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A Cause Map Approach to Exploring MIS Benefits

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Abstract

This paper considers the problem of implementing large strategic MIS in the UK Health Sector, which has recently been the subject of wide-reaching institutional reforms involving the introduction of information technology. The paper details the empirical results from four case hospitals studied over two years. The research involved a cause map investigation of the collective constructs and organizational processes impacting upon the achievement of benefits, as perceived by the stakeholders. A model is proposed which gives some novel insights into the phenomena involved.

Introduction

Information systems (IS) and information technology (IT) failures appear to consistently make headline news and to be the topic of discussion in the IS literature. Data on the extent of these failures abounds. For example, Willcocks and Lester (1993) argue that around two thirds of all projects can be considered to be 'failures'.

Until very recently in the UK, these problems have largely focused upon organizations in the private sector. However, during the last decade, the public sector, including the National Health Service (NHS), has been the subject of wide-ranging reforms involving the introduction of competitive practices, and significantly, the introduction of IS and IT to aid in this task (Brown, 1995; Beynon-Davies, 1995). However, some specific developments, noticeably NHS Case Mix, have received relatively little attention in the IS literature.

Research Problem

A survey of contemporary literature on the introduction of IS in organizations points to a number of important issues, relating both to research content and methodology. Here, we draw attention to two issues.

The first issue relates to the neglect of complex processes in models (Pettigrew, 1985), which comes partly as a result of the focus on 'snap-shot' surveys (Cheon *et al*, 1993) and technically-oriented research (Westrup, 1995). Such methods can be considered inappropriate for the study of more qualitative organizational and managerial aspects of the IS subject area, where systems and data must be viewed in the context of attributed meaning (Galliers, 1993).

A second and interrelated problem stems from the fact that the majority of models neglect context, despite the fact that many are derived from single case studies where context may be implicit (Cheon *et al*, 1993; Galliers, 1993). Whilst we would like to produce generalizable theory, there are many benefits from understanding rather than ignoring the effects of context (Pettigrew, 1985).

Thus, the questions approached by the research are: (1) How is organizational context enabling or constraining towards the achievement of project benefits? (2) Which processes are critical or influential to project benefits ?

Research Methodology

The research strategy involved intensive prospective longitudinal case research of four IS in each of three periods during the course of IS introduction. Most of the study data was gathered by means of 96 semi-structured interviews on a cross-section of key stakeholders, using key themes and concepts in the project. The themes emerged from preliminary interview sessions, supported by a synthesis of themes in the literature (e.g. from King and Grover, 1991; Schultz *et al* 1987).

Collecting data in this manner facilitates the construction of cause maps for each respondent, pertaining to positive or restraining forces within the project towards achieving benefits. As such, the method adds value in grounding concepts. The research involved Laukkanen's (1994) techniques for eliciting and processing data, and the comparative analysis of cognition in terms of respondents' subjective concepts and causal thought patterns (i.e. using Laukkanen's CMAP2 software). The study goes one step further, using the GCOPE software associated with Eden's SODA approach (Eden, 1991) to facilitate the graphical mapping of concepts, such as those presented in Figure 1.

Background to the Research

The case studies used were four NHS Trust Hospitals in the North West Region of the UK, each with around 1000 hospital beds, similar specialisms, and experiencing Government reforms and Resource Management Initiative (RMI) between 1992 and 1995.

As part of a recent package of reforms aimed at increasing efficiency and introducing an 'internal market' in the publicly-owned NHS (HMSO, 1989), RMI was first announced in 1986 (DHSS, 1986). The Initiative was aimed at persuading clinicians to own the management process, and providing them with accurate, up-to-date and relevant information to cost medical activities and improve patient. The latter came via the development of Case Mix (CMIS), with its dependence on data fed from other systems such as PAS, radiology, pathology, theater and nursing systems, which provided a catalyst for the adoption of operational systems throughout the hospital.

The Cause Map

Figure 1 presents a cause map of the key standard terms (STs) used by respondents directed towards the focal concept of 'benefits'. The grounded terms are those drawn from the cause map database using the criteria that each Standard Causal Unit (SCU) must be used by at least half of the respondents in each hospital. This figure will be used as a 'frame' or 'structure' on which to hang the subsequent discussion and logically analyze the features contributing to the outcomes in the case. Constructs have been grouped in similar domains in order to aid interpretation of the map.

As we see from Figure 1, the outcome 'benefits' is immediately determined, in the minds of the respondents, by three STs: use of the system, information/system completeness, and change to culture / structure. The first two of these terms refer to whether the system is actually being used as intended by the users, and the extent to which the system and subsystems had been completed, and the subsequent quality of the data. We found that in all of the hospitals, systems were not being used as intended: whilst CMIS were used by financial users, there was a lack of clinical use. This came as a direct result of the incompleteness of the system, in terms of software, a lack of feeder systems and data quality on one hand, and user behavior on the other.

Benefits associated with the changed culture and structure of the hospital stemmed from: the shift in culture towards more acceptance and integration of IT; more responsibility and absorption of clinicians into the hospital hierarchy associated with the shift towards clinical directorates; and, improved relations between clinicians and administrators which was, until RMI, more of a problem.

From an examination of the cause map, user behavior is perhaps most complex via the interdisciplinary nature of its users, clinicians, financial managers and planners, and senior managers. Three causes of user behavior derive from the user group: user understanding/skills, user involvement in pilots/projects, and user commitment ownership. Clinicians, particularly older clinicians, tended to be less familiar with IT and lacked computer skills. As a consequence, many of these were the most inert, and found it difficult to see the value of investing in IT vs. patients. Secondly, clinicians particularly tended to be more positive towards the system the more involved that they became in choice, design and implementation. Less involvement tended to lead to less interest, and less ownership/commitment, which is our final term in the user-construct group.

Clarity of objectives was another problem. Objectives were largely imposed blanket-fashion throughout hospitals, and not particularly well explained or communicated to users. In addition, initially the systems were not part of an IS strategy, and as such, CMIS did not have a clearly defined place in the hospitals. Other simultaneous organizational changes also had a severe impact on the clarity of objectives, as information for contracting suddenly became a priority, and other objectives 'took a back-seat'. This change of emphasis affected user attitudes: clinical users began to think of CMIS as a primarily financial tool and reduced involvement. In addition, other initiatives aimed at improving quality assurance increased workloads and reduced staff time for CMIS.

Training was a serious problem grounded in all cases, explained in terms of training strategy and planning and the availability of adequate resources. Historically, training was not particularly good, and poor project management and a lack of priority on training exacerbated the problem. By the end of the designated project period, as the money put aside for RMI by the Government ran out, resource requirements for training became an important issue.

Turning to information / system completeness we find a bi-directional link with the ST, technical issues. The latter is a function of the quality and completeness of the system and data, and the support and advice of the system vendors (an effect of supplier behavior), playing a large part in the technical development of Case Mix, which in turn determines its usefulness. Poor functionality and development of systems, which varied across hospitals, was a strong determinant of use. In addition, the traditional poor quality of data from PAS and interfacing problems affected clinical attitudes.

Conclusions

In conclusion, it is clear that this is a very fruitful area of research, and the methodology appears capable of yielding some novel insights into the research problem, and, by facilitating cross-case comparison, aiding in the production of models and theory. The case research presents a picture which is illustrative of many other instances of similar types of application, and is useful for interpreting other such studies. The study concludes that more research is needed into NHS Case Mix, and suggests that the mode of investigation could be productively employed elsewhere.

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<u>Figure 1: Cause Map of Benefits</u>

RESOURCES

- 134 Resource requirement
- 54 Education & training

TRAINING

- 79 Strategy / planning of training
- 85 Training adequacy

SUPPLIER

- 100 Supplier support / advice / communication
- 137 Supplier behaviour

TECHNICAL ISSUES

- 25 Technical issues
- 49 System quality / development
- 46 Data poor / not trusted
- 63 Information / system completeness

USERS

- 148 User involvement in plans / project
- 105 User commitment / ownership
- 120 User behaviour
- 108 Use of system
- 135 User understanding / skills

BENEFITS

- 4 Project has changed culture / structure
- Benefits
- 5 Lack of benefits

OBJECTIVES

- 67 Objectives' clarity / strategy

ORGANISATIONAL REFORMS AND PRESSURES

- 95 Other priorities / overload
- 97 Other organisational changes
- 64 Outside influences
- 29 Emphasis on contracting
- 101 Government initiatives
- 53 Hospital competition