Chapter 34
Design and Implementation of Mobile-Based Technology in Strengthening Health Information System:
Aligning mHealth Solutions to Infrastructures

Saptarshi Purkayastha
Norwegian University of Science & Technology, Norway

ABSTRACT

In the context of developing countries, there is a mounting interest in the field of mHealth. This surge in interest can be traced to the evolution of several interrelated trends (VW Consulting, 2009). However, with numerous attempts to create mobile-based technology for health, too many experiments and projects have not been able to scale or sustain. How is it possible to design and implement scalable and sustainable mHealth applications in low resource settings and emerging markets?. This chapter provides lessons from case studies of two successful and large scale implementations of mHealth solutions and the choices that were made in the design and implementation of those solutions. The chapter uses Information Infrastructure Theory as a theoretical lens to discuss reasons why these projects have been able to successfully scale.

INTRODUCTION

India is the fastest growing mobile market in the world (ITU, 2010). Mobile phones are accessible in remote geographies and have become an integral part of the fabric of society. India has more number of mobile phones than landline phones. Thus, mobile phones are the most common medium of communication for long distances in India (TRAI, 2010). Such deep penetration in social structure and technological capabilities, make mobile phones relevant Information & Communication Technology for Development (ICT4D). Mobile technology has been identified as an important

DOI: 10.4018/978-1-4666-2770-3.ch034

tool to strengthening of health information systems (Ganapathy & Ravindra, 2008). Provisioning of health services through the use of mobile technology is called mHealth. mHealth applications range from data collection for health services using mobile devices, delivery of health related information to medical practitioners or researchers or patients, monitoring of patient vital signs through mobile sensors or mobile networks and even direct interventions (telemedicine) through the use of mobile technology. Using Sweden as an example of developed economy, it can seen that mobile phone penetration in developing countries had reached the same penetration levels as that of Sweden within just 10 years (ITU, 2009); while for infant mortality, the rate in developing countries in 2007 was at the level where Sweden was 72 years earlier. This shows the irony between the progress made in mobile phone acceptance and health indicators.

The excitement around mHealth can be seen through the increased interest in mHealth applications as summarized by VW Consulting (2009). Recent studies (Pyramid Research, 2010) show that mHealth applications will "increase three-fold in the next two years by 2012". Thus, a whole network of actors which includes mobile operators, handset manufacturers, application developers, health providers, patients, researchers have large stake in the field of mHealth. With this increased interest in mHealth, we have also seen numerous attempts that have not been able to scale or meet the needs of the health sector. An analysis by Anderson and Perin (2009) of the VW Consulting (2009) report shows that only 7 out of 51 projects have been able to scale, while 36 out of 51 have been stuck in proposal or just small pilots that have not continued. Some of these pilots have stopped because the funding agencies stopped the project and were not taken up by the community or the government. Few others projects have been surpassed by better technology availability and highlights the fact that infrastructure in the field of mHealth changes quickly. The argument holds true for mHealth that any new field of research meets with initial failures. Experiments should be considered a commonplace in development of new science. But for how long can the investments continue without extending our pool of knowledge is a question that researchers and stakeholders ask of mHealth.

In the next section of the chapter the author present opportunities and challenges for mHealth, by looking at some failed examples of mHealth projects. The section presents mobile phones as the Information & Communication Technology (ICT) of choice compared to other technologies. In the later section, the case of scalable Indian mHealth solution, "SCDRT" and its technology choices is presented. Afterwards, author presents the case of using plain-text SMS in Kenya to scale health services. In Section 5, author look at his case studies through the lenses of information infrastructure theory and discuss the reasons why these two projects have been able to scale well. In the later section, open-source solutions and their advantages in emerging markets and ICT4D projects is discussed. In the last section, author provide avenues for future research and give concluding remarks. This chapter attempts to bring together successful cases of mHealth applications and theoretically explain why these projects have been able to successfully scale.

OPPORTUNITIES AND CHALLENGES FOR MHEALTH IN EMERGING MARKETS

There are numerous examples of mHealth failures, which in itself would be enough to fill this entire chapter. Following is a concise list of solutions that were hailed as revolutionary, but have not been able to scale (Anderson & Perin, 2009):

- **TeleDoc:** Jiva Healthcare by The Soros Foundation and Jiva Institute in 15 villages in Haryana. Doctors receive diagnostics on