Chapter 4
Factors Affecting the Sustainability of Computer Information Systems: Embedding New Information Technology into a Hospital Environment

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ABSTRACT
This study explores the issues and barriers to developing a sustainable system for the collection of quality of life data in hospitals. A set of sustainability factors was identified and tested in a study that introduced tablet computers to collect questionnaires from cancer patients. These factors are considered a good starting point for practitioners and researchers to use in other IT contexts if they wish to develop sustainable information systems.

INTRODUCTION
The 2003 CHAOS Chronicles report (The Standish Group, 2003) shows an increase of project success rates to 34%, which, although still very low, was actually a significant improvement on the 16% reported in 1994. However, put the other way, two thirds of projects still either fail or are ‘challenged’ as Standish defines it. The Standish Group estimated US IT projects wasted US$140 billion ($80 billion in failed projects) against $250 billion in project spending (The Standish Group, 2003). Although in recent years there have been improvements in success rates (Johnson, 2006), the authors contend that given the huge amount of investment and focus in I.T. over many decades,
such failure rates are an extraordinary and embarrassing statistic. Therefore, the question must be asked: in what ways is the I.T. community unaware of or poor at building systems that stand the test of time? How do technological factors (such as introducing new technology) affect sustainability? Are there social factors associated with the preferences of individuals that over time cause information systems to atrophy or be accepted? To what extent do organisational and economic imperatives play in determining sustainability? It seems clear that in a climate of continuing high failure rate of projects, it is imperative that researchers re-examine factors that contribute towards the long term sustainability of information systems that are being developed.

Whilst the research in this paper concerns the use of tablet computers, it is suggested that many of the issues and challenges reported relate to adopting new computer technologies in general and not only in healthcare settings. Indeed, the term ‘technostress’, now widely used, defines the stress experienced in the process of adopting and accepting new technologies, particularly computers (McDermid, 2008). Whether the technology is a mobile phone, personal digital assistant or audio player, humans are constantly being asked to assimilate more and more complicated technologies to a point where arguably they will use the tool reluctantly and perhaps superficially or not use the tool at all. So this proliferation of new technologies in our workspace raises important questions about how we deal with technology adoption.

Although the specific research questions guiding this paper concern the sustainability of computer systems in hospitals, discussion in this paper also relates to factors that would appear to relate to the sustainability of computer systems in general, since many of the issues raised concern how people relate to technology and also the processes we use to develop systems. Therefore, this paper will attempt to provide a framework for practitioners and researchers to apply and manage sustainability criteria not just in hospitals or with tablet technology but across a variety of projects.

**BACKGROUND**

Although an increasing number of research studies in hospitals employ regular collection of quality of life information, obtaining good reliable data has traditionally been considered problematic. For example, patients are frequently asked to complete a multi-item questionnaire of over 100 questions. Completion of all relevant items is of necessary for research conclusions to be significant, yet with paper-based systems, up to 10% of questionnaires are incomplete through, for example, patients being unaware that they have missed certain sections (Streiner & Norman, 1995). This has serious implications since a cause for missing items can be personal problems in that area, and hence these personal problems, in research studies, are almost certainly underreported.

A second problem in these studies is the concern that the feedback obtained is not representative of the whole population undergoing treatment. More specifically, although clinical studies now try to recruit a representative sample of patients there is a concern that feedback, whether paper or computer based, tends to be more easily obtainable from younger and fitter patients. Therefore the data may be skewed, which in turn creates problems in generalising the conclusions. Possible reasons for this include:

- Elderly patients who are negatively disposed towards technology,
- Patients with weakened cognitive functions due to medication or illness,
- Patients who have difficulty in reading or whose eyesight is poor.
- Patients whose concentration is affected because of anxiety.

A related issue is the fact that a single, universal approach to data collection system will not work for all patients. It is important that the patient’s capabilities and preferences are taken into consideration when planning a data collection system. For example, some patients may not be
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