

## Chapter 15

# “Developed in the South:” An Evolutionary and Prototyping Approach to Developing Scalable and Sustainable Health Information Systems

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### ABSTRACT

*The expansion of ICT across Africa is influenced by many factors including political imperatives, donor priorities, private sector and NGO needs, and economic interests and as a result takes place in a haphazard and largely uncontrolled fashion. The health sector is no exception. The challenge, as in many developing countries, is to provide a robust and reliable health information system while effecting a transition between paper-based systems and computerized systems. The transition involves not only the introduction of new ICT, and the accompanying social and educational transformations of people and processes that accompany the introduction of ICT, but also the development of scalable health information systems that can facilitate a smooth transition as ICT expansion and development takes place. This chapter draws on 10 years of experience of the Health Information Systems Programme (HISP), an action research orientated network of public health practitioners and academics who initiated a pilot project in health information systems development in the post-apartheid transformation of South Africa, and which has subsequently had a profound effect on the development of health information systems in Africa and Asia. Through an exploration of health information systems development in numerous countries in Africa, we highlight insights into approaches and methodologies that contribute to successful and sustainable health information systems in resource constrained settings.*

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## INTRODUCTION

The expansion of ICT across Africa is proceeding at a rapid rate. Not only is access to computers becoming more pervasive, internet access is also increasing. The expansion of information and communication technology (ICT) networks is influenced by many factors including political imperatives (see for instance Sahay, Monteiro and Aanestad (2009)), private sector and NGO needs (Odedra, 1994), and economic interests (for instance Madon, Reinhard, Roode and Walsham (2009)). The result is that the expansion of ICT networks takes place in a haphazard and largely uncontrolled fashion (Braa, Hanseth, Heywood, Mohammed, & Shaw, 2007; Odedra, 1992). The health sector is no exception. The challenge, as in many developing countries, is to take advantage of the opportunities presented by increased access to ICT, to provide a robust and reliable health information system while effecting a transition between paper based systems and computerized systems (Boerma, 2005; Shibuya, Scheele, & Boerma, 2005; The Lancet Editorial, 2009). This chapter draws on 10 years of experience of the Health Information Systems Programme (HISP) network in health information systems development (HISD) in Africa to describe an evolutionary and prototyping approach to the development of scalable health information systems (HIS).

The transition from paper-based to computerized systems involves not only the introduction of new ICT, and the accompanying social and educational transformations of people and processes that accompany the introduction of ICT, but also the development of scalable health information systems that can facilitate a smooth transition as ICT expansion and development takes place. HISD is complicated by a number of factors, namely:

1. In traditional business processes, information systems development (ISD) is expected to take place in a uniform and controlled manner. This is seldom possible in an environ-

ment where ICT development takes place at an uneven pace. For instance, in resource constrained contexts, access to computers and the internet does not become universally available at the same time – rather they are distributed from the centre to the periphery in a haphazard manner that reflects socio-political imperatives and economic realities. Not only is the expansion process uneven from a geographical perspective, but the access to technology is also uneven in the sense that a range of technologies may be simultaneously available from the very sophisticated to the very outdated. HISD must be able to respond to the unevenness by ensuring that HIS can be easily scaled from paper to computerized systems as access to ICT improves in an uneven manner;

2. A second major challenge is having to accommodate the low level of resources and infrastructure as reflected by the inadequate or absent power supplies, absence of paper on which to print reports, and restricted finances to purchase supplies;
3. The third, and perhaps most significant challenge, is related to human resource issues – from low staffing levels, to dealing with staff who have a very poor educational background and who have not been exposed to ICT;
4. Fourthly, but not least important, the influence of social and political practices, which often reflect vested interests and decision making processes unrelated to health information systems development, may have a profound effect on the outcome of development projects.

The traditional health information systems literature describes the development and implementation of health information systems as being a fairly uniform and deterministic process (Pan American Health Organization, 1999). The process is described as being the typical waterfall approach

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