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Toward Systems Tailorability:  Comparative Analysis of Business Change and Systems Flexibility

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Abstract

The flexibility of information systems to business change is examined. Four organizations were used as case studies, where information systems development and usage was investigated using interpretivist research methods. The case data reveals that information systems development using systems development methodologies which are bounded in business projects is largely an inflexible process that is not adequately catering for changes in business requirements. The alternative of tailorable information systems is proposed and the case is made for the spiral of change model of tailorable information systems as a more flexible development process.

Introduction

This paper describes research into the flexibility of information systems to business change. The deficiencies of the classic life cycle model to business change have been recognised by researchers (Fitzgerald 1990; Boogard 1994). These approaches are coined here methodologico-project frameworks. The present research is underpinned by the living information systems paradigm (see Paul, 1993).

The investigation reveals that methodologico-project frameworks result in information systems development processes that are generally unresponsive to changing needs of users.

The case organizations are briefly presented in section2. In Section 3, the historic context and social processes of the organizations are detailed as they have impact on systems development and usage. The information systems development approaches adopted by the organizations and whether they are flexible to business change is discussed in Section 4. In Section 5, the discussion is broadened to consider the alternative spiral of change model of tailorable information systems, which may improve the flexibility of development and usage processes. In the final section, some conclusions are drawn and issues for further research are considered.

Changing Organisations and Information Systems

In this section, the research epistemology used is presented, brief descriptions of the four case organizations and their information systems are given, and the factors of business change found in the case organisations are detailed.

The research used interpretivist research methods (Walsham, 1993). Case data was collected through a combination of quantitative and qualitative methods. A questionnaire was designed to survey initially the selected cases to gather descriptions of particular information systems.

The form of semi-structured interviews was used. This captured the meanings interviewees attached to their actions. To reduce threats to the explanations of the data the veracity of the data collection process itself was checked.

The main sources of data were systems developers and users. The questionnaire survey was directed at users only, and the semi-structured interviews were undertaken with managers and administrators, as well as with systems developers.

The case study method was selected because it enabled the investigation of systems development and usage in real organisational and social contexts. Walsham (1993) and Orlikowski (1993) state that the case study method enables exploration of meanings and understandings of individuals and groups. The data interpretation is partly based on Benbasat et al.’s (1987) guidelines.

Information Systems Development Methodologies

In this section, the information systems development methodologies used in the case organisations are detailed and how flexible these were to business change is discussed.

The information systems development approaches were examined with reference to Paul’s (1993) mock fixed-point theorem of information systems. He argues that systems development mistakenly requires analysts to seek to define users’ information requirements, that is the fixed point, before beginning to build systems.
Datatel Corporation has a formal systems department called Management Information Systems. It has to develop information systems in the changing organisational circumstances described in Section 2.

The Department has a significant role in the company as it provides other functional departments with computer-based information systems. As the needs of user-departments change, the provided systems have to cope either through new systems developments or through enhancing existing systems.

The actual systems development process is more flexible than it would be if the standard Structured Systems Analysis and Development Methodology (SSADM 4) - that is used in British government contracts - were strictly followed. Systems design is an interactive social process at Datatel Corporation, where consultation continuously happens between developers and users, often informally because of their familiarity with each other. This culture of familiarity prevails is strengthened by the fact that some systems professionals have moved across from other functional areas of the business.

The Management Services Department is the University of Luton’s equivalent of an information systems department. An experienced systems developer heads the Department. The Department is small and serves to administer and maintain either industry standard systems or bespoke systems like HEMIS. Information systems in the organisation may be described as inflexible. HEMIS has been developed in a changing organisational setting. The structured development approach adopted is inflexible. It does not cope well with the kind of organisational change experienced by the University. Organizational change significantly affected HEMIS’s development process. In practice, this meant that users’ requests for changes to requirements were not enthusiastically received and sometimes denied.

Nene College has an Information Technology Services Department. It provides various services to faculties and other management and administrative departments. User-departments who want to develop systems by themselves are given advice on equipment purchase and systems development. This service is extended to students too.

Systems developers from the vendor Education Management Information Systems (EMIS) undertook planned meetings with the user group to discuss their problems and establish requirements. The Department is careful not to undertake large enhancements to HEMIS because of the additional cost and complexity of making changes, which makes the systems inflexible to major organisational change.

Ace Business Computers has no distinct department or section dedicated to exploiting information technology. The Finance Director is responsible for the provision of computer-based information systems to support decision-making.

The Finance Director thought out two ground rules for developing information systems. One is that everything has been “very easy to use” and two those systems should be resilient. In selecting the Pegasus system to develop an accounting information system, the Finance Director opted for a proven system rather than risking a new and unproved technology. The Pegasus system is capable of being tailored to facilitate patterns of work, and in this sense it is flexible.

The flexibility of project management is examined by considering planned activities and business change which affects those planned activities across the four case organisations. Most aspects of project management, like work breakdown and coding and scheduling, were affected by organisational change.

Project management, according to Morris and Hugh (1993) combines functional disciplines to achieve the project’s budgetary, schedule and technical objectives. These objectives were impacted upon by the changes in higher level management in the case organisations. At the University of Luton, for example, changes to the university’s modular credit scheme were not reflected in HEMIS, because additional funds to enhance HEMIS were difficult to secure.

Though project plans were made, they were difficult to adhere to because of changes in available resources such as the availability of expert programmers or reassignment of project leaders. In addition, actual changes in business processes or objectives impacted on project plans. Project plans were often changed at Datatel Corporation, the University of Luton and Nene College of Higher Education because new systems tasks were identified which were not apparent during the planning phases.

A Flexible Information Systems Development and Usage Process with the Spiral of Change Model

The Spiral of Change Model of Tailorable Information Systems is proposed as an alternative way of thinking of systems development and usage in changing organizations. Interpretive case study results are not meant to be generalisable to all cases. Interpretivist generalizations are “analytic generalizations” Orlikowski (1993).

The case data reveals that information systems are developed and used in changing organisational settings, whether that change consists of major or continuous minor changes.

To increase the flexibility of information systems development and usage to business change, the tentative alternative of tailorable information systems in the context of the spiral of change model is conceptually discussed in this section. The following discussion is based on Patel (1997).

One view held by developers and researchers in the methodologico-project framework is that information systems are products. On the contrary, the data shows that there is continuous change in systems requirements. The spiral of change model views information systems as continuous processes affected by organisational change, and not only as products. Thus business software and its development has to be considered as simultaneously being product and processes.

This has implications for research. In considering the suitability of tailororable information systems in a new paradigm for information systems research, Probate (1997) comments that the ‘objects’ in systems tailorability research are intertwined...
between technical and social aspects. In such situations, the *tailorability* of an information system is an *emergent property*, determined by the possibilities (and constraints) of the technology and social arrangements.

The spiral of change model of tailorable information systems recognizes the dynamic need for information by thinking of information systems development and usage as a dynamic process. Patel (1997) extends the spiral of change model with the concept of *deferred system's design* as an aspect of dynamic systems development and usage process.

**Conclusions**

In organizations where the social context and processes dominate, methodologies are used as reference points and information systems development and usage is more flexible to business change.

Structured approaches to systems development are usable in a relatively static organizational environment, where things can be known and be predictable.

To make information systems development and usage processes more flexible, the spiral of change model of tailorable information systems is worthy of further research. Systems tailorability is one way of providing flexible information systems.

**References**


