Introduction

Theorizing ICT4D Research

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The aim of this special issue is to show how theoretical ideas from the social sciences can be applied to researching ICTs and socioeconomic development.

Why should this be needed? Because the explosion of work on ICTs for development (ICT4D) has (unconsciously) followed Marx's dictum: "The philosophers have only interpreted the world differently; the point is, to change it." There has been a bias to action, not a bias to knowledge. We are changing the world without interpreting or understanding it. Most of the ICT4D research being produced is therefore descriptive not analytical. It might make some interesting points but it lacks sufficient rigor to make its findings credible and it can often be repetitive of earlier work. It has a close-to-zero shelf life. The pictorial analogy of such work is that of stones being thrown into a pond, each one making a ripple but then sinking without trace.

Instead, it would be better if each "stone" was placed on a cairn, building on what has come before and acting as a foundation for future work. Such a contribution is generally possible only where the research draws on some preexisting conceptual framework.

Of course, there are existing and ongoing research foundations for ICT4D work, which we can find particularly in various factions of "informatics":

- The I of ICT4D—work drawing from library and information sciences.
- The C of ICT4D—work drawing from communication studies.
- The T of ICT4D—work drawing from information systems.

Very little work to date has drawn from the D of ICT4D—linking concepts in development studies to this research domain.

However, the base created from these foundations has some limitations. First, much of the research undertaken has based itself on models or on schema of categorization but has not generally provided the solidity of a true theoretical foundation. Second, where work has been based on theory, it mainly emerges in academic journal articles. In such articles, the explanation of the theory used tends to be relatively brief, because the main focus of the article is the case application of the theory rather than the theory itself. Similarly, any reflections within such articles tend to be on the object of study not on the theory.

The "Theorizing Development Informatics" Project

The result is that ICT4D researchers looking for guidance on how to apply theory in their work have only a partial basis for assistance. This problem became the basis for an ongoing project of the University of Manchester's Development Informatics Group: to develop a set of publications that would draw on a range of theoretical ideas and explain to ICT4D researchers what those ideas were and how they could be applied to devel-

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opment informatics research. (We prefer the term "development informatics" to "ICT4D" because the former is less technocentric and allows an equal focus on information, knowledge, and information systems as well as on ICTs. Recognizing the widespread usage of the latter, though, we will use both terms interchangeably.)

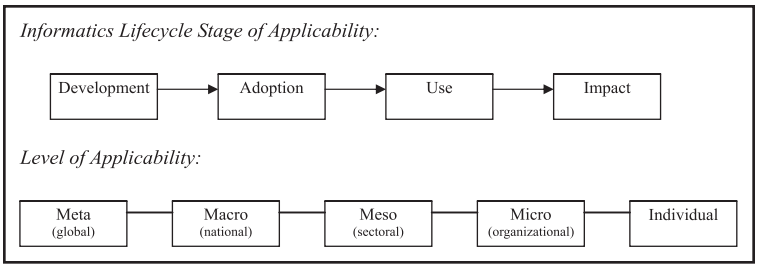

Figure 1. Applying theory in development informatics research.

All papers developed within the "Theorizing Development Informatics" project follow a consistent four-part format that we believe will be of particular assistance to those undertaking ICT4D research, ranging from academic and graduate/postgraduate researchers through to consultants, donor staff, and other "reflective practitioners" seeking to add greater rigor, validity, and longevity to their work:

- *Issue:* following a brief overview introduction, the paper describes an issue of current interest in development informatics and identifies a particular focal topic that will be addressed.
- *Theory:* a description is provided of a theory that could be helpful in addressing the focal ICT4D issue. This description aims to be as full as possible and to avoid any assumptions of preknowledge or prereading: a "theory 101," of sorts.
- *Application:* an illustration of how to apply the theory to the issue, usually through analysis of a specific field project or country. Brief findings are presented.
- *Reflection and Review:* reflection on what the case application and other literature tells us about using the theory. Alongside highlighting positive values of the theory, this might also identify shortcomings or modifications to the theory required to make it more appropriately applicable. Finally, in this section, we aim to provide some broader guidance on other ICT4D issues to which the theory might be applied and summarize its likely research applicability according to two models, shown in Figure 1. This first identifies which parts of the informatics lifecycle the theory might best be applied to: research on the initial development/invention of ICT innovations and/or research on the diffusion and adoption of those innovations in developing countries (which would include issues of ICT policy) and/or research on issues related to the use of ICTs and/or research on the impact of ICTs, including their relation to development goals. Second, the figure identifies what level of analysis the theory best applies to: from research at the meta level of a global perspective down to the level of research on individuals. This is intended to help researchers with a particular issue in mind identify whether a given theory might be appropriate to their needs.

Overall, then, we try to provide a "one-stop shop" guide for development informatics researchers considering use of a particular theory: not just an application of that theory, but also an explanation of it and pointers to the issues that arise in its use for research into ICT4D topics.

Categorizing Theories for ICT4D Research

What theories can be used in ICT4D research? We categorized in two ways: first in terms of depth; second in terms of discipline.

Relating to depth, what counts as "theory"? To avoid many hours of unproductive, introspective navel-gazing on that question, we adopted a fairly rough-and-ready continuum of the frameworks of knowledge used in development informatics research:

- *Theory-based work:* this makes clear use of an identified theory, either applying or testing that theory and referring to "theory." An example might be structuration theory.
- *Framework-based work:* this makes use of a framework that explicitly derives itself from a body of theoretical work. For example, a

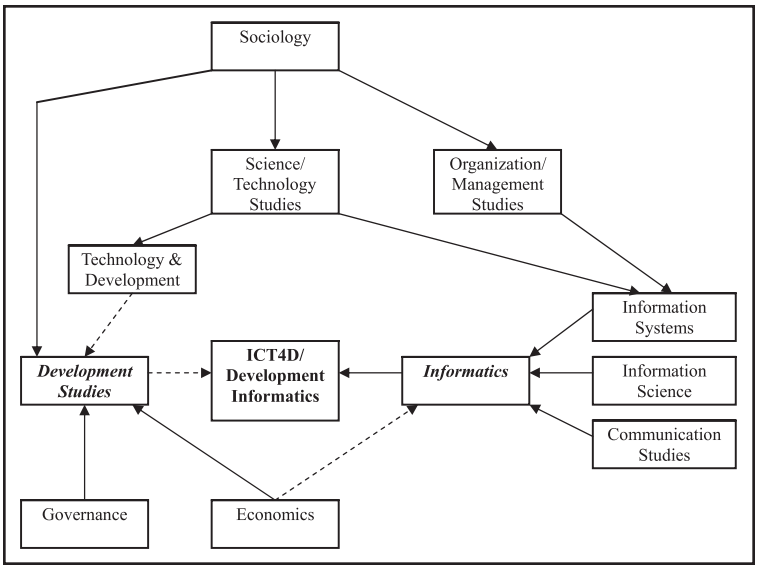

Figure 2. Disciplinary foundations for development informatics research theories.

a rough map from which our theories were likely to be drawn (see Figure 2). This shows not just the range of disciplines that can be drawn on, but also the typical diffusion paths that conceptual ideas have taken to date. It includes, in the dashed lines, paths that have generally not yet been taken such as the lack of use of development studies theories within development informatics research. In drawing from the whole pool of indicated disciplines, we were therefore making a deliberate attempt to move beyond the information science, communication studies, and information systems concentrations that have dominated ICT4D research to date.

framework of different perspectives on ICT regulation, based on ideas from theories in political science.

- *Model-based work:* this makes use of a model that is presented without reference to any deeper framework of knowledge. An example would be some variant on the four-part "Web stage" model (e.g., information–interaction–transaction–transformation).
- *Schema-based work:* this uses a schema of techniques or a technical architecture for ICT4D, such as a data architecture.
- *Concept-based work:* this uses a particular concept, such as "sustainable development."
- *Category-based work:* this presents a set of categories, or a list of factors, such as success factors in telecenter projects.
- *Nonframework-based work:* this makes no use of any discernible framework of knowledge; it merely provides a set of data and ideas.

We decided that only the first two would be admissible, recognizing that the distinction between a theory and a framework is probably quite murky but that we were looking for foundations around which a body of conceptual work already existed.

What, then, about discipline? We set the whole of social sciences as our boundary and then created

Special Issue Papers

For this particular special issue, we have selected four papers:

- My own paper looks at competitive advantage theory, based on Porter's work and the well-known "diamond of determinants," applied to study of the IT sector in developing countries.
- Carolyne Stanforth makes use of actor-network theory, drawing particularly from material by Callon and Law, applying it to the trajectories of e-government-for-development projects.
- Savita Bailur presents stakeholder theory and the technique of stakeholder analysis, reviewing their application to telecenters.
- Richard Duncombe discusses the livelihoods framework, which is widely used in development circles, and investigates its use for the analysis of microenterprise and poverty reduction.

Our selection was based on two main criteria. In terms of depth, we drew concepts that are arguably around the interface of theory and framework: not so deep (as, say, structuration theory) that practical lessons may be hard to find; not so shallow that they are really just models without a deeper under-

pinning. Although three are called "theory," as will be seen in the papers, this label can be questioned.

In terms of discipline, we decided to select from four different disciplines to illustrate the range of theoretical ideas than can be applied to development informatics research. Competitive advantage theory comes from economics (though may be seen as having strayed into business studies); actor-network theory was developed from science/technology studies (though has arguably backtracked to become a sociological theory); stakeholder theory is rooted in organization/management studies; and the livelihoods framework is a tool of development studies.

In addition, our selections ensured that at least two theories were applicable to research at each stage of the informatics lifecycle and at each research level (see Figure 1).

What is presented here should be seen as just a first tranche of outputs. The Theorizing Development Informatics project is ongoing, and we welcome general feedback on the aims of the project and specific contributions of new papers. ■