

# Towards a Theory of ICTs for Poverty Reduction

## Researching Computerization of the Indian Public Distribution System

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### ABSTRACT

The study of e-governance for poverty reduction has become a central theme in the area of ICTs for development (ICT4D). Yet, the intertwining between technology design and the political agendas behind it still needs to be theorized more explicitly, from both an analytical and a normative perspective. To this end, we study the dynamics underlying computerization of the Public Distribution System (the largest food security programme in India) in the state of Karnataka, and the ways in which ICTs mediate access of beneficiaries to the scheme. Preliminary findings suggest that technology, rather than simply pursuing more effective programme delivery, is designed to advance specific political agendas, which embody clear assumptions on the roots of food insecurity, and on the ideal ways in which these should be tackled. This commentary, based on research in progress, outlines our preliminary considerations towards a theory of technology for poverty reduction.

### Introduction

As powerfully synthesized by Heeks (2014), the study of e-governance for poverty reduction has become a top priority in the ICT for Development (ICT4D) research agenda. Among the factors behind this is the fact that social safety nets, utilized to develop anti-poverty systems all over the world, are increasingly being pervaded by digital technologies in all their phases, a phenomenon referred to as end-to-end computerization. The increasing digitalization of anti-poverty schemes gives rise to a set of questions: primarily, what are the causes behind it, and how are they related to the context of development? And crucially, how can any beneficial effects of ICTs be leveraged beyond isolated cases? In sum, the field of ICTs for poverty reduction is in dire need for dedicated theorization.

So far, discourse on anti-poverty ICTs has been crafted in a predominantly results-oriented fashion, leading to a focus on *what* may lead to success in digitalizing social safety nets. Predominance of this thread, while helpful from the point of view of policy prescription, may lead to a limited vision of

the problem: sheer identification of success factors, aimed at cross-contextual replication of outcomes, transcends the localized processes of interaction between technology and the actors around it. In the case of developing countries, where the provision of locally relevant content and adaptation of tools to recipients are paramount, a sheer results-oriented view may miss this part of the picture, leading to weak grounds for analytical generalization.

Our research is predicated on a socially embedded view of technology (Avgerou 2008), articulated through political context and observation of the *meaning* of development embodied in e-governance (Prakash and De 2007). Observing technology through this view, we aim at building theory on the intertwining between ICT systems for poverty reduction and the policy agendas behind them. To do so, we have embarked on a study of the Indian Public Distribution System (PDS), the biggest Indian food security programme, as mediated by technology in the state of Karnataka: we aim to arrive, through ethnographic insights, at formulation of analytical theory on these processes.

### Social Safety Nets and the Politics of Technology Design

The idea that “artefacts have politics”, articulated in seminal work by Winner (1980), is inscribed in the

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theoretical understanding that inspired our research. The view that technology constitutes the physical embodiment of political visions and goals acquires specific meaning with respect to e-governance, with technology being framed as a potential “carrier” of the policy objectives of governing actors (Cordella and Iannacci 2010). However, the vision of technology subsumed here goes beyond a deterministic tool view, which reduces the meaning of the artefact to that of a sheer means to given purposes. The idea from which we start is instead that of an *ensemble* view: the unit of analysis is not technology *per se*, but the ensemble resulting from its enmeshment in the social, political and institutional context of use (Orlikowski and Iacono 2001).

The ensemble view is at the root of our vision of technology, which ascribes to Avgerou’s (2008) concept of social embeddedness: technology is *embedded* in its context of action, and emerges from it while, in turn, influencing its evolution. Having being largely accepted in the information systems domain, the idea of technology as socially embedded has gained substantial grounds in ICT4D: developing nations, it is sustained, conceive new technologies according to local needs, and lead implementation according to locally determined sets of priorities.

As we apply a socially embedded vision to ICTs for poverty reduction, two notions become particularly relevant. First, when it comes to e-governance, the *political* context of action (specifically, locally determined objectives of policymaking) needs to be explicitly considered. Second, technology may be used to advance a specific vision or *meaning* of development, enacted by policymakers through the construction of dedicated programmes. Identification of that meaning, as it surfaces in the design of anti-poverty technology, becomes therefore relevant to theory-building.

This leads us to the question inspiring our project: specifically, what is the nature of the relation between anti-poverty technologies and the policy agendas behind them? And, how does that relation come alive in practice, as appraised by programme recipients? Our study of food security in southern India aims at making sense of these relations. To do so, we are leading ongoing fieldwork on the state of Karnataka, one of those in which digitalization of food security is most advanced.

### **Karnataka: The Computerization of Food Security**

As per the IFPRI (2014) Global Hunger Index report, hunger and malnutrition persist at extremely alarming rates in India today. The PDS is the main food security programme in the nation, based on rationed distribution of basic-need items – primarily rice, wheat, sugar and kerosene – to below-poverty-

line (BPL) households through a network of ration shops. To leverage the anti-poverty potential of ICTs, the National E-Governance Plan mandates computerization of PDS for all states.

The IT system for the PDS, developed by the National Informatics Centre (NIC) Karnataka, consists of a back-end infrastructure, in which details of all ration card holders are registered into a database (available at <http://ahara.kar.nic.in>), and a front-end one, constituted by biometric weighing-cum-point of sales machines installed in the ration shops. While the Ahara database covers the whole state, the machines – designed by a private firm, Essae Teraoka – are part of a pilot project of end-to-end computerization, which partially covers 6 of the state’s 29 districts. The government’s plan is that of scaling up the pilot to all districts, in order to reach full automatization of the transactions conducted in the ration shops.

The newly-implemented machines directly affect people’s access to the PDS, by structuring the transactions through which they buy the subsidized goods. In Karnataka, all BPL households are entitled to a certain quota of PDS goods: as they require their rations, they are identified through their ration card number (a ration card is a document of entitlement) and their thumb impression. As the ration dealer weighs commodities, the machine’s speakers announce (in the local language) the type and quantity of goods being sold: when the transaction is completed, a bill is printed automatically. The IT system for the PDS acts, therefore, as a composite technology, in which a back-end infrastructure is completed by the front-end machines through which people’s access is structured.

### **Emerging Linkages: Technology vs. Anti-Poverty Agendas**

As it emerges from preliminary fieldwork results, the purpose of mediating PDS transactions through biometric machines is twofold. The main issue, programme staff reveals, is that of non-entitled users accessing the system: before the creation of the Ahara database, “temporary ration cards” had been released to many, without proper verification of entitlements. To curb misappropriation of PDS supplies, the machine has made sales conditional to secure identification, as only verified PDS beneficiaries can access the subsidized goods. At the same time, the machine is designed to prevent misbehaviour from ration dealers: speakers and bills “force” them (at least on paper) to sell exact PDS entitlements, at their correct price. This is particularly relevant in a state where diversion of PDS goods to the private market has constituted, historically, a major impediment to the programme’s good functioning (Khera 2011).

Both problems – misappropriation by users and

ration dealers – are corroborated by statistics on PDS diversion (Government of India 2010), whose pervasiveness has motivated computerization of the PDS across states. And still, at the core of our ongoing investigation is the embodiment of assumptions on patterns of corruption in the PDS, and on the measures to be taken against them: in this respect we are observing two threads of connection, apparently linking the computerized PDS with a specific policy agenda.

The first assumption emerging here is that inclusion errors (assigning PDS benefits to non-entitled citizens) are to be prioritized over exclusion errors (i.e. excluding needful beneficiaries). The machine's design focuses indeed on preventing non-entitled users from accessing the programme: this does not apply to citizens who, while genuinely entitled to the PDS, are factually unable to access it. Even in a relatively well-functioning PDS like that of Karnataka, exclusion is still widespread this is largely due to narrow targeting of the system, arrived at as a consequence of structural adjustment policies in the 1990s (Swaminathan 2008). To poor households excluded by BPL criteria one needs to add, after computerization, citizens whose details are "not recognized" by the machine, which may result in rations being denied. In fact, though implementation is generally smooth, we met users whose rations had been denied for months after installation of biometric machines: this is due to failure of recognition, mismatching fingerprints, and failure of the ration shop to pay for connectivity.

A second assumption can be envisaged in the fact that machines, as they are constructed, control transactions at the ration shop level: but do not, *per se*, monitor the previous stages of the PDS supply chain. A software programme (Financial and Stock Accounting System – FIST) has been designed for usage in wholesale points, from which ration dealers lift their foodgrains: its utilisation is however in its early stages, and not yet scaled up at the state level. The decision of focusing on ration shops reflects the assumption that diversion of goods, from the PDS to the market, occurs primarily at this stage: be it through customers misappropriating goods, or through ration dealers reselling them through illegal networks, the ration shop is seen as the unit at the core of the problem. Evidence is being collected on whether this is the case in Karnataka, where diversion of PDS commodities is articulated on several levels, and often results in theft of foodgrains *before* they even reach the ration shops.

Our research questions required close observation of how technology is enacted in practice, with specific reference to anti-poverty programmes. This led us to approach them through a method - an in-depth, interpretive case study - which is particularly suited to process-related questions, regarding ongoing

dynamics unfolding on the field. Our aim, in doing so, is close to Gregor's (2006) notion of analytical theory-building: our purpose is that of generating theory with an inherently *descriptive* nature, on phenomena on which existing knowledge in theory/practice is limited. This descriptive purpose, as we proceed in our investigation, will be coupled with a *normative* one building on it, in order to draw lessons for states computerizing their social safety nets.

### The Way Forward

The idea that is taking shape here is that technology, when applied to poverty reduction programmes, may reshape them on the basis of policy agendas with specific assumptions and priorities. This puts into question the idea that technology, when applied to social safety nets, acts as a mere catalyst of process effectiveness: ICT seems instead to create whole new routes to accountability, based on localized identification of the roots of programme's malfunctioning. At the same time, recipients' perception of IT seems to depend on how their access to core entitlements is affected: a focus on entitlements should then inform the dialectics of technology design and implementation.

As anti-poverty programmes worldwide are increasingly being imbued with technology, discourse on computerization as a means to better performance is steadily gaining hegemony in this respect. It is in this context, potentially prone to a partial return of the old determinisms in ICT4D, that disentangling the relations between technology and context acquires new relevance, as applied to the multiple politics that characterize the anti-poverty domain. This is why we believe that a theory of ICTs for poverty reduction needs to have political context at its core, and be inspired by identification of the *meaning* of development that is imbued in each programme's construction. It is by these principles that our ongoing work, and its way forward in Karnataka's food security system, are inspired.

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