Chapter 12

The Mobile is Part of a Whole:
Implementing and Evaluating mHealth from an Information Infrastructure Perspective

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ABSTRACT

A challenge with mHealth in developing countries is that implementations are frequently treated as standalone solutions. Implementations fail because they are not sufficiently aligned with existing health information infrastructures (II). An interesting tool for evaluating implementation efforts in the context of the overall health II strategy, and thus potentially useful for identifying and mitigating risks, is the Bootstrap strategy. Bootstrapping is concerned with addressing take-off challenges facing novel solution implementations through incremental progression, resource maximization, mutual learning, and complexity mitigation. Although the strategy has been previously employed in retrospect to explain how implementation take-off challenges can be alleviated, less is known about its effectiveness as a tool for real time implementation risk assessment. Drawing on an action research mHealth project in Malawi, the study confirms bootstrapping as an effective tool for risk assessment, although the case also reveals that it may not always be easy to mitigate risks identified.

1. INTRODUCTION

Application of theory as a sensitizing device informing conceptualization, design, implementation, evaluation of interventions, and application of evaluations has gained recognition and influence over the past two decades. However, despite ap-

parent recognition and influence of the approach, there is a dearth of case examples which clearly document and recount enactment approaches, procedures and analytic frameworks, and application of evaluation results (Coryn, Noakes, Westine, & Schröter, 2011). This paper reflects on application of conceptualizations on information

infrastructure (II) (Bowker, Baker, Millerand, & Ribes, 2010; Hanseth & Lyytinen, 2010; Ribes & Finholt, 2009; Star & Ruhleder, 1996) in the planning, implementation, and evaluation of mHealth pilots for routine health data reporting in Malawi. II can be defined II as shared, open, heterogeneous and evolving socio-technical systems consisting of IT capabilities and their users, operations and design communities (Hanseth & Lyytinen, 2010).

Goals for our mHealth pilots were threefold. First, we set out to investigate the possibility of replacing existing paper-based data reporting between health facilities and district health offices with mobile phone supported reporting. Second, we were interested in studying the interplay between mobile phone supported data reporting and existing reporting practices which centred on the movement of paper-based report forms. The third goal encompassed the first two in that we were ultimately interested in observing how existing socio-technical arrangements in the broader health information system setup would interplay with our efforts. The healthcare industry is characterised by diversity: patients, professional disciplines, treatment options, healthcare delivery processes, and interests of various stakeholder groups (AbouZah & Boerma, 2005). Consequently, building on such a socio-technical setup (installed base) (Hanseth & Lyytinen, 2010) in the implementation and use of mHealth solutions demands the convergence of people, healthcare processes, devices, healthcare information systems, systems development, and wireless communication technologies (Yu, Wu, Yu, & Xiao, 2006). To exemplify the significance of this, some studies posit that IT initiatives in developing countries often fall apart due to inadequate local human and technical capacity (AbouZah & Boerma, 2005; Heeks, 2002); over reliance on external financial and technical support (AbouZah & Boerma, 2005; Heeks, 2002); weak enabling infrastructure, resource constraints, and top-down design and implementation of initiatives (Lippeveld, 2001).

Adopting an information infrastructure perspective can therefore be informative towards design, implementation and evaluation of mHealth interventions due to emphasis placed on heterogeneity and multiplicity of competing, cooperating, converging and diverging composite socio-technical subsystems (Constantinides & Barrett, 2005; Garcı´a-Marco, 2011; Hanseth & Lyytinen, 2010). We adopted an information infrastructure perspective not because the pilots we are running are large scale, but because of the considerable multiplicity and importance of socio-technical arrangements that interplay with our pilots. In addition, previous studies demonstrate that the growing tendency by stakeholders to treat mHealth implementations as standalone solutions despite the obvious existence of multiple solutions and interacting components, hampers mHealth interventions from realising their potential (Braa & Nielsen, 2013; Mechael et al., 2010).

Negotiating complexity that results from heterogeneity of parts and logics at work in information infrastructure innovations is characterised by ambiguity and nonlinearity of outcomes (Baker & Bowker, 2007; Edwards, Jackson, Bowker, & Knobel, 2007; Hughes, 1987). The implication of these observations is that as researchers we could not only focus on possible outcomes of our pilots. Design, implementation, and maintenance of the pilots to address shortcomings in the installed base upon which we were building, as well as making arrangements to enhance prospects for long-term sustainability, were just as important. Design, implementation, and maintenance work has a bearing on the attainment of our first goal. With this realisation we drew upon *bootstrapping* (Hanseth & Aanestad, 2001, 2003; Hanseth & Lyytinen, 2010), a strategy targeted at addressing take-off problems facing IT innovations, as a sensitizing lens in the design, implementation, and evaluation of our pilots. The strategy addresses challenges of reaching a momentum of user adoptions and stability of novel information

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