Applying Design Science Approach in ICT4D Research
Mobile Phone Based Agriculture Market Information Service (AMIS) in Bangladesh

M. Sirajul Islam and Åke Grönlund
Örebro University, Swedish Business School
Fakultetsgatan 1, Örebro 70182, Sweden
{sirajul.islam, ake.gronlund}@oru.se

Abstract. This paper describes the characteristics and scope of Information and Communication Technologies for Development (ICT4D) and Design Science Research (DSR), and subsequently presents findings from a case study regarding how the call for future research, practical and methodological, on IS in general and ICT4D in particular can be well addressed with DSR. The paper contributes to the domain of design research knowledge as it critically discusses as well as exemplifies the use of DSR in an interpretive research perspective that aims at solving some socio-economic problems, which is significantly lacking in contemporary research. The major argument here is that DSR can be fruitfully used in ICT4D research as long as the goal of ICT4D research is to innovate or design something new. Furthermore, due to the stage-gate model nature of DSR, its comprehensive use in ICT4D needs an integrated research approach with well-coordinated activities throughout the development process.

Keywords: ICT4D research, design science research (DSR), Information Systems (IS), IT artifact, Mobile phones, Agriculture Market Information Service (AMIS), Farmers, Bangladesh.

1 Introduction

Information and Communication Technologies for Development (ICT4D or ICTD) can be defined as use of ICTs in the development agenda, especially for the improvement of quality of life (living, literacy, health, life expectancy etc.) by way of enhancing decision-making capability at the individual, group or community (micro), sectoral (meso), national (macro) and global (meta) levels. A research report from UNDP asserts that “ICTs can enhance capabilities for human development when applied with foresight, clear objectives, a firm understanding of the obstacles that exist in each context and proper policies that establish an institutional framework that promote the use and benefits of ICTs for the poor” [1, p. 4].

ICT4D is an interdisciplinary research field. Emerging during the past decade, it is new compared to the Information Systems (IS) field in general. According to a literature search, use of design science in ICT4D research is significantly lacking, although design science research (DSR) is an old research paradigm especially in engineering
discipline. Acknowledging the lack of a universal definition of DSR, Iivari and Venable [2] define DSR as a “research activity that invents or builds new, innovative artifacts for solving problems or achieving improvements, i.e. DSR creates new means for achieving some general (unsituated) goals, as its major research contributions” (p.4). They further assert, “Such new and innovative artifacts create new reality, rather than explaining existing reality of helping to make sense of it” (p. 4). This is a socio-technologically-enabled-contextually-situated [3] research approach that can also serve for socially-constructed development aspects of ICT4D research. DSR, therefore can be a powerful research tool especially in a situation where a researcher needs to address many key questions [4, 5] related to development, users, and IS/ICTs within a limited time frame (in contrast to action research) and within a coherent research framework. However, so far little has been done to understand the artifact itself, although there are by now a good number of studies in IS in general and in ICT4D in particular. Referring to an argument of Orlikowski and Iacono [6], Sein et al. [7] suggest that IS requires a research method that explicitly recognizes IT artifacts which are shaped by the interests, values, and assumptions of developers, investors and users. Furthermore, although current ICT4D research investigates social and development aspects directly associated with contemporary technological innovations there is a lack of a clear theoretical and methodical stance of ICT4D research. With the exception of Walsham’s [8, 9] and Klein and Myers’ [10] guidelines for IS interpretive field study, there is a significant lack of notable methodological directions for conducting ICT4D research. According to a recent study by Dörflinger and Gross [11], “[ICTD] research lacks appropriate research methods along the entire development lifecycle spanning design, development, deployment, evaluation and monitoring.” (p. 517). They therefore suggest that ICTD research needs “a shared methodology and rigorously applies appropriate research methods” (p. 517). As so far DSR mainly applies or assumes a positivist perspective and ICT4D has a slant towards interpretive approaches, there are reasons to try to understand if and how the two could be joined. To that end, this paper presents some theoretical arguments in combination with an illustrative case study regarding how we can adopt DSR in an ICT4D research based on an interpretive perspective in the process of constructing an ICT artifact that aims to address problems related to socio-economic development.

The subsequent discussion proceeds by defining characteristics and scope of DSR and ICT4D, followed by a comparative argument and concluding remarks.

2 Design Science Research: Characteristics and Scope

McKay and Marshall [12] define design as an iterative process of initiating something new. They explain, in accordance with Archer [13], that design involves “an activity [that] gets conceptualized as an oscillating conceptual and practical activity, with thinking and activity swinging between clarifying requirements (reducing obscurity) and articulating provisions that match the requirements to varying degrees, until a solution that satisfies the problem owner emerges” (p. 608).