s and 1990s. Its main argument has been that lives of the poor must be understood as the poor themselves understand their own lives – as a complex of interacting factors.
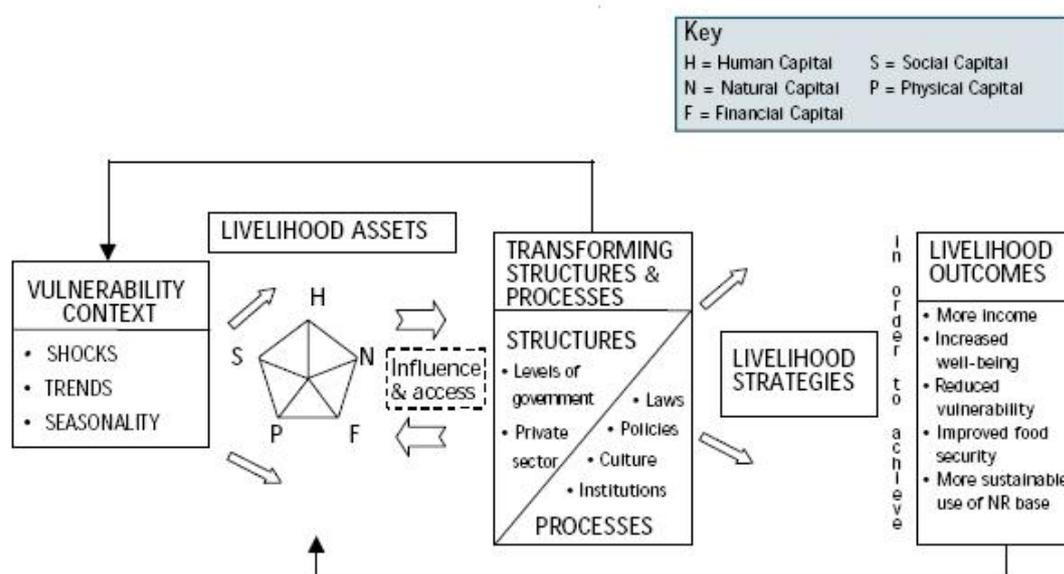
Its elements (DFID 1999):
- *Vulnerability context*: the external environment that shapes people's lives via shocks (e.g. conflict, disaster), trends (e.g. demographics, changing global prices), and seasonality.
- *Assets*: five types of capital – Human (skills, knowledge, health, ability to work); Natural (land, forests, water); Financial (income, financial savings, non-financial savings (e.g. jewellery, livestock)); Physical (infrastructure (transport, housing, water, energy, information/communications), producers goods (tools, equipment)); Social (networks, connectedness, group/organisation membership, relationships)
- *Structures*: the public, private and NGO sector organisations that deliver policy, legislation, services, goods and markets
- *Processes*: the forces shaping how organisations and individuals behave (i.e. operate and interact)
- *Strategies*: "the range and combination of activities and choices that people make/undertake in order to achieve their livelihood goals"
- *Outcomes*: what strategies achieve through use of assets via structures and processes within a context

SW Analysis

Strengths
- Comprehensive coverage of possible impacts (on all SL framework elements)
- Well-accepted and well-understood by development community
- Lot of guidance on general methods and implementation (e.g. www.livelihoods.org)
- Flexible to different situations because considers specifics of each different context, assets, institutions, etc.
- Covers the (often complex) realities of people's lived experiences
- Avoids over-emphasis on the technical given focus on broader social structures and processes
- Allows a causal chain of impacts <u>on</u> and impacts <u>of</u> ICT4D

Weaknesses
- Poor/limited linkage to information and ICTs; can make attributing causality difficult because framework contains a multiplicity of potential independent, dependent and intervening variables
- Focus is more on broader outcomes and impacts rather than specific causal outputs from ICT4D project
- Overall framework is complex so may be costly and time-consuming to implement and hard to conclude and generalise from
- High-level nature of framework requires interpretation to apply for any given project
- More of a framework within which IA methods can be slotted than a specific IA method

Methodological Summary

Livelihoods Framework		
Primary/Secondary?	Primary Required	Requires fieldwork. Secondary may be used to provide details on context and generic demographics, structure and process
Data-Gathering Methods?	Multiple	Interview, Observation, Survey, Focus Group
Participatory?	Possible	E.g. participants determine which livelihoods outcomes matter most; what livelihood assets and strategies mean
Quasi-Experimental?	Possible	E.g. compare community ICT4D users vs. non-users
Quantitative/ Qualitative?	Either	E.g. quantitative assessment of financial, physical and social capital; qualitative assessment of human, social and political capital
Multi-Disciplinarity?	Possible	E.g. can combine economic and sociological perspectives
Timing?	Either	Longitudinal or cross-sectional
Level?	Multiple Micro/Meso	Individual; Household; Group; Community
Audience/ Discipline?	Development Studies	Broadly understood by development agencies and practitioners
Resource Requirements?	Variable	Flexibility on the methods you use, though need fair level of skills to understand and apply framework
Generalisability From One Project?	Limited	Framework deliberately developed to be situation-specific. But could generalise types of impact seen
Comparability Across Projects?	Variable	Depends if consistent definition of SL elements and of methods is used across projects

Method Recommendations
- Consider using as overarching IA framework, in combination with more-focused techniques.
- Gather data on all aspects of framework, including outcomes, to build a full cause-effect chain: build picture of pre-existing context, assets and structure/process; of ICT4D-enabled strategies; of ICT4D impact on outcomes and assets. Consider impact on context and structure/process.
- Use amended pentagon as per Variant 1.
- Include non-users for counterfactual and pre-existing assets for baseline.
- Utilise Duncombe (2006) Figure 3 framework showing information/ICT role within livelihoods.
- For guidance on data-gathering methods in applying the SL framework: http://www.livelihoods.org/info/info_guidancesheets.html (esp. see Section 4)

References
- DFID (1999) *Sustainable Livelihood Guidance Sheet Section 2*, DFID, London http://www.livelihoods.org/info/guidance_sheets_pdfs/section2.pdf

Variants

1. *Assets Only*. A cut-down version focuses only on the impact of the ICT4D project on the "assets pentagon". In its original form, this means the five capitals: Financial; Human; Natural; Physical; Social. Impact on these of ICT4D can be assessed at the level of the individual, household, group or community. Main research method is to interview about:
a)   Change: "before" and "after" ICT4D in terms of asset changes, and
b)   Causation: investigating how the change was causally related to the ICT4D.

Variations on the assets pentagon include:
i)   Swapping Natural for Political Capital – ICT4D rarely has an impact on land and other natural capital, but it can be helpful to give clear and separate emphasis to the political impacts of ICT4D (including empowerment).

Human Capital:
Skills, Attitude,
Health; Knowledge

Social Capital:
Networks;
Relationships

Political Capital:
Empowerment;
Mobilisation; Status;
Gender Relations

Physical Capital:
Producer goods;
Infrastructure

Financial Capital:
Earnings; Savings
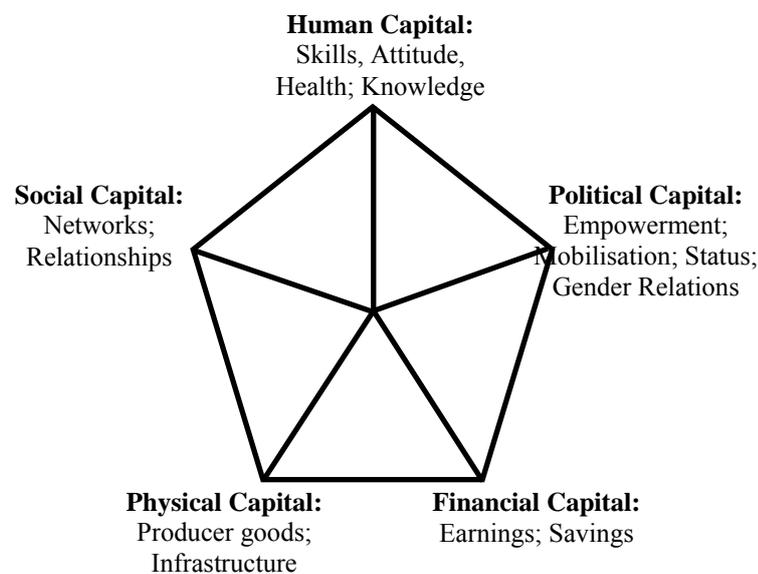
Example: Heeks, R. (2006) Social outsourcing: creating livelihoods, *i4D*, IV(9) - September, 17-19 http://www.i4donline.net/articles/current-article.asp?articleid=800&typ=Features

ii)   Adding Information Capital – moving to a hexagon by adding in a specific asset of "knowledge capital" or "information capital": what ICT4D users know (i.e. what they know now that they did not know before).

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Examples of Use – *Livelihoods Framework*

Livelihoods Framework Example 1: *Parkinson & Ramirez*	Comment	Reference
	Of some value in thinking how to convert SL framework to use for ICT4D evaluation. Mainly uses livelihoods framework to provide the background rather than the impact. Assets treated only as an input, not seen as something that ICT4D impacts; structures and processes are very narrowly defined; no explicit consideration of livelihood outcomes.	Parkinson, S. & Ramirez, R. (2006) Using a sustainable livelihoods approach to assessing the impact of ICTs in development, *Community Informatics*, 2(3), 116-127 http://ci-journal.net/index.php/ciej/issue/view/15 Journal article; Open Access; 12 pages

Focus and Level	Method	Framework Application
• Application – one donor-supported telecentre in Aguablanca district of Cali city, Colombia; based within larger community centre. • Impact Level – individual residents	• Research Resource – Single independent researcher for two months • Primary – Survey of 102 households mainly for assets and strategies (including ICT use) data. Key informant (telecentre personnel, competing ICT access point staff) for data on structure/process of ICT use. Phone survey of 100 telecentre users for demographic and ICT use data. In-person semi-structured interview with 27 telecentre users for more strategies (esp. ICT use) data. Document analysis of project reports and minutes for some structure/process data. • Secondary – Use of census data for context data. • Other – Cross-sectional; Qualitative & Quantitative; Not participatory	Applies the first four main elements of the SL framework, and notes some adaptations and consequent questions for each one: • Vulnerability context (seasonality ignored; key question on risks faced by residents) • Assets (natural capital ignored; key question on what assets residents have and how they use) • Structures/Processes (key question on who uses the internet, how and where) • Strategies (key questions on livelihood strategies used and how internet affects). Main focus on economic strategies (i.e. making money) • Outcomes: not included.

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
Fairly good on method, but not instruments.	Qualitative link of ICT4D to different livelihood strategies. No real link to outcomes/impacts.	• Context – "high unemployment, flooding, violence, inadequate health care services, insufficient numbers of public schools, and police violence" • Assets – house was main physical asset; social capital was mainly informal networks. • (Economic) Strategies – short-term financial capital gain (through work), long-term capital gain (invest in education), alter financial assets (e.g. home purchase), reduce financial asset need (cut back expenditure) • Telecentre – tied only to the second economic strategy (long-term gain via education) but not to any others. (Did seem to be used to reinforce social capital.)
Baseline/Counterfactual	**Value Chain Stage(s)**	
Does not consider impacts in absence of ICT4D. Does cover those accessing ICT via non-telecentre channels but no strong comparison with telecentre users.	Main focus is on Outputs (new actions/behaviours) and not on Outcomes or Development Impacts.	

Livelihoods Framework Example 2: *Molla & Al-Jaghoub*	**Comment**	**Reference**
	A relatively quick-and-dirty approach to using the SL framework – acts just as a framework rather than strong value-added tool. Note ideas on position in cause-effect chains (context and structure/process as ICT4D cause; strategies (and outcomes) as ICT4D effect; assets as both). Frames livelihood outcomes in terms of assets rather than SL list of outcomes. Supports idea of variant assets pentagon.	Molla, A. & Al-Jaghoub, S. (2007) Evaluating digital inclusion projects: a livelihood approach, *International Journal of Knowledge and Learning*, 3(6), 592-611 Refereed journal article; Restricted Access; 20 pages

Focus and Level	**Method**	**Framework Application**
• Application – three government-supported telecentres (Knowledge Stations) in Jordan. • Impact Level – individual users	• Research Resource – Two independent researchers for ?c. two weeks? • Primary – Interviews with telecentre manager and c.5 users in each telecentre. Interviews with key national officials. Focus groups with four and five participants in two telecentres. Document analysis of telecentre records. • Other – Cross-sectional; Qualitative & (slightly) Quantitative; Not participatory	Fairly brief consideration of SL elements. Mainly considers • Context (just brief general background) and Structures/Processes (only ICT4D-specific) as impacts on ICT4D • Strategies as impacted by ICT4D • Assets as both impacting on and impacted by ICT4D. Does not cover natural capital. Places political capital within human capital. • Outcomes not included.

Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Fairly brief on method: no details of questions or instruments.	Some conflation of ICT4D vs. hosting organisation/staff vs. central development fund as causes of observed impacts.	Livelihoods Framework Impact: • Context – poverty and potential for agricultural vulnerabilities • Assets – age and gender literacy divisions; financial obstacles to ICT use; strong family networks; few alternative ICT access options

Baseline/Counterfactual	**Value Chain Stage(s)**	
Not really considered.	Main focus is on Outcomes (asset gains) rather than Outputs (e.g. specific new behaviours) or Development Impacts.	• Strategies – ICT4D used in three ways: to educate and empower women; to access entrepreneurship funds; to aid employment through skill development • Outcomes – a) physical capital of the telecentre plus financial capital for those ICT entrepreneurs created; b) easier (lower transaction cost) access to government development funds; c) human capital gains of ICT skills plus self-esteem/empowerment esp. young women; d) social capital in terms of better links with relatives abroad • Structure/Process – an important mediator of outcomes e.g. background/source of telecentre trainer; nature of host organisation; governance structure

Livelihoods Framework Example 3: *Duncombe*	**Comment** Insightful discussion about how to use SL framework for ICT4D assessment generally, but does not then actually apply to a typical ICT4D project assessment – instead, gives a general discussion at national level. Considers both cause and effect relation of context to ICT4D. Mainly considers cause relation of assets and structures/processes on ICT4D. Considers effect of ICT4D on livelihood strategies. Does not look at livelihood outcomes.	**Reference** Duncombe, R. (2006) Using the livelihoods framework to analyse ICT applications for poverty reduction through microenterprise, *Information Technologies and International Development*, 3(3), 81-100 http://www.mitpressjournals.org/toc/itid/3/3 Refereed journal article; Open Access; 20 pages
Focus and Level	**Framework Application**	
• Application – ICT4D overall in one country: Botswana • Impact Level – individual residents **Method** • Research Resource – Single independent researcher for some months • Primary – Not clear from article (though known to be based on dozens of interviews plus survey data from entrepreneurs). • Secondary – Use of census and published household survey data for context data. • Other – Cross-sectional; Qualitative & Quantitative; Not participatory	Role of information within each component of the SL framework: • Context: information can help poor understand and act on their vulnerabilities. • Assets: information as foundation for knowledge (part of human capital), as basis for identifying sources of financial capital, as a key resource shared by social networks, as handled by ICTs which are a form of physical capital, • Structures/Processes: information allows these to function e.g. markets, policies, culture; and recognise "infomediaries" as part of this including their ICT policies and strategies. • Strategies: information contributes to long-term capacity-building and short-term decision-making In applying SL framework: • Context: considered in terms of urban—rural, and male—female divides, with greater vulnerabilities for latter in each pair. • Assets: each of five assets considered mainly in terms of asset deficiencies that reduce the ability to use ICTs • Structures/Processes: three main areas - for supporting poverty alleviation, for delivery of ICT infrastructure and services, and in determining gender roles/relations. • Strategies: uses 2x2 matrix of long-term vs. short-term; formal vs. informal. • Outcomes: not included.	
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Very limited (reported in more detail elsewhere); nothing on actual methods or instruments.	Clear link of ICT4D to effects on context and strategies.	• Context: ICT4D digital divide tends to reinforce existing location and gender vulnerabilities. • Strategies: four types – short-term, informal (supported by telephony); short-term, formal (supported by radio); long-term, informal (telephony may develop new social networks); long-term, formal (ICTs can strengthen infomediaries). Overall, need broad not ICT4D-specific development interventions.
Baseline/Counterfactual	**Value Chain Stage(s)**	
Not really appropriate concepts – does not chart impact of a specific intervention.	Focuses mainly on Output (impact of ICT4D on livelihood strategies) and some consideration of Development Impacts (on urban—rural and gender divides).	

ICT4D Impact Assessment Frameworks Compendium: Entry 6
6. Information Economics

Provides a firm foundation for analysis of the business (commerce/trade) related impacts of ICT4D. Covers the impact of ICT4D on information failures commonly-found in developing countries and the related characteristics that make commerce slow, costly, risky and intermediated, and make markets and trade relatively slow to develop. Overall, a very useful approach where business is involved, though easier to apply if focused just on one business sector.

The Framework
Information economics takes an information-centric approach to assessment of ICT4D systems, rooted in the information-oriented work of economists such as Stiglitz (1988). This sees development activity in terms of transactions – some interchange of goods or services – and it sees information as required to support the decisions and actions integral to all transactions.
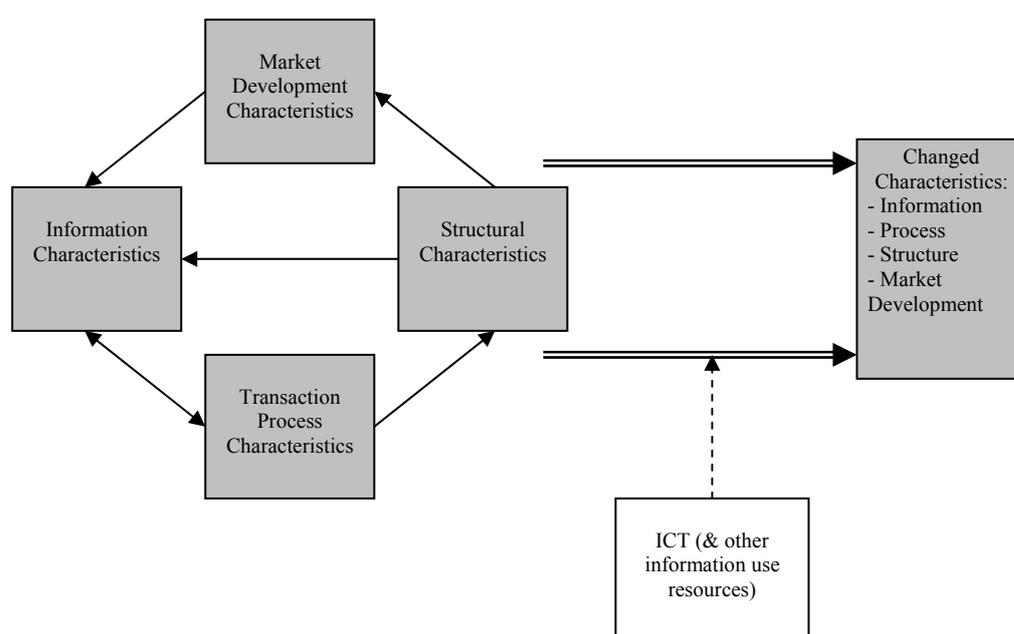
One foundation for development problems is information failures around transactions, which are rife in developing countries and which fall into five main categories:
a) *Information absence*: key information that development actors need is not available.
b) *Information quality*: key information that development actors need is available but of poor quality.
c) *Information uncertainty*: key information that development actors need is available but its quality is uncertain.
d) *Information asymmetry*: some development actors have access to key information that others lack.
e) *Information cost*: key information can only be obtained at high cost (often a physical journey).

As a result of these information failures, transactions in developing countries take on particular process and structural characteristics which, in turn, have negative developmental outcomes. For example, transaction processes in developing countries tend to be slow, costly, and risky. As a result, commerce structures tend to be localised and intermediated (i.e. with

the presence of middlemen), and prices fluctuate significantly. As a result, the development of markets is constrained, investments are suppressed, and the benefits of commerce and business flow to the "haves" more than the "have nots" (e.g. limiting the income of small producers). In turn, all of these factor reinforce the initial information failures, creating a negative cycle.

This foundation can then be used to assess the impact of ICT4D. The micro-level impact of ICTs is assessed in terms of its impact on the five information failures; assessing to what extent the technology alters the information characteristics of transactions. Then, in turn, an assessment is made of:

a) *Changes to transaction processes*: for example, are they becoming faster or less costly?
b) *Changes to structural characteristics*: for example, is there any change in the status of middlemen?
c) *Changes to market development characteristics*: for example, is there any growth in investment in the focal domain?

In making such an assessment, it is important to understand those characteristics ICTs can affect, and also those it cannot. The latter may be tied up in "institutional" issues such as trust, reputation, ongoing need for physical interaction or exchange, and cultural norms.

Key issues in the application of the IE framework for ICT4D impact assessment include:

- *Information Failures*: which of these are addressed?
- *Other Characteristics*: are process, structural and development characteristics also considered?
- *Specificity*: is assessment narrowed to a particular technology and/or a particular sectoral supply chain?
- *Price*: price is a key item of information in many transactions, aggregating other information (such as production and coordination costs, supply and demand). Comparing price levels and also price fluctuations before and after ICT adoption can be a valuable impact indicator.
- *Transaction Scope*: to what extent does the impact assessment cover the informational aspects of all three stages to a transaction:
  > information acquired prior to trading (on the existence of the other party, on their reputation and trustworthiness, on typical prices);
  > information communicated during trading (on items offered and money/other items sought, on quality of items offered, as part of negotiation);
  > information acquired after trading (on whether or not the terms of the agreed trade contract have been fulfilled).

SW Analysis

Strengths
- Particularly useful for understanding business (rather than social) use impacts of ICTs, and for understanding development of markets and commerce. Applicable from individual micro-enterprises up to analysis of macro-economic impact of ICTs (see Variant 2 below).
- Can be applied to different technologies, markets and supply chains. Generic indicators such as information characteristics or price fluctuations can be adapted to the specific context of evaluation.
- Given information-centricity of this approach, it avoids techno-centrism but still addresses a core capability of ICTs. Causality to wider developmental impact can be established both quantitatively and qualitatively.
- Interpretation of indicators is mostly straightforward.

Weaknesses
- Mostly limited to market impact, although results can be extrapolated from market-related benefits to wider development outcomes.
- Unlike other models (such as cost-benefit analysis) there is no known comprehensive guideline to assist users in conducting an IE based impact assessment. In particular, there is a lack of guide on how to analyse and present data. As a result, evaluations lack uniformity and consistency.
- Some form of longitudinal perspective is required but this can be problematic (e.g. see Variant 1 below).
- In assuming that other changes flow from informational changes, it may fail to recognise process, structural and market development impacts unless these are specifically assessed.
- Given the need to follow particular sectors/supply chains in depth, it may be difficult (and certainly time-consuming) to assess some ICT4D projects if they have impacts on commerce in several different sectors.

Methodological Summary

Information Economics Framework		
Primary/Secondary?	Primary Required	Requires fieldwork. Secondary data such as longitudinal price (if and when it is available) can also be used
Data-Gathering Methods?	Multiple	Interview and focus group discussion with key players in a supply chain, especially to understand structural changes. Cross-sectional survey can be used to collect more quantitative data on information characteristics
Participatory?	Not likely	Because of formal/template nature of approach
Quasi-Experimental?	Possible	E.g. comparing commerce characteristics of ICT users vs. non-users
Quantitative/Qualitative?	Both	E.g. quantitative assessment of information characteristics; qualitative assessment of process, structural and broader changes
Multi-Disciplinarity?	Limited	Strongly rooted in economic theories
Timing?	Longitudinal	Before-and-after nature requires longitudinal or quasi-longitudinal approach
Level?	Typically Meso	Dealing with a particular enterprise sector, but could be used for micro-analysis of individual enterprises or macro-analysis
Audience/Discipline?	Economics	Main audience among those concerned with economic development and business growth
Resource Requirements?	High	Because of the need for (quasi-)longitudinal design and in-depth analysis of commerce
Generalisability From One Project	Moderate	Tends to focus on specific technology and sector, but generalised nature of characteristics can enable some generalisation
Comparability Across Projects	Rather Limited	Consistency of underlying model helps but limited by specificities of technology and sector

Method Recommendations
- Use IE in a specific supply chain (such as coffee, fish) and for a specific technology (such as mobile telephony).
- Try to adopt a longitudinal design or at least collect retrospective baseline data or use control group for comparing impact.
- Identify and involve all key members of a supply chain in primary data collection.
- See if rating scales and other quantification can be used for information and other characteristics.
- Incorporate an understanding of institutional factors such as trust, reputation and other norms.
- Overall, a valuable model for technology/application specific impact assessment. But of limited use for projects and programs.

References
- Stiglitz, J.E. (1988) Economic organisation, information, and development. In: *Handbook of Development Economics*, H. Chenery and T.N. Srinivasan (eds.), Elsevier Science Publishers, Amsterdam, 93-160.

Variants

1. *Cross-Sectional Approach*. Information economics is a before-and-after model and therefore best applied via a longitudinal approach that looks at transactions over time. In the absence of such an approach it may be proxied if transaction records such as contracts are available for review. Given the frequent difficulty of obtaining such records, a final (rather weak) proxy is to ask respondents how transactions have changed over time (e.g. Abraham 2007 – see below).

2. *Whole Economy Analysis*. The IE model can be used to analyse the impact of ICT infrastructure investments on the whole economy. Such study uses quantitative econometrics tools to model ICTs input in the economy and their effect on macro-level dependent variables such as GDP and per capita income; the assumed intervening variables occurring via impacts of ICTs on informational and other characteristics of commercial transactions (Waverman et al 2005).

References
- Waverman, L., Meschi, M. & Fuss, M. (2005) The impact of telecoms on economic growth in developing countries, *The Vodafone Policy Paper Series*, 3, 10-24 http://www.vodafone.com/etc/medialib/attachments/cr_downloads.Par.78351.File.dat/GPP_SIM_paper_3.pdf

<div align="right">Alemayehu Molla & Richard Heeks</div>

Examples of Use – *Information Economics*

Information Economics Example 1: *Abraham*	Comment	Reference
	A basic application of the information economics model for impact evaluation. Identifies potential data sources for using IE (as per Variant 1) and show-cases what an IE analysis looks like.	Abraham, R. (2007) Mobile phones and economic development: evidence from the fishing industry in India, *Information Technologies and International Development*, 4(1), 5-17 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.5 Refereed journal article; Open Access; 13 pages

Focus and Level	Method	Framework Application
• Application – mobile phone use by the fishing supply chain actors in Kerala, India. • Impact level – individual actors (fishermen, agents, merchants) and overall supply chain/market	• Research Resource – One independent researcher; not specific about time length • Primary – Field study at 12 locations in Kerala. Expert interviews (50), focus groups, and a survey of 172 respondents • Secondary – Informal transaction records of merchants and agents • Other – Cross-sectional; Quantitative (basic perceptions of change) and Qualitative (for detail); Not participatory.	• *Information Failures*: limited consideration of characteristics; focuses mainly on price information. • *Other Characteristics*: some consideration of process, structure and broader development characteristics (market integration and efficient use of resources). • *Specificity*: one technology (mobiles) in one sector (fishing) • *Price*: price seen as a key information aggregator, and both dispersion and fluctuation of price seen as a key issue. Lack of records meant had to rely on respondents' perceptions of price fluctuation changes over time between and within fish markets. • *Transaction Scope*: largely pre and during transaction information was the focus. Did not consider post-transaction information.

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
One paragraph on method. No instruments provided. Provides limited guidance on how to apply IE, though notes impact of soft issues (trust, perception) on data collection.	Almost all impacts are causally related to ICT4D.	Adoption of mobile phones has: • facilitated better flow of information. A potential negative consequence of such information flow is that "news of scarcity and higher prices travels to merchants and this could result in supply overshoot". • reduced price dispersion across markets and price fluctuations within the same markets. Fishing search cost has also dropped.

Baseline/Counterfactual	Value Chain Stage(s)	
Except noting inefficiencies in developing economies market in general, does not systematically capture baseline data. No comparison of users with non-users.	Focuses on Uptake (mobile phone use), Output (market information access and use), and Outcome (efficiency, productivity and quality of life).	• improved market knowledge and enhanced productivity through use of mobile-borne information. Fishermen that use mobile phones at sea were able to "respond quickly to market demand and prevent unnecessary wastage of catch". However, rather than downstream members of the chain, midstream members (because of their existing "monopsony" market power) appear to be the greatest beneficiaries. • reduced information asymmetry and improved market efficiency. Mobiles reduced the risk of vulnerability of users (fishermen) and their isolation which resulted in improved quality of life. Overall, "cautiously optimistic" about impact of ICTs in rural communities of developing economies.

Information Economics Example 2: *Jagun et al*	**Comment**	**Reference**
	Central application of the basic IE model with focus on process and structural rather than information, market development and price elements. Very good application of causal maps to capture the pre-and post mobile phone structure, process and relationships of supply chain.	Jagun, A., Heeks, R. & Whalley, J. (2007) *Mobile Telephony and Developing Country Micro-Enterprise*, Development Informatics Paper no.29, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp29.pdf Impact assessment report; Open Access; 24 pages
Focus and Level	**Method**	**Framework Application**
• Application – mobile telephony use by members of a cloth supply chain in peri-urban Nigeria. • Impact level – individuals actors (producers, suppliers, intermediaries, customers) and overall supply chain	• Research Resource – One independent researcher for several months • Primary – Interviews with 16 members of the supply chain. Observation, field notes, and photographs of products and techniques • Secondary – None mentioned • Other: Quasi-longitudinal; Mainly qualitative; Not participatory	• *Information Failures*: very brief consideration of information cost and quality • *Other Characteristics*: detailed consideration of process (risk, time, cost) and structure (localisation, intermediation) characteristics, with limited consideration of broader development characteristics. • *Specificity*: one technology (mobiles) in one sector (cloth-making) • *Price*: Not really considered, and market efficiency analysis not included. • *Transaction Scope*: pre and during transaction information only.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Fairly detailed. No instrument.	ICT seen as directly causing changes in information characteristics. Changes to process and structural characteristics have an ICT input but also affected by many other (e.g. institutional) variables.	Adoption of mobile phones has: • Reduced some information failures by reducing information costs and improving information quality (though evidence base for this is not that strong). • Improved transaction process characteristics by reducing the time, cost and risk of transactions. However, broader characteristics of commerce – issues of trust, design intensity, physical inspection and exchange, and interaction complexity – have limited the impact of the ICT because all these characteristics compel a continuing need for face-to-face meetings. • Not changed transaction structural characteristics: commerce remains localised and intermediated. Indeed, mobiles have consolidated existing intermediaries (because of their access to capital and other resources) and even led to the creation of new form of intermediaries. • Created a "mobile divide" with those with mobiles getting more trade and those without being excluded from supply chains (though, again, evidence base is limited).
Baseline/Counterfactual	**Value Chain Stage(s)**	
Builds an information, process and structural characteristics profile (e.g. poor information flow and risk, time and cost of travel, geographic dispersion) of supply chain before introduction of ICT. Counterfactual covered by evidence on non-mobile users (though small sample).	Focuses on Uptake (mobile phone use); Outputs (changes in information patterns and communication processes); and Outcomes (structural characteristics of supply chains).	

ICT4D Impact Assessment Frameworks Compendium: Entry 7
7. Information Needs/Mapping

The information needs/mapping approach is particularly appropriate to ICT4D given its focus on ICTs' information delivery capacities. It is sensitive to the specific information needs of individual communities, and maps these against ICT4D information impacts. This is likely to be a foundation of impact assessment for information delivering ICT4D projects, though perhaps modified to take account of the further steps that exist between information delivery and development impact (see Variant 1).

The Framework
Lack of access to information – especially information which is complete, accurate, reliable, timely, and appropriately presented – exposes individuals and communities to vulnerabilities and to poverty. This framework, therefore, seeks to identify information requirements prior to the ICT4D intervention, and then assess if ICT4D project is meeting those requirements.

There are three basic approaches to information needs/mapping:
- It is particularly suitable for a longitudinal action research-type impact assessment. In this case, needs identified through a baseline survey prior to an intervention will form part of the input to the design of the intervention and then map against the actual/perceived benefits after the intervention.
- Alternatively, it requires a two-phase design whereby the information needs identified in phase one will be cast in terms of anticipated benefits, and indicators for measuring the impact of the information in the second phase. The framework is very simple and works as follows:
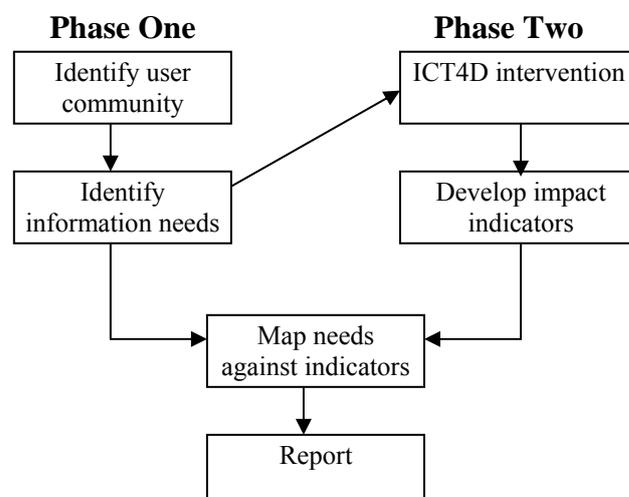
- Where a longitudinal/two-phase approach is not possible, then there a number of ways to put together information needs: a) a generic set of information needs may be used, or b) interviews and other forms of retrospective data collection may be used to identify recollections of pre-intervention needs, or c) ongoing information needs may be identified (since information needs are relatively stable over time).

Looking in more detail at particular elements of the approach:

Information Needs. These can be assessed in a bottom-up, participatory, grounded manner: allowing the user community to identify and determine its own information needs. Alternatively, a top-down, template-based approach can be used. These are typically some form of development goal or livelihoods checklist. Examples include:

- *Livelihoods-based approach* (e.g. Sigauke 2002): Physical assets (housing, water/sanitation, communications, health, transport); Financial assets (income generation, employment, credit/loans); Social assets (local government, NGOs, consultative committees, CBOs); Human assets (education); Natural assets (land, natural resources).
- *Issue-based approach* (e.g. Schilderman 2002): Housing, Money, Water, Waste, Illness, Schooling, Transport, Security.

Needs analysis may include the identification of "information gaps" or "information shortcomings". These can be assessed on various information criteria (e.g. the CARTA criteria described below). Alternatively, one measure the "demand—supply" gap – the gap between the % of users saying an item of information is important or very important to them, and the % of users saying they are able to obtain this information (see Duncombe & Heeks 2001).

Impact Indicators. As with information needs, so indicators of ICT4D impact on information needs can be developed in two ways. A bottom-up, participatory process can be used. This, for example, was used by ActionAid (see Beardon et al 2004 and Variant 2 below). Alternatively, a template can be used. The impact of ICT4D on the information demand— supply gap can be used. Or, for example, ICT4D impact can be assessed according to the extent to which it improves information delivery on the following "CARTA" criteria (Heeks 2006):

- *Completeness*: How much more complete is the information produced by the ICT4D system compared to the pre-system situation?
- *Accuracy*: How much more accurate is the information produced by the ICT4D system compared to the pre-system situation?
- *Relevance*: How much more relevant is the information produced by the ICT4D system compared to the pre-system situation?
- *Timeliness*: How much more timely is the information produced by the ICT4D system compared to the pre-system situation?
- *Appropriateness of presentation*: How much more appropriately presented is the information produced by the ICT4D system compared to the pre-system situation?

Alternatively, one could use a template of (adapted from Mchombu 1995):

- *Efficiency*: the cost of delivering information to users
- *Effectiveness*: the extent to which users make use of the information delivered, and their satisfaction with the information delivered
- *Equity*: the accessibility of information delivered by different community groups

Information Mapping. This then puts the two elements – needs and indicators – together in a matrix that is filled in. For example:

	ICT4D Impact Indicators				
Information Needs	Completeness	Accuracy	Relevance	Timeliness	Appropriateness of Presentation
Housing information					
Water/sanitation information					
Health information					
Transport information					
…					

SW Analysis

Strengths
- Simple and strongly-linked to ICT4D's information delivery/communications capacities.
- Information needs are context-specific and can be adapted to meet the requirements of a specific community. If necessary, so too can impact indicators.
- Needs and gap analyses have a strong tradition among development practitioners and there are fairly well-developed guidelines on how to conduct needs assessment.
- Very simple to apply and use. Allows participatory, bottom up approach if desired.
- Indicators are mostly straightforward and conclusions are easy to interpret.
- Can support both ex-ante design and ex-post evaluation.

Weaknesses
- By focusing on the micro-level of information needs and quality, this approach of itself does not necessarily focus on contextual factors that affect ICT4D delivery.
- This depends on the design of indicators and needs, which makes downstream impact comparison across projects difficult.
- The two stage design could be very time consuming.
- Difficult to establish a link between information needs and impact. As such, it tends to focus on availability and outputs of the ICT4D value chain, and ignores the steps and resources required to turn information outputs into development outcomes and impacts. See Variant below.

Methodological Summary

Information Needs/Mapping Framework		
Primary/Secondary?	Primary Required	Requires fieldwork to identify information needs and assess the impact of ICT4D on those needs
Data-Gathering Methods?	Multiple	Both needs gathering and indicators definition typically require multi-method data gathering including interview, observation, survey and focus group
Participatory?	Possible	A bottom-up approach that allows participants to determine their information needs and perceived impact indicators
Quasi-Experimental?	Not likely	Since it is needs based, it does not easily lend itself to experimental design
Quantitative/Qualitative?	Mainly Qualitative	Definition of information needs tends to be qualitative, as do indicators, but rating scales could be used
Multi-Disciplinarity?	Unlikely	Given strong rooting in information systems ideas but could take different perspectives on this
Timing?	Preferably Longitudinal	As per pre- and post-design; but can be done cross-sectionally
Level?	Micro and/or Meso	Can be done either for individual and/or community levels
Audience/Discipline?	Information Systems	But simplicity of approach does make it accessible to development practitioners
Resource Requirements?	Relatively High	In order to map and then assess information needs
Generalisability From One Project	Limited	Because needs tend to be highly context- and subject-specific.
Comparability Across Projects	Possible	If used templates for both information needs and impact

Method Recommendations

- In identifying a user community, try to assess "fault lines" that may exclude some members from information delivery (e.g. gender, income), and that need to be incorporated into impact assessment.
- If at all possible, adopt a longitudinal action research design that allows for pre-intervention assessment of information needs, and post-intervention tracking of impact on those needs.
- The value of information can only be determined by its recipient. Therefore needs and impact indicators must derive from the users' standpoint.
- Overall, a valuable model for evaluating whether information products and services meet specific community needs. Does require the Variant below to make a clearer connection to developmental impact.

References

- Heeks, R.B. (2006) *Implementing and Management eGovernment: An International Text*, Sage Publications, London
- Schilderman, T. (2002) *Strengthening the Knowledge and Information Systems of the Urban Poor*, ITDG, Rugby, UK http://practicalaction.org/docs/shelter/kis_urban_poor_report_march2002.doc
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- Raihan, A., Hasan, M., Chowdhury, M. & Uddin, F. (2005) *Pallitathya Help Line*, D.Net, Dhaka http://www.dnet-bangladesh.org/Pallitathya_pcc.pdf
  >>Applies the framework using action research to evaluate "People's Call Centres", a project designed to serve the information needs of rural communities in Bangladesh. Offers well detailed methods and analysis.

Variants

1. *Linking Information to Development*. As noted above, a key problem with the information needs/mapping approach is that it stops at the point of information delivery, without going on to look at the impact of that information. To push impact assessment forwards, we can use the DIKDAR model (adapted from Heeks 2005) of the steps and resources needed to turn information into development results.

The model acts as a reminder that, in addition to delivery of data, ICT4D project users need:
- *Information Resources*: Data, not information, is delivered. To turn the delivered data into useful information and then into behavioural precursors, ICT4D project users need money, skills, motivation, confidence, trust and knowledge in order to access, assess and apply the processed data they get from the ICT4D system.
- *Action Resources*: ICT4D project users require hard resources such as money, technology and raw materials plus soft resources like skills and empowerment in order to turn their decisions into actions.

A full information needs/mapping assessment approach may thus also investigate the presence or absence of those information and action resources, and the extent to which the ICT4D project has or has not helped develop those resources, and has or has not helped users take all the steps of the DIKDAR model.
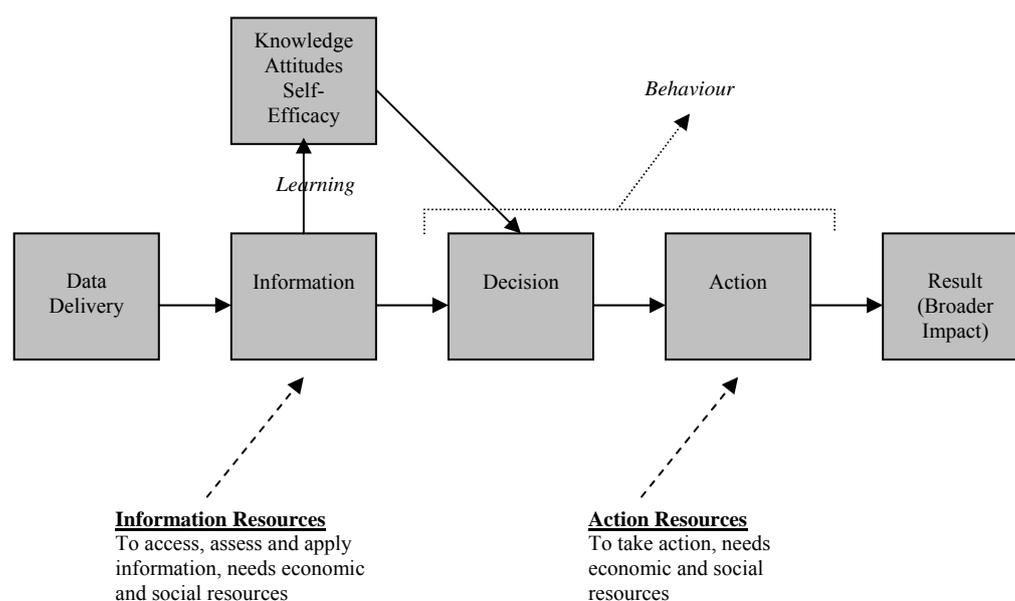
2. *Extended Information Needs Analysis*. Initial analysis of information needs can view community members just as passive recipients of external information. However, that analysis – and related impact assessment – can go beyond this in a number of ways (see Beardon et al 2004 below for an example):
- Community Information: analysing what information is already available within the community; and assessing the impact of ICT4D on this. For example, can community members contribute to the information delivered by ICT4D?
- Context and Power: analysing what contextual issues – including power and powerlessness – impact the flow and use of information; and assessing whether ICT4D affects these.

- Context and Value: analysis what contextual issues impact the value placed on information; this may include assessing issues like the symbolism and trustworthiness of ICT4D-delivered information vis-à-vis other information.

References
- Heeks, R.B. (2005) *Foundations of ICTs in Development: The Information Chain*, Development Informatics Group, IDPM, University of Manchester, UK
http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/index.htm#sp

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Examples of Use – *Information Needs/Mapping*

Information Needs/Mapping Example 1: *Raihan et al*	Comment	Reference
	A useful best practice guide on how to plan, implement and evaluate action research-based information needs/mapping. Offers detailed notes on methodology and the action cycle process (from problem diagnosis to exit). Extremely data rich and participatory. However, gives limited attention to the steps/resources between information and development.	Raihan, A., Hasan, M., Chowdhury, M. & Uddin, F. (2005) *Pallitathya Help Line*, D.Net, Dhaka http://www.dnet-bangladesh.org/Pallitathya_pcc.pdf Impact assessment report; Open Access; 70 pages

Focus and Level	Method	Framework Application
• Application – livelihood information services: a mobile phone-assisted help line staffed by subject matter experts (people's call centre) to meet information needs of four rural villages in Bangladesh • Impact – individual users	• Research Resource – Team of c. dozen ICT4D project members; research duration unclear • Primary – Consultative meetings with 40 villages' representatives. Four focus group discussions, surveys of information providers (24), users (80) non-users (40) and infomediaries (4). • Secondary – Background (such as socio-economics) information about villages, project documentation (such as call records, feedback sheets, questions file). • Other – Longitudinal (covering a period of more than a year); Mix of quantitative surveys and qualitative interviews; Participative for information needs (many consultations with villagers at different points)	• *Design*: longitudinal action research titled "Pallitathya Help Line". • *Information Needs*: follows a participatory action research approach through close consultation with the beneficiaries to gather information needs. Also surveys service providers. Needs cover most aspect of livelihoods including agriculture, health, skills, markets, logistics, human rights, training, government, NGOs, service providers (such as medicine sellers). • *Impact Indicators*: cost-effectiveness of four modes of service delivery, user and non-user profile, information indicators around information quality and satisfaction. • *Information Mapping*: no specific method for conducting this but user and non-user and pre- and post-implementation surveys indicate how well the service met informational expectations and requirements.

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
Very good detail on action research design and data collection method including processes and instruments used for all phases of data collection. Incorporates some aspects of Gender Evaluation Methodology.	Direct link via mobile based livelihood information systems. to ICT. Focus is on information which might or might not be ICT based.	• 97% of the users received answers of which than 80% felt that information was complete, correct and timely. "A few users were not satisfied with the received answers because the answers were incomplete or previously known to him/her." The Help Line played an important role in transferring knowledge to the villagers. • "It was observed that about 58 percent of the respondents posed questions more than once to the Help Line. Most of these questions received in the Help Line were related to agriculture and health" • "A number of people argued that the success of Help Line largely depends on linking other tangible services with it. They believe that *only information can not do any good to them if further assistance is not provided*."
Baseline/Counterfactual	**Value Chain Stage(s)**	
Baseline – through scenario analysis and survey, captures the pre-project features of the villages and information provision. Counterfactual – through survey of users and non-users.	Readiness (need for information, cost of calls), Uptake (usage/non usage of helpline), Output (information services), Outcome (benefits, service satisfaction) and Development Impact.	

Information Needs/Mapping Example 2: *Mchombu*	**Comment**	**Reference**
	A very good guide on designing information needs/mapping type impact assessment. Offers a checklist of needs and related benefits and provides guide on how to link needs to impact. Outlines the additional resources and skills that are required in the information value chain for impact to materialise. Also notes the need for evaluating the efficiency and effectiveness of information centres in understanding the impact of information on development.	Mchombu, K. *(1995)* Impact of information rural development, in: *Making a Difference: Measuring the Impact of Information on Development*, P. McConnell (ed.), IDRC, Ottawa http://www.idrc.ca/en/ev-9372-201-1-DO_TOPIC.html Pre-impact assessment report; Open Access; c.20 pages
Focus and Level	**Method**	**Framework Application**
• Application – Community information centres in three African countries (Malawi, Botswana and Tanzania) • Impact – individual, groups	• Research Resource - One researcher and community participants. Phase one two years (already completed) and phase two three years. • Primary - Phase two data was not collected. But there was a plan to conduct stakeholder consultation, up to 180 surveys from six communities • Secondary - Background information about the community • Other – Longitudinal (covering a period of five years); Qualitative (interviews) and quantitative (survey); Participatory (through community engagement)	• *Design*: two phase action research. • *Information Needs*: identifies five categories of information needs – employment, income generation, health, soil conservation, community leadership. • *Impact Indicators*: a shopping list of impacts. For example under income generation need, the anticipated benefits include find opportunities to earn off farm incomes, identify opportunities to earn extra incomes from agricultural products, learn about small businesses, be aware of basic economics and simple accounting procedures, and increase cash incomes in household. • *Information Mapping*: under each information category, lists anticipated benefits and products and services to deliver those benefits.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Very good detail on the design and data collection method with some generic information needs and impacts indicators.	No direct link to ICT. Focus is on information which might or might not be ICT based.	Not provided as this is a proof of concept and design paper rather than an actual assessment.
Baseline/Counterfactual	**Value Chain Stage(s)**	
During phase one of the project, community information needs was identified. Counterfactual not incorporated.	Output (information), Outcome (benefits of information), and Development Impact.	

Information Needs/Mapping Example 3: *Beardon et al*	**Comment**	**Reference**
	Strongly information-based approach. Very good for need identification and using that as an input for designing the structure and process of communication intervention projects. Identifies processes and power issues that affect the perceived value and usefulness of information. Does offer a list of community-specific impact indicators developed based on bottom-up participation.	Beardon, H., Munyampeta, F., Rout, S. & Williams, G.M. (2004) *ICT for Development: Empowerment or Exploitation?*, ActionAid, London http://www.reflect-action.org/Initiatives/ict/resources/publication1.pdf Pre-impact assessment report; Open access; 53 pages

Focus and Level	**Method**	**Framework Application**
• Application – Community information service centres in India, Burundi, Uganda • Impact – Micro (individual) and Meso (community)	• Research Resource – One facilitator (per community) and community groups. Action research-based, so duration might extend to a couple of years. • Primary – Extensive small group consultation in three countries • Secondary – Records of community information centres (in phase 2) • Other – Longitudinal; Qualitative; Strongly participatory	• *Design*: two-phase action research type design. Phase one focuses on planning; phase two on monitoring and evaluation. The planning phase identified information needs (as per Variant 2) using a participatory approach called Reflect. This was then used as an input to determine the nature and type of communication intervention (action) for each of the three communities. Phase two monitoring and evaluation has not been undertaken. • *Information Needs*: compiles community-specific needs (as per Variant 2) using a participatory approach. • *Impact Indicators*: applies a bottom-up participatory process to define impact indicators for each community. For example in India indicators include the number of landless families, migrants and preventable deaths. In Burundi, change in awareness, skills acquired, rate and orientation of local development. In Uganda, support, sensitivity to poor people's needs, better cooperative learning. • *Information Mapping*: does not use a specific method to map impacts to needs. Recommends using participatory review and reflection to track impacts.

Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Some pages of method description. Includes a detailed data collection protocol and guidance sheets.	Direct informational linkage to ICT4D.	Since the monitoring and evaluation phase of the project has not been undertaken, no specific findings about impact are reported.

Baseline/Counterfactual	**Value Chain Stage(s)**	
In each of the three sites extensive consultation was undertaken to identify baseline communication practices and information networks. No counterfactual data were collected.	Focus on Processes in this report rather than Impact.	

Information Needs/Mapping Example 4: *Duncombe & Heeks*	**Comment** Does not consider specific impact of ICT4D but maps with/without ICT information needs and flows of small enterprises. Provides useful checklists and method on enterprise information needs (via demand—supply gaps), and detail on methods/instruments.	**Reference** Duncombe, R.D. & Heeks, R.B. (2001) *Information and Communication Technologies and Small Enterprise in Africa: Lessons from Botswana – Full Final Report*, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/is/ictsme/full/ Impact assessment report; Open Access; c.200 pages (but all findings in Section 4)
Focus and Level	**Method**	**Framework Application**
• Application – Enterprise information practices (including use/non-use of ICTs) and needs for micro-entrepreneurs in urban and rural Botswana • Impact – Individual micro-enterprises	• Research Resource – One independent researcher for several months • Primary – Semi-structured interviews with 20 enterprises. Survey of 90 small, medium and micro-enterprises. Observation of enterprise information activities. • Secondary – Policy environment for ICT and enterprise development, and previous enterprise studies • Other – Cross-sectional; Mainly quantitative; Not participatory	• *Design*: single-phase research design only: therefore information needs assessed for current enterprise situation, whether ICT-using or not • *Information Needs*: categorises as new markets, existing customers, staff, laws, premises, finance, technology, training. • *Impact Indicators*: assesses demand—supply gap – difference between % users who feel information type is important/very important, and % who are able to access such information • *Information Mapping*: covers information lifecycle: sources and channels of information, storage and processing of information, dissemination of information. Also covers usage levels of ICTs, and barriers to use of information and ICTs.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Several pages (Section 3) of details on methods. Survey instrument available at: http://www.sed.manchester.ac.uk/ idpm/research/is/ictsme/ictsmeaf.htm	Main focus on information, not ICT4D. Assumed delivery of information by ICT4D but otherwise does not consider effects of ICT.	For urban enterprises: • Particular ongoing information gaps related to land/premises, new local customers, and management/staff training. These vary by sector (manufacturing vs. services), enterprise lifecycle stage (start-up vs. older), and location (urban vs. rural). • Key information sources were the entrepreneur themselves, customers, family/friends and foreign contacts. Key information channels were face-to-face, phone and fax. Information was mainly stored on paper or mentally. Most information was disseminated face-to-face. • Around two-thirds used word processing, 60% had a mobile phone, 40% used Internet/email. For rural enterprises: • Main information needs related to demand/markets. Almost all information systems were informal. Virtually no use was made of ICTs due to barriers of knowledge, skills, finance, and technical infrastructure.
Baseline/Counterfactual	**Value Chain Stage(s)**	
Not a before-and-after study, so no baseline. Counterfactual considered somewhat by coverage of ICT users and non-users.	Focus on Information Availability and ICT Usage	

ICT4D Impact Assessment Frameworks Compendium: Entry 8
8. Cultural-Institutional Framework

Overall, a potentially-valuable entry point to the softer factors which have a key influence on ICT4D users but which are often overlooked by other approaches. Main difficulty is that culture and other institutions are to date mainly treated as static, not dynamic; and as inputs to, not impacts of ICT4D projects. So some thought and planning required.

The Framework
In the broadest sense, this draws from new institutionalism. From this perspective, "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction." (North 1990:3). They may be formal sanctions (regulations such as rules, laws or contracts) or they may be informal sanctions (such as the norms, values and meanings bound up in the notion of culture). We can summarise the relationship to technology and human behaviour in the following way (adapted from Orlikowski 1992):

Institutional Context:
Regulations, Culture

Influences

Impacts

Invents, Designs, Uses

Human Agency

Constrains, Enables
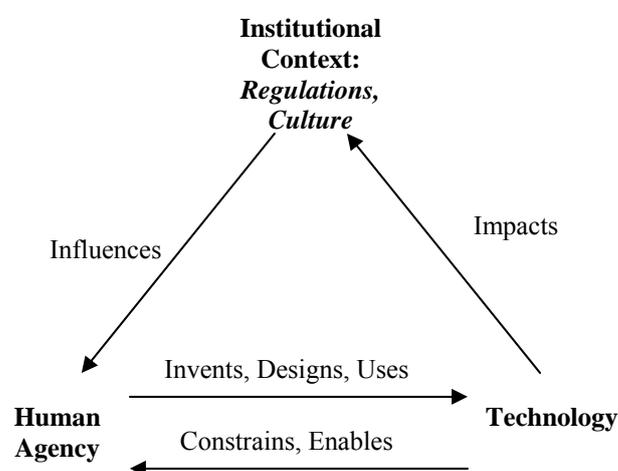
Technology

Institutions therefore have a two-way relation with the technology of ICT4D projects – they influence the way in which humans use the technology, but the technology also impacts (i.e. modifies) the institutional regulations and culture. Put another way, institutions here are seen as a dynamic phenomenon (though many studies treat them as static).

Cultural Frameworks
The component of institutions most-commonly used in ICT4D project studies is culture. Unfortunately, there is a wide variety of possible frameworks that can be used to understand and measure culture (see Dafoulas and Macaulay 2001 for a short list). Key models include the following dimensional models of culture:
- Hofstede: Power distance; Individualism/Collectivism; Uncertainty avoidance; Masculinity/Femininity, Time orientation
- Hall: High- vs. low-context communication; Time; Space; Information flow
- Trompenaars: Universalism/Particularism; Collectivism/Individualism; Neutrality/Emotionality; Specificity/Diffusion; Status; Time; Environment

These are generic but Licker (2001) offers a more ICT-specific set of cultural values:
- Fatalism: the belief that ICT is its own motive force.
- Determinism: the belief that ICT shapes the world.
- Particularism: the belief that ICT is determined differently by each society.

In general, though, these have so far been seen mainly as national-level and have been used mainly to model static inputs to projects, not impacts from projects.

Impact assessment could therefore use these frameworks but might need to extend them in two ways. First, looking at a broader range of cultural norms and values. Second, adding in impacts on the other type of institutions – formal regulatory constraints: rules, laws and contracts.

SW Analysis

Strengths
- In its full form, provides a way to assess how ICT4D affects the key influences on all human behaviour; particularly the "soft" – often rather hidden – influence of culture
- Provides an in-depth, non-techno-centric means to understand real values and practices on ICT4D project

Weaknesses
- Difficulty that institutional forces such as culture are both cause and effect in relation to ICT4D, and many ICT4D assessments to date see only one side – especially seeing culture as a static influence on (i.e. input to, not impact of) ICT4D project implementation
- Culture particularly is often seen as a national set of values, rather than something that is community-, even individual-, specific
- There are specific models and methods for investigating static, national-level, cause-oriented perspectives on culture, but little specific guidance to date in ICT4D research on the recommended dynamic, micro-level, impact-oriented perspective on institutions

Methodological Summary

Cultural-Institutional Framework		
Primary/Secondary?	Primary Required	If analysing changes to cultural norms and values. Formal institutional regulations may be recorded in documentation, though their impact in practice will not
Data-Gathering Methods?	Multiple	Most studies use in-depth interviews, but all other methods could be incorporated
Participatory?	Possible	Given the importance of individual perceptions and values. Also a number of examples of participatory research – i.e. researcher worked on ICT4D project.
Quasi-Experimental?	Rarely	Mainly adopts a case study approach
Quantitative/Qualitative?	Typically Qualitative	But quantitative approaches are equally possible
Multi-Disciplinarity?	Possible	Particularly given there are clear economic, sociological and political fractions of "new institutional" thought
Timing?	Either	But typically "quasi-longitudinal" – based on cross-sectional data-gathering but providing a historical perspective, or working during period of implementation
Level?	Micro or Meso	Depending on whether individual behaviour or group/community regulation and culture are the focus
Audience/Discipline?	Varied	Institutional ideas have a presence in most disciplines but profile is not that high in either development studies or ICT/information systems
Resource Requirements?	Variable	But typically one researcher immersing themselves in the project for a number of weeks
Generalisability From One Project?	Poor	Can generalise broad issues and generic models but not specifics of impact
Comparability Across Projects?	Poor	Given project-specific nature of institutional/cultural forces

Method Recommendations

- Treat institutions like culture as dynamic factors that both influence and are influenced by ICT4D.
- Interrogate the impact of ICT4D projects on a fuller range of "institutions" – i.e. not just culture but all formal and informal forces shaping human behaviour.
- Treat institutions like culture as something to be understand at a micro-level, not in broad-brush terms such as "national culture".
- Seek ways for more longitudinal and more participatory/action research approaches as per Mosse & Nielsen, and Heeks & Santos literature examples.
- Consider whether some development of Licker's (2001) ideas could be made to develop a framework of ICT-specific cultural values/beliefs.
- Consider the utility of Mosse & Nielsen's (2004) categorisation of institutional-behavioural practices into: Functional; Symbolic; Ritualistic.
- Overall, an interesting model for accessing softer issues but would need some further thought and specification for rigorous use in ICT4D impact assessment.

References
- Dafoulas, G. & Macaulay, L. (2001) Investigating cultural differences in virtual software teams, *Electronic Journal of Information Systems in Developing Countries*, 7(4), 1-14
  http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/37/37
- Licker, P. (2001) A gift from the gods? Components of information technological fatalism, determinism in several cultures, *Electronic Journal of Information Systems in Developing Countries*, 7(1), 1-11
  http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/34/34
- North, D.C. (1990) *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge, UK
- Orlikowski, W.J. (1992) The duality of technology: rethinking the concept of technology in organizations, *Organization Science*, 3(3), 398-427

Variants

1. ***Institutional Systems and Dualism***. This argues that, rather than seeing institutional forces, such as cultural values and regulations, as individual free-floating influences, we should recognise that there are "institutional systems" (or "institutional networks") of elements that are self-reinforcing and self-reproducing (Heeks & Santos 2007 – see summary below). These self-reinforcing systems consist of sets of formal and informal institutional forces, of human behaviours, and of organisational structures created by the behaviour and shaped by the forces.

When an ICT4D project is introduced, it often brings two differing institutional systems into contact via the ICT4D application: first, the institutional system of the project designers/implementers; second, the institutional system of the project users. This is a situation of "institutional dualism" – two differing institutional systems that now intersect. The outcome may be domination of designers' institutions, or domination of the users' institutions, or some hybrid outcome.
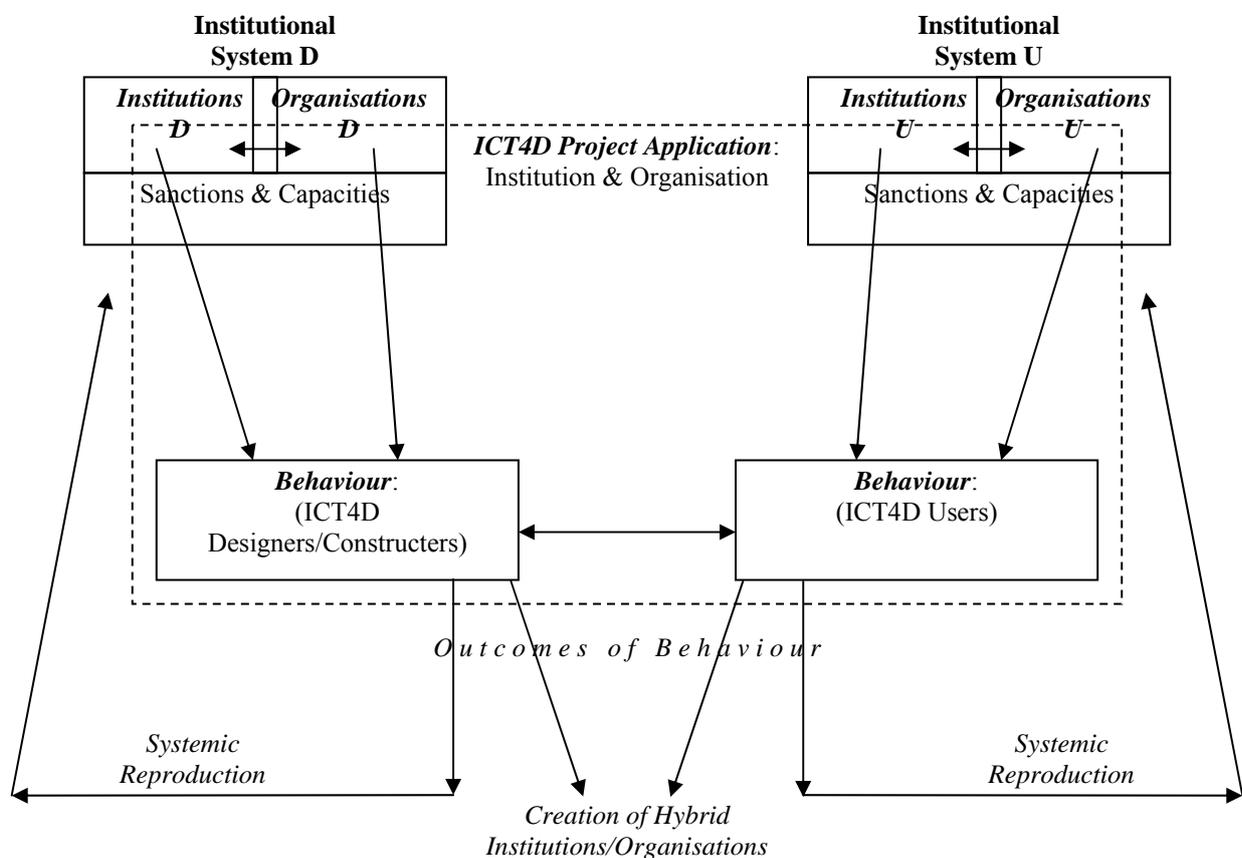
In impact assessment terms, this requires the usual focus of this approach on formal and informal constraints to behaviour, but particular attention to the different institutional constraints brought by the design group and the user group, and the way in which those constraints survive, cease, or are modified during the ICT4D project.

2. ***Institutional Isomorphism***. Draws from DiMaggio & Powell (1983) to cite three types of institutional influence on ICT4D projects that tend to make projects alike:
- Coercive isomorphism: arising from politics and the use of power, such as formal and informal pressures e.g. from donor agencies.
- Mimetic isomorphism: arising from the copying of other projects in order to reduce the uncertainty about how to proceed with ICT4D.

- Normative isomorphism: arising from the norms within the professional groupings to which ICT4D project staff perceive themselves to belong.

An example of using this to analyse an ICT project in a developing country (though in a bank rather than a traditional ICT4D setting) can be found in Bada (2004). The main impact assessment issue is that this approach treats institutional forces as influences on the design and implementation of the ICT4D project, rather than as dependent variables that are impacted by the ICT4D project.

References
- Bada, A.O., Aniebonam, M.C. & Owei, V. (2004) 'Institutional pressures as sources of improvisations: a case study from a developing country context', *Journal of Global Information Technology Management*, 7(3), 27-44
- DiMaggio, P.J. & Powell, W.W. (1983) The iron cage revisited: institutional isomorphism and collective rationality in organizational fields, *American Sociological Review*, 48, 147-160
- Heeks, R.B. & Santos, R. (2007) *Enforcing Adoption of Public Sector Innovations: Principals, Agents and Institutional Dualism in a Case of e-Government*, unpublished paper, Development Informatics Group, IDPM, University of Manchester, UK [available on request]

Richard Heeks

Examples of Use – *Cultural-Institutional Framework*

Cultural-Institutional Example 1: *Griswold et al*	Comment	Reference
	Looks just at culture, not at all institutions. Provides no framework or checklist, but discusses the cultural norms and values associated with ICT. Relatively limited in the guidance for IA practice that it offers.	Griswold, W., McDonnell, E.M. & McDonnell, T.E. (2006) Glamour and honor: going online and reading in West African culture, *Information Technologies and International Development*, 3(4), 37-52 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.3.4.37 Refereed journal article; Open Access; 16 pages

Focus and Level	Method	Framework Application
• Application – a variety of internet cafes and school-based Internet access in parts of Accra, Lagos, and some other parts of urban Nigeria • Impact Level – individual recipients	• Research Resource – three independent researchers for several months • Primary – Observation in cybercafes, interviews with a few cybercafe managers, and focus groups in three schools (unclear how many involved) • Secondary – Not stated • Other – Cross-sectional; Mainly qualitative, though some implicit quantification of how time is spent; Not participatory	Implicitly uses the triangular model – focuses on a particular human agency/behaviour (reading) which it sees as regulated by local culture. That culture, in turn, may be impacted by the introduction of ICT4D. (Does also complete the triangle by recognising how reading-type behaviours are part of the usage of ICTs.) In looking at the impact of technology on institutions (culture), contrasts the change vs. reinforcement views. Implicitly considers some notion of institutional systems (see Variant 1): reinforcing groups of norms, values and practices.

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
Just a single paragraph. Focus group, but not interview, questions provided.	Recognises the duality between culture (institutions) and ICT: that particular norms and values come to be associated with ICT; both affecting and being affected by ICT.	Going online eats into time for phone calls, television, letter-writing, hanging with friends. But does not eat into reading time. Reading and going online are seen as too separate institutional systems. Reading is private and home/room-based and linked to cultural values of elitism, wisdom and honour. Going online is public and café-based and linked to cultural values of youth, globalisation and glamour.

Baseline/Counterfactual	Value Chain Stage(s)	
No baseline survey conducted. No consideration of counterfactual/non-exposed actors.	Key focus on Use (both online and book reading practices) but also consideration of Outcomes (cultural norms and values)	

Cultural-Institutional Example 2: *Mosse & Nielsen*	**Comment**	**Reference**
	An example of ICT4D action research with a useful three-way characterisation of "practices" (behaviour+institution combinations) that could be used on other IA. Does reinforce the value of longitudinal and in-depth research in order to study impact of culture and other institutions.	Mosse, E. & Nielsen, P. (2004) Communication practices as functions, rituals and symbols, *Electronic Journal of Information Systems in Developing Countries*, 18(3), 1-17 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/112/112 Refereed journal article; Open Access; 17 pages
Focus and Level	**Method**	**Framework Application**
• Application – study of communication practices in one Mozambican health district at time of introducing new ICT-based health information system • Impact Level – individual recipients	• Research Resource – Two researcher-implementers for four months • Primary – Interviews and discussions; Observation of actual practices; Participant observation (one researcher was also a trainer and facilitator for the project) • Secondary – Project documents • Other – Quasi-longitudinal (shortish period but spanned the introduction of ICT4D system); Qualitative; Participation in project of one researcher	Implicit use of the triangle model: sees "practices" – human behaviour guided by a mix of institutional forces – as falling into three types: • Functional: to achieve rational purposes e.g. sending an email to communicate information to assist a decision • Symbolic: "to present and legitimize a rational organization to external constituencies" e.g. using ICTs to be seen as modern and effective by donors • Ritualistic: as a means to reinforce membership of a particular community e.g. contributing to a dGroup to be seen as part of the membership of that group Sees these practices (behaviour-institution combinations) as both affecting and affected by ICTs. Implicit, verging on explicit, use of the institutional dualism model, contrasting traditional practices with different institutional forces around, and inscribed into, ICT being introduced.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Three paragraphs on method. No details of research instruments.	Recognises the duality between practices (behaviour+institution) and ICT: that particular norms, values and behaviours impact whether and how ICT is used, but are in turn impacted when ICT is used.	Describes the three types of practices at health facility, district and provincial level. For example, at provincial level, typing health data received into health IS and producing reports can be understood three ways: • Functional: to produce aggregated health statistics. • Symbolic: to demonstrate to Ministry and donor officials the credibility of province staff and the authenticity of their work.
Baseline/Counterfactual	**Value Chain Stage(s)**	• Ritualistic: to reinforce membership of the health IS team.
No formal baseline survey but proxied by observing pre- and post-ICT practices. Counterfactual observed via those settings yet to have ICTs or resisting intended implementation of ICTs.	Key focus on Use (both ICT- and paper-based practices) but also consideration of Outcomes (impact on functional, symbolic and ritualistic practices).	ICTs do not have a deterministic impact on these three, but can see how they might conflict – e.g. that ICTs could enhance functional and symbolic practices but damage ritualistic practices, and so not be fully utilised.

Cultural-Institutional Example 3: *Heeks & Santos*	**Comment** Rather dense "academic" style of writing, and at least half the paper focuses on how to enforce adoption of ICT4D. But does also discuss impact of ICT4D introduction on institutional forces and systems.	**Reference** Heeks, R.B. & Santos, R. (2007) *Enforcing Adoption of Public Sector Innovations: Principals, Agents and Institutional Dualism in a Case of e-Government*, unpublished paper, Development Informatics Group, IDPM, University of Manchester, UK Impact assessment report; Restricted Access [but available from author]; 22 pages
Focus and Level	**Method**	**Framework Application**
• Application – a public health expenditure e-government system introduced across all levels of Brazilian government (inc. all 5,559 municipalities) • Impact Level – individual recipients and individual municipalities (local governments)	• Research Resource – One semi-independent researcher for several months spread over two years • Primary – Interviews with 25 project staff. Survey of 80 project staff. Two focus group sessions. Some participant observation. Not clear what different data was collected by different means. • Secondary – "archives, government documents, and state-level support unit files" • Other – Longitudinal (during different stages of ICT4D implementation); Mainly qualitative but some quantitative (on levels of use of ICT4D system); Limited participatory observation as researcher invited to attend and contribute to meetings in latter stages	Explicit use of the ideas of institutional systems and dualism (see Variant 1). The ICT4D application brings into conflict the "traditional" institutional system of most potential ICT4D users (based on values of centralisation, exclusion, fragmentation, unaccountability and politicisation) and the "new" institutional system of the ICT4D designers/implementers (based on values of "decentralization, public participation, integrated services, audit, and impartial decision-making"). Also makes use of a three-element "enforcement framework" – for understanding how ICT4D designers seek to force users to adopt their ICT4D application.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
One page on actual method, plus one page justifying methodology used. No instrument provided.	Recognises the duality between institutional systems (norms/values+behaviour+structures) and ICT: that institutional systems impact whether and how ICT is used, but are in turn impacted when ICT is used.	Because of "institutional dualism", there has been a lot of resistance to using the new ICT4D system. In terms of impact, three types of outcome are seen: • Those that reinforce the traditional institutions e.g. political capture of councils supposed to monitor use of the system • Those that reinforce the new institutions e.g. attempts to mandate use of the new system by law. • Those that are hybrids between the two sets of institutions e.g. amendments to the design of the ICT4D system to make it more likely to be used.
Baseline/Counterfactual	**Value Chain Stage(s)**	
Does consider the history and pre-existing situation prior to ICT4D introduction. Counterfactual observed via those municipalities resisting use of ICTs.	Main focus on Inputs (esp. values) and Use, but also consideration of Outcomes (impact on cultural-institutional forces).	

ICT4D Impact Assessment Frameworks Compendium: Entry 9a
9a. Enterprise (Variables)

Comprehensive in its coverage of all aspects of an enterprise and, hence, in its potential to assess all aspects of ICT4D impact. Actual assessment would need to narrow down on a sub-set of variables: performance variables being the most outcome-relevant. Overall, this would be the starting point for assessment. The Relations Model (see Entry 9b) can be added to get a better understanding of networks and communications; the Value Chain Model (see Entry 9c) can be added as a key means to chart the impact.

The Framework
A significant amount of work has been done on enterprise in development, producing a variables model that can be used to assess the impact of ICT4D.
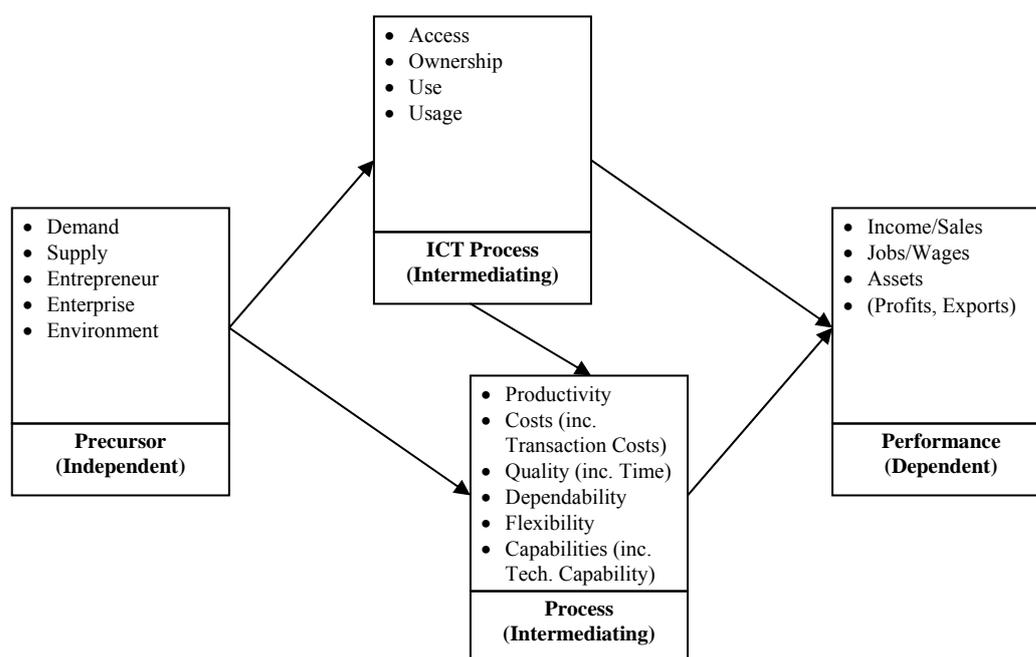
To understand the impact of ICT4D on enterprise, the impact of ICT4D on any or all of these elements of the Enterprise Variables Model can be investigated.

Precursors: these are a set of independent variables that are found to impact the performance of an enterprise:
- *Demand*: the nature and size of the market that exists for the enterprise's products or services.
- *Supply*: the ability to access inputs such as materials, labour, finance.
- *Entrepreneur*: the economic and social status, expertise, attitude/motivation, and other background of the entrepreneur.
- *Enterprise*: the managerial systems and methods used, and the nature of the enterprise.
- *Environment*: external factors such as economic situation, location, policy and competition

A detailed list is shown below under Variant 1. An example is the work of Duncombe & Heeks (2001), which investigates the impact of ICTs on barriers to information for enterprise – one of the input variables. Alternatively, one might look at the impact of ICT4D on the development of "entrepreneurship".

ICT Process: these are intermediating variables that can be taken as proxies or precursors to the impact of ICT4D on enterprise performance. Example variables/impact indicators include:

*   *ICT Availability*: the extent to which entrepreneurs are able to access ICTs
*   *ICT Ownership*: the extent to which entrepreneurs themselves own ICTs
*   *ICT Use*: the extent to which entrepreneurs actually use ICTs
*   *ICT Usage*: the actual uses to which entrepreneurs put ICTs

Slightly harder to assess, Duncombe & Heeks (2001) talk of enterprises going through an information "transition point". This is "the point – or, more accurately, the process – of transition from entirely informal to more balanced formal/informal information systems." It is required "when the enterprise reaches the capacity and compatibility limits of its informal information systems." One impact, therefore, of ICT4D may be to usefully hasten enterprises through the transition point.

Wholly Informal Information		Wholly Formal Information
	Making the Transition →	
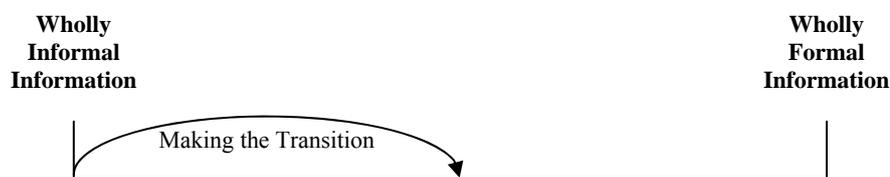
Process: these are a set of variables that measure the processes within an enterprise. In some sense, they intermediate between the precursors and the actual performance of the enterprise. Thus the impact of ICT4D on these, also, may be seen as intermediate to the actual performance of the enterprise. In more detail, the variables are (adapted from Lefebvre & Lefebvre 1996):

*   *Productivity*: typically represented either as the cost of standard outputs in terms of labour inputs required (e.g. 200 bottles produced per member of staff per day) or financial expenditure inputs required (e.g. US$200 per training session produced). The typical intention is that ICT would improve both productivity measures.
*   *Costs*: very much allied to productivity measures, this looks – independently of the level of outputs – at one or several of labour, raw material, and equipment costs. The typical intention is that ICT would reduce costs. This might be interpreted in terms of the impact of ICT on the price of the goods or service produced by the enterprise.

ICT4D Impact on Transaction Costs

Transaction Costs: a particular focus for enterprise ICT4D impact assessment has been transaction costs – normally understood as the costs associated with undertaking trade transactions (buying from suppliers, or selling to customers). For example, Annamalai & Rao (2003) break down farming enterprise transactions into five elements – commission; handling/transit losses; labour costs; bagging/weighing; and transportation. They then assess the impact of ICT on each one of these.

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*   *Quality*: the quality of the product or service produced by the enterprise. The typical intention is that ICT would improve quality. As a more "upstream" issue, one might assess ICT4D impact on the quality of management, or of working conditions. A key element of quality is lead time – the time taken to produce the product or service: does ICT4D reduce this?
*   *Dependability*: allied to quality, this looks at the degree to which the enterprise can be trusted to produce what it promises (e.g. to schedule), or the degree to which its equipment and production process can be trusted to keep working. The typical intention is that ICT would increase dependability.

- *Flexibility*: the degree to which the enterprise can cope with change in terms of its processes, labour, equipment, and management. Changes could be required customisation, or competing products/services, or sales fluctuations (e.g. a large new order), or other challenges such as loss of staff. The typical intention is that ICT would increase flexibility.

A detailed list of possible indicators allowing assessment of ICT impact on these variables is provided in Appendix E of Lefebvre & Lefebvre 1996 (http://www.idrc.ca/ict4d/ev-30737-201-1-DO_TOPIC.html).

- *Capabilities*: the skills, knowledge and attitudes bound up within the enterprise. The typical intention is that ICT would expand capabilities. One particular case is that of "technological capability" which can be read as a measure of innovation. This is a process indicator but is so critical in longer-term enterprise performance that it is often regarded as a performance measure. ICT4D's impact would be assessed as positive to the extent it enabled movement up the categories shown below (and regardless of whether or not the final stage is attained).

Scale of General Technological Capability

Level 1. Non-production operational capabilities
- 1a: Using the main production technology involved in producing the enterprise's goods or services
- 1b: Choosing the technology
- 1c: Training others to use the technology

Level 2: Non-production technical capabilities
- 2a: Installing and troubleshooting the technology

Level 3: Adaptation without production
- 3a: Modifying the finished good or service to meet local consumer needs

Level 4: Basic production
- 4a: Copying the main production technology to make new examples
- 4b: Assembling the main production technology
- 4c: Reproducing the entire main production technology to create a new production site using existing products and processes

Level 5: Minor production modification
- 5a: Modifying the product and production process to meet consumer needs

Level 6: Production redesign
- 6a: Redesigning the product and production process to meet local consumer needs
- 6b: Redesigning the product and production process to meet regional/global consumer needs

Level 7: Innovative production
- 7a: Developing a new product with production process innovation to meet local consumer needs
- 7b: Developing a new product with production process innovation to meet regional/global consumer needs
- 7c: Developing a completely new production process
- 7d: Transferring a new production process to other producers

Source: Heeks (2008).

Enterprise Performance: this measures the impact of ICT4D on key enterprise performance indicators, which are typically quantitative

- *Income/Sales*: ICT4D's impact on the overall revenues of the enterprise; these might be proxied in terms of sales or the owner's income from the enterprise. An even simpler proxy may be number of customers or frequency of orders.

- *Jobs*: ICT4D's impact on the number of people employed in the enterprise. If appropriate, one could also look at employee income, and also at more qualitative measures – the skill levels of job, job security, working hours, and working conditions.
- *Assets*: ICT4D's impact on the assets (e.g. equipment, accommodation) owned by the enterprise.

Looking at the impact of ICT4D on profitability may be of interest but is not often possible given data limitations. Likewise impact of ICT4D on exports may apply only in a limited number of cases.

SW Analysis

Strengths
- Provides a comprehensive and systematic means to understand the impact of ICT4D on enterprise.
- Broad coverage allows flexibility and ability to focus on specific areas of interest.

Weaknesses
- In at least some ways, this approach transfers and downsizes Northern models of large enterprise. The actual applicability of methods may not match field realities. This can be a matter of data. Even simple measures – like the impact of ICT4D on sales – may be hard to assess if, as can easily be the case with microenterprises, there are no accounts or even no written records at all. Or it may be a rather subtler issue of concepts. Trying to measure the impact of ICT4D on jobs or wages may be difficult if the relations between "owner" and "employee" are social rather than the contractual-financial norms assumed in Northern large enterprise. Assumptions about the value of ICTs in reducing requirements for labour may be turned upside-down in a situation where providing jobs for extended family members is a critical goal of enterprise.
- The Enterprise Variables Model potentially contains dozens of variables and even more indicators, requiring further narrowing down. In some ways, as one moves from left to right in the model (at least, from ICT process to process to performance), the variables become more relevant to actual development outcomes but also become harder to measure and/or harder to link directly in a cause—effect manner to ICT4D.
- Home-based, informal enterprises and failed enterprises can be hard to identify and include.

Methodological Summary

Enterprise Variables		
Primary/Secondary?	Primary Required	Unless enterprise keep, and will allow access to, good written records
Data-Gathering Methods?	Multiple	Given the wide variety of different possible variables that could be studied
Participatory?	Possible	For example, getting entrepreneurs to define what variables are important to them; perhaps particularly what enterprise performance variables they value
Quasi-Experimental?	Possible	For example comparing ICT users vs. non-users, or comparing different levels of ICT usage (e.g. see Duncombe & Heeks (2001))
Quantitative/Qualitative?	Both	Typically more quantitative for enterprise performance, costs and ICT process; more qualitative for other variables
Multi-Disciplinarity?	Possible	Given the broad variety of different variables; though a business studies flavour pervades many impact assessments
Timing?	Either	Most work is cross-sectional but Donner (2007) notes only longitudinal work may really provide the performance data and cause—effect foundation needed
Level?	Micro	Focuses on the individual entrepreneur and/or their enterprise
Audience/Discipline?	Business Studies	May only have a relatively niche audience e.g. in development agencies
Resource Requirements?	Variable	Depending on the number and type of variables that IA seeks to cover
Generalisability From One Project?	Modest	Micro-enterprises have some common features across many developing countries, but projects typically do not encompass a large number of enterprises, and generalisability may be restricted to same-sector enterprises
Comparability Across Projects?	Fair	Assuming use of a common set of defined variables

Method Recommendations
- Focus on just one or two areas and variables of the Variables Model if it is not to become very resource-intensive.
- Where appropriate, incorporate a genderised approach to variables.
- Differentiate enterprises (e.g. in terms of formality or lifecycle stage: see Variant below) and entrepreneurs (e.g. in terms of sex, and in terms of motivation: see Variant below) to understand which variables are particularly pertinent.
- Consider how home-based and other informal enterprises will be identified and included.
- Consider how failed enterprises will be identified and included, if appropriate.
- Consider whether a livelihoods assets approach (see Variant below) would the appropriate approach, particularly for more informal/survivalist-type of micro-enterprises.
- Overall, some part of this model would be the obvious way to assess ICT4D impact on enterprise.

References
- Donner, J. (2007) Customer acquisition among small and informal businesses in urban India, *Electronic Journal of Information Systems in Developing Countries*, 32(3), 1-16 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/464/232
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  >>See summary of full report in Information Needs/Mapping compendium entry
- Heeks, R.B. (2008) *Researching ICT-Based Enterprise in Developing Countries: Analytical Tools and Models*, Development Informatics working paper no.30, IDPM, University of Manchester, UK
  http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp30.htm
  >>Also contains ideas about other possible enterprise assessment models.
- Lefebvre, E. & Lefebvre, L.A. (1996) *Information and Telecommunication Technologies: The Impact of Their Adoption on Small and Medium-Sized Enterprises*, IDRC, Ottawa
  http://www.idrc.ca/ict4d/ev-9303-201-1-DO_TOPIC.html
  >>Chapter 4 discusses impact of ICTs; Appendices E, F and G suggest possible indicators for assessing ICT impact. There is no particular focus on developing countries.

Variants

1. *Entrepreneur/Enterprise Categorisation*. The impact assessment approach described above has been blind to the particular motivations of the entrepreneur. However, we can identify three different types of entrepreneur (Heeks 2008):

- *Survivalists* are those who have no choice but to take up the income-generating activity because they have no other source of livelihood. Income provided may be poverty-line or even sub-poverty-line. Most "entrepreneurs" in developing countries are of this type, and Mead (1994) describes them as "supply-driven": forced into enterprise by push factors related to their poverty and lack of opportunity.
- *Flyers* are true entrepreneurs who have taken up enterprise because they see opportunities for growth. Income levels may meet more than basic needs, and enterprises may graduate to the medium-scale category. Only a very small proportion of developing country small entrepreneurs fall into this category. Mead describes them as "demand-driven": pulled into enterprise by factors such as the opportunity for profit.
- *Trundlers* fall in between the two other groupings and represent those whose enterprise turnover is roughly static and who show no great desire or no great capacity to expand. Income provided will be enough to meet basic needs. These form the second-largest group of small entrepreneurs in developing countries, and their stasis reflects the relative lack of strong external push/pull factors.

As already seen from this description, different patterns of variables will be relevant to these different groups. Therefore ICT4D impact assessment would focus on different variables for these different entrepreneur categories, or would generalise within but not between categories. These categories are sometimes proxied by income, or by the *informal—formal dichotomy* (typically understood in terms of whether enterprise is registered or not). See also Esselaar et al (2007) categorisation.

2. *SWOT*. Assesses the impact of ICT4D on four key sets of enterprise variables:

- *Strengths*: areas where internal and external business factors are strong and where constraints have been overcome. For example, ICT4D might create a new strength for the enterprise in its communication with customers.
- *Weaknesses*: areas that are still significant internal constraints. For example, ICT4D might create a new weakness for the enterprise in its lack of ICT skills.
- *Opportunities*: areas of possible growth and positive environmental factors. For example, ICT4D might create a possible new income stream for the enterprise in data entry work.
- *Threats*: external factors that might jeopardise the future of the enterprise. For example, ICT4D might create a new vulnerability of the enterprise to ICT breakdown.

3. *Livelihood Assets*. This views enterprise performance through the lens of the sustainable livelihoods framework; specifically the assets identified in the framework: Financial (earnings, savings); Physical (producer goods, infrastructure); Human (skills, attitude, health, knowledge), Social (networks, relationships – see Enterprise Relations Model for more details), Political (empowerment, mobilisation, status, gender relations).
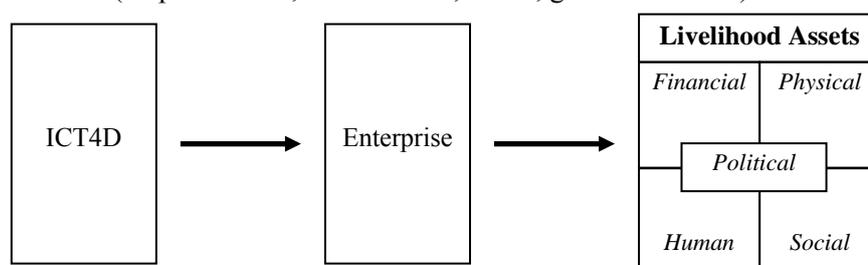
Compared to the enterprise performance variables listed above, this gives a fuller picture of the actual impact that ICT4D has had on the lives of individual entrepreneurs and enterprise employees. See Compendium Entry on Livelihoods Framework for further details.

4. *Enterprise Lifecycle Categorisation*. The impact assessment approach described above has been blind to the particular lifecycle stage of the enterprise. However, the impact of ICT4D may be different at different stages. Typically, the stages are divided into three:
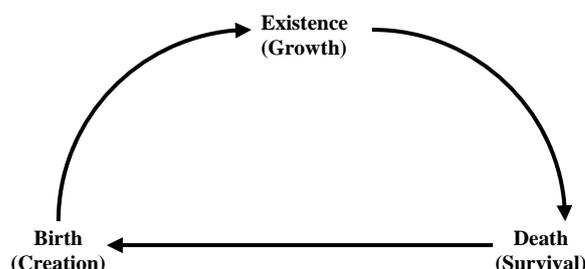
- *Birth*: focusing on the impact of ICT4D on the creation of new enterprises. To the variables listed above, one would at least add assessment of ICT4D impact on numbers of new enterprises formed.
- *Existence*: focusing on the impact of ICT4D on the growth of existing enterprises. To the variables listed above, one would at least add assessment of ICT4D impact on change in enterprise performance variables over time.
- *Death*: focusing on the impact of ICT4D on the survival of existing enterprises. To the variables listed above, one would at least add assessment of ICT4D impact on longevity of enterprises.

Although the factors affecting these three stages overlap considerably, they are not do not exactly coincide. To give a very simplistic example, the presence of ICT4D might motivate villagers to create a new enterprise but, in the long-run, not help that enterprise to survive.

Summary of Factors Influencing the Enterprise Lifecycle

	Birth Rates	**Growth**	**Survival**
Demand Factors			
Market demand	+ +	+ +	+ +
Perceived greater than current income	+ +	+ +	+ +
Supply Factors			
Barriers to finance	− −	− −	− −
Barriers to skills/labour	− −	− −	− −
Barriers to technology	− −	− −	− −
Barriers to information	− −	− −	− −
Barriers to premises, land, production inputs, and infrastructure	− −	− −	− −
Entrepreneur Factors			
Unemployment	+ + (+)	−?	?
Previous small enterprise experience	+ +	0	?
Previous experience of same sector	0	0	?
Entrepreneurial personality	+	+	?
Motivation	?	+	?
Educational attainment	+(?)	+(?)	+?
Family history in business	+	0	?
Previous managerial experience	+	+	?
Marketing experience	?	+?	?
Sex	+?	−?	−?

	Birth Rates	Growth	Survival
Membership of immigrant or other marginalised group	+?	?	?
Training	+?	+?	?
Cultural factors	=?	=?	?
Age	0	0?	?
Enterprise Factors			
Sound enterprise financing	?	+	+
Product and customer range	?	0?	+
Positioning and innovation	?	+	+
Enterprise growth	n.a.	n.a.	+ +
Business planning	?	+	?
Enterprise age	n.a.	–	!
Recruitment of managers	?	+	?
Operational sector	=	=	0?
Ownership and form of enterprise	?	=	?
Enterprise size	–	?	+ +
Environmental Factors			
Unemployment levels	+ +	–??	?
Overall wealth	0	0	?
Increase in disposable income (or GDP growth rate)	+	?	?
Urban/rural location	+?(urban)	=	?
Proximity of other small firms	+	?	+
Government policy	=	=	?
Current contextual trends	=	=?	?

Key: + +: strong positive association   =: an association but too complex to simplify
          +: some positive association   as either positive or negative
          0: no association   ?: too few studies or too much disagreement
          –: some negative association   to be certain
          – –: strong negative association   n.a.: not applicable

Sources: Heeks 2008

A summary of variables associated with each particular lifecycle aspect is given below. These could form the focus for ICT4D impact assessment attention, depending on the particular lifecycle aspect that is of interest.

Birth:
- The existence of market demand and the perception of greater than current earnings
- Entrepreneur unemployment, experience in small enterprise, management experience, personality, level of education, family history in business
- Minimisation of barriers to finance, skills/labour, technology, information, other inputs
- Unemployment levels, disposable income/GDP growth, some government policies

Growth:
- The existence of market demand and the perception of greater than current earnings
- Entrepreneur management experience, motivation, level of education
- Minimisation of barriers to finance, skills/labour, technology, information, other inputs
- Enterprise sound finance, positioning and innovation, business planning, youth, manager recruitment, multiple founders
- Some government policies

Survival:
- The existence of market demand and the perception of greater than current earnings
- Minimisation of barriers to finance, skills/labour, technology, information, other inputs

- Enterprise sound finance, breadth of product/customer range, positioning and innovation, growth, size

5. ***Sectoral Competitive Advantage***. Most ICT4D impact assessment will focus on a few micro-enterprises in one location. An alternative would be to focus on one sector within a country (e.g. the textile sector or the food processing sector). Porter's (1990) diamond of competitive advantage determinants could then be applied, looking at ways in which ICT4D had affected those determinants and, in turn, had affected measures of sectoral competitive advantage. Such measures are generally confined to sectors that are significant exporters. See Heeks (2006) for further details of applying this model.
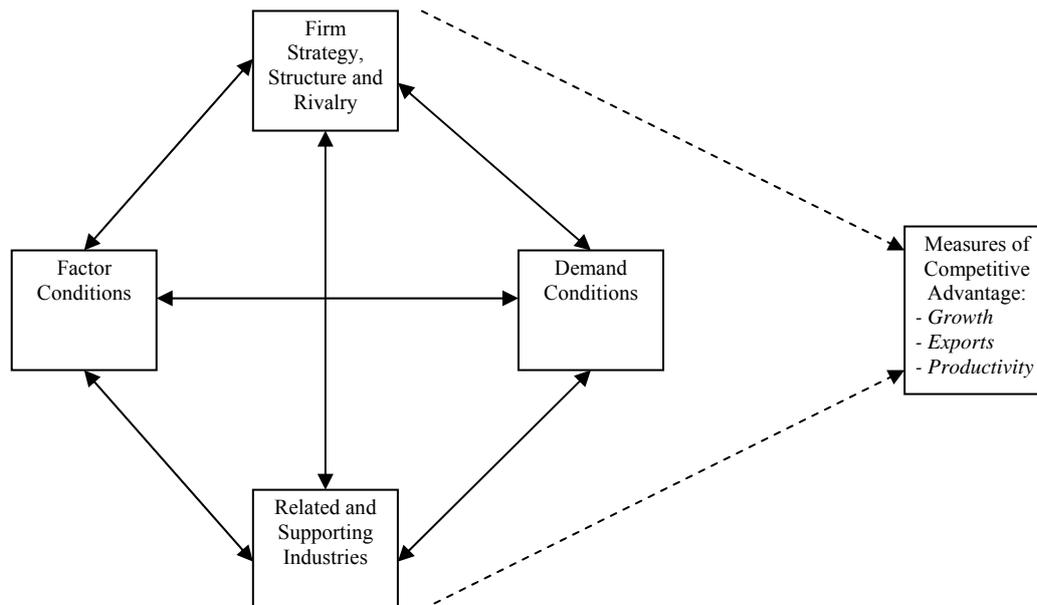
6. ***Calculating Variable Relations Strength***. Antecedent to studying the impact of ICT on precursor or process variables, one could ascertain the quantitative contribution of those variables to enterprise performance. This allows a prioritisation of the variables – understanding those on which the impact of ICT4D will have greatest effect on enterprise performance. See Vaughan & Tague-Sutcliffe (1997) provide an example, showing – for instance – the contribution that information usage makes to successful enterprise performance.

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Richard Heeks

Examples of Use – *Enterprise Variables*

Enterprise Variables Example 1: *Karanasios & Burgess*	Comment	Reference
	Focuses only on a limited, specific part of the Enterprise Variables Model – ICT Process, though does give perceived impact on enterprise performance. "Spaces" model is more a simple checklist than a model. Overall, does not offer breadth or depth of guidance for IA of Enterprise Variables.	Karanasios, S. & Burgess, S. (2006) Exploring the Internet use of small tourism enterprises: evidence from a developing country, *Electronic Journal of Information Systems in Developing Countries*, 27(3), 1-21 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/254/179 Refereed journal article; Open Access; 21 pages
Focus and Level	**Method**	**Framework Application**
• Application – use of ICTs by 14 tourism small enterprises (<20 staff) in urban, rural and semi-rural Malaysian Borneo • Impact Level – individual enterprises	• Research Resource – One independent researcher; Unstated time period • Primary – Semi-structured interviews • Secondary – Study of enterprise web sites • Other – Cross-sectional; Mainly qualitative (e.g. reasons for particular web development approaches); Non-participatory	In terms of the Enterprise Variables Model, this focuses on the impact of ICT4D on ICT Process. Rather than the measures indicated in the Model diagram, this uses a model of four "virtual spaces": • Information Space: through which enterprises display and access information • Communication Space: through which enterprises communicate with other stakeholders • Distribution Space: through which enterprises can distribute digitised products/services (not relevant to the Malaysia study) • Transaction Space: through which enterprises initiate and execute business-related transactions
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Two pages on method, though mainly about sample selection. No instruments provided.	Direct link given the focus on ICT process, and then gives perceptions of entrepreneurs about link from ICT process to enterprise performance (measured in customer numbers).	In relation to the virtual spaces: • Information Space: two-thirds of enterprises had their own web site. These were static and held just basic information for customers; mainly developed by family or friends. Almost all also made use of tourism portal sites. Web presence had increased the number of customers. • Communication Space: all enterprises used email and had led to increased interaction with tourism intermediaries both online (e.g. tourism directories) and other (e.g. local travel agents). 60-90% of customer bookings occurred via email, and email had increased the number of customers.
Baseline/Counterfactual	**Value Chain Stage(s)**	
No baseline survey conducted. No consideration of counterfactual/non-user actors.	Focuses on Outputs (ICT process measures) and Outcomes (e.g. customer numbers)	• Transaction Space: no usage Cost was not seen as a significant barrier though ICT capabilities and connectivity were for some.

Enterprise Variables Example 2: *Esselaar et al*	Comment	Reference
	Frustrating presentation of findings with key impacts not discussed or discussed obscurely. As a basic model, though, looks a potentially-interesting way of following a quantitative approach to IA of ICT4D on enterprises. Useful categorisation of enterprise by formality.	Esselaar, S., Stork, C., Ndiwalana, A. & Deen-Swarray, M. (2007) ICT usage and its impact on profitability of SMEs in 13 African countries, *Information Technologies and International Development*, 4(1), 87-100 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.87 Impact assessment report; Open Access; 14 pages
Focus and Level	**Method**	**Framework Application**
• Application – ICTs in over 3,500 small and medium enterprises (<50 staff) in urban locations in 13 African countries • Impact Level – individual enterprises	• Research Resource – Independent research team; unclear time span • Primary – Questionnaire survey • Secondary – Unclear • Other – Cross-sectional; Quantitative; Not participatory	In terms of the Enterprise Variables Model, this focuses on the impact of ICT4D on: • ICT Process: based on three rating scale indices. a) Ownership (of phones, fax, PO box, PC, Internet); b) Use (of each ICT type either to communicate with clients or to order supplies); and c) Usage intensity (calculated from dividing use index by ownership index) • Process (labour productivity) • Enterprise Performance (profitability; sales turnover) Uses a three-way enterprise categorisation based on registration and record-keeping: informal; semi-formal, formal.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Two pages on method.	Appears to assume causal links to enterprise performance that are not appropriate to statistical associations presented.	Does not provide direct data on ownership and use (i.e. what % of SMEs have/use a mobile or have/use an Internet connection). Does not provide data on relation between ICTs and profits. Findings that are presented: • Mobiles are by far most widely-used ICT. • Ownership and use of all ICTs increases from informal to semi-formal to formal, but usage intensity is the opposite.
Baseline/Counterfactual	**Value Chain Stage(s)**	• ICT usage is positively correlated with higher labour productivity,. ICT expenditure is positively correlated with higher sales turnover. Conclusions appear to make unwarranted leap from correlation to causation. • Key obstacle to further diffusion is high cost of ICTs – proportionately higher for informal than formal enterprises.
No baseline. Counterfactual covered by differing levels of ICT ownership and use.	Main focus on Outputs (ICT process indices and productivity) and Outcomes (turnover).	

ICT4D Impact Assessment Frameworks Compendium: Entry 9b
9b. Enterprise (Relations)

Charts the way in which ICT4D affects the networks and relations that an enterprise has. Slightly tangential to the key developmental outcomes typically sought from enterprise, but highlights the interactional and transactional communications capabilities of ICTs. Overall, a rather specialised approach to ICT4D IA that would need to be combined with a more outcome-focused approach (e.g. the enterprise performance part of the Enterprise Variables Model (see Entry 9a)).

The Framework
As illustrated, enterprises may have a broad range of stakeholders and contacts.

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                        ┌─────────────────────┐
                        │  Social Institutions│
                        │                      │
                        │  - Household         │
                        │  - Family/Friends    │
                        │  - Community         │
                        │  - Community-Based   │
                        │  Organisations       │
                        └──────────┬──────────┘
                                   │
┌────────────────────┐  ┌─────────┴──────────┐  ┌──────────────────┐
│Political Institutions│ │  Focal Enterprise  │  │    Economic      │
│                     │ │                     │  │  Institutions    │
│  - Government       │◄┼►- Entrepreneur/Owner│◄─┼►                 │
│  - NGOs             │ │  - Employees        │  │  - Markets       │
│                     │ │                     │  │  - Suppliers     │
│                     │ │                     │  │  - Customers     │
│                     │ │                     │  │  - Competitors   │
└─────────────────────┘ └─────────┬──────────┘  └──────────────────┘
                                   │
                        ┌──────────┴──────────┐
                        │   "Infrastructural" │
                        │     Institutions    │
                        │                      │
                        │  - Banks/Finance     │
                        │  - Schools/Colleges  │
                        │  - Utilities         │
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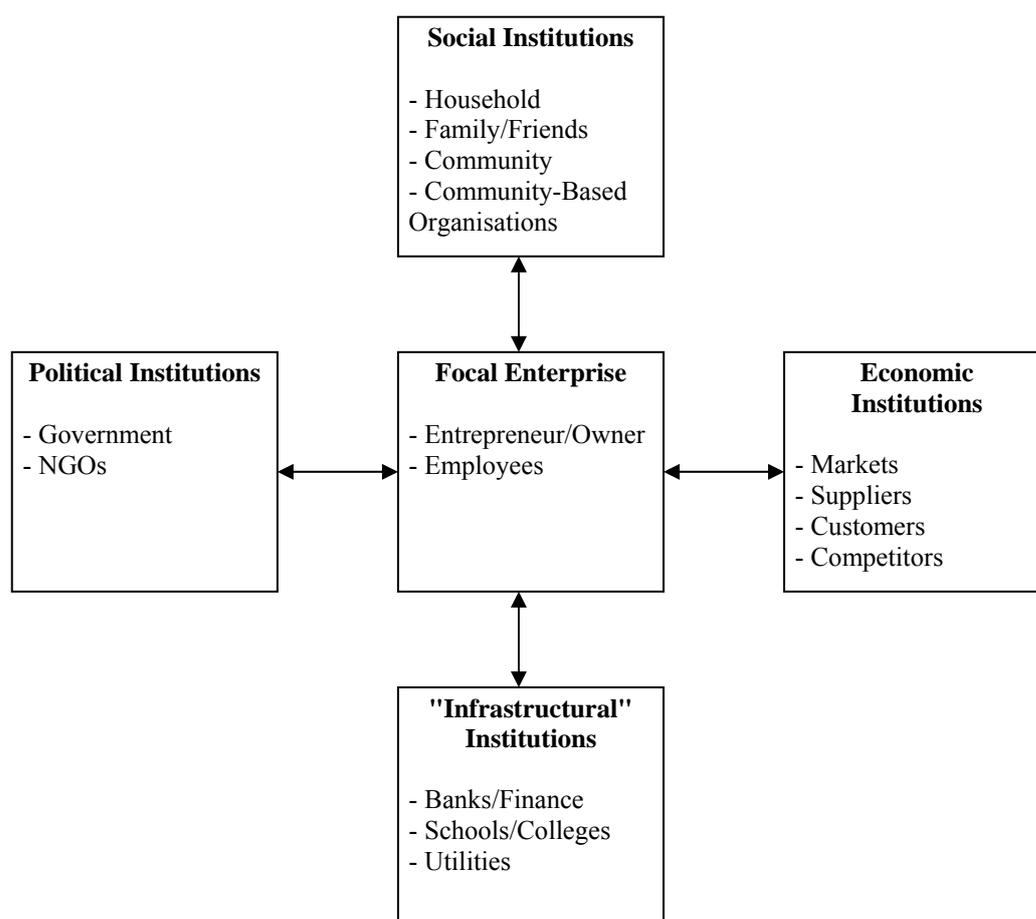
These stakeholders could be further broken down into:
- Primary stakeholders: those directly interacting with the enterprise.
- Secondary stakeholders: those only indirectly interacting with the enterprise (e.g. via some intermediary).
- Key stakeholders: those that have the power to significantly influence the operation of the enterprise (may be either primary or secondary).

In ascertaining the impact of ICT4D on these other stakeholders, a number of factors can be assessed. For example:
- Nature: how interaction with or influence of the stakeholder occurs; how often; and through what channel.

- Content: of the interaction or influence, including any material or immaterial items transacted
- Context: the broader nature of social and power relations bound up with interaction or influence including its equality or inequality, and the synergy or conflict of interests represented.

SW Analysis

Strengths
- Particularly well-attuned to the communication and transactional capacities of ICT (as opposed to its data processing capacities).

Weaknesses
- Of itself says relatively little about the impact of ICT4D on the performance of the enterprise.
- Home-based, informal enterprises can be hard to identify and include.
- As suggested by Donner's (2007) research, as yet, ICTs – even mobiles – may be having relatively little impact on the relationships of the majority of urban micro-enterprise

Methodological Summary

Enterprise Relations		
Primary/Secondary?	Primary Required	The nature, content and context of interactions and influence are rarely recorded in secondary sources
Data-Gathering Methods?	Multiple	Surveys are a typical way of charting relations but could equally use in-depth interviews, observation, etc. Log analysis – e.g. call logs for mobiles; email records for computers – provides valuable objective data.
Participatory?	Rarely	The few studies there are tend to apply rather top-down models, although a more participatory approach to defining relations would be possible
Quasi-Experimental?	Possible	Relatively easy to set up control group or groups with greater/lesser access to ICTs
Quantitative/Qualitative?	Both	Quantitative data is readily used to count number and frequency of relations, and can also be used via rating scales to measure nature and content; Qualitative data used for context and can also be used for some aspects of nature and content
Multi-Disciplinarity?	Possible	For example, taking an economic and a sociological perspective on relations
Timing?	Either	Though as with so much of ICT4D IA, longitudinal study offers a clearer sense of how ICTs change enterprise relations
Level?	Micro	Focuses on the individual entrepreneur and/or their enterprise
Audience/Discipline?	Business Studies	Though may be able to break out from this by focusing on social capital/trust elements
Resource Requirements?	Moderate-to-High	Use of logs can reduce costs, but still typically requires fairly intensive interrogation of individual entrepreneurs

Generalisability From One Project?	Limited	Unless projects encompass a large number of enterprises
Comparability Across Projects?	Fair	So long as the same stakeholders and same relation definitions are used

Method Recommendations
- Make use of call logs and other forms of recording the ICT component of relations.
- Seek to compare ICT-enabled vs. non-ICT-enabled relationship for the same enterprise.
- Consider how home-based and other informal enterprises will be identified and included.
- For more formalised enterprises, consider whether one of the competitiveness variants (see below) would offer greater insights.

Variants

1. *Competitive Strategy*. This focuses solely on the impact of ICT4D on the relations between the enterprise and its competitors. Does the ICT4D intervention make the enterprise more or less able to compete? Porter (1985) identifies three main competitive strategies:
- Low cost: does ICT4D help the enterprise reduce its costs (and, hence, the price of its products or services)?
- Differentiation: does ICT4D help the enterprise produce some unique value that competitors do not?
- Niche: does ICT4D help the enterprise more successfully focus on and meet the particular needs of a narrow market segment?

Some care needs to be taken, though, in applying this very Northern enterprise model e.g. to developing country micro-enterprises.

2. *Competitive Forces*. This provides a business-oriented checklist for assessing the changes in relations with economic institutions that ICT4D may bring about. It particularly looks at whether or not ICT4D alters the competitiveness of an enterprise by changing the status of, and relations with other stakeholders. For further details, see Porter (1979).
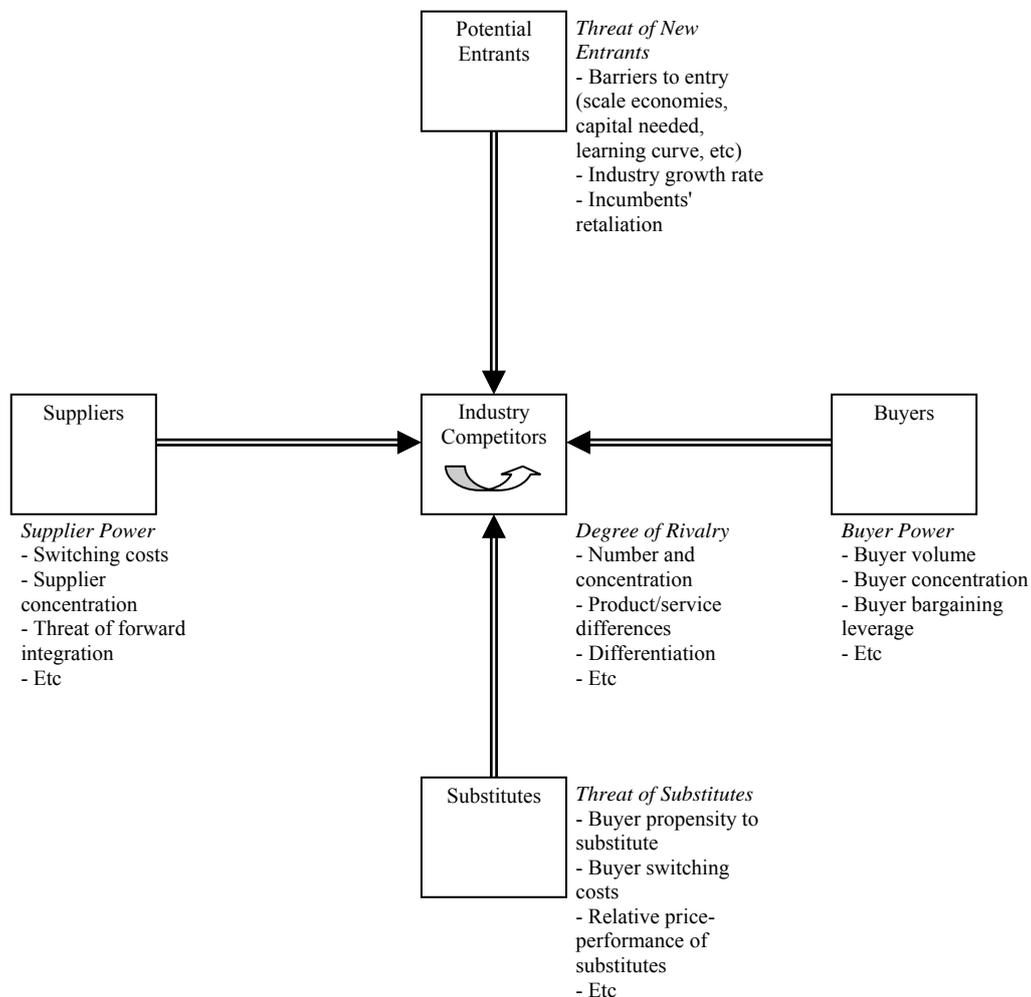
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- Porter, M.E. (1979) How competitive forces shape strategy, *Harvard Business Review*, 57(2), 137-145
- Porter, M.E. (1985) *Competitive Advantage*, The Free Press, New York.

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Examples of Use – *Enterprise Relations*

Enterprise Relations Example 1: *Donner*	Comment	Reference
	Focuses only on relations with customers, not other stakeholders. Provides four dimensions for assessing relations. Does not directly focus on how ICTs have changed relations, though indirect evidence suggests they have not.	Donner, J. (2007) Customer acquisition among small and informal businesses in urban India, *Electronic Journal of Information Systems in Developing Countries*, 32(3), 1-16 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/464/232 Refereed journal article; Open Access; 16 pages
Focus and Level	**Method**	**Framework Application**
• Application – ICT use by micro-enterprises in Hyderabad, India • Impact Level – individual entrepreneur/enterprise	• Research Resource – several paid field researchers, unclear for how long • Primary – interview survey of just over 300 entrepreneurs on use of ICTs for customer communication • Secondary – Not stated • Other – Cross-sectional; Mainly quantitative e.g. relational variables were rated on scales; Not participatory	No explicit framework but draws on ideas about the importance of social capital and trust in developing country microenterprise business relations, and the role of ICT (esp. mobile phones) in mediating relations in urban environments. Focuses on only one stakeholder group – customers. Looks at relations with those stakeholders in terms of: • Size (i.e. number of relations) • Multiplexity (e.g. combining business and social elements in a single relation) • Familiarity (i.e. of customer prior to interaction) • Geographic distance Controls for both enterprise location (urban/suburban) and income (seen as a proxy for survivalist, trundler, flyer categorisation – see Enterprise Variables entry).
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
About one page on methods. No instruments but the results give a good sense of the questions asked.	No clear impact of ICT4D – study did not ask directly what ICTs <u>were</u> actually used for.	First contact with customers was never via ICTs – most were "walk-ins"; the remainder referrals or direct approach by owner. 97% of customer contact was face-to-face; remainder by phone. For all customers, only 30% are known very well and 62% represent a business-only relationship. But with best customer, 65% are known very well and only 47% are business-only relationships. 85% of customers come from the immediate neighbourhood or nearby.
Baseline/Counterfactual	**Value Chain Stage(s)**	
No baseline survey conducted. Consideration of counterfactual by comparing those with/without phones.	Focuses on Outcomes (customer relations)	No strong correlations were found between phone ownership and the multiplexity, familiarity and geographic distance of customers relations (some correlation between landline ownership and no. customers). (Suburban – compared to urban – enterprises had more, more local, more familiar, and more multiplex customer relations.)

ICT4D Impact Assessment Frameworks Compendium: Entry 9c
9c. Enterprise (Value Chain)

The value chain model is a very valuable way of systematically charting the impact of ICT4D on an enterprise. However, of itself, it focuses only on ICT4D outputs, not outcomes. It therefore needs to be combined with some way of measuring outcomes – such as the enterprise performance part of the Enterprise Variables Model (see Entry 9a).

The Framework
In some ways, this model can be seen as a combination of the other two enterprise ICT4D IA frameworks. It has the input-process-output notion that is partly present in the Enterprise Variables Model. And it incorporates relations with at least some of the key stakeholders identified in the Enterprise Relations Model (see Entry 9b).

The generic value chain model consists of two parts (developed from Laudon & Laudon 2007 after Michael Porter's original):

- *Enterprise value chain*: related to an individual enterprise in which the impact of ICT4D is being assessed.
- *Sectoral value chain* (or supply chain): relating to the chain of enterprises that supply to, collaborate with, and purchase from, the focal enterprise.
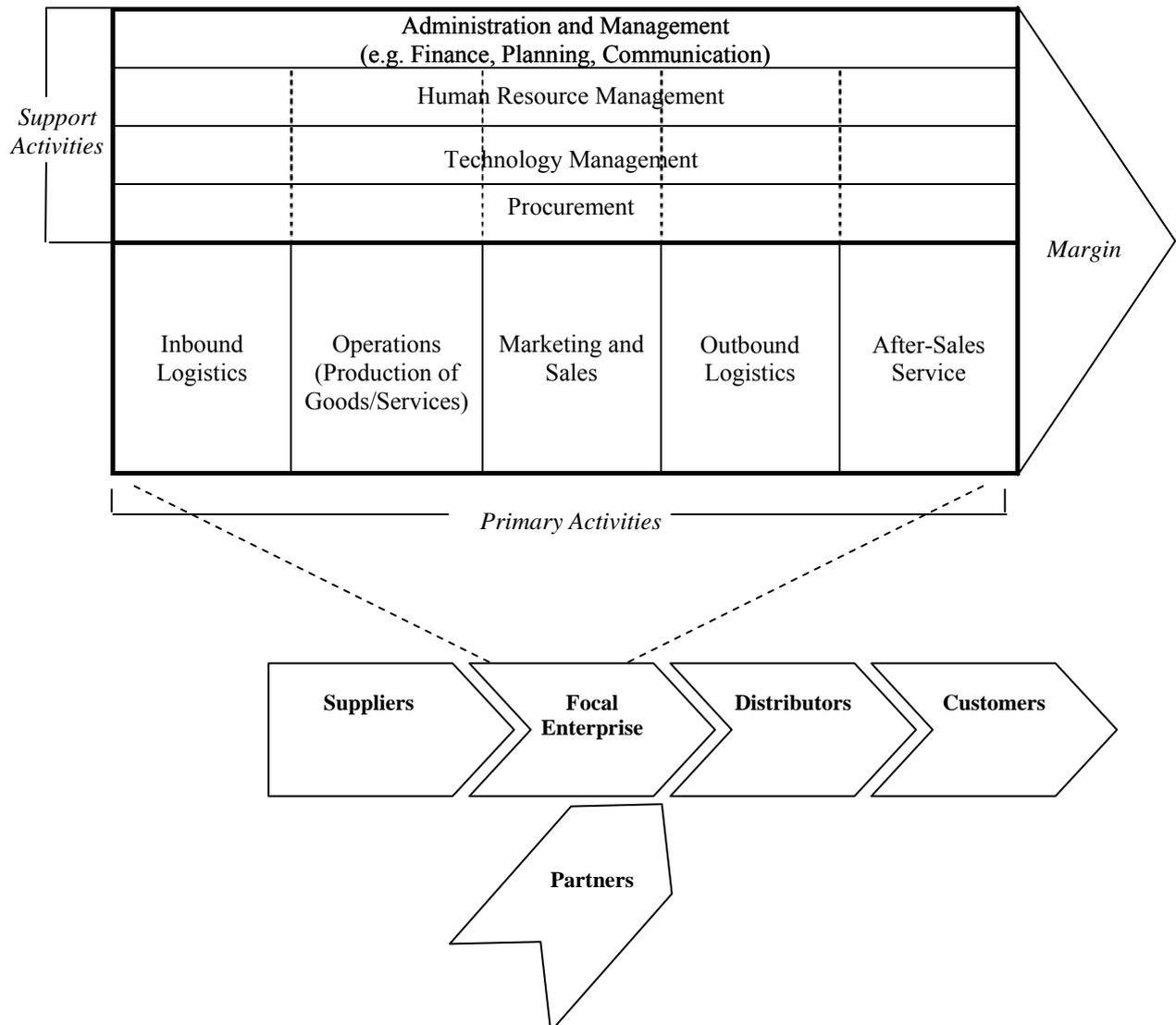
The enterprise value chain is basically a checklist of areas to investigate for impact of ICT4D:

- *Primary*: There are primary activities that directly "create value" for the enterprise: Has ICT affected the way materials and other items purchased by the enterprise are received and stored (inbound logistics)? … Has ICT affected the way marketing and sales are undertaken? … Has ICT affected after-sales service?
- *Support*: There are the support activities that enable the primary activities to take place: Has ICT affected the way that finance is managed? Has ICT affected the way plans are made? …Has ICT affected the ways purchases are made?

To move beyond mere description, some analytical frame would need to be added. For example, quantitatively, this could look at the financial and time costs of each value chain process. Qualitatively, this could look at the quality of particular processes.

The sectoral value chain is similarly just a descriptive checklist in its raw form, to which some analytical frame must be added. Again, quantitatively, one can look at the financial and time transaction costs of value chain interactions. Qualitatively, one could use an approach similar to the Enterprise Relations Model:

- *Process*: has ICT affected the supply chain process? I.e. the way in which materials, services, information, money, etc are passed from one stakeholder to the next.
- *Content*: has ICT affected what is exchanged between the stakeholders?
- *Relations*: has ICT affected the nature of relations with other stakeholders? I.e. not just the way they interact and frequency of interaction, but also the social and power relations bound up with their interaction.

In particular, there would be a focus on how ICT4D impacts the supply of inputs into the enterprise (labour, raw materials, equipment, money, information), and the ability to access customer markets for enterprise outputs. These are the key elements in the sustainability of an enterprise.

SW Analysis

Strengths

- Provides systematic coverage of business actions and interactions for an enterprise; hence a systematic checklist of areas of possible ICT4D impact.
- Provides balanced coverage of both "internal" and "external" ICT4D impacts.
- Offers a good visual summation of key ICT4D process changes.

Weaknesses

- The value chain notion derives from Northern large enterprises. It may need considerable simplification to be applicable to a typical Southern micro-enterprise.
- This is a very business-oriented approach that will typically miss socio-cultural and other contextual aspects to enterprise, and which may mismatch the actual interests and goals of Southern micro-entrepreneurs.
- Home-based, informal enterprises can be hard to identify and include.
- Of itself, the value chain provides no guidance on how to measure the impact of ICT4D; it mainly describes and charts changes to processes.
- The value chain describes outputs of ICT4D, not outcomes.

Methodological Summary

Enterprise Value Chain		
Primary/Secondary?	Primary Required	In order to understand the specific impact of ICT, which will almost always be undocumented
Data-Gathering Methods?	Interviews Plus	Interviews normally required to get depth of understanding of impact on value chain elements. May supplement with other methods such as observation or diary.
Participatory?	No	Typically the idea of the value chain is imposed top-down as a framework for assessment
Quasi-Experimental?	Rarely	Tends to take a more case study approach
Quantitative/Qualitative?	Both	Can approach quantitatively (e.g. assessing ways in which ICT reduces costs of value chain processes) and/or qualitatively (e.g. description of the way in which value chain processes have changed)
Multi-Disciplinarity?	Unlikely	Could combine, say, a more economic and a more sociological perspective, but tends to take a uni-disciplinary business studies approach
Timing?	Quasi-Longitudinal	There is almost always a sense of "before-and-after" analysis of the value chain impact of ICT4D
Level?	Micro and/or Meso	Focuses on the individual enterprise and/or a particular sector
Audience/Discipline?	Business Studies	May only have a relatively niche audience e.g. in development agencies
Resource Requirements?	Relatively High	Because requires in-depth understanding of impacts on various value chain elements
Generalisability From One Project?	Moderate	Individual enterprises and sectors have their value chain specificities but the relative universality of the overall model gives some basis for generalisation
Comparability Across Projects?	Moderate	Because of the use of the common model

Method Recommendations

- Simplify and amend the value chain notion to better fit the realities of enterprises under study.
- Use to focus on the impact of ICT4D on existing enterprises. Use the Enterprise Variables Model to assess the impact of ICT4D on the creation of new enterprises.
- Consider how home-based and other informal enterprises will be identified and included.
- Combine with some other means of actually charting the changes that ICT4D has brought to the value chain processes (e.g. see Variant below)
- Combine with some other means of actually charting the outcomes of ICT4D (e.g. the enterprise performance part of the Enterprise Variables Model).
- Overall, an important element for graphically summarising ICT4D impacts on enterprise.

References

- Laudon, K.C. & Laudon, J.P. (2007) *Management Information Systems*, Prentice Hall, Upper Saddle River, NJ

Variants

1. ***Enterprise Process Variables***. The value chain can be combined with the Enterprise
Variables Model, using the process variables to create an analytical matrix checklist of
possible effects of ICT4D. For example, just for the enterprise value chain:

	Productivity	*Cost (inc. transaction costs)*	*Quality (inc. time)*	*Dependability*	*Flexibility*	*Capabilities (inc. technological capabilities)*
Admin & Mgmt						
HR Mgmt						
Tech Mgmt						
Procurement						
In Logistics						
Operations						
Mrkting & Sales						
Out Logistics						
Service						

The Annamalai & Rao (2003) literature sample summarised below uses a variant of this
approach.

Richard Heeks

Examples of Use – *Enterprise Value Chain*

Enterprise Value Chain Example 1: *Annamalai & Rao*	**Comment** Appears a little rose-tinted in places but, based around the value chain, provides a systematic analysis of impact of ICT on agro-enterprise trade. A useful model.	**Reference** Annamalai, K. & Rao, S. (2003) *ITC's E-Choupal and Profitable Rural Transformation*, World Resources Institute, Washington, DC http://www.nextbillion.net/files/eChoupal.pdf Impact assessment report; Open Access; 33 pages
Focus and Level	**Method**	**Findings on ICT4D Impact**
• Application – a network of Internet-linked PCs set up by private firm ITC in rural farming communities in India • Impact Level – individual users (farmers) and sector (value chain)	• Research Resource – Not stated • Primary – Unclear but did involve some field interviews • Secondary – Some use of other e-Choupal articles • Other – Quasi-longitudinal (charts before and after ICT situation); Mix of quantitative (e.g. transaction costs) and qualitative (e.g. nature of value chain processes); Not participatory	Value chain before: Value chain after: "Farmers benefit from more accurate weighing, faster processing time, and prompt payment, and from access to a wide range of information, including accurate market price knowledge, and market trends, which help them decide when, where, and at what price to sell." Farmers using the system get an average 2.5% higher income (though unclear if this is due to higher price or lower transaction costs). "The total benefit to farmers includes lower prices for inputs and other goods, higher yields, and a sense of empowerment."
Depth of Method Guidance Absolutely none. **Baseline/Counterfactual** Both covered by detailed consideration of situation before ICT introduction, which still pertains in many markets. **Causal Link to ICT4D** ICTs are central to the new value chain model and directly linked to benefits produced. **Value Chain Stage(s)** Focuses on Outputs (e.g. new value chain) and Outcomes (e.g. farmer benefits).	**Framework Application** The primary activities value chain is a core of the framework for understanding how ICT4D has affected sales from agro-enterprises. Although not explicit, the analytical checklist then used for assessing ICT4D-enabled change to the value chain processes is: • Financial cost • Time cost • Quality (e.g. accuracy of weighing) • Dependability (e.g. ability of farmers to trust the process via its transparency) There is also consideration of empowerment via the information produced and choices facilitated.	ITC also saves on commission and transport costs, and gets a more direct link to farmers. ITC also sells more inputs and goods to farmers via the system. IT systems are also used for accessing other information, for email, for student use. Losing out from the new value chain model are commission agents, labourers at the non-ICT-enabled government markets, and shops near those markets. No women have access to the system.

ICT4D Impact Assessment Frameworks Compendium: Entry 10
10. Gender

Gender is a vital perspective for ICT4D impact assessment. In GEM (Gender Evaluation Methodology) there is a ready-made framework and expertise pool/constituency. However, as yet there appears to be a surprising lack of detailed case applications in the public domain. Assessors will thus have to put in additional work to apply the methodology in practice. Alternatively, a simpler incorporation of a "gender lens" may suffice.

The Framework
Gender represents the socially-constructed values and roles differentially attributed to women and men. These create a two-fold concern for ICT4D project impacts. First, that pre-existing gender differences skew the distribution of positive impacts to men more than women. Second, that impacts reinforce gender differences (i.e. values and roles), typically to the detriment of women.

In terms of ICT4D impact assessment, we can see different levels of approach to this issue. An example is illustrated in the figure.
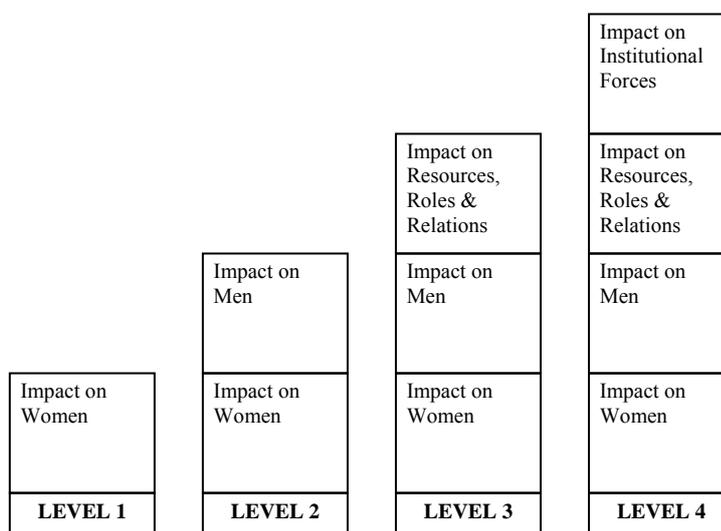
At its simplest, there would just be consideration of the direct impacts on women (e.g. in terms of information, communication, decisions, income). One level up, there would be comparison of these same impacts on men vs. women. At level 3, to these would be added a consideration of the impact on relations between men and women, and the genderised nature of actions and roles and resources (e.g. skills, financial assets). Finally, at the deepest level, ICT4D IA would look at impact on the institutional and organisational forces that create gender: norms, values, attitudes, structures of ownership and power, and practices.

A specific framework that provides guidance on gender-focused impact assessment at a variety of these levels is GEM – the Gender Evaluation Methodology for Internet and ICTs. Although the group behind its development is global – particularly based around the Association for Progressive Communications – it has mainly been developed with a focus on ICT usage in developing countries.

GEM is based around a series of principles for evaluation including a critical perspective that is sensitive to gender, to the influence of context and to the non-neutrality of evaluation; that demands stakeholder participation; and that values real experiences and action for change

(Ramilo & Cinco 2005). GEM is summarised as following seven steps, as illustrated in the figure.

```
┌─────────────┐    ┌─────────────┐    ┌─────────────┐    ┌─────────────┐
│ 1. Define   │    │ 2. Identify │    │ 3. Finalise │    │ 4. Set Gender│
│ Intended Use│··▶ │ Gender and  │··▶ │ Evaluation  │··▶ │ and ICT     │··┐
│ and Intended│    │ ICT Issues  │    │ Questions   │    │ Indicators  │  │
│ Users       │    │             │    │             │    │             │  │
└─────────────┘    └─────────────┘    └─────────────┘    └─────────────┘  │
                                                                          │
┌─────────────┐    ┌─────────────┐    ┌─────────────┐                     │
│ 5. Select   │    │ 6. Analyse  │    │ 7.Incorporate│                    │
│ Data-       │◀·· │ Data from a │◀·· │ Learning into│                    │
│ Gathering   │    │ Gender      │    │ Work        │                     │
│ Methods/Tools│   │ Perspective │    │             │                     │
└─────────────┘    └─────────────┘    └─────────────┘                     │
      ▲                                                                    │
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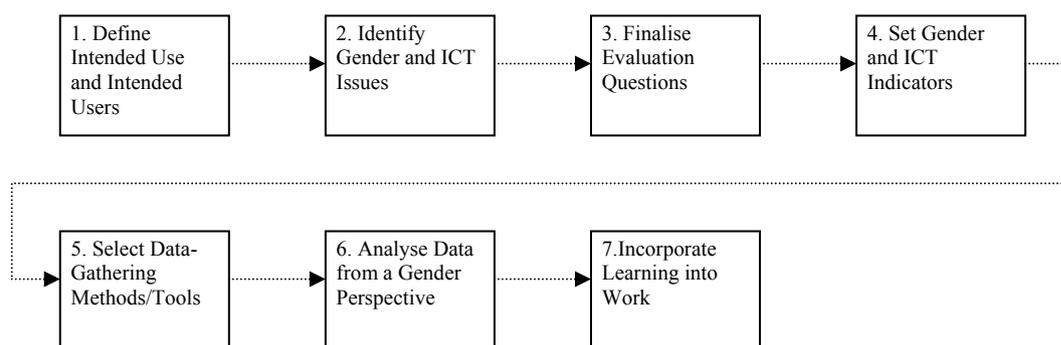
In some ways, GEM is similar to other overarching ICT4D IA frameworks. Thus, for example, it does not prescribe what criteria to assess or how to measure those criteria but, instead, provides guidance on how to choose indicators and how to choose appropriate methods for measurement. What it does do, though, is a) provide a continuous reminder to include gender-relevant elements at each stage of impact assessment implementation; b) provide examples and real-world illustrations of gender-relevant elements; and c) seek to follow its particular principles e.g. in advocating a participative approach.

Foundational concepts that shape a gendered approach include:
- Triple role of women – reproductive (childbearing and "domestic"), productive (income-generating work), and community (maintenance of collective resources). ICTs may impact any or all of these.
- Dual level of women's interests – practical needs (fulfilling existing triple role including basic needs of shelter, food, employment), and strategic interests (challenging existing roles). ICTs impact the former but not the latter – only the deeper-level assessment approaches, though, may recognise this.

Putting these into an ICT4D project context, one may identify interests in assessing impact on:
- Precursors: e.g. cultural norms, societal structures of ownership and power, censorship
- Inputs: e.g. skills and access to training; information content and language; ability to adapt information and technology
- Implementation: e.g. power and control over ICT resources and projects
- Availability: e.g. access to information and ICTs
- Use: e.g. nature and organisation of work (inc. divisions of labour); gender roles; privacy, security and pornography

In addition, one would consider impacts deriving more directly from ICT usage, e.g. on livelihoods.

SW Analysis

Strengths
- In GEM, provides a clear overall framework that has been developed through practice
- There are clear groups, workspaces and individuals who can provide advice and support in analysing ICT4D projects from a gender perspective (e.g. http://www.apcwomen.org/gem/?q=forum/25)
- A ready direct audience/constituency for such IA work but also some receptivity and understanding of the approach within development agencies
- Use of GEM can, of itself, lead to gender developmental impacts (see Buré 2006).

Weaknesses
- GEM is – deliberately – more of a framework explaining how to approach impact assessment than a specific guide on what precisely to do. It thus requires time and effort to work through exactly what will be done in practice.
- There appears to be a lack of clearly-accessible, detailed case study applications of GEM
- Participatory users sometimes struggle to understand exactly what GEM is (see Buré 2006)
- Presence of GEM has tended to shadow out other gender-sensitive methods
- Potential need to fight the perception that this is a narrowly-focused, special interest type of IA

Methodological Summary

Gender		
Primary/Secondary?	Primary Required	In order to understand the differential experiences of women and men, their roles, relations, and contextual influences
Data-Gathering Methods?	Multiple	Studies use quite a wide variety of methods; typically some form of sex-disaggregated log or survey of use plus some more participative approach including focus groups/workshops
Participatory?	Typical	At least for those evaluations which are following a GEM-type methodology. Participation may include not just evaluation design and implementation but also data evaluation
Quasi-Experimental?	Rarely	Partly due to emphasis on participative and qualitative methodology
Quantitative/Qualitative?	Both	Typically more quantitative for impact on access and use of information; more qualitative for impact on gender relations, roles and institutional determinants
Multi-Disciplinarity?	In Theory	Though in practice there are few signs of reaching out to, say, economics or information systems
Timing?	Either	But typically at least partly longitudinal because of the emphasis on GEM as an ongoing process rather than a one-time technique
Level?	Micro and/or Meso	Focuses on individuals' experiences, roles, relations, but will also consider women and men as groups
Audience/Discipline?	Gender Studies	Alongside specific "GEM audience", likely to be heard in many development agencies
Resource Requirements?	Relatively High	If the GEM approach is to be fully taken on board, because requires community engagement and participation (and, often, pre-sensitisation)
Generalisability From One Project?	Moderate	Partly dependent on the extent to which one can generalise genderisation of roles and relations, and underlying institutional forces
Comparability Across Projects?	Fair	Beyond project specificities, the consistent focus on gender provides a ready basis for comparability

Method Recommendations
- Ensure that gender is not translated simply as "women", but looks at relative impacts on women and men, their inter-relations and roles, and the institutional determinants of those relations and roles. Thus, in practice, include men as well as women in evaluation process.
- As with other institutional forces, recognise that gender constructs both impact and are impacted by ICT4D projects. Thus avoid seeing gender solely as a static cause of project impacts.
- Ensure identification of specific micro-level gender context and impacts rather than following broad-brush national or regional stereotypes.
- Recognise that more participatory approaches will be more costly, require more preparation and training, and may produce what appear to be – to a Western, rationalist

eye – more simplistic and less rigorous findings (see Ramilo 2003). Buré (2006) recommends a "feasibility scan" first prior to going down this route. Ramilo (2003) notes the need for pre-sensitisation training in most situations.

- Identify whether application of GEM is required, or just basic gender-sensitivity, with sex-disaggregation of key data and investigation of some deeper foundations for gender differentiation.
- Overall, some form of "gender lens" is a critical part of any ICT4D impact assessment.

References

- Buré, C. (2006) *Grounding GEM for Telecentres: The Experiences of Ecuador and the Philippines*, IDRC, Ottawa
  http://www.bcoalliance.org/system/files/GEMforTelecentres.pdf
  >>Reflective piece reviewing use of GEM in two projects; one for project planning (Ecuador), one for project evaluation (Philippines). Includes recommendations on applying GEM.
- Ramilo, C.G. & Cinco, C. (2005) *Gender Evaluation Methodology for Internet and ICTs*, APC, Melville, South Africa http://www.apcwomen.org/gemkit/pdf/GEMEnglish.pdf

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  >>Consideration of gender, ICTs and development issues, partly on the basis of impact assessment evidence
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  http://www.bridge.ids.ac.uk/reports/cep-icts-src.doc
  >>Structured annotated bibliography on gender, ICTs and development. Most items downloadable. Very few items relevant to ICT4D impact assessment
- Odame, H.H. (ed.) (2005) *Gender and ICTs for Development: A Global Sourcebook*, KIT, Amsterdam http://www.kit.nl/net/KIT_Publicaties_output/ShowFile2.aspx?e=820
  >>Unstructured annotated bibliography on gender, ICTs and development. About half downloadable, half journal articles. Very few items relevant to ICT4D impact assessment

Variants

1. *Process as Outcome*. Not so much a variant as taking seriously one lesson of many gender-sensitive impact assessments: that the implementation process strongly shapes the outcome. For example, a gender-blind implementation is unlikely to produce gender-positive outcomes. Thus one can see one element of a full impact assessment being to assess the implementation process in gender terms.

One example is Swamy (2007), looking at a rural ICT4D project. This focuses on the (positive) gender implications of this project's implementation process:
- Collective ownership of project space by women
- Collective participation of women in project implementation
- Collective rather than individual empowerment through group ICT4D-related activities
- Allowing for external information inputs and project ideas, but rooting ICT4D value in goals defined by the women
- Allowing women's group to appropriate the technology to aid sustainability and institutionalisation

This focus gives a strong sense of factors that will determine long-term gender impacts, though it does need to be set alongside assessment of the more direct impacts of ICT4D.

2. *Women's Empowerment*. A useful scale of women's empowerment is provided by Hashemi et al (1996). Fuller details of the measures used are provided in the article but, in brief, the eight scaled items are:
- Mobility: local facilities women had ever visited.
- Economic security: ownership of assets and savings
- Ability to make small purchases: cooking oil/spices, personal items, with/without man's permission and money
- Ability to make larger purchases: cooking utensils, clothing, food, with/without own money
- Involvement in major decisions: land, housing, animals, with/without own money
- Relative freedom from family domination: money or other items taken without permission, ability to visit natal home and work outside home
- Political and legal awareness: ability to name politicians and explain key regulations and laws
- Participation in protests/campaigns

The list is somewhat eclectic and could well be modified for assessing ICT4D impact, but it provides a useful foundation for understanding gender impacts.

References
- Hashemi, S.M., Schuler, S.R. & Riley, A.P. (1996) Rural credit programs and women's empowerment in Bangladesh, *World Development*, 24(4), 635-653
- Swamy, M. (2007) A gender framework for analysis of ICTD projects in India, paper presented at *Gender Evaluation Methodology-2* workshop, Kuala Lumpur, 25-27 July http://www.itforchange.net/images/stories/files/GEMPresentation_Write_UpforGDISP.pdf

Richard Heeks

Examples of Use – *Gender*

Gender Example 1: *Ramilo*	Comment	Reference
	An example of using GEM to assess impact of a telecentre. Provides some detail on methods used but does not offer a guide to how GEM was actually applied in practice. Little depth on actual impact.	Ramilo, C.G. (ed.) (2003) *Gender Evaluation Methodology for Internet and ICTs*, APC/WNSP, London http://www.apc.org/english/capacity/policy/mmtk_gender_ictpol_gem_publication.pdf Guidance report; Open Access; 71 pages

Focus and Level	Method	Framework Application
• Application – summarises six case studies but main focus of this summary is two telecentres in rural areas of the Philippines • Impact Level – individual recipients (and small mention of community groups)	• Research Resource – small GEM team for two days but project staff and users were main evaluators • Primary – Sex-disaggregated logs of telecentre use; focus groups and informal interviews on how telecentre used, and to create personal stories; reflective journals for project staff • Secondary – Not stated • Other – Longitudinal; Mix of quantitative (e.g. use logs) and qualitative (e.g. stories); Participatory (inc. data evaluation)	Uses the GEM approach to evaluate though in a much-simplified manner. Relatively few details on actual application. In terms of GEM principles, it is gender-sensitive, adopts a participatory approach, and roots in real experiences. Does not particularly focus on context, or recognise the non-neutrality of evaluation. Does not explicitly consider women's triple role (though stories do so implicitly), nor the impact on precursors, inputs, implementation, availability and use. Takes evaluation up to about Level 2.

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
One page of methods and no instruments provided.	Not discussed though implicit direct causal relation assumed between ICT4D and outcomes. Buré (2006) identifies presence of community development NGO as more likely cause of some outcomes.	Findings are relatively "shallow": • Majority of telecentre users are female. • Has helped to strengthen various community groups, including women. • Has helped community members develop a sense of their information needs. • Story-based example of changed family and community roles and relations for one woman involved with telecentre project, and changes in her personal values.

Baseline/Counterfactual	Value Chain Stage(s)	
No baseline survey conducted. No consideration of counterfactual/non-exposed actors.	Focuses on Use (by gender) and Outcomes	Also seen as a need to deepen consideration of gender and ICT issues in future evaluations. Buré (2006) reports same findings with greater interpretation about empowerment, self-esteem, changing family roles and male—female communication relations. Notes one woman was motivated to set up her own IT microenterprise. But also notes telecentres fell into disuse post-evaluation.

Gender Example 2: *Hafkin*	Comment	Reference
	A pre-GEM gender analysis of infoDev projects. No method details and just limited guidance on questions asked and impacts seen.	Hafkin, N.J. (2002) Are ICTs gender neutral? A gender analysis of six case studies of multi-donor ICT projects, paper presented for *UN/INSTRAW Virtual Seminar Series on Gender and ICT*, 1-12 July http://www.un-instraw.org/en/docs/gender_and_ict/Hafkin.pdf Impact assessment report; Open Access; 17 pages

Focus and Level	Method	Framework Application
• Application – six infoDev projects covering in all; this summary focuses on two rural ICT projects in Peru (agric. information system) and India (health worker use of PDAs) • Impact Level – individual recipients, and women as a group	• Research Resource – One researcher for each project • Primary – Project staff and user interviews • Secondary – Typical absence of user logs or sex-disaggregated records • Other – Cross-sectional; Qualitative; Not participatory	Talks only of viewing projects through a "gender lens" with five focal areas: • Identifying gender issues that affected implementation and results • How the project outputs affected women's situation • If and how women benefited from the project • How women could have benefited more from the project • What lessons could be learned by other projects about the involvement of, and benefits to, women In terms of GEM principles, it is gender-sensitive, and roots in real experiences. It has a small consideration of context. At least as presented here, it does not appear to be participatory, nor to recognise the non-neutrality of evaluation. Does not explicitly consider women's triple role nor the impact on precursors, inputs, implementation, availability and use (though does consider the impact of gender on some of these). Takes evaluation up to about Level "1-plus" – focuses on impact on women, not comparative impact on women and men, but does touch slightly on deeper gender issues.

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
Nothing stated other than "field studies".	Recognition that ICT plus broader contextual factors determine impacts.	Project schedules and gender-blindness (e.g. joint-sex meetings and training) disadvantaged women, and men will typically benefit more than women from ICTs unless specific steps are taken. Some gain in skills and leadership roles for women in Peru. Some gain of knowledge, self-esteem and status for women in India.
Baseline/Counterfactual	**Value Chain Stage(s)**	
No formal baseline, though does consider the gains made from that baseline. No counterfactual.	Main focus on Implementation and very limited consideration of Impact.	

Gender Example 3: *Richardson et al*	**Comment**	**Reference**
	Shows the ability to uncover gender-relevant impacts by asking some fairly simple questions (i.e. without using a specific gender framework but by being gender-sensitive).	Richardson, D., Ramirez, R. & Huq, M. (2000) *Grameen Telecom's Village Phone Programme in Rural Bangladesh: a Multi-Media Case Study*, TeleCommons Development Group, Guelph, ON http://www.telecommons.com/villagephone/finalreport.pdf Impact assessment report; Open Access; 104 pages
Focus and Level	**Method**	**Framework Application**
• Application – Village Pay Phone project in Bangladesh focused on poor rural areas • Impact Level – individual phone operators and users	• Research Resource – Six paid field researchers for two months • Primary – Interviews with project staff, phone operators and other key informants. Survey of 300 phone operators and users. Focus group sessions. Some video/photo documentation • Secondary – Uses previous study survey data (Bayes et al 1999) • Other – Cross-sectional; Quantitative (e.g. usage rates, consumer surplus) and Qualitative (e.g. creation of "phone culture"); Non-participatory	No explicit gender framework for analysis but focuses on differences in usage patterns seen with male vs. female phone operators; and specific impacts on actions, status and empowerment of women. In terms of GEM principles, it is gender-sensitive, roots in real experiences, and there is significant consideration of context. It does not appear to be participatory, nor to recognise the non-neutrality of evaluation. Does not explicitly consider women's triple role. Some consideration of impact on precursors (culture), availability and use. Takes evaluation up to about Level "2-plus" – limited differentiation of impacts on women vs. men in consumer surplus terms; some consideration of gender roles and resources.
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Four pages of detail on research methods. Two pages on how consumer surplus was calculated. Full list of all data items (i.e. questions) for survey.	Direct quantitative link seen between ICT (phone) and creation of consumer surplus; link assumed to other outcomes – status, culture, income.	Usage findings: "The gender of the Village Phone operator and the physical placement of the phone within a gendered village context can either inhibit or improve women's access to phones. … men tend to use telephones owned by male operators [6% of Grameen Bank member users were women] while women prefer female operators [82% of GB member users were women]"; some women also prefer to phone from within another's home rather than publicly. This seriously challenges earlier gender-blind universal access notions.
Baseline/Counterfactual	**Value Chain Stage(s)**	
No baseline survey, though does consider gains from baseline. Counterfactual partly covered through survey inclusion of phone non-users.	Main focus on Use and Outcomes.	Outcomes: • Potential higher consumer surplus (saving through phone use from journeys avoided) for women than men • Gain in status and income (c.30-40% of total household income) for female village phone operators. Creation of culture of phone use and operation among women.

ICT4D Impact Assessment Frameworks Compendium: Entry 11
# <u>11. Telecentres</u>

Given the variety of telecentre experiences and services, there is no single agreed-upon telecentre impact assessment framework. Therefore, a generic framework is presented here detailing a set of indicators that may be selected on the basis of the ICT4D value chain; thus looking at implementation, availability, use, outputs, outcomes and impacts. These indicators may be selected on the basis of various criteria and interests. Overall, this framework offers guidance on how to approach telecentre IA; the specifics of exactly what to do would still need to be determined and could well involved reference to other Compendium entries.

Framework
Impact assessment of telecentres can be approached in two ways: telecentre performance indicator- (TPI-) based, and framework- (model-) based.

A. Telecentre Performance Indicator-Based Approach
This follows the ICT4D value chain to define specific indicators for the evaluation of telecentres, as exemplified in the diagram (developed from NTCA 2000, Whyte 2000, Wisner 2003). The indicators could be policy, value chain, time horizon, and telecentre specific and can be developed based on bottom up participation. Figure 1 offers a generic TPI based IA framework.

⇒ Telecentre Value Chain ⇒

Stakeholder Analysis Telecentre Categorisation	**Implementation** - Goals - Extent of participation - Ownership - Location & hosting - Demand/needs analysis	**Availability** - Space provided - Number/type of ICT - Services available - Localisation & relevance of data content - Skills/assistance available - Training provided - Reliability/uptime	**Use/Outputs** - No./demographics of users - No., length and frequency of uses - Content/type of usage - Information received/sent - Consequent decision/actions - Non-users	**Outcomes/Impacts** - ICT project income - User income - User savings - User satisfaction - Enterprises created or assisted - New partnerships or collaborations - Cost/benefit analysis - Other livelihood impacts (social, physical, political, human) - Demographics of above and equity - Sustainability
	During	*Immediately After*	*Shortly After*	*Some Time Later*

Timing vis-à-vis implementation

Key issues and determinants in applying this approach include:

Stakeholder Analysis: Seen as an important precursor to impact assessment in order to ensure key impacts are not missed. Stakeholder checklists are offered, for example by:
- Whyte (2000): Community; Telecentre; National; Regional; International.
- Wisner (2003): Users; Owners; Business community; Government; Society; Donors

There does need to be a balance between efficiency and coverage, pointing to a prioritisation such that only key stakeholders rather than all stakeholders are considered.

Telecentre Categorisation: Telecentres exist in various forms, shapes and names. Categorisation of the telecentre(s) under assessment can help identify particular contextual and other variables of importance to impact assessment indicators. See Variant 1 for more details on implications of categorisation by sophistication.

Criterion	Categories
Linkage with development policy	Isolated, aligned, integrated
Ownership	Public(government), community (joint), civil society, private
Start-up fund	Public, private, community, donor, public-private, donor-private, public-private-donor
Business model	No-charge, minimal fee, cost-recovery, profit-oriented, social-enterprise
Sophistication	Basic (ICT connection only); intermediate (training and information access); advanced (e-learning, e-banking, e-government and e-health services)
Revenue model	Not applicable, ICT goods and services, other value-added services
Location	Urban, peri-urban, rural
Network	Independent, networked, franchised

Programme Goals: The overriding programme goals within which the telecentre is implemented will shape the focus of indicators selected. For example, NTCA (2000) highlights the focus of two different programme goal perspectives:
Poverty alleviation: the focus here will be on the demographics of users, the identity of non-users, the impact on income, and also on other livelihood dimensions of poverty.
Private sector participation/market development: the focus here will be on the extent to which private sector/enterprise clients are users, and to which enterprises have been assisted or created.

Value Chain Stage: Particular issues are associated with indicators for particular value chain stages. Upstream indicators (implementation) tend to provide just a contextual background for assessment. Midstream indicators (availability, use and outputs) tend to be the focus of most telecentre assessments and are relatively easy to operationalise. Downstream impact assessment (outcomes, impacts) require more time and effort to gather data, and also to establish cause and effect. As Hudson (1999) notes, chains of inference between ICT4D and outcomes/impacts are often implicit but they need to be made explicit – though this will be a complex process.

Time Horizon: One of the challenges in impact assessment is the time lag factor. To adequately assess downstream indicators like outcomes and, particularly, impacts then months – even years – of telecentre operation must occur. Too often, telecentre evaluations have been done too soon after implementation.

Sustainability: This has been a central issue of concern within impact assessment of telecentres, particularly given their high investment costs and high failure rates. Sustainability can be broken down in two main ways. First in terms of types of sustainability (Ali & Bailur 2007):
- *Financial sustainability*: can telecentres generate enough revenues to cover costs?
- *Social sustainability*: are telecentres accepted by their user community?
- *Technological sustainability*: is the telecentre ICT simple, flexible, durable and maintainable?
- *Institutional sustainability*: do key stakeholders buy in to the idea of the telecentre and legitimise its existence?

Second, in terms of key requirements of sustainable ICT4D projects (Heeks 2005):
- *Capacity*: does the telecentre have available the necessary resources on an ongoing basis; these include money, skills, data and technology? This makes a project usable.
- *Utility*: will the telecentre keep meeting the needs of at least some stakeholders? It must continue to be useful to someone, for this is what makes a project used.
- *Embedding*: for long-term sustainability, will the telecentre become "institutionalised" – embedded in the rules and norms, culture and values of its setting? This makes a project used as a matter of routine.

One key question – rarely made explicit in considering telecentre sustainability – is whether information should be regarded as a private or public good. The answer will lead to very different views on whether or not telecentres should be subsidised.

B. Framework-Based Telecentre Impact Assessment

Rather than approaching matters in terms of indicators, this approaches impact assessment in terms of frameworks, driven by the particular objectives of assessment. Those objectives can be related to the ICT4D value chain. Many of the models are covered in other entries in the Compendium. Specific examples that start from this perspective include Molla & Al-Jaghoub (2007), based on the livelihoods framework, and Khelladi (2001, based on the cost-benefit analysis framework.
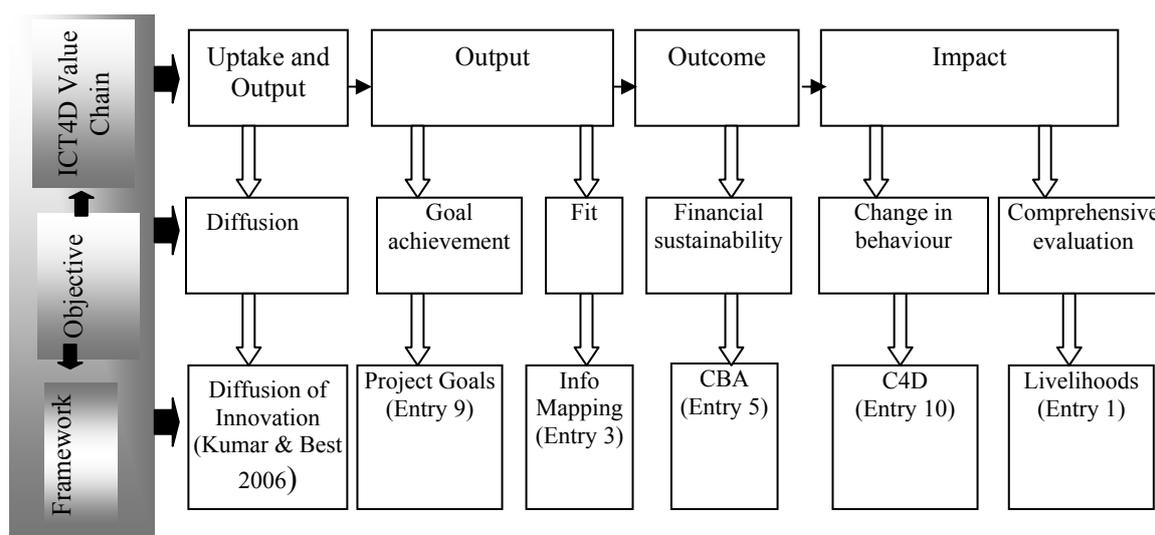
SW Analysis (TPI only)

Strengths
- Potentially covers a large variety of telecentre impacts, though with flexibility to design impact coverage to be either very narrow or very comprehensive.
- Flexible and adaptable to the context of the telecentre and objective of evaluation.
- There is a large amount of resource (much of it online) and experience regarding telecentre evaluation (although this tends to be limited on the application of specific frameworks).
- TPI impact assessment can support most ex-post decisions such as scalability and sustainability.

Weaknesses
- Frameworks suggested for telecentre impact assessment tend to be generic, and focus on the rationale, planning and process of conducting the assessment rather than the content of assessment. Thus, in many ways, this approach still leaves open the question of what, actually, is to be done.
- Developing and agreeing indicators can be very time consuming. In addition drawing the causal relationship between telecentre use and its impact is complex and fraught with a number of exogenous influences.
- Because of the lack of standardised indicators, comparison across projects is difficult unless pre-designed.

Methodological Summary

Telecentre (TPI) Framework		
Primary/Secondary?	Primary Required	Typically requires primary data gathering from a range of telecentre stakeholders include funders, operators, competitors, users and non-users. Secondary data from telecentre transaction records are also needed
Data-Gathering Methods?	Multiple	Interview (beneficiaries, funding agencies managers and operators), Observation (to get a true understanding of facilities and their status), Survey (users and non users), Focus group (users and non users), Document analysis (telecentre records, computer-generated usage log files and other project documents, diaries of participants)
Participatory?	Possible	Benefit indicators can be developed via a bottom-up, participatory process
Quasi-Experimental?	Possible	Desirable to conduct before-and-after and/or treatment-and-control group analysis
Quantitative/Qualitative?	Mixed	Either quantitative (e.g. user logs, income) or qualitative (e.g. data content, collaborations)
Multi-Disciplinarity?	Possible	E.g. can combine economic and sociological perspectives
Timing?	Either	Most studies are cross-sectional, multiple-telecentre but deeper analysis can be longitudinal study of a single telecentre
Level?	Multiple Micro/Meso	Analysis can focus on individual, household, group or community level impacts
Audience/Discipline?	Varied	Draws from a variety of roots but formed specifically within ICT4D sub-discipline, which also forms main audience
Resource Requirements?	Varied	Depending on breadth of indicators used
Generalisability From One Project	Possible	Depends on the type of project and design of IA
Comparability Across Projects	Possible	Depends on the context, process and content of IA

Method Recommendations

- Guide indicator selection on the basis of programme/assessment goals, value chain stage and time horizon.
- In general, undertake telecentre assessment later rather than sooner.
- Ensure the needs and views of key stakeholders are incorporated into both design and data-gathering.
- Particularly if planning assessment of multiple telecentres, use telecentre categorisation as a guide (see above and also Variant 1).
- Establish early on whether a more participatory, learning approach to telecentre IA is appropriate (see Variant 2).
- Build links to other individuals and groups involved in telecentre evaluation (e.g. www.telecentre.org)
- Overall, the approach described here is useful for understanding the context and process of impact assessment, but offers less guidance on its specific content.

References

- Ali, M & Bailur, S. (2007) The challenge of "sustainability" in ICT4D, paper presented at *9th International Conference on Social Implications of Computers in Developing Countries*, São Paulo, Brazil, 28-30 May http://www.ifipwg94.org.br/fullpapers/R0010-2.pdf
- Heeks, R.B. (2005) *Sustainability and the Future of eDevelopment*, eDevelopment Briefing no. 10, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/index.htm#sp
- Hudson, H. (1999) Designing research for telecentre evaluation. In: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 149-164 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf
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- Whyte, A.V.T. (2000) *Assessing Community Telecentres*, IDRC, Ottawa http://www.idrc.ca/openebooks/263-5/
  >> Provides a list of questions for telecentre IA covering issues from output (performance) through outcome (change in knowledge, attitudes and practices) and impact (business opportunities, connecting communities, gender equality and fairness).
- Wisner, P.S. (2003) Beyond profitability: a framework for measuring the impact of ICT kiosks. In: *Connected for Development – Information Kiosks and Sustainability*, Badshah, A., Khan, S & Garrido, M. (eds), UNDESA, New York, NY, 97-103 http://www.unicttaskforce.org/perl/documents.pl?id=1361

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- Cocchiglia, M. (2004) Regional information centres in Azerbaijan: a preliminary evaluation, *Electronic Journal of Information Systems in Developing Countries*, 17(4), 1-11 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/106/106
  >> Follows a simple checklist of issues in order to evaluate: ICT available/services provided; Facility management/ownership; Financial sustainability; Relevance and accessibility. Does not provide framework or indicators, and barely a sentence on method.

- Etta, F.E. & Parvyn-Wamahiu, S. (2003) *The Experience with Community Telecentres*, IDRC, Ottawa
  \>> Focuses on issues of telecentre availability (resources and services), uptake (patterns of use, use(r) and non use(r) profiles, user satisfaction) and outcome (financial sustainability).
- Harris, R.W. (1999) Evaluating telecentres within national policies for ICTs in developing countries. In: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 131-138 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf
  \>> Conceptualises the role of telecentres in the context of national ICT diffusion and offers input and output indicators only. Input indicators include resources (accommodation, equipment, and people) and services. Output indicators focus on community-based indicators (such as socio-econometrics and stories) and sustainability (ownership, finance and replicability).
- Lengyel, G., Eranusz, E., Füleki, D., Lőrincz, L. & Siklós, V. (2006) The Cserénfa experiment: on the attempt to deploy computers and Internet in a small Hungarian village, *Journal of Community Informatics*, 2(3) http://ci-journal.net/index.php/ciej/article/view/296/261
  \>> Relatively unique in focusing on telecentre impact on individual's lives, both positives (e.g. increase in knowledge, skills and aspirations) and negatives (envy and frustration).
- Miller, N.L. (2004) Measuring the contribution of Infoplazas to Internet penetration and use in Panama, *Information Technologies and International Development*, 2(2), 1-23 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752044193443
  \>> Focuses more on precursors, adoption and use and less on impact. Offers a one page description of methods but does include survey questionnaire.
- Rothenberg-Aalami, J. & Pal, J. (2005) *Rural Telecentre Impact Assessments and the Political Economy of ICT for Development (ICT4D)*, BRIE Working Paper 164, Berkeley Roundtable on the International Economy (BRIE), University of California-Berkeley, CA http://repositories.cdlib.org/brie/BRIEWP164/
  \>> Reviews some of the background and approaches used to telecentre IA before giving very detailed outline of a proposed approach
- Ulrich, P. (2004) Poverty reduction through access to information and communication technologies in rural areas: an analysis of survey results from the social impact assessment conducted by the Chinese Ministry of Science & Technology and the United Nations Development Program, *Electronic Journal of Information Systems in Developing Countries*, 16(7), 1-38 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/102/102
  \>> Uses "social impact assessment" of telecentres but does not define what that is, or its framework. However, the study is quite thorough, and has cost-benefit elements. Clear on methodology, and includes questionnaire.

Variants

1. *Assessment by Telecentre Type*. As noted above, telecentre type/categorisation can partly guide indicator selection. To give an example of this, we choose sophistication of telecentres. Building on the taxonomy offered above, we can classify telecentres into three categories: *connect* (basic), *interact* (intermediate) and *transact* (advanced). Impact indicators can be developed to match to these categories. For example indicators of "connect telecentres" (see Kyabwe & Kibombo 1999 – see summary below) might tend to focus on usage only. On the other hand "transact telecentres" (e.g. Lobo & Balakrishnan 2002) might be assessed by indicators such as savings in costs and time of transaction and accessibility of services that would have otherwise been difficult.
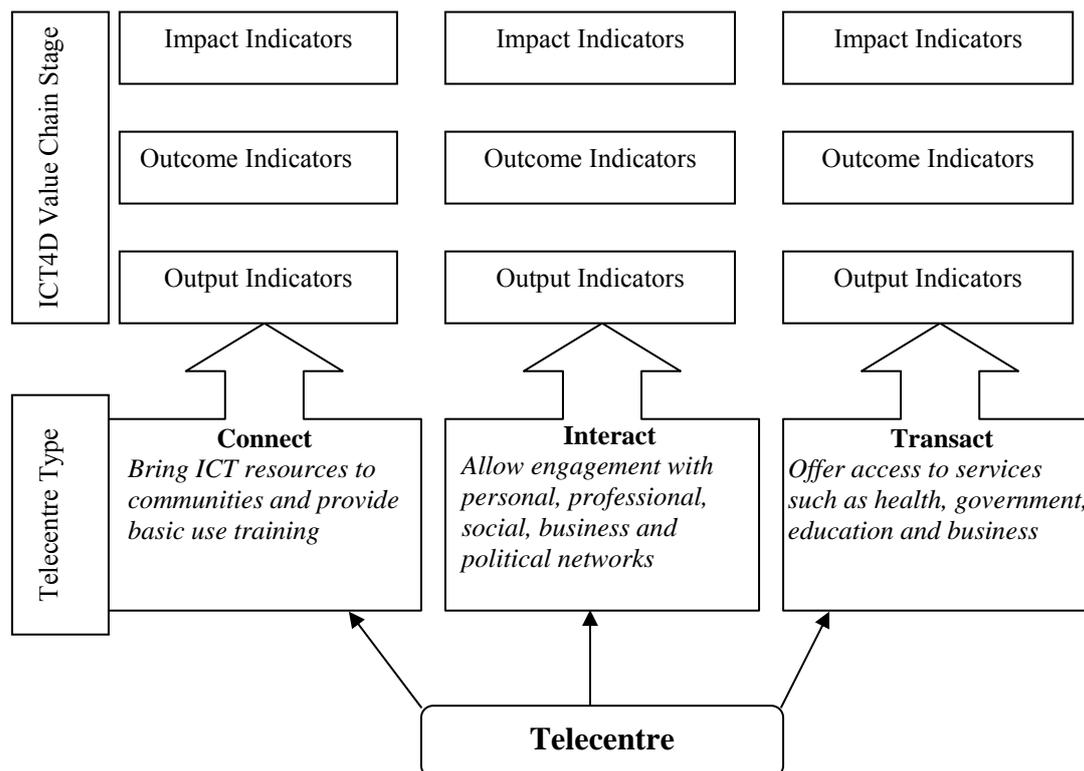
2. *Learning Approach*. Given that telecentres are often bound up with a specific group of operators/managers and users, a learning approach to impact assessment can be undertaken. This starts the impact assessment process early on in the life of the telecentre, and grounds it in a strongly participatory approach in which these stakeholders engage in the design, implementation and interpretation of telecentre IA. In this way, the output of IA is not merely a report but also greater knowledge within the groups who are central to use, impacts and sustainability of the telecentre.

References
- Lobo, A. & Balakrishnan, S.(2002) *Report Card on Service of Bhoomi Kiosks: An Assessment of Benefits by Users of the Computerized Land Records System in Karnataka*, Public Affairs Centre, Bangalore.
  http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN015135.pdf

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Examples of Use – *Telecentres*

Telecentre Example 1: *Kyabwe & Kibombo*	Comment	Reference
	Focus almost all on pre-implementation issues, not impact. Provides rigorous approach with strong, clear methodology. Does not use a specific model. Shows how telecentre type can influence assessment and notes data collection challenges.	Kyabwe, S. & Kibombo, R. (1999) Buwama and Nabweru Multipurpose Community Telecentres: Baseline Surveys in Uganda, in: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 171-194 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf Pre-impact assessment report; Open Access; 24 pages

Focus and Level	Method	Framework Application:
• Application – two telecentres in rural Uganda • Impact – individual and organisational potential users	• Research Resource – A group of paid consultants employing 24 data collectors, using a multistage design covering a period of about two months with about 30 field days in two sites. • Primary – 1,000 potential user survey respondents (one-to-one questionnaire), 18 interviews with organisational potential users and two focus group discussions involving one consultant and two assistants. Experiences of data collector/users. • Secondary – Background data about the location and socio-economic status (population, economic activities, food, water, etc) of sites • Other – Cross-sectional; Quantitative survey supplemented by qualitative interview and focus groups; Very slightly participatory (some of the data collectors were users)	• *Evaluation Type*: TPI-based • *Stakeholder Analysis*: mainly user-focused • *Telecentre Categorisation*: no clear linkage to development policy, owned by a community (though respondents did not feel that way); funded by IDRC; rural (based on occupation of community); standalone, part of Acacia Initiative hence networked. Connect type telecentre, no charge business model so no revenue base. • *Programme Goals*: not specific • *Value Chain Stage*: readiness and availability • *Time Horizon*: immediately at point of implementation • *Indicators*: offers a list of uptake and output-related indicator guidelines

Depth of Method Guidance	Causal Link to ICT4D	Findings on ICT4D Impact
Well detailed method (5 pages) covering pre-assessment preparation and visits, sample design, data collection (survey, interview, focus group and secondary). Paper makes references to instrument appendices, these are not included.	Not particularly seen given lack of focus on impact	• Because of the early stages of the telecentres, evaluation was limited to needs assessment of potential users. • Majority of the potential users are interested in information on education/new skills followed by information on health care. Most potential users were interested in communicating information to outsiders on what they are or can do. • "there was no significant difference in information needs and means of communication (receiving & sending) between the community organisations and the rest of the business community/ farming community depending on the type of activity they are involved in."

Baseline/Counterfactual	Value Chain Stage(s)	
Main focus is baseline survey using an already existing instrument. Compares organisational users and non-users.	Readiness (information needs and potential user profiles), and Availability (services and resources).	

Telecentre Example 2: **_Kumar & Best_**	**Comment**	**Reference**
	A simplistic framework-based assessment based on indicators developed from diffusion of innovation theory. Takes a social impact approach but focuses on uptake and output issues – notes difficult in assessing downstream impacts. Interesting findings on telecentre reinforcement of existing inequalities.	Kumar, R. & Best, M.. (2006) Social impact and diffusion of telecentre use, *Journal of Community Informatics*, 2(3) http://ci-journal.net/index.php/ciej/article/view/328/267 Refereed journal article; Open Access; 21 pages
Focus and Level	**Method**	**Framework Application:**
• Application – Internet kiosks in five villages in rural India • Impact – individuals	• Research Resource – Not specific but appears to one independent researcher; unclear for how long • Primary – Survey of 132 users plus interviews • Secondary – Project officials' survey and other project documents. • Other – Cross-sectional; Quantitative (demography of users) supplemented by qualitative interview; Not participatory.	• *Evaluation Type*: framework-based (diffusion of innovation) • *Stakeholder Analysis*: mainly user-focused • *Telecentre Categorisation*: generic, though mostly "connect" and "inform" type sophistication. • *Programme Goals*: sustainable access across India • *Value Chain Stage*: uptake and output • *Time Horizon*: shortly after implementation (about one year) • *Indicators*: include relative advantage, compatibility and complexity drawn from diffusion of innovation theory
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Good on data collection but no instrument or data collection protocol	Direct linkage via the use of ICT facilities. However finding is not extrapolated from usage to downstream impacts.	"Diffusion biases along dimensions of gender (more males than females), age (users are usually younger than 30), caste (scheduled caste members are less likely to use the facilities save in those villages where the facility is located in an SC area), religion (Muslims and Christians are under-represented as users in some villages), educational attainment (with few illiterate users), and income (users are richer as measured by standard surrogate indicators)."
Baseline/Counterfactual	**Value Chain Stage(s)**	
Neither offers baseline data nor compares users with non-users.	Availability (services of the telecentre), Uptake (who is using it), and some Output (use purpose).	

Telecentre Example 3: *Whyte*	Comment	Reference
	Although not based on a single model, this provides a general guidance frame for telecentre IA. It also maps evaluation questions (some related to impact) to data sources and to specific topics (such as characteristics of telecentres and communities, use, sustainability and impacts).	Whyte, A. (1998) *Telecentre Research Framework for Acacia*, IDRC, Ottawa http://www.idrc.ca/en/ev-10197-201-1-DO_TOPIC.html Guidance report; Open Access; c. Dozens of pages
Focus and Level	**Method**	**Framework Application:**
• Application – generic telecentre • Impact – individuals, groups	Recommendations, not actual: • Research Resource – Multi-person research team • Primary – Nine different methods including survey, interview, focus group • Secondary – Use of telecentre monitoring documents. • Other – Potentially longitudinal; Quantitative and qualitative; Participatory.	• *Evaluation Type*: TPI-based • *Stakeholder Analysis*: mainly user- and operator-focused • *Telecentre Categorisation*: generic, though mostly "connect" and "inform" type sophistication. • *Programme Goals*: non-specific • *Value Chain Stage*: all stages • *Time Horizon*: ongoing • *Indicators*: provides a series of questions/indicators appropriate to all value chain stages
Depth of Method Guidance	**Causal Link to ICT4D**	**Findings on ICT4D Impact**
Very detailed list of questions and indicators	Assumed to be fairly direct, including for outcomes and impacts.	Not applicable – this is a proposal for impact assessment
Baseline/Counterfactual	**Value Chain Stage(s)**	
Does not appear to be incorporated	All stages	

ICT4D Impact Assessment Bibliography

This bibliography is a summary of literature – including many real-world case studies – on impact assessment of information-and-communication-technologies-for-development (ICT4D) projects.

Each entry summarises five things:
- ***Framework Type***: the type of framework used in the document.
- ***Reference***: the bibliographic details of the document.
- ***Value Chain Stage***: which stage of the ICT4D value chain (see Figure 2 above) the document mainly focuses on. Only those that include one of the value-chain Impact elements (Outputs, Outcomes, Development Impacts) relate to impact assessment specifically.
- ***Methods Detail***: the depth of information provided about the actual methods used.
- ***Commentary***: a short summary/opinion about the document.

The literature reviewed includes all the items provided in the main Compendium entries, but it also moves beyond those. Table 3 therefore provides a revised version of Table 1, showing all of the different types of framework about which at least one item of literature is summarised. A very few documents have been included under more than one framework heading.

Type	Sub-Type	Focus	No. of Literature Items
GENERIC		*Assessing ICT4D IA*	6
		Cost-Benefit Analysis (CBA)	9
		Project Goals	2
DISCIPLINE-SPECIFIC	Communication Studies	*Communications-for-Development*	8
	Development Studies	*Capabilities/Sen*	5
		Livelihoods Framework	4
	Geography	*Locational/Exclusion*	2
	Informatics	*e-Readiness*	4
	Information Science	*Information Economics*	2
		Information-for-Development	3
		Information Needs/Mapping	7
	Science & Technology Studies	*Technology Transfer*	1
	Sociology	*Cultural-Institutional*	6
		Political Economy	2
	Systems Thinking	*Project Management*	3
ISSUE-SPECIFIC		*Empowerment*	2
		Enterprise (Growth)	12
		Gender	10
		Inequality	2
		Social Capital	3
		Transparency & Corruption	3
APPLICATION-SPECIFIC		*Generic ICT4D*	6
		Community Radio	5
		Email	1
		Handhelds/PDAs	2
		Mobile Telephony	6
		Telecentres	12
		Telephony (Public)	3
		Other ICT	1

Type	Sub-Type	Focus	No. of Literature Items
METHOD-SPECIFIC		*Ethnographic*	2
		Interpretive	1
		Participatory	4
SECTOR-SPECIFIC		*Agriculture*	1
		Education	6
		Finance	2
		Government	8
		Health	3

Table 3: ICT4D Impact Assessment Bibliography Structure and Content

1. Generic ICT4D Impact Assessment Documents

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Generic: Assessing ICT4D IA	Garrido, M. (2004) *A Comparative Analysis of ICT for Development Evaluation Frameworks*, Center for Internet Studies, University of Washington, WA http://www.asiafoundation.org/pdf/ICT_analysis.pdf	n/a	n/a	Summarises a set of ICT4D IA frameworks mainly around e-government, e-education, and e-civil society. The closest other literature item to this Compendium, and the model for its case example summaries.
Generic: Assessing ICT4D IA	Heeks, R.B. (2006) *Benchmarking eGovernment: Improving the National and International Measurement, Evaluation and Comparison of eGovernment*, IDPM i-Government Working Paper no.18, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/igov_wp18.htm	n/a	n/a	Provides an Appendix checklist for assessing an assessment (or for evaluating an evaluation), though these are specific to e-government project assessments.
Generic: Assessing ICT4D IA	Nijland, M. & Willcocks, L.P. (2008) How IT evaluation methods are used, in *Evaluating Information Systems*, Z. Irani & P. Love (eds), Butterworth-Heinemann, Oxford, 49-77	n/a	n/a	Not a guide on how to assess IAs, but does show how IA frameworks are non-neutral and are actually inscribed with values and interests.
Generic: Assessing ICT4D IA	Reilly, K. & Gomez, R. (2001) Comparing approaches: telecentre evaluation experiences in Asia and Latin America, *Electronic Journal of Information Systems in Developing Countries*, 4(3), 1-17 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/23/23	n/a	n/a	Compares two telecentre impact assessments against good practice guidelines for ICT4D IA (that they should be: participatory; socially inclusive; locally grounded; public and transparent; methodologically appropriate; sustainability enhancing; capacity building; reflective of shared values; strategically oriented; gender sensitive)

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Generic: Assessing ICT4D IA	Rosas, V. (2004) *Understanding Telecentre Evaluation Frameworks Through The Venezuelan Infocentros Programme*, Funredes, Santo Domingo, Dominican Republic http://funredes.org/mistica/castellano/ciberoteca/partici pantes/docuparti/Understanding_Telecentre_Evaluatio n_Frameworks_-_Valeria_Rosas.rtf	n/a	n/a	Based on the CCP (content, context, process) approach to evaluating impact assessment – provides a table of questions under the CCP headings.
Generic: Assessing ICT4D IA	Stockdale, R. & Standing, C. (2006) An interpretive approach to evaluating information systems: a content, context, process framework, *European Journal of Operational Research*, 173(3), 1090-1102	n/a	n/a	Provides a framework for evaluating info. systems impact assessment – quite simple and just asking why, what, how, who, when, what context questions. Also uses the CCP approach.
Generic: CBA	CEG (2002) *Gyandoot: A Cost-Benefit Evaluation Study*, Centre for Electronic Governance, Indian Institute of Management, Ahmedabad http://www.iimahd.ernet.in/egov/documents/gyandoot-evaluation.pdf	Adoption, Use and Outputs	A couple of pages of detail, plus full copies of all three (user, kiosk owner, government official) survey questionnaires used.	Gives details of prices (Annex 2) and revenues (Section 3.5.2 and Annex 8) and costs (Annex 12) for rural kiosk owners (providing e-gov services).
Generic: CBA	Goussal, D. (1998) Rural telecentres: impact-driven design and bottom-up feasibility criterion, paper presented at seminar on *Multipurpose Community Telecentres*, Budapest, 7-9 December http://www.itu.int/ITU-D/univ_access/seminar/buda/papers/final/F_Goussal.pd f	Financial Inputs and Outcomes	One paragraph on method. Strong discussion of indicator selection.	Uses an economic approach to telecentre evaluation, including some real costs and revenues for a Suriname telecentre, but seems rather limited in utility and is more a general approach than specifically applied to assess a particular ICT4D project.
Generic: CBA	Khelladi, Y. (2001) *The Infocentros Telecenter Model*, World Resources Institute, Washington, DC http://www.nextbillion.net/files/Infocentros.pdf	Financial Inputs and Outcomes	Very limited detail on how to collect data, how to identify costs and benefits and how to value them. Fair on the summary of data to show cost estimation.	Evaluation of five El Salvador telecentres. No framework but provides details of prices for services, fixed and variable costs including costs per PC, and telecentre income. (Some care needed – also includes quite a lot of financial projection data.)

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Generic: CBA	Kumar, R. (2004) eChoupals: a study on the financial sustainability of village Internet centers in rural Madhya Pradesh, *Information Technologies and International Development*, 2(1), 45-73 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752043971161	Outcomes	One page on data collection and triangulation procedure. Good detail on assumptions as well as calculations of revenues. No appendix of interview protocol.	No detailed framework but uses two years of financial data to analyse mainstream cost-benefit analysis elements including costs, income/profit, payback period and sensitivity analysis.
Generic: CBA	Lobo, A. & Balakrishnan, S.(2002) *Report Card on Service of Bhoomi Kiosks: An Assessment of Benefits by Users of the Computerized Land Records System in Karnataka*, Public Affairs Centre, Bangalore. http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN015135.pdf	Outcomes (assumed link to ICT4D usage)	A paragraph summary of study design. A well detailed description of report card methodology. Provides instruments used for collecting the data.	Just benefit analysis: rather narrowly-defined but clear method. Good quasi-experimental approach.
Generic: CBA	Magnette, N. & Lock, D. (2005) *Scaling Microfinance with the Remote Transaction System*, World Resources Institute, Washington, DC http://www.digitaldividend.org/pdf/rts.pdf	Financial Inputs and Outcomes	Unclear.	Looks at pilot usage of a smart-card-plus-mobile/remote-handheld-device system to collect and transfer financial data from field agents to central microfinance institution HQs. Provides a series of cost, savings and income calculations to show issues around breakeven points (that in part led to abandonment of project).
Generic: CBA	Potashnik, M. & Adkins, D. (1996) Cost analysis of information technology projects in education: experiences from developing countries, *Education and Technology Series*, 1(3) http://wbln0018.worldbank.org/HDNet/HDdocs.nsf/C11FBFF6C1B77F9985256686006DC949/167A6E81A893851B8525675500681C7E/$FILE/v1n3.pdf	Financial Inputs and Educational Outcomes	Several pages discussing issues around cost measurement.	Looks at cost-effectiveness of different ICT4E interventions – e.g. $ per improvement in test scores.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Generic: CBA	Shakeel, H., Best, M., Miller, B. & Weber, S. (2001) Comparing urban and rural telecenters costs, *Electronic Journal of Information Systems in Developing Countries*, 4(2), 1-13 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/22/22	Financial Inputs	Little on actual method but several pages of discussion on calculation of costs.	Does not cover the benefits side of the equation but provides a comprehensive framework for evaluation of ICT4D project costs (base telecentre; power consumption; telecommunications), though base telecentre costs are not broken down.
Generic: CBA	Whyte, A. (1999) Understanding the role of community telecentres in development – a proposed approach to evaluation, in: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 271-312 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf	Uptake and Impact	Whole focus is on how to plan ICT4D IA.	Not an actual impact assessment but a discussion of how to do IA. p307 has a checklist for telecentre start-up costs; operating costs; and revenue. p310 has a checklist for economic benefits of telecentre.
Generic: Project Goals	Ballantyne, P. (2004) *Evaluation of Swedish Support to SchoolNet Namibia*, SIDA, Stockholm http://www.sida.se/sida/jsp/sida.jsp?d=118&a=3077&language=en_US	Inputs (skills), Availability (access) and Use	Limited – about one page. No research instruments provided.	Clear and simple – outlines four project goals and evaluates against them.
Generic: Project Goals	Batchelor, S. & Norrish, P. (2005) *Framework for the Assessment of ICT Pilot Projects*, InfoDev, World Bank, Washington, DC http://www.infodev.org/en/Publication.4.html	Impact, with some consideration of Implementation and Uptake	Generic framework, but does provide a couple of paragraphs on each of four or five possible research methods to fit into the framework. Annex 9 provides a detailed checklist of ICT4D project assessment questions.	Combines "Project Purpose" questions (combination of project goals and wider impacts) with "Research" questions about pilot project scalability and link to MDGs. Not an individual project assessment but a framework description.

2. Discipline-Specific ICT4D Impact Assessment Documents

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Communications-for-Development	Bertrand, J.T., O'Reilly, K., Denison, J., Anhang, R. & Sweat, M. (2006) Systematic review of the effectiveness of mass communication programs to change HIV/AIDS-related behaviors in developing countries, *Health Education Research*, 21(4), 567-597 http://her.oxfordjournals.org/cgi/reprint/21/4/567	Outputs	Just a paragraph summary for each of the 24 studies on design, not methods. No instrument provided.	Not assessment of an individual project, but a review of 24 other communications impact assessment studies. Useful in making the C4D model explicit, and in offering guidance on good practice in C4D impact assessment.
Discipline: Communications-for-Development	Byrne, A., Gray-Felder, D., Hunt, J. & Parks, W. (2005) *Measuring Change: A Guide to Participatory Monitoring and Evaluation of Communication for Social Change*, Communication for Social Change, South Orange, NJ http://www.communicationforsocialchange.org/pdf/measuring_change.pdf	Uptake and Impacts	Whole document focuses on participatory methods of IA.	Very detailed guidance on how to undertake participatory assessment in communications projects. See also entry under Methods: Participatory.
Discipline: Communications-for-Development	Chesterton, P. (2004) *Evaluation of the Meena Communication Initiative*, UNICEF, Kathmandu http://www.unicef.org/evaldatabase/files/ROSA_2004_800_Meena_Comm_Initiative.pdf	Implementation, Uptake (inc. Sustainability), and Impact (mainly behavioural Outputs)	Several pages of details. Includes a checklist of issues (though impact aspect makes up only a few lines).	Assesses impact of data communicated via traditional not digital ICTs using standard C4D behaviour change focus. Strongest element is comparison of exposed vs. non-exposed groups.
Discipline: Communications-for-Development	Danida (2005) *Monitoring And Indicators For Communication For Development*, Danida, Copenhagen http://webzone.k3.mah.se/projects/comdev/_comdev_PDF_doc/Danida_ComDevt.pdf	All stages	Whole document relates to planning evaluation of C4D.	Itself, mainly general and strategic/national/programme level but some useful ideas.
Discipline: Communications-for-Development	Jallov, B. (2005) 'Assessing community change: development of a 'barefoot' impact assessment methodology', *Radio Journal*, 2005 http://www.comminit.com/pdf/ImpactAssessment-FinalRadioJournalVersion.pdf	Availability, Uptake and Outputs	A couple of pages on how the IA was developed and implemented, though the main focus of paper is a review of the IA process.	Focuses on impact of radio programmes. Covers internal capacity of station; match of production to community needs, and impact. But beyond this framework, not much rigour or guidance.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Discipline: Communications-for-Development	Meekers, D., Agha, S. & Klein, M. (2005) The impact on condom use of the "100% Jeune" social marketing program in Cameroon, *Journal of Adolescent Health*, 36(6), 530.e1-530.e12	Outputs	Two pages on research methods, mainly about how to measure behaviour predictors and behaviour. No instrument but details of many questions provided.	Clear C4D study – looks at dependent variable of behaviour (condom use); at intermediate variable of knowledge/beliefs; and at independent variable of level of exposure to communications campaign. Done via household survey of several thousand.
Discipline: Communications-for-Development	Mosse, E. & Nielsen, P. (2004) Communication practices as functions, rituals and symbols, *Electronic Journal of Information Systems in Developing Countries*, 18(3), 1-17 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/112/112	Use and Outcomes	Three paragraphs on method. No details of research instruments.	Looks at communication flows (in a section of the Mozambiquan health system) not just in functional terms but also as symbols for external legitimisation, and as rituals to confirm membership of a community. Of three parts of health system, only one has yet introduced ICTs.
Discipline: Communications-for-Development	Myers, M. (2005) *Monitoring and Evaluating Information and Communication for Development (ICD) Programmes*, DFID, London http://www.dfid.gov.uk/pubs/files/icd-guidelines.pdf	Availability, Uptake and Impact	Whole document focuses on IA methods.	A very clear guide on the steps in both formative assessment (pre-project baseline and ongoing process evaluation) and summative assessment (post-project) of C4D projects, with brief reviews of different possible approaches and methods.
Discipline: Capabilities	Alampay, E. (2006) Analysing socio-demographic differences in the access and use of ICTs in the Philippines using the capability approach, *Electronic Journal of Information Systems in Developing Countries*, 27(5), 1-39 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/204/182	Readiness (esp. different individual characteristics and values), Uptake (both access and use/non-use) and Outputs (ICT usage patterns)	Quite detailed (3 pp) on method and sampling used. Several pages on development of survey questionnaire. Survey questionnaire available from Richard Heeks.	A detailed piece of survey work, shaped by capabilities ideas, though not in a deep sense. Focuses mainly on phone rather than other ICT use. Treats capabilities as mix of inputs and outputs. Includes both usage and non-usage.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Discipline: Capabilities	De', R. (2007) The impact of Indian e-government initiatives, *Regional Development Dialogue*, 27(2), 88-100 http://www.apdip.net/projects/e-government/capblg/casestudies/India-De.pdf	Outcomes and knock-on into broader Development Impacts	One sentence only.	Uses Sen's five-way categorisation of freedoms as a moderately-useful checklist for ICT4D impacts. Doesn't make use of the capabilities concept or wider aspects of the capabilities framework.
Discipline: Capabilities	Gigler, B.-S. (2004) Including the excluded: can ICTs empower poor communities?, paper presented at *4th International Conference on the Capability Approach*, Pavia, Italy, 5-7 Sept http://www.unipv.it/deontica/ca2004/papers/gigler.pdf	Outcomes	Lots of detail on development of framework. Little detail on case study methods.	Presents a combined livelihoods and capabilities framework. Sets out indicators but does not really apply to two case studies.
Discipline: Capabilities	Madon, S. (2004) *Evaluating E-Governance Projects in India: A Focus on Micro-Level Implementation*, Working Paper no.124, Information Systems Dept, LSE, London http://is2.lse.ac.uk/wp/pdf/WP124.PDF	Outcomes	Two pages of detail.	Uses Sen's concepts (freedoms, opportunities, capabilities, functionings) to colour an evaluation of Kerala projects FRIENDS and Akshaya; but provides no framework or systematic usage.
Discipline: Capabilities	Zheng, Y. & Walsham, G. (2007) *Inequality of What? Social Exclusion in the e-Society as Capability Deprivation*, Working Paper no.167, Information Systems Dept, LSE, London http://is2.lse.ac.uk/wp/pdf/WP167.PDF	How Readiness (esp. Human and Institutional and Legal and Data systems Precursors) absence means Deliverables are not adopted or used	One paragraph on each case. No instruments.	Focuses on failures to convert ICTs into capabilities. Helpful in focusing on and understanding why and how ICT4D projects can partly fail to deliver.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Livelihoods	Duncombe, R. (2006) Using the livelihoods framework to analyse ICT applications for poverty reduction through microenterprise, *Information Technologies and International Development*, 3(3), 81-100 http://www.mitpressjournals.org/toc/itid/3/3	Output (impact of ICT4D on livelihood strategies) and some consideration of Development Impacts (on urban—rural and gender divides)	Very limited (reported in more detail elsewhere); nothing on actual methods or instruments.	Insightful discussion about how to use SL framework for ICT4D assessment generally, but does not then actually apply to a typical ICT4D project assessment – instead, gives a general discussion at national level.
Discipline: Livelihoods	Molla, A. & Al-Jaghoub, S. (2007) Evaluating digital inclusion projects: a livelihood approach, *International Journal of Knowledge and Learning*, 3(6), 592-611	Outcomes (asset gains)	Fairly brief on method: no details of questions or instruments.	Assesses Jordan's knowledge stations project using the livelihoods framework; mainly focuses on impacts on livelihood assets pentagon, but also mentions vulnerability context, pre-project assets, and livelihood strategies.
Discipline: Livelihoods	Parkinson, S. & Ramirez, R. (2006) Using a sustainable livelihoods approach to assessing the impact of ICTs in development, *Community Informatics*, 2(3), 116-127 http://ci-journal.net/index.php/ciej/issue/view/15	Outputs (new actions and behaviours)	Fairly good on method, but not instruments.	Of some value in thinking how to convert SL framework to use for ICT4D evaluation. Mainly uses livelihoods framework to provide the background rather than the impact. Assets treated only as an input, not seen as something that ICT4D impacts; structures and processes are very narrowly defined; no explicit consideration of livelihood outcomes.
Discipline: Livelihoods	Soriano, C.R.R. (2007) Exploring the ICT and rural poverty reduction link: community telecenters and rural livelihoods in Wu'an, China, *Electronic Journal of Information Systems in Developing Countries*, 32(1), 1-15 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/462/230	Outcomes mainly	One paragraph summary of (mixed) methods used; no instruments.	Uses a modified and simplified (but explicit) version of the SL framework, with key focus on assets impact and a little on strategies and process/structure

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Discipline: Geography	Furuholt, B. & Kristiansen, S. (2007) A rural-urban digital divide? Regional aspects of Internet use in Tanzania, *Electronic Journal of Information Systems in Developing Countries*, 31(6), 1-15 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/417/216	Mainly Adoption and Use	About a page on research method. No instrument, though can construct on the basis of findings.	Looks at the digital divide between urban, semi-urban and rural Internet kiosk locations.
Discipline: Geography	Reinikka, R. & Svensson, J. (2003) *The Power of Information: Evidence from a Newspaper Campaign to Reduce Capture*, Policy Research Working Paper Series no. 3239, World Bank, Washington, DC http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2004/03/26/000012009_20040326142036/Rendered/PDF/WPS3239.pdf	Outputs (teacher knowledge)	A couple of paragraphs about method. A lot of detail on the statistical methods used (an econometric paper).	Measures the impact of a public information campaign (newspaper-based) about monthly amounts transferred from central to local government. Measures the impact in terms of distance from the communication outlet.
Discipline: e-Readiness	Information Technologies Group (n.d.) *Readiness for the Networked World*, Harvard University, Cambridge, MA http://cyber.law.harvard.edu/readinessguide/guide.pdf	All stages	None specific.	Outlines a set of indicators/categories for understanding e-readiness (and impact).
Discipline: e-Readiness	Minges, M. (2006) Tracking ICTs: World Summit on the Information Society Targets, in: *Information and Communications for Development 2006*, World Bank, Washington, DC, 125-148 http://go.worldbank.org/PB9HXQQUR0	Readiness and Availability	No particular description.	Discussion of national-level indicators for access to key ICT infrastructure
Discipline: e-Readiness	Mansell, R. & When, U. (eds) (1998) *Knowledge Societies*, OUP, Oxford	All stages	Some description of statistical/data sourcing.	Bases e-readiness measurement around four elements: infrastructure, experience, skills, and knowledge.
Discipline: e-Readiness	UNCTAD (2008) *Measuring the Information Society*, UNCTAD, Geneva http://new.unctad.org/default____575.aspx	All stages	Detailed descriptions within documentation.	Portal drawing together documentation on new national-level ICT statistics including those on e-readiness.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Information Economics	Abraham, R. (2007) Mobile phones and economic development: evidence from the fishing industry in India, *Information Technologies and International Development*, 4(1), 5-17 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.5	Uptake (mobile phone use), Output (market information access and use), and Outcome (efficiency, productivity and quality of life)	One paragraph on method. No instruments provided. Provides limited guidance on how to apply IE, though notes impact of soft issues (trust, perception) on data collection.	A basic application of the information economics model for impact evaluation. Identifies potential data sources for using IE and show-cases what an IE analysis looks like.
Discipline: Information Economics	Jagun, A., Heeks, R. & Whalley, J. (2007) *Mobile Telephony and Developing Country Micro-Enterprise*, Development Informatics Paper no.29, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp29.pdf	Uptake (mobile phone use); Outputs (changes in information patterns and communication processes); and Outcomes (structural characteristics of supply chains)	Fairly detailed. No instrument.	Assesses impact of mobile telephony on informal sector textile producers in Nigeria. Focuses on informational impacts of telephony, and impacts on process and structure of commerce between different players in a supply chain. Does include a couple of framework models.
Discipline: Information-for-Development	McConnell, S. (1999) *Connecting with the Unconnected: Proposing an Evaluation of the Impacts of the Internet on Unconnected Rural Stakeholders*, FAO, Rome http://www.fao.org/docrep/x0295e/x0295e19.htm	Availability and Impact	None – just a suggested framework.	Presents an information-centred framework for measuring the efficiency, effectiveness and impact of rural Internet projects. Like other frameworks in the information-for-development tradition, does not indicate utilisation in practice.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Information-for-Development	Menou, M. (1993) *Measuring the Impact of Information on Development*, IDRC, Ottawa http://www.idrc.ca/openebooks/708-6/ SEE ALSO: McConnell, P. (1995) *Making a Difference: Measuring the Impact of Information on Development*, IDRC, Ottawa http://www.idrc.ca/en/ev-9372-201-1-DO_TOPIC.html	All stages, though particularly Outputs, Outcomes and Development Impacts	Whole document is about how to undertake ICT4D IA.	Very thorough guide to the assessment of ICT4D from an informational perspective. Application in McConnell is disappointing: - Case 2 applies a bit but in a research centre not public access - Case 5 applies a bit but in relation to use to make policy
Discipline: Information-for-Development	Sida, L. & Szpak, C. (2004) *An Evaluation of Humanitarian Information Centers*, USAID, Washington, DC http://www.humanitarianinfo.org/hicstakeholder2007/ HIC_evaluations/HIC_Evaluation_2004.pdf)	Outputs and Outcomes	Just two paragraphs in main text but further detail of analysis areas and ToR in Appendices.	In-depth analysis of information centres; rooted in an informational view though without a strong guiding conceptual model.
Discipline: Information Needs/Mapping	Beardon, H., Munyampeta, F., Rout, S. & Williams, G.M. (2004) *ICT for Development: Empowerment or Exploitation?*, ActionAid, London http://www.reflect-action.org/Initiatives/ict/resources/publication1.pdf	Processes rather than Impact	Some pages of method description. Includes a detailed data collection protocol and guidance sheets.	Rooted in ideas about rights-based development, empowerment and communication (and so with potentially something to say for all these), this actually takes a largely informational approach, with a strong emphasis on information mapping. Very good for need identification and using that as an input for designing the structure and process of communication intervention projects.
Discipline: Information Needs/Mapping	Duncombe, R.D. & Heeks, R.B. (2001) *Information and Communication Technologies and Small Enterprise in Africa: Lessons from Botswana*, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/is/ictsme/summary/summary.pdf	Information Availability and ICT Usage	Several pages (Section 3) of details on methods. Survey instrument available at: http://www.sed.manchester.ac.uk/ idpm/research/is/ictsme/ictsmeaf.htm	Uses a set of information-centred models to investigate information needs and flows around micro/small enterprises in Africa, including role of ICTs. Does not consider specific impact of ICT4D but maps with/without-ICT information needs and flows of small enterprises.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Information Needs/Mapping	Godtland, E. M., Sadoulet, E., de Janvry, A., Murgai, R., & Ortiz, O. (2004) The impact of farmer field schools on knowledge and productivity: A study of potato farmers in the Peruvian Andes. *Economic Development and Cultural Change*, 53(1), 63-92	Outputs (farmer knowledge); too early for Outcomes (productivity)	Just a couple of paras on method, but a lot of detail on how to do an effective control grouping when you can't get an exact control match.	Maps out key information sources and key items of livelihoods information/knowledge that potato farmers require. Then conducts a robust control survey to show significant difference in knowledge between programme-exposed and control group.
Discipline: Information Needs/Mapping	Kyabwe, S. & Kibombo, R. (1999) Buwama and Nabweru Multipurpose Community Telecentres: Baseline Surveys in Uganda, in: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 171-194 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf	Uptake (Use)	Several pages of detail on survey.	Only brief on info. needs – as title suggests, more of a background on who uses what ICT channel.
Discipline: Information Needs/Mapping	Mchombu, K. *(1995)* Impact of information rural development, in: *Making a Difference: Measuring the Impact of Information on Development*, P. McConnell (ed.), IDRC, Ottawa http://www.idrc.ca/en/ev-9372-201-1-DO_TOPIC.html	Output (information), Outcome (benefits of information), and Development Impact (wider gains)	Very good detail on the design and data collection method with some generic information needs and impacts indicators.	A very good guide on designing information needs/mapping-type impact assessment. Offers a checklist of needs and related benefits and provides guide on how to link needs to impact. Outlines the additional resources and skills that are required in the information value chain for impact to materialise. Also notes the need for evaluating the efficiency and effectiveness of information centres in understanding the impact of information on development.
Discipline: Information Needs/Mapping	Meera, S.N., Jhamtani, A. & Rao, D.U.M. (2004) *Information And Communication Technology In Agricultural Development: A Comparative Analysis Of Three Projects From India*, Network Paper no. 135, Overseas Development Institute, London http://www.odi.org.uk/networks/agren/papers/agrenpaper_135.pdf	More on Implementation and Uptake than on Impact	Very limited on method. No instruments.	Contacts with 40 farmers and 30 staff per project. Looks particularly at: Project staff – education, training given, attitude, perceived effectiveness; and at Project users – landholding size, use frequency, and user (farmer) information needs.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Information Needs/Mapping	Raihan, A., Hasan, M., Chowdhury, M. & Uddin, F. (2005) *Pallitathya Help Line*, D.Net, Dhaka http://www.dnet-bangladesh.org/Pallitathya_pcc.pdf	Readiness (need for information, cost of calls), Uptake (usage/non usage of helpline), Output (information services), Outcome (benefits, service satisfaction) and Development Impact (wider gains)	Very good detail on action research design and data collection method including processes and instruments used for all phases of data collection. Incorporates some aspects of Gender Evaluation Methodology.	A useful best practice guide on how to plan, implement and evaluate action research-based information needs/mapping. Offers detailed notes on methodology and the action cycle process (from problem diagnosis to exit). Extremely data rich and participatory. However, gives limited attention to the steps/resources between information and development.
Discipline: Science & Technology Studies	Baark, E. & Heeks, R. (1998) *Evaluation of Donor-Funded Information Technology Transfer Projects in China: A Lifecycle Approach*, Development Informatics Working Paper no.1, IDPM, University of Manchester http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp01.pdf	Mainly Implementation	Only a couple of sentences. Used interviews, observation and document analysis	Uses a five-part framework of the way in which ICTs are transferred by donor agencies into developing countries (choosing technology, purchase and installation, assimilation and use, adaptation, diffusion and innovation). Also provides a scale of technological capabilities for judging deeper competencies that ICT4D projects can create
Discipline: Cultural-Institutional	Avgerou, C. (2000) Recognising alternative rationalities in the deployment of information systems, *Electronic Journal of Information Systems in Developing Countries*, 3(7)), 1-15 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/19/19	Culture mainly seen as an Input, but can also be an Outcome	No method provided.	Contrasts Western rationality with other rationalities that ICT4D projects may meet. Gives two examples from Cyprus and Greece of this happening. No specific framework but provides a general basis for understanding deeper aspects of "culture".

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Discipline: Cultural-Institutional	Dafoulas, G. & Macaulay, L. (2001) Investigating cultural differences in virtual software teams, *Electronic Journal of Information Systems in Developing Countries*, 7(4), 1-14 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/37/37	Culture as an Input, but some focus on Outputs	No method.	Not applied and not specific to ICT4D, but does provide an overview of several general cultural models that could be used to measure culture as a factor in ICT4D projects.
Discipline: Cultural-Institutional	Griswold, W., McDonnell, E.M. & McDonnell, T.E. (2006) Glamour and honor: going online and reading in West African culture, *Information Technologies and International Development*, 3(4), 37-52 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.3.4.37	Use (both online and book reading practices) and considers Outcomes (cultural norms and values)	Just a single paragraph. Focus group, but not interview, questions provided.	Takes a cultural and qualitative perspective to look at how ICTs have/have not impacted cultural values around reading. Provides no framework or checklist, but discusses the cultural norms and values associated with ICT.
Discipline: Cultural-Institutional	Heeks, R.B. & Santos, R. (2007) *Enforcing Adoption of Public Sector Innovations: Principals, Agents and Institutional Dualism in a Case of e-Government*, unpublished paper, Development Informatics Group, IDPM, University of Manchester, UK	Inputs (esp. values) and Use, and considers Outcomes (impact on cultural-institutional forces)	One page on actual method, plus one page justifying methodology used. No instrument provided.	Rather dense "academic" style of writing, and at least half the paper focuses on how to enforce adoption of ICT4D. But does also discuss impact of ICT4D introduction on institutional forces and systems.
Discipline: Cultural-Institutional	Licker, P. (2001) A gift from the gods? Components of information technological fatalism, determinism in several cultures, *Electronic Journal of Information Systems in Developing Countries*, 7(1), 1-11 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/34/34	Can be seen as an Input or Outcome	Brief description of survey study on these ICT cultural values.	Looks at three different aspects of ICT-relevant culture: fatalism (ICT drives itself), determinism (ICT shapes the world), particularism (ICT is determined by each society). Could use to measure impact of ICT4D via changes to beliefs.
Discipline: Cultural-Institutional	Mosse, E. & Nielsen, P. (2004) Communication practices as functions, rituals and symbols, *Electronic Journal of Information Systems in Developing Countries*, 18(3), 1-17 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/112/112	Use (both ICT- and paper-based practices) and considers Outcomes (impact on functional, symbolic and ritualistic practices)	Three paragraphs on method. No details of research instruments.	Looks at communication flows (in a section of the Mozambiquan health system) not just in functional terms but also as symbols for external legitimisation, and as rituals to confirm membership of a community. Of three parts of health system, only one has yet introduced ICTs.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Political Economy	Puri, S.K. & Sahay, S. (2003) Participation through communicative action: a case study of GIS for addressing land/water development in India, *Information Technology for Development*, 10, 179-199	Outputs, Outcomes	Some method detail – mainly interviews – no instruments.	Investigates the power relations around decision-making after a GIS was introduced.
Discipline: Political Economy	Schech, S. (2002) Wired for change, the links between ICTs and development discourse, *Journal of International Development*, 14(1), 13-23	Outcomes and Development Impacts	None – secondary analysis.	Discusses two applications of ICT4D – an ITDG project and the Zapatistas. Ideas are not constituted in a specific model but discuss the nexus of power and knowledge, and how ICT4D projects are exercises in governing.
Discipline: Systems Thinking	Gunawardena, C. & Brown, D.H. (2007) IS initiatives in the vocational and technical education sector of developing Asian countries: a systems approach to the management of project intervention processes, *Electronic Journal of Information Systems in Developing Countries*, 30(1), 1-19 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/332/202	Implementation	Provides detailed account of how to apply soft systems methods.	Not an evaluation, but details of how to use soft systems methods in ICT project management in developing countries.
Discipline: Systems Thinking	Heeks, R. (2002) *Failure, Success and Improvisation of Information Systems Projects in Developing Countries*, Development Informatics Working Paper no.11, IDPM, University of Manchester http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp11.pdf	Implementation and Uptake	None – suggested framework and secondary case analysis.	Presents a framework that explains why ICT4D projects succeed or fail.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Discipline: Systems Thinking	Krasnikova, V. & Heeks, R. (2003 *Computerising a Central Asian Epidemiology Service*, Design-Reality Case Study no.2, University of Manchester, UK http://www.egov4dev.org/success/case/epidemiology.shtml AND: Anonymous (2003) *A Single Personnel Information System for a Southern African Government*, Design-Reality Case Study no.4, University of Manchester, UK http://www.egov4dev.org/success/case/centralpersis.shtml	Implementation and Uptake	None on data gathering but detailed application of design-reality framework.	Applies design-reality gap framework to explain why a particular ICT4D case project in Central Asia was a success, and one in South Africa was a failure.

3. Issue-Specific ICT4D Impact Assessment Documents

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Issue-Specific: Empowerment	Corbett, J.M. & Keller, C.P. (2004) Empowerment and participatory geographic information and multimedia systems, *Information Technologies and International Development*, 2(2), 25-44 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752044193425	Outcomes	Virtually none.	Evaluates introduction of PGIMS into two Indonesian villages using an empowerment matrix of four types of individual and community empowerment, and four empowerment catalysts (information, process, skills and tools). The framework does not have a lot of strong theoretical foundation, but it is applied clearly and systematically.
Issue-Specific: Empowerment	Puri, S.K. & Sahay, S. (2003) Participation through communicative action: a case study of GIS for addressing land/water development in India, *Information Technology for Development*, 10, 179-199	Outputs, Outcomes	Some method detail – mainly interviews – no instruments.	Uses Habermas' theory of communicative action, and Ideal Speech Situation ideas to assess how participative and empowering were decision-making processes since GIS was introduced.
Issue-Specific: Enterprise (Growth)	Annamalai, K. & Rao, S. (2003) *ITC's E-Choupal and Profitable Rural Transformation*, World Resources Institute, Washington, DC http://www.nextbillion.net/files/eChoupal.pdf	Outputs (e.g. new value chain) and Outcomes (e.g. farmer benefits)	None obvious.	Provides no overall framework for evaluation of the e-Choupal (rural kiosk) project. However, does make use of the business value chain, showing before- and after-ICT models.
Issue-Specific: Enterprise (Growth)	Donner, J. (2004) Microentrepreneurs and mobiles: an exploration of the uses of mobile phones by small business owners in Rwanda, *Information Technologies and International Development*, 2(1), 1-21 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752043971198	Outcomes	One paragraph on method, but a few pages on methodology – Q-sort, and includes statement list used.	No framework, but categorises perceptions of microentrepreneurs about impact/value of mobiles.
Issue-Specific: Enterprise (Growth)	Donner, J. (2007) Customer acquisition among small and informal businesses in urban India, *Electronic Journal of Information Systems in Developing Countries*, 32(3), 1-16 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/464/232	Outcomes	About one page on methods. No instruments but the results give a good sense of the questions asked.	Very tight focus on just one issue – ICTs impact on customer relationships. Provides four dimensions for assessing relations. Does not directly focus on how ICTs have changed relations, though indirect evidence suggests they have not.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Issue-Specific: Enterprise (Growth)	Duncombe, R.D. & Heeks, R.B. (2001) *Information and Communication Technologies and Small Enterprise in Africa: Lessons from Botswana*, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/is/ictsme/summary/summary.pdf	Information Availability and ICT Usage	Several pages (Section 3) of details on methods. Survey instrument available at: http://www.sed.manchester.ac.uk/idpm/research/is/ictsme/ictsmeaf.htm	Uses a set of information-centred models to investigate information needs and flows around micro/small enterprises in Africa, including role of ICTs. Does not consider specific impact of ICT4D but maps with/without-ICT information needs and flows of small enterprises.
Issue-Specific: Enterprise (Growth)	Esselaar, S., Stork, C., Ndiwalana, A. & Deen-Swarray, M. (2007) ICT usage and its impact on profitability of SMEs in 13 African countries, *Information Technologies and International Development*, 4(1), 87-100 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.87	Outputs (ICT process indices and productivity) and Outcomes (turnover)	Two pages of detail – questionnaire survey.	Frustrating presentation of findings with key impacts not discussed or discussed obscurely. As a basic model, though, looks a potentially-interesting way of following a quantitative approach to IA of ICT4D on enterprises. Useful categorisation of enterprise by formality.
Issue-Specific: Enterprise (Growth)	Heeks, R.B. (2008) *Researching ICT-Based Enterprise in Developing Countries: Analytical Tools and Models*, Development Informatics working paper no.30, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp30.htm	Outcomes	Not applicable – presents frameworks.	A comprehensive review of different frameworks by which to measure enterprise: Basic indicators (size/scale; financial performance, enterprise and entrepreneur categorisation); Lifecycle stage; Form of production; Competitive strategy. Plus frameworks for enterprise impact analysis: employment; financial performance; technological capability; livelihoods, gender and environmental impact. Plus other analysis frameworks such as context analysis and value chain.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Issue-Specific: Enterprise (Growth)	Jagun, A., Heeks, R. & Whalley, J. (2007) *Mobile Telephony and Developing Country Micro-Enterprise*, Development Informatics Paper no.29, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp29.pdf	Uptake (mobile phone use); Outputs (changes in entrepreneur communication processes); and Outcomes (structural characteristics of supply chains)	Fairly detailed. No instrument.	Assesses impact of mobile telephony on informal sector textile micro-enterprises in Nigeria. Covers impacts on process and structure of commerce between different players in a micro-enterprise supply chain. Does include a couple of framework models.
Issue-Specific: Enterprise (Growth)	Karanasios, S. & Burgess, S. (2006) Exploring the Internet use of small tourism enterprises: evidence from a developing country, *Electronic Journal of Information Systems in Developing Countries*, 27(3), 1-21 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/254/179	Outputs (ICT process measures) and Outcomes (e.g. customer numbers)	Two pages on method, though mainly about sample selection. No instruments provided.	Focuses only on a limited, specific part of the Enterprise Variables Model – ICT Process, though does give perceived impact on enterprise performance. "Spaces" model is more a simple checklist than a model.
Issue-Specific: Enterprise (Growth)	Lefebvre, E. & Lefebvre, L.A. (1996) *Information and Telecommunication Technologies: The Impact of Their Adoption on Small and Medium-Sized Enterprises*, IDRC, Ottawa http://www.idrc.ca/ict4d/ev-9303-201-1-DO_TOPIC.html	Impacts	Appendices provide guidance on measures, if not actual methods.	Not DC-specific, but Chapter 4 contains discussion on impact, and Appendices E, F and G (esp. E) contain suggested indicators.
Issue-Specific: Enterprise (Growth)	Overå, R. (2006) Networks, distance, and trust: telecommunications development and changing trading practices in Ghana, *World Development*, 34(7), 1301-1315	Outcomes	Three paragraphs; mainly interviews.	No framework, but systematically logs micro/small enterprise impacts of mobile telephony: on social networks, synchronising supply and demand, co-ordinating activities, greater availability, safer money transactions, and improved services.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Issue-Specific: Enterprise (Growth)	Vaughan, L.Q. & Tague-Sutcliffe, J. (1997) Measuring the impact of information on development: a LISREL-based study of small businesses in Shanghai, *Journal of the American Society for Information Science*, 48(10), 917-931 AND Vaughan, L.Q. (1999) The contribution of information to business success: a LISREL model analysis of manufacturers in Shanghai, *Information Processing and Management*, 35(2), 193-208	Precursors/Inputs and Outcomes	Some detail; used questionnaire (not provided).	Independent—dependent variable model. Independent variables include use of information; dependent variables are various measures of enterprise success.
Issue-Specific: Enterprise (Growth)	Young, J., Ridley, G. & Ridley, J. (2001) A preliminary evaluation of online access centres: promoting micro e-business activity in small, isolated communities, *Electronic Journal of Information Systems in Developing Countries*, 4(1), 1-17 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/21/21	Outputs	No particular details given.	Makes use of data already gathered by telecentres. Measures business activity in terms of local business pages/adverts hosted plus no. hits of on those pages; so only of use in contexts where micro-enterprises set up Web pages.
Issue-Specific: Gender	APC (n.d.) *Gender Evaluation Methodology for Internet and ICTs*, Association for Progressive Communications http://www.apcwomen.org/gemkit/en/gem_tool/index.htm AND: Ramilo, C.G. & Cinco, C. (2005) *Gender Evaluation Methodology for Internet and ICTs*, APC, Melville, South Africa http://www.apcwomen.org/gemkit/pdf/GEMEnglish.pdf	All stages	Whole documents focus on methodology.	Provides a foundational basis for understanding application of GEM to ICT4D projects. Lacks clear examples of implementation of GEM.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Issue-Specific: Gender	Buré, C. (2006) *Grounding GEM for Telecentres: The Experiences of Ecuador and the Philippines*, IDRC, Ottawa http://www.bcoalliance.org/system/files/GEMforTelecentres.pdf	All stages	Main focus of document is on how GEM is applied.	An evaluation of evaluations but still quite grounded and certainly a useful guide to putting GEM into practice. - Ecuador case: GEM used more for planning than for evaluation. - Philippines: used for evaluation of 2 telecentres – v. brief (p18) report of results p23-5 recommendations for use of GEM in ICT4D projects (rather general).
Issue-Specific: Gender	Gurumurthy, A. (2004) *Gender and ICTs: Overview Report*, BRIDGE, University of Sussex, UK http://www.bridge.ids.ac.uk/reports/CEP-ICTs-OR.pdf AND: Jolly, S., Narayanaswamy, L. & Al-Zu'bi, R. (2004) *Gender and ICTs: Supporting Resources Collection*, BRIDGE, University of Sussex, UK http://www.bridge.ids.ac.uk/reports/cep-icts-src.doc	n/a	n/a	Overview reports synthesising findings on gender in ICT projects. Latter is an annotated bibliography.
Issue-Specific: Gender	Hafkin, N.J. (2002) Are ICTs gender neutral? A gender analysis of six case studies of multi-donor ICT projects, paper presented for *UN/INSTRAW Virtual Seminar Series on Gender and ICT*, 1-12 July http://www.un-instraw.org/en/docs/gender_and_ict/Hafkin.pdf	Implementation and very limited consideration of Impact	Nothing stated other than "field studies".	A pre-GEM gender analysis of infoDev projects. No method details and just limited guidance on questions asked and impacts seen.
Issue-Specific: Gender	Morgan, S., Heeks, R. & Arun, S. (2004) *Researching ICT-Based Enterprise for Women in Developing Countries: A Gender Perspective*, IDPM, University of Manchester, UK http://www.womenictenterprise.org/GenderResearch.doc	Outcomes	None – only presents framework.	Converts the GEM perspective into a summary table of issues, questions and indicators to use in evaluation of ICT4D projects.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Issue-Specific: Gender	Odame, H.H. (ed.) (2005) *Gender and ICTs for Development: A Global Sourcebook*, KIT, Amsterdam http://www.kit.nl/net/KIT_Publicaties_output/ShowFile2.aspx?e=820	Implementation and some Outputs	Generally few details.	A set of five case studies – some impact assessment though mainly about background and lessons learned. Unfortunately either not really about gender (cases 2, 3, 4) or not public ICT use (1 and 5). Has its own annotated bibliography.
Issue-Specific: Gender	Ramilo, C.G. (ed.) (2003) *Gender Evaluation Methodology for Internet and ICTs*, APC/WNSP, London http://www.apc.org/english/capacity/policy/mmtk_gender_ictpol_gem_publication.pdf	Use (by gender) and Outcomes	One page of methods and no instruments provided.	Presents six 5-6 page summaries of using GEM Some aren't that useful but two Philippines telecentres (pp30-36) give some detail, though not how GEM was applied in practice, nor with much depth on actual impact.
Issue-Specific: Gender	Richardson, D., Ramirez, R. & Huq, M. (2000) *Grameen Telecom's Village Phone Programme in Rural Bangladesh: a Multi-Media Case Study*, TeleCommons Development Group, Guelph, ON http://www.telecommons.com/villagephone/finalreport.pdf	Use and Outcomes	Four pages of detail on research methods. Two pages on how consumer surplus was calculated. Full list of all data items (i.e. questions) for survey.	Shows the ability to uncover gender-relevant impacts by asking some fairly simple questions (i.e. without using a specific gender framework but by being gender-sensitive). Key impacts on pp30-36; summarised p50-51.
Issue-Specific: Gender	Swamy, M. (2007) A gender framework for analysis of ICTD projects in India, paper presented at *Gender Evaluation Methodology-2* workshop, Kuala Lumpur, 25-27 July http://www.itforchange.net/images/stories/files/GEMPresentation_Write_UpforGDISP.pdf	Pre-Impact	Unable to find.	A near-miss in some ways – takes an interesting ownership and empowerment perspective but talks more about how the process of the project helps rather than providing evidence on the actual impacts.
Issue-Specific: Gender	World Bank (2008) *Indicators for Monitoring Gender and ICT*, World Bank, Washington, DC http://go.worldbank.org/VDY0ST50Y0	Precursors and Uptake	Very limited discussion on collection of indicators.	Mainly a discussion of the national-level indicators that are, and ideally would be, sex-disaggregated.
Issue-Specific: Inequality	Kumar, R. & Best, M.. (2006) Social impact and diffusion of telecentre use, *Journal of Community Informatics*, 2(3) http://ci-journal.net/index.php/ciej/article/view/328/267	Uptake	Three paragraphs. No instruments provided but findings and Appendix tables give guide on questions used.	Shows differences in user vs. overall populations on various criteria: age, gender, religion, caste, income.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Issue-Specific: Inequality	Furuholt, B. & Kristiansen, S. (2007) A rural-urban digital divide? Regional aspects of Internet use in Tanzania, *Electronic Journal of Information Systems in Developing Countries*, 31(6), 1-15 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/417/216	Mainly Adoption and Use	About a page on research method. No instrument, though can construct on the basis of findings.	Looks at different usage between urban vs. semi-urban vs. rural location. Also gives differences in usage in gender, age, education, employment, IT skills terms. Findings on differences in both user profiles and usage in urban vs. rural areas.
Issue-Specific: Social Capital	Donner, J. (2006) The use of mobile phones by microentrepreneurs in Kigali, Rwanda: changes to social and business networks, *Information Technologies and International Development*, 3(2), 3-19 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.3.2.3	Outcomes	1.5 pages on method, via interviews with 277 people. Interesting use of call logs as data source.	No particular single framework or direct link to social capital, but looks at the relationships networks of mobile phone callers – personal vs. business, and addition of new individuals not previously known.
Issue-Specific: Social Capital	Molony, T. (2006) 'I don't trust the phone; it always lies': trust and information and communication technologies in Tanzanian micro- and small enterprises, *Information Technologies and International Development*, 3(4), 67-83 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.3.4.67	Precursors and Outcomes	One page on method – semi-structured interviews.	No clear framework though does discuss social capital, and findings are presented in a fairly unstructured manner. Interest is more in showing role of trust in mediating impact of ICTs, then in charting changes in social capital and networks.
Issue-Specific: Social Capital	Rajalekshmi, K.G. (2007) E-governance services through telecenters: the role of human intermediary and issues of trust, *Information Technologies and International Development*, 4(1), 19-35 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.19	Precursors	One page on method – semi-structured interviews.	Deals largely with trust between citizen and intermediary (telecentre operator), but sees it as a cause of utility/use of ICTs, not as an impact.

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Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Issue-Specific: Transparency & Corruption	Heeks, R. (1998) *Information Technology and Public Sector Corruption*, ISPSM Working Paper no.4, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/documents/igov_wp04.pdf	Precursors, Implementation and Outcomes	One sentence – uses thumbnail sketches only.	No framework, but outlines three types of outcome when introducing ICTs into corrupt public sector environments: no effect, reduced corruption, and new corruption opportunities. (Also looks at how precursors and implementation process impact ICT project corruption outcomes.)
Issue-Specific: Transparency & Corruption	Heeks, R. (2004) *Transparency Definitions Page*, eGovernment for Development http://www.egov4dev.org/transparency/definitions.shtml AND: A set of linked cases studies shows results at different steps on the transparency ladder: http://www.egov4dev.org/transparency/case/categorised.shtml#type	Outcomes	None provided.	Provides three models for assessing impact of ICTs on transparency (and corruption) – a "ladder" of transparency; the relation of transparency and accountability; the various stakeholders to whom government officials are accountable. Further categorisation of "e-transparency" can be found at: http://www.egov4dev.org/transparency/categories.shtml
Issue-Specific: Transparency & Corruption	Vasudevan, R. (2007) Changed governance or computerized governance? Computerized property transfer processes in Tamil Nadu, India, *Information Technologies and International Development*, 4(1), 101-112 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.101	Outcomes	Three paragraphs on method – mainly interviews.	Looks at before and after time taken for public service delivery processes, and at perceived and likely actual impact on reliability, transparency and corruption (but doesn't directly measure actual impacts).

4. Application-Specific ICT4D Impact Assessment Documents

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Application-Specific: Generic ICT4D	Batchelor, S. & Norrish, P. (2005) *Framework for the Assessment of ICT Pilot Projects*, InfoDev, World Bank, Washington, DC http://www.infodev.org/en/Publication.4.html	Impact, with some consideration of Implementation and Uptake	Generic framework, but does provide a couple of paragraphs on each of four or five possible research methods to fit into the framework. Annex 9 provides a detailed checklist of ICT4D project assessment questions.	More limited in scope than the other documents summarised on generic ICT4D, but offers a clear framework that seeks to assess combined impact of ICT4D on project goals, project scalability, wider impacts, and contribution to MDGs.
Application-Specific: Generic ICT4D	Bridges.org (2005) *The Real Access/Real Impact Framework for Improving the Way that ICT is Used in Development*, Bridges.org http://www.bridges.org/publications/94	Mainly Precursors and Implementation, with a little Uptake/Impacts	None.	Despite the mention of impact, this is actually a list of twelve mainly precursory/strategic and twelve mainly implementation best practices; with a very brief reference to use of ICT and of data content. See examples of application of framework in health and government sections.
Application-Specific: Generic ICT4D	CTA/KIT/IICD (2005) *Smart Toolkit for Evaluating Information Products and Services*, CTA, Wageningen http://www.anancy.net/uploads/file_en/smarttool_kit_final.pdf	All stages	Whole document relates to guidance on how to undertake IA. See also tools at: http://demosurvey.iicd.org/	A comprehensive, though often quite generic, look at information project evaluation. Plenty of background on what evaluation is and why/how to do it.
Application-Specific: Generic ICT4D	Harris, R. & Rajora, R. (2006) *Empowering the Poor: Information and Communications Technology for Governance and Poverty Reduction*, UNDP-APDIP, Bangkok http://www.apdip.net/publications/ict4d/EmpoweringThePoor.pdf	Mix of Readiness (including Development process), Uptake, and Impact	Does include questionnaire used, though does not connect explicitly to 16 indicators used.	Although mainly focused on telecentres, provides a more general framework that can be used by any ICT4D project.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Application-Specific: Generic ICT4D	Wakelin, O. & Shadrach, B. (2001) *Impact Assessment Of Appropriate And Innovative Technologies In Enterprise Development*, Enterprise Development Impact Assessment Information Service, Manchester, UK http://www.enterprise-impact.org.uk/pdf/ICTs.pdf	Impact	Summary section offers good practice advice on ICT4D IA.	Reviews various different approaches to ICT4D IA, mostly those supported during the 1990s by IDRC.
Application-Specific: Generic ICT4D	Young, V., Brown, G. and Laursen, J. (1997) *ICTs and Development: Testing a Framework for Evaluation*, Canadian International Development Agency, Quebec http://www.ictdevlibrary.org/downloads/cida_icts_development.pdf	Process and Impact, but as implemented here almost entirely focused on project process	Some description.	Mainly about how ICTs impact goals of broader development projects, and how to fit ICT analysis into broader development project assessment frameworks. Can see this as a variant of ICT4D project assessment – a kind of half-way house between standard project assessment and fully-focused ICT4D project assessment.
Application-Specific: Community Radio	Gamos (2006) *Community Radio – A General View of Impact in Senegal*, Gamos, Reading, UK http://www.gamos.org/icts/catia-catalysing-access-to-ict-in-africa.html	Uptake and some knowledge Outcomes	None, though based on survey detailed at same URL.	Mix of demographics of listening and example of (apparently rather limited) impact of community radio on health knowledge.
Application-Specific: Community Radio	Jallov, B. (2005) 'Assessing community change: development of a 'barefoot' impact assessment methodology', *Radio Journal*, 2005 http://www.comminit.com/pdf/ImpactAssessment-FinalRadioJournalVersion.pdf	Availability, Uptake and Outputs	A couple of pages on how the IA was developed and implemented, though the main focus of paper is a review of the IA process.	Focuses on impact of radio programmes. Covers internal capacity of station; match of production to community needs, and impact. But beyond this framework, not much rigour or guidance.
Application-Specific: Community Radio	McCay, B. (2005) Fishers and radios: a case study of Radio Ada in Ghana, in: *Gender and ICTs for Development: A Global Sourcebook*, H.H. Odame (ed.), KIT, Amsterdam, 45-50 http://www.kit.nl/net/KIT_Publicaties_output/ShowFile2.aspx?e=820	Outcomes	No details.	No framework apparently used but provides qualitative reports on impact of listening.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Application-Specific: Community Radio	Metcalf, L., Harford, N. & Myers, M. (2007) *The Contribution of Radio Broadcasting to the Achievement of the Millennium Development Goals in Southern Madagascar*, Andres Lees Trust, London http://www.andrewleestrust.org/Reports/1%20Project%20Radio%20Impact%20Study%20-%20Metcalf,%20Harford%20and%20Myers.pdf	Outputs, Outcomes and Development Impacts	Compares nine IA studies and gives a page or so on the methods for each one.	Relatively simple ICT4D value chain-type framework but strong method – based on nine IA studies with clear methodology, and lots of detail on findings and impact.
Application-Specific: Community Radio	Wambui, M. (2005) Development through radio: a case study from Sierra Leone, in: *Gender and ICTs for Development: A Global Sourcebook*, H.H. Odame (ed.), KIT, Amsterdam, 51-60 http://www.kit.nl/net/KIT_Publicaties_output/ShowFile2.aspx?e=820	Implementation and some Outcomes	One paragraph summary of community visits.	Short qualitative summaries on communities and their radio-listening.
Application-Specific: Email	Chand, A., Leeming, D., Stork, E., Agassi, A. & Biliki, R. (2005) *The Impact of ICT on Rural Development in Solomon Islands: The PFNet Case*, University of the South Pacific, Suva, Fiji http://www.usp.ac.fj/jica/ict_research/documents/pdf_files/pfnet_report.pdf	Mainly Use and Outcomes	Three pages on methods. Five questionnaires used, but not provided. c250 user and c250 non-users covered plus staff and officials. Also uses user-log data.	No framework used to assess impact of "email stations". Mainly looks at usage levels, user types, and nature of usage. Charts farming, microenterprise, health, and education uses. Includes a fair bit of material on why people are non-users.
Application-Specific: Handhelds/PDAs	Bridges.org (2003) *Evaluation of the SATELLIFE PDA Project*, Bridges.org, Cape Town http://www.bridges.org/satellife SEE ALSO: (2005) *Handhelds for Health: SATELLIFE's Experiences in Africa and Asia*, SATELLIFE, Watertown, MA http://pda.healthnet.org/download/pdapaper1.pdf	Precursors and Implementation, with a little Use/Outputs	Quite full details, including copies of questionnaire used with a few dozen users.	Uses the Bridges.org Real Access/Real Impact framework to assess use of PDAs by health staff in three African nations. Evaluation focuses on precursors and implementation process, but does give some details of use of technology and use of data content.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Application-Specific: Handhelds/PDAs	Magnette, N. & Lock, D. (2005) *Scaling Microfinance with the Remote Transaction System*, World Resources Institute, Washington, DC http://www.digitaldividend.org/pdf/rts.pdf	Financial Inputs and Outcomes	Unclear.	Looks at pilot usage of a smart-card-plus-mobile/remote-handheld-device system to collect and transfer financial data from field agents to central microfinance institution HQs. Provides a series of cost, savings and income calculations to show issues around breakeven points (that in part led to abandonment of project).
Application-Specific: Mobile Telephony	Abraham, R. (2007) Mobile phones and economic development: evidence from the fishing industry in India, *Information Technologies and International Development*, 4(1), 5-17 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.5	Outcomes	Two paragraphs only – questionnaire survey.	Some grounding in information economics (though not that strong), but reports impacts on price dispersion and fluctuation, waste of time and resources, and reduction of risk and uncertainty.
Application-Specific: Mobile Telephony	Donner, J. (2004) Microentrepreneurs and mobiles: an exploration of the uses of mobile phones by small business owners in Rwanda, *Information Technologies and International Development*, 2(1), 1-21 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752043971198	Outcomes	One paragraph on method, but a few pages on methodology – Q-sort, and includes statement list used.	Categorises microentrepreneurs using mobiles into four viewpoints on mobiles (convenient, intrinsic, indispensable, productive). Despite highly-quantitative approach, is quasi-interpretive since deals with perceptions.
Application-Specific: Mobile Telephony	Donner, J. (2006) The use of mobile phones by microentrepreneurs in Kigali, Rwanda: changes to social and business networks, *Information Technologies and International Development*, 3(2), 3-19 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.3.2.3	Outcomes	1.5 pages on method, via interviews with 277 people. Interesting use of call logs as data source.	No particular single framework, but looks at the relationships networks of mobile phone callers – personal vs. business, and addition of new individuals not previously known.
Application-Specific: Mobile Telephony	Horst, H.A. & Miller, D. (2006) *The Cell Phone: An Anthropology of Communication*, Berg, Oxford, UK (Some parts available via Google Books)	Outputs, Outcomes and (a bit) Development Impacts	Little detail.	A study of the impact of mobile phone usage in Jamaica on both social and economic aspects of poor citizens' lives.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Application-Specific: Mobile Telephony	Jagun, A., Heeks, R. & Whalley, J. (2007) *Mobile Telephony and Developing Country Micro-Enterprise*, Development Informatics Paper no.29, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp29.pdf	Uptake (mobile phone use); Outputs (changes in information patterns and communication processes); and Outcomes (structural characteristics of supply chains)	Fairly detailed. No instrument.	Assesses impact of mobile telephony on informal sector textile producers in Nigeria. Focuses on informational impacts of telephony, and impacts on process and structure of commerce between different players in a supply chain. Does include a couple of framework models.
Application-Specific: Mobile Telephony	Overå, R. (2006) Networks, distance, and trust: telecommunications development and changing trading practices in Ghana, *World Development*, 34(7), 1301-1315	Outcomes	Three paragraphs; mainly interviews.	No overriding framework, but is particularly interested in social networks and links and trust. In addition to looking at impact of mobiles on this, also looks at five other business outcomes – synchronising supply and demand, co-ordinating activities, greater availability, safer money transactions, and improved services.
Application-Specific: Telecentres	Cocchiglia, M. (2004) Regional information centres in Azerbaijan: a preliminary evaluation, *Electronic Journal of Information Systems in Developing Countries*, 17(4), 1-11 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/106/106	Deliverables and Implementation	Barely a sentence on method.	Follows a simple framework of issues in order to evaluate: ICT available/services provided; Facility management/ownership; Financial sustainability; Relevance and accessibility.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Application-Specific: Telecentres	Ernberg, J. (1998) Integrated rural development and universal access: Towards a framework for evaluation of multipurpose community telecentre pilot projects implemented by ITU and its partners, paper presented at *Development: Exploring What Works And Why* conference, Guelph, Ontario, 26-27 Oct http://www.itu.int/ITU-D/univ_access/telecentres/papers/guelph.doc	Implementation, Uptake and Outcomes	Virtually no details for Suriname case example, but includes indicators and questionnaires in Annexes 2 and 3.	Discusses background to IA for telecentres; then provides a short example from Suriname (of a largely-failed project).
Application-Specific: Telecentres	Etta, F.E. & Parvyn-Wamahiu, S. (2003) *The Experience with Community Telecentres*, IDRC, Ottawa http://www.idrc.ca/en/ev-33004-201-1-DO_TOPIC.html	Readiness, Availability and Uptake	Overview only of instruments provided in Appendices.	Lots of country case examples of telecentres with good coverage of context, ICT provided, profile of users, and small bits on use and relevance, but nothing really on impact.
Application-Specific: Telecentres	Hudson, H. (1999) Designing research for telecentre evaluation. In: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 149-164 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf SEE ALSO: Hudson, H.E. (2006) *From Rural Village to Global Village*, Lawrence Erlbaum Associates, Mahwah, NJ – Chapter 9 on "Evaluation: Issues and Strategies"	All stages	Whole piece is about how to plan telecentre impact assessment.	A "how to" guide to impact assessment of telecentres, rather than the specific application of one type of IA.
Application-Specific: Telecentres	Hunt, P. (2001) True stories: telecentres in Latin America & the Caribbean, *Electronic Journal of Information Systems in Developing Countries*, 4(5), 1-17 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/25/25	All stages	Very brief method used.	No framework – just asked those involved (staff at 28 LAC telecentre projects) to respond on: set-up/resources; social role; main problems and solutions; obstacles; enabling factors; results.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Application-Specific: Telecentres	Kumar, R. & Best, M.. (2006) Social impact and diffusion of telecentre use, *Journal of Community Informatics*, 2(3) http://ci-journal.net/index.php/ciej/article/view/328/267	Availability (services of the telecentre), Uptake (who is using it), and some Output (use purpose)	Good on data collection but no instrument or data collection protocol.	A simple framework-based assessment using indicators developed from diffusion of innovation theory. Takes a social impact approach but focuses on uptake and output issues – notes difficult in assessing downstream impacts. Interesting findings on telecentre reinforcement of existing inequalities.
Application-Specific: Telecentres	Kyabwe, S. & Kibombo, R. (1999) Buwama and Nabweru Multipurpose Community Telecentres: Baseline Surveys in Uganda, in: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 171-194 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf	Readiness (information needs and potential user profiles), and Availability (services and resources)	Well detailed method (5 pages) covering pre-assessment preparation and visits, sample design, data collection (survey, interview, focus group and secondary). Paper makes references to instrument appendices, these do note appear to be included.	Focus almost all on pre-implementation issues, not impact. Provides rigorous approach with strong, clear methodology. Does not use a specific model. Shows how telecentre type can influence assessment and notes data collection challenges.
Application-Specific: Telecentres	Lengyel, G., Eranusz, E., Füleki, D., Lőrincz, L. & Siklós, V. (2006) The Cserénfa experiment: on the attempt to deploy computers and Internet in a small Hungarian village, *Journal of Community Informatics*, 2(3) http://ci-journal.net/index.php/ciej/article/view/296/261	Uptake and some Outcomes	No particular details provided.	Without any clear framework, but interesting because it looks at the impact of a telecentre (and home PCs) on individual lives, mixing quantitative and qualitative findings.
Application-Specific: Telecentres	Miller, N.L. (2004) Measuring the contribution of Infoplazas to Internet penetration and use in Panama, *Information Technologies and International Development*, 2(2), 1-23 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752044193443	Precursors, Adoption and Use, little on Impact	Quite detailed – c. one page – on method. Includes survey questionnaire.	Looks mainly at how telecentres have impacted the diffusion and use of the Internet in Panama. Provides clear and detailed findings.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Application-Specific: Telecentres	Ulrich, P. (2004) Poverty reduction through access to information and communication technologies in rural areas: an analysis of survey results from the social impact assessment conducted by the Chinese Ministry of Science & Technology and the United Nations Development Program, *Electronic Journal of Information Systems in Developing Countries*, 16(7), 1-38 http://www.ejisdc.org/ojs2/index.php/ejisdc/article/viewFile/102/102	Uptake, Outputs and (a bit) Outcomes	Clear on methodology, and includes questionnaire.	Uses "social impact assessment". Does not define what that is, or its framework – but the study is quite thorough, and has cost-benefit elements alongside quite a lot of detail on demographics of ICT user populations, and broader household survey data on information sources and behaviour.
Application-Specific: Telecentres	Whyte, A. (1998) *Telecentre Research Framework for Acacia*, IDRC, Ottawa http://www.idrc.ca/en/ev-10197-201-1-DO_TOPIC.html SEE ALSO: Whyte, A.V.T. (2000) *Assessing Community Telecentres*, IDRC, Ottawa http://www.idrc.ca/openebooks/263-5/ AND: Whyte, A. (1999) Understanding the role of community telecentres in development – a proposed approach to evaluation, in: *Telecentre Evaluation*, R. Gomez & P. Hunt (eds), IDRC, Ottawa, 271-312 http://www.idrc.ca/uploads/user-S/10244248430Farhills.pdf	Readiness, Uptake, Availability and Impact	Very detailed list of questions and indicators. (Whyte 1999 also has a good list of indicator tables.)	Although not based on a single model, this provides a general guidance frame for telecentre IA. It also maps evaluation questions (some related to impact) to data sources and to specific topics (such as characteristics of telecentres and communities, use, sustainability and impacts).
Application-Specific: Telecentres	Wisner, P.S. (2003) Beyond profitability: a framework for measuring the impact of ICT kiosks. In: *Connected for Development – Information Kiosks and Sustainability*, Badshah, A., Khan, S & Garrido, M. (eds), UNDESA, New York, NY, 97-103 http://www.unicttaskforce.org/perl/documents.pl?id=1361	Mix of Inputs, Process, Outputs and Impacts	Not applicable: just describes framework.	Just a framework piece, not an actual case application. Provides various diagrammatic models that could be used for telecentre evaluation: mini-value chain; stakeholders; and a "performance matrix".

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Application-Specific: Telephony (Public)	Raihan, A., Hasan, M., Chowdhury, M. & Uddin, F. (2005) *Pallitathya Help Line*, D.Net, Dhaka http://www.dnet-bangladesh.org/Pallitathya_pcc.pdf	Readiness (need for information, cost of calls), Uptake (usage/non usage of helpline), Output (information services), Outcome (benefits, service satisfaction) and Development Impact	Very good detail on action research design and data collection method including processes and instruments used for all phases of data collection. Incorporates some aspects of Gender Evaluation Methodology.	A useful best practice guide on how to plan, implement and evaluate action research-based telephony impact studies, centred around information needs. Offers detailed notes on methodology and the action cycle process (from problem diagnosis to exit). Extremely data rich and participatory. However, gives limited attention to the linkage between phone-delivered information and development outcomes.
Application-Specific: Telephony (Public)	Richardson, D., Ramirez, R. & Huq, M. (2000) *Grameen Telecom's Village Phone Programme in Rural Bangladesh: a Multi-Media Case Study*, TeleCommons Development Group, Guelph, ON http://www.telecommons.com/villagephone/finalreport.pdf	Use and Outcomes	Provides quite a detailed review of research methods (Appendix A.8, pp88-91) – a mix of survey and focus groups, plus a list of the data items gathered in the survey (App A.13, pp102-104), and details on how to calculate consumer surplus for the true value of a phone call (App A.11, pp98-99).	Does not provide an explicit framework for evaluation, but the evaluation is positive in evaluating both the producer (village phone operators) and consumer (phone users) sides of impact. Producer impact is judged mainly as contribution to household income. Consumer impact is assessed quantitatively (in terms of consumer surplus) and qualitatively (e.g. reducing risk in remittance transfers). Also include gender analysis from both perspectives.

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Application-Specific: Telephony (Public)	Souter, D., Scott, N., Garforth, C., Jain, R., Mascarenhas, O. & McKemey, K. (2005) *The Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction: A study of rural communities in India (Gujarat), Mozambique and Tanzania*, Commonwealth Telecommunications Organisation, London http://www.telafrica.org/R8347/files/pdfs/FinalReport.pdf	Uptake, Outputs and Outcomes	Several pages on overall methodology and methods. Appendices provide full copies of questionnaires used.	Covers ownership, use and value of telephony plus some background on information sources and priorities. Some consideration from a livelihoods perspective.
Application-Specific: Other ICT (Smart cards/ATMs)	Hernandez, R. & Mugica, Y. (2003) *Prodem FFP's Multilingual Smart ATMs for Microfinance*, World Resources Institute, Washington, DC http://www.digitaldividend.org/pdf/prodem.pdf	Inputs and Implementation	Unclear.	No framework, and no consideration of use. Only gives figures for adoption, and lots about inputs and implementation.

5. Method-Specific ICT4D Impact Assessment Documents

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Method: Ethnographic	Zheng, Y. & Walsham, G. (2007) *Inequality of What? Social Exclusion in the e-Society as Capability Deprivation*, Working Paper no.167, Information Systems Dept, LSE, London http://is2.lse.ac.uk/wp/pdf/WP167.PDF	How Readiness (esp. Human and Institutional and Legal and Data systems Precursors) absence means Deliverables are not adopted or used	One paragraph on each case. No instruments.	Does adopt an ethnographic stance to work-based study of ICT use in two South African hospitals. Not much detail provided.
Method: Ethnographic	Horst, H.A. & Miller, D. (2006) *The Cell Phone: An Anthropology of Communication*, Berg, Oxford, UK (Some parts available via Google Books)	Outputs, Outcomes and (a bit) Development Impacts	Little detail.	A rich ethnographic study of the impact of mobile phone usage in Jamaica.
Method: Interpretive	Donner, J. (2004) Microentrepreneurs and mobiles: an exploration of the uses of mobile phones by small business owners in Rwanda, *Information Technologies and International Development*, 2(1), 1-21 http://www.mitpressjournals.org/doi/pdf/10.1162/1544752043971198 SEE ALSO: Donner, J. (2007) Perspectives on mobiles and PCs, paper presented at *Mobile Media 2007*, Sydney, 2-4 July http://www.jonathandonner.com/donner_PC_vs_mob_percep.pdf	Outcomes	Nothing on interpretive method.	Takes a highly-quantitative approach, but is quasi-interpretive since deals with perceptions. Uses Q-Sort method for ranking interpretive statements about ICTs.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Method: Participatory	Byrne, A., Gray-Felder, D., Hunt, J. & Parks, W. (2005) *Measuring Change: A Guide to Participatory Monitoring and Evaluation of Communication for Social Change*, Communication for Social Change, South Orange, NJ http://www.communicationforsocialchange.org/pdf/measuring_change.pdf SEE ALSO: Figueroa, M.E., Kincaid, D.L., Rani, M. & Lewis, G. (2002) *Communication for Social Change: An Integrated Model for Measuring the Process and Its Outcomes*, CFSC Working Paper no.1, Communication for Social Change, South Orange, NJ http://www.communicationforsocialchange.org/pdf/socialchange.pdf AND: Parks, W., Gray-Felder, D., Hunt, J. & Byrne, A. (2005) *Who Measures Change? An Introduction to Participatory Monitoring and Evaluation of Communication for Social Change*, Communication for Social Change, South Orange, NJ http://www.communicationforsocialchange.org/pdf/who_measures_change.pdf	Uptake and Impacts	Whole document focuses on participatory methods of IA.	Very detailed guidance on how to undertake participatory assessment. Byrne et al is introduction; Figueroa et al gives details on indicators; Parks et al expands on Byrne et al.
Method: Participatory	Lennie, J., Hearn, G., Simpson, L. & Kimber, M. (2005) Building community capacities in evaluating rural IT projects, *International Journal of Education and Development*, 1(1) http://ijedict.dec.uwi.edu/viewarticle.php?id=14&layout=html	n/a	Whole document focuses on enabling participatory methods.	Provides a methodology for building capacity for participative ICT evaluation within (two Australian) rural communities. Also links to online EvaluateIT resource kit. Limited details (less than one paragraph) on actual results of participative evaluations. Notes barriers to participation and recommendations (though many are general rather than specific to participative evaluation).

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Method: Participatory	Misra, H., Hiremath, B.N. & Mishra, D.P. (2006) *Citizen Centric ICT Initiatives For Rural Development In Indian Context: A Participatory Framework*, Working Paper no. 193, Institute of Rural Management, Anand, India http://www.livelihoods.org/hot_topics/docs/wp1931.pdf	n/a	Whole document explains and illustrates participatory process.	Not an evaluation but a description of using participatory methods to design ICT project in a village
Method: Participatory	Ramirez, R. & Richardson, D. (2005) Measuring the impact of telecommunications services on rural and remote communities, *Telecommunications Policy*, 29(4), 297-319	Impacts	Whole document focuses on the method of IA.	Describes how got community members to specify indicators.

6. Sector-Specific ICT4D Impact Assessment Documents

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Sector-Specific: Agriculture	Meera, S.N., Jhamtani, A. & Rao, D.U.M. (2004) *Information And Communication Technology In Agricultural Development: A Comparative Analysis Of Three Projects From India*, Network Paper no. 135, Overseas Development Institute, London http://www.odi.org.uk/networks/agren/papers/agrenpaper_135.pdf	More on Implementation and Uptake than on Impact	Very limited on method. No instruments.	Contacts with 40 farmers and 30 staff per project. Looks particularly at: Project staff – education, training given, attitude, perceived effectiveness; and Project users – landholding size, use frequency, and user (farmer) information needs.
Sector-Specific: Education	Balanskat, A., Blamire, R. & Kefala, S. (2006) *The ICT Impact Report: A Review of Studies of ICT Impact on Schools in Europe*, European Schoolnet, Brussels http://insight.eun.org/shared/data/pdf/impact_study.pdf	Outcomes	Two-page discussion of different methods used.	A review of 17 impact studies on ICTs in European schools (including some transitional economies), with detailed discussion about impact on educational performance.
Sector-Specific: Education	Dangwal, R., Jha, S., Chatterjee, S. & Mitra, S. (2005) A model of how children acquire computing skills from hole-in-the-wall computers in public places, *Information Technologies and International Development*, 2(4), 41-60 http://www.mitpressjournals.org/doi/pdf/10.1162/154475205775249319	Outcomes	Three pages, including some detail on the "Icon Association Inventory" used.	Provides an approach for evaluating skills gains though ICT.
Sector-Specific: Education	Farrell, G., Isaacs, S. & Trucano, M. (2007) *The NEPAD e-Schools Demonstration Project*, infoDev, World Bank, Washington, DC http://infodev.org/en/Publication.355.html	Readiness and (rather less) Outcomes	Half a page or so of detail. No instruments but includes three pages of education impacts and indicators.	No framework used to assess various ICTs-in-Schools demonstration projects in Africa. But covers both contributions to learning, and broader unanticipated outcomes.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Sector-Specific: Education	Linden, L., Banerjee, A. & Duflo, E. (2003) *Computer-Assisted Learning: Evidence from a Randomized Experiment*, Poverty Action Lab, Massachusetts Institute of Technology, Cambridge, MA http://www.povertyactionlab.com/papers/banerjee_duflo_linden.pdf	Outcomes	Some pages of description of data gathering and (particularly) statistical analysis of data.	Compares treatment and control groups of Indian primary schools (c.50 in each) that did or did not adopt a computer-assisted learning programme for maths, with pre- and post-test scores at beginning of school year. Found greater maths test improvements in the CAL group. However, also concludes that a parallel programme to pay for an additional instructor was much more cost-effective.
Sector-Specific: Education	Mujakachi, L. (2004) *Impact Assessment Of A School-Based Information And Communication Technology Centre In Binga District*, Horizont3000, Vienna http://www.mulonga.net/archive/project/ImpactAssessment.pdf	Impacts (but rather tangential to actual learning outcomes)	Does include interview schedule questions.	Mainly judges ICT4E project in Zimbabwe against its specific deliverables. Consideration of technological, institutional and social impact is not based on any particular framework.
Sector-Specific: Education	Wagner, D.A., Day, B., James, T., Kozma, R.B., Miller, J. & Unwin, T. (2005) *Monitoring and Evaluation of ICT in Education Projects*, InfoDev, Washington, DC http://www.infodev.org/en/Publication.9.html	All stages	Most of the document is dedicated to discussion of methodology and methods.	Thorough review of ICT4E project evaluation including details of indicators and management of impact assessment.
Sector-Specific: Finance	Hernandez, R. & Mugica, Y. (2003) *Prodem FFP's Multilingual Smart ATMs for Microfinance*, World Resources Institute, Washington, DC http://www.digitaldividend.org/pdf/prodem.pdf	Mainly Inputs and Implementation	Unclear.	No framework, and no consideration of use. Only gives figures for adoption, and lots about inputs and implementation.
Sector-Specific: Finance	Magnette, N. & Lock, D. (2005) *Scaling Microfinance with the Remote Transaction System*, World Resources Institute, Washington, DC http://www.digitaldividend.org/pdf/rts.pdf	Financial Inputs and Outcomes	Unclear.	Looks at pilot usage of a smart-card-plus-mobile/remote-handheld-device system to collect and transfer financial data from field agents to central microfinance institution HQs. Provides a series of cost, savings and income calculations to show issues around breakeven points (that in part led to abandonment of project).

Framework Type	Literature	Value Chain Stage	Methods Detail	Commentary
Sector-Specific: Government	Ahuja, M. & Singh, A.P. (2006) Evaluation of computerisation of land records in Karnataka, *Economic and Political Weekly*, 7 Jan, 69-77	Outcomes and Development Impacts	Just a couple of sentences only; appears to be a survey of hundreds of respondents.	No framework as basis for evaluation, just a set of objectives around assessing various impacts on users and within government. Impacts assessed include time taken to issue certificate, harassment and payments required (including bribery), accuracy of records. Also broader impacts: land disputes, ability to raise loans, ease of buying/selling land, ease of updating/correcting records.
Sector-Specific: Government	Bridges.org (2003) *Provincial Government of the Western Cape, Cape Gateway Project Evaluation*, Bridges.org, Cape Town http://www.bridges.org/publications/63	Precursors and Implementation	Interviews 11 staff but no users. No instruments provided.	Uses the Bridges.org Real Access/Real Impact framework to assess a South African e-government portal. Evaluation focuses on precursors and implementation process of a project that was still ongoing (i.e. uncompleted) at the time of evaluation. No evaluation of use, outputs or other impact.
Sector-Specific: Government	CEG (2002) *Gyandoot: A Cost-Benefit Evaluation Study*, Centre for Electronic Governance, Indian Institute of Management, Ahmedabad http://www.iimahd.ernet.in/egov/documents/gyandoot-evaluation.pdf	Adoption, Use and Outputs	A couple of pages of detail, plus full copies of all three (user, kiosk owner, government official) survey questionnaires used.	Evaluates Gyandoot rural kiosk scheme. No framework used, but provides quite detailed coverage on users (demographics, awareness, motivation, actual use inc. frequency, perception and ranking of service, perceived impact), kiosk owners (revenue), government officials, and non-users.
Sector-Specific: Government	Heeks, R. (2006) *Benchmarking eGovernment*, iGovernment Working Paper no.18, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/documents/iGWkPpr18.pdf	Outcomes	Whole document focuses on concept, methodology and method for IA of e-government projects.	A comprehensive review of the why, what and how of evaluating e-government. Presents a number of potential evaluation models including ones based on e-government value chain, public value, Web stage, and quantitative indicators.

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Sector-Specific: Government	Lobo, A. & Balakrishnan, S.(2002) *Report Card on Service of Bhoomi Kiosks: An Assessment of Benefits by Users of the Computerized Land Records System in Karnataka*, Public Affairs Centre, Bangalore. http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN015135.pdf	Outcomes (assumed link to ICT4D usage)	A paragraph summary of study design. A well detailed description of report card methodology. Provides instruments used for collecting the data.	Just benefit analysis of this e-government application: rather narrowly-defined but clear method. Good quasi-experimental approach.
Sector-Specific: Government	Suthrum, P. & Phillips, J. (2003) *Citizen Centricity: e-Governance in Andhra Pradesh*, Michigan Business School, University of Michigan http://www.nextbillion.net/files/eGovernance.pdf	Outcomes and Development Impacts	Unclear.	Mainly focuses on eSeva initiative. Lots of quantitative data on outcomes (e.g. on use of e-gov centres to pay bills, on revenues collected, on chasing defaulters, on addressing complaints) and impacts (e.g. use of higher revenues by government), but no framework used.
Sector-Specific: Government	UNDESA (2008) *United Nations e-Government Survey 2008*, UN Department of Economic and Social Affairs, United Nations, New York, NY http://unpan1.un.org/intradoc/groups/public/documents/un/unpan028607.pdf	Precursors and Availability	A chapter and Annex detailing methodology and methods.	A national level evaluation of e-government readiness. No particular consideration of impacts.
Sector-Specific: Government	Vasudevan, R. (2007) Changed governance or computerized governance? Computerized property transfer processes in Tamil Nadu, India, *Information Technologies and International Development*, 4(1), 101-112 http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.4.1.101	Outcomes	Three paragraphs on method – mainly interviews.	Looks at before and after time taken for public service delivery processes, at views on reliability, transparency and corruption.
Sector-Specific: Health	Bridges.org (2003) *Evaluation of the SATELLIFE PDA Project*, Bridges.org, Cape Town http://www.bridges.org/satellife	Precursors and Implementation, with a little Use/Outputs	Quite full details, including copies of questionnaire used with a few dozen users.	Uses the Bridges.org Real Access/Real Impact framework to assess use of PDAs by health staff in three African nations. Evaluation focuses on precursors and implementation process, but does give some details of use of technology and use of data content.

Framework Type	*Literature*	*Value Chain Stage*	*Methods Detail*	*Commentary*
Sector-Specific: Health	Bridges.org (2005) *Evaluation of the On Cue Compliance Service Pilot*, Bridges.org, Cape Town http://www.bridges.org/publications/11	Precursors and Implementation, with a little Use/Outcomes	Interviews with 26 patients and 7 staff, plus review of 221 patient records. Separate annex contains patient and staff questionnaires.	Uses the Bridges.org Real Access/Real Impact framework to assess use of mobile phones to remind TB patients about treatment. Evaluation focuses mainly on precursors and implementation process, but does look at outputs (e.g. taking of tablet after reminder) and cost outcomes (lower for SMS users). Shows in health outcome terms there was no difference between ICT users and non-users.
Sector-Specific: Health	Heeks, R., Mundy, D. & Salazar, A. (1999) *Why Health Care Information Systems Succeed or Fail*, ISPSM Working Paper no.9, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/documents/igov_wp09.pdf	Implementation	None – presents framework with use of secondary case analysis.	Provides a framework to explain why health ICT project outcomes of failure or success occur.

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