Chapter 19
A Deeply Embedded Sociotechnical Strategy for Designing ICT for Development

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ABSTRACT
Development is a social phenomenon. Information and Communication Technologies (ICT) are a technical phenomenon. Therefore, ICT for development is inescapably a socio-technical phenomenon. For this reason, ICT design efforts that frame themselves with development objectives, require an analysis of their intervention strategies in explicitly socio-technical terms. In this paper, the authors reflect on the strategies adopted by the Rural e-Services project, which has been working with a co-operative of marginal farmers in rural India to design new software and new practices using mobile camera phones to communicate with their agricultural advisors. By combining approaches from participatory development practice and participatory methods of ICT design, the project was able to manage a sustainable socio-technical reconfiguration of the operations of the co-operative.

UNDERSTANDING OBJECTIVES
This paper and special issue are concerned with applications of ICT in development settings. To discuss such topics requires an initial framing in which concepts of development and concepts of ICT can be delineated. Only with these ideas clarified, can any discussion of designing ICT with development objectives be meaningful.

Conceptions of Development?
Perhaps the most common misconception of development is the idea that increases in the gross domestic product of a nation necessarily imply
positive development for the people of that nation. Sen (1999) provides a comprehensive argument against this narrow conception. Sen records how the life expectancy for an African-American who has reached the age of 20, is lower than for someone of the same age in China or India, despite the large differences between these countries financial positions. Even avoiding aggregated national measures, income is still a partial measure as correlations between income and happiness are limited (Layard, 2005). Sen offers ‘Development as Freedom’ focusing on people’s ability to make free choices to further their own interests. Income is clearly a relevant factor in development, since lack of income limits choice, but is only one dimension. Improving free participation in social debate is also a direct development gain, independent of arguments about the contribution to economic growth. Sen is concerned not only with freedom from externally imposed constraints (such as social restrictions imposed by gender or caste), but also with peoples’ sense of their own agency, skill and confidence. Thus improvements in health, new learning and political freedom should be understood as primary ends of development, independent of their secondary contribution as a means to improved incomes.

A similar perspective on development with a focus on available life choices and freedom from vulnerability is the sustainable livelihoods perspective (DFID, 2001). In this approach, the needs, opportunities and capability of a person, family, community or region are considered examining the types of resources available to them to advance their own interests. This framework focuses on a range of types of capital, including:

- human capital (the knowledge, skills, health and labour capabilities),
- natural capital (the available natural resources such as rivers, land, trees etc.),
- physical capital (tools used in building and maintaining livelihoods, including buildings, roads, water supplies, energy supplies and access to information),
- social capital (human networks, social structures, connections, trust), and
- financial capital.

These five types of capital are typically presented as ‘the asset pentagon’.

These assets are not employed in a vacuum. The livelihood strategies that people adopt are also supported and constrained by what the framework calls transforming structures (government, civil society, and private sector) and processes: (institutional arrangements, policies, legislation and cultural norms). These factors impact heavily on the terms under how different assets can be employed and the rates of return that are possible from different livelihood strategies. In the process of securing their livelihoods and in changing their situation, people both access these structures and processes, and exert influence upon these structures and processes.

This framework can be used in either planning or evaluating development interventions. Effective interventions should examine how all these different types of capital are currently being used, and understand the ways in which structures and processes influence people’s livelihoods. Intervention then needs to discover ways for the community to secure their livelihoods in ways that build up their stock of (different types) of capital, without dangerously depleting the other types of capital, and enable people to change the structures and processes that surround them to promote enhanced opportunities for themselves.

From a systems theoretic perspective, the core of the livelihoods framework may be understood as a system which exhibits some aspects of autopoiesis (Maturana & Valera, 1980; Winograd & Flores, 1986; Truex et al., 1999), i.e. the system is self-organising and self-sustaining. When an autopoietic system encounters new artefacts, new resources, or external agents it cannot accommo-
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