An Exploration of the Effects of Organizational Change on the Development, Implementation and Operation of Information Systems

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Abstract

The reasons for information systems (IS) failure are numerous and frequently difficult to determine. This study focuses on factors outside a project's control and their influence on IS projects outcomes. The impact of IS and information technology (IT) on organizations is well established, but little research is available concerning a possible relationship between organizational change and IS. A research strategy for exploring the effects of organizational change on the development, implementation and operation of IS is outlined. Preliminary findings indicate that little attention is being paid to minor organizational changes and their influence on IS projects.

Keywords

AD0102 information in organizations, AI0101 action research, AI0112 ethnography, DD01 organizational change, EL0202 IS project failures.

INTRODUCTION

This paper outlines research in progress for a Ph.D. in Information Systems. The research explores the effects of organizational change on the development, implementation and operation of information systems (IS). The paper suggests a research approach for the exploration of change within an organization and its influence on IS development, implementation and operation.

The paper starts with an overview of the problem under investigation. An outline of the suggested research strategy follows. The case study, which is used to explore the effects of organizational change on IS development, implementation and operation, is introduced and the research findings so far presented. The expected contribution and outcome of the research are described. The paper concludes with a brief discussion of potential difficulties that could confront the researcher and the next steps in the research program.

IS FAILURE

Despite the best efforts of researchers and practitioners IS failures continue to occur (Lyytinen, Robey 1999). The factors that can affect an IS project are numerous and extensively discussed in the literature (Saarinen 1996). In reality it is often difficult to determine why a project was not successful. Rarely is it possible to either pinpoint with

confidence the point at which the process started to go wrong or which factor or factors were responsible for its failure. Frequently the various groups of participants differ in their opinion concerning the causes of failure and may even disagree on their assessment of the overall outcome. Methodologies, risk management and software process improvement are the major strategies designed to ensure IS project success. But despite the numerous methods and strategies that are advocated, it is still not possible to confidently predict a successful project outcome for all project participants.

Many of the strategies that are said to ensure a successful outcome focus on the IS project and the process itself. It has, however, been suggested that factors that are outside the project's control can contribute to the outcome (Ward 1995). This has led to the development of approaches that consider an understanding of the organization essential if IS projects are to succeed (Checkland 1989).

The impact of IS and information technology (IT) on organizations has been widely acknowledged (Eason 1988, Robey, Boudreau 1999) and is supported by a significant body of research (Winfield 1991, Lucas, Baroudi 1994, Orlikowski et al 1996). IS projects are not carried out in isolation from the organization. It can therefore be expected that organizational factors influence the project outcome and that organizational change would have an impact on IS (McKeen, Smith 1996). Research highlights the importance of the organizational context for the implementation and use of IS/IT (Orlikowski 1993, Karsten, Jones 1998). The discussion of organizational changes in IS literature seems to focus on the effect of changes arising from the implementation of new IS/IT. Comparatively little attention has been paid to the influence of organizational restructure on IS development and on the continued usefulness and suitability of existing systems.

ORGANIZATIONAL CHANGE AS CONTRIBUTING FACTOR TO IS FAILURE

Organizational change has for some time preoccupied managers and is extensively discussed in organizational literature. Change and adaptation is regarded as inevitable and vital for organizational survival. A volatile environment, increased competition and particularly IT are accepted as the main catalysts and enablers for organizational change. IS/IT can be a supporter, leader or catalyst for reengineering the organization (McKeen, Smith 1996, Oden 1999). Many technologies are adopted as a means of controlling and facilitating organizational change (Orlikowski, Hofman 1997, Karsten, Jones 1998). Triggering in fact a cycle where organizations deploy technology in order to absorb the effects of change and having to adapt organizational processes to the new technologies (McKeen, Smith 1996).

Some of the approaches and strategies that are advocated to ensure IS success, explicitly take the organizational context into account (Checkland 1989) or address issues such as changing user requirements (Boehm, Papaccio 1990). However, they do not allow the project participants to monitor and assess the effects of organizational change during the course of a project. In general the major goals of the IS development process still include a satisfactory level of completeness of requirements and specifications and rigorous

advanced planning which may be incompatible with continuous organizational change (Truex et al 1999).

The relationship between IS project outcomes and organizational change is complex (McKeen, Smith 1996, Westrup 1996, Kirveennummi et al 1998) and needs further investigation. It is the aim of this research to explore the effect of organizational change on the development, implementation and operation of IS. A research strategy has been developed that is appropriate to the nature of the problem, accepted with IS research and designed to extend the knowledge in the field as well as provide guidance to the researcher.

RESEARCH APPROACH AND STRATEGY

Since the organizational context of IS development, implementation and operation will be the focus of the research, a qualitative rather than quantitative research method is appropriate (Bryman 1989). There is disagreement even on fundamental issues within the proposed research area, for example on what constitutes IS success or failure (Sauer 1993). Whether a project is classed as success or failure depends on the perceptions of the people concerned and on their role in and their view of the IS development and implementation process (Lyytinen 1988). It is often impossible for those involved to assess a situation correctly and objectively (Sauer 1993). Because of the various perspectives that need to be taken into account, their subjectivity and the complexities of the context the researcher opted for an interpretive approach.

Research in IS should not only contribute to the knowledge in the field, but also benefit practitioners. Action research associates theory and practice in an iterative process (Lau 1997). It encourages the researcher to reflect upon his or her influence on the situation, while the iterations allow a gradual unfolding of the context thus supporting learning. The research strategy is therefore built on an action research learning cycle adapted from Avison and Wood-Harper (1991) (Appendix).

Research based on case studies has frequently been criticized, but most of the limitations can be overcome (Lee 1989, Yin 1994) and interpretive case studies can make a useful contribution to IS research (Walsham 1995). Case studies are more likely to provide real life situations, particularly if it is not clear what the results of the research may reveal. Since this research will focus on the organizational context of IS development and implementation, it may at times be difficult to establish where the boundaries of a project are and which factors can be attributed to organizational events and which to the project or process itself. This indicates that this research the use of a case study is appropriate (Yin 1994).

During the case study there was extensive opportunity for informal contact with members of the organization and participant observation was possible. The researcher was also conscious of the historical aspect of the case study. If it had been carried out at some earlier or later point in time the data could have revealed different issues. Ethnography supports the exploration of context and allows the researcher to bridge the gap with practitioners (Harvey, Myers 1995), which are aims of the research. The intent of the study is to gain insight rather than to predict events or to develop a universal theory.

These aims are in agreement with those of ethnography (Prasad 1997). Critical hermeneutics is proposed as a suitable mode of analysis for the case study data (Harvey, Myers 1995, Myers 1997).

THE CASE STUDY

From August to November 1998 the researcher carried out a consultancy within the regional office of a large statewide organization. The researcher's task was to identify the information needs of operational management within the regional office, to investigate the current regional and state information systems for their capability to satisfy these needs and to propose strategies to overcome any deficiencies.

The regional office employs approximately 500 staff. Although there is considerable independence from the state organization, decisions made at state level as well as outside influences over which neither the state organization nor the regional office have control can have a significant impact on the way in which the core business activities are carried out.

The organization had recently undergone a major restructure. Power bases shifted and the restructure left in its wake a great deal of resentment at all levels of the organization. The intent of the restructure had been to assist the organization in carrying out its mission statement more successfully. In addition it was hoped that a leaner organizational structure would allow the organization to deploy its limited resources more effectively and efficiently. Despite the completion of the restructure the organization was still in the process of change. New positions were created, existing ones abolished and roles and responsibilities redefined.

The researcher became for the duration of the consultancy a member of the organization. The insight into various IS projects, the opportunity to become familiar with a number of IS and the climate of change at the time of the consultancy provided the necessary background for investigating the effects of organizational change on IS development, implementation and operation.

RESEARCH FINDINGS TO DATE

An IS audit revealed that a great number of state and regional information systems in varying stages of development, implementation and operation existed. At the same time the attitude among staff towards their usefulness and their future success was largely negative. In at least one case the system did not meet several of the original critical success factors. Incompatibilities between state wide systems developed by the centralized IS group and regional systems added to the problems. It appeared that many of the existing IS did not satisfy the needs of new groups of users, created as a result of the organizational restructure.

Staff was still adjusting to new roles and responsibilities. Communication problems between the head office and the region, between users and IS staff as well as within the region were intensified by the restructure. Small, incremental changes continued to occur

and seemed to influence ongoing IS projects. The preliminary analysis of the case study data indicates that organizational changes did influence the development, implementation and operation of IS and that even minor changes had a significant effect.

The first iteration through the action research learning cycle has been completed. A preliminary analysis of the case study data and an initial literature review has been carried out. This helped to develop the research strategy and the research questions. The researcher aims to find answers to the following questions:

- What is the relationship between IS/IT and organizational structure?
- Does organizational change have any influence on the development, implementation and operation of IS?
- What are the conditions for such an influence?
- To what extend are development, implementation and operation of IS affected?

The framework of analysis that underlies much of the research concerning the relationship between IS/IT and organizations can be traced back to Leavitt. In Leavitt's diamond model of the organization, first developed in the 1960s, the components tasks, structure, people and information and control are interconnected and a change in one will affect all others (Leavitt, Bahrami 1988). The framework has been modified as a result of research conducted so far and roles and responsibilities are substituted for people and IS/IT for information and control. This model will form the basis of the data analysis for the ongoing research on the effects of organizational change on IS development, implementation and operation.

The importance of the "fit" between organizational structure and technology for the success of the organization as well as for the development and operation of IS has frequently been pointed out (Kanellis et al 1999). But the concept of "fit" is based on the assumption that the organization will remain unchanged once this "fit" has been found. Some researchers have recognized that the concept of "fit" needs to be expanded to include IT flexibility (Knoll, Järvenpää 1994). Others point out that the traditional approach to IS development and implementation is in the current climate of constant change no longer adequate (Truex et al 1999). Organizational design is seen as an emergent process and due to the persistence of change organizations are characterized as "emergent" rather than as stable or unstable (Lucas, Baroudi 1994, Baskerville, Smithson 1995). The effects of organizational change on IS are extensively discussed in relation to mergers and acquisitions (Robbins, Stylianou 1999, Rosa 1999). Major consulting firms provide guidelines and support to organizations in this situation. It appears that in this case IS practice is leading theory.

Despite the extensive literature on the subject it is surprisingly difficult to find definitions for "organizational change". An understanding of what organizational change involves is often assumed rather than explicitly stated. The formal organization is discussed, while the effects of or on the informal organization are largely ignored. Researchers as well as practitioners appear to focus on major restructuring of the organization, a single event that involves a transition from one organizational structure to another. Organizational change is viewed as a planned process with predictable outcomes. Organizational change can, however, also occur in seemingly insignificant stages that are often unintentional and

unnoticed (Orlikowski 1993, Orlikowski, Hofman 1997). Frequent or continuous minor restructuring can change the organization as fundamentally as a major restructure and the consequences of such changes are difficult to predict. Anecdotal evidence suggests that such "creeping" changes not only influence IS projects, but that these changes could have a more profound effect than the radical changes that are the result of business process re-engineering. The exploration of the effect of these minor organizational changes on the development, implementation and operation of IS is the focus of this research.

EXPECTED CONTRIBUTION

The expected contribution of the research to the field is a better understanding of the influence of organizational change on IS development, implementation and operation. In particular the research will help to clarify the effects of minor organizational changes and the role of the informal organization in relation to IS. This may help explain why despite all efforts of researchers and practitioners IS failures continue to occur.

EXPECTED OUTCOME

The outcome of this research will be twofold and add to practice as well as theory. The aim is to develop a theoretical framework that focuses on all organizational changes, even those that may initially appear to be insignificant, and that takes the informal organization into account. This can be the basis of further research on the reasons for IS failure. It can become a stepping stone towards comprehensive organizational analysis and towards the formulation of techniques that help managers to avoid potential pitfalls. Concepts for the development of the theoretical framework could possibly be found in areas such as user participation or organizational memory.

The researcher's experience as IS practitioner and her current role as educator in IS have influenced the choice of research topic. The researcher therefore hopes to benefit practitioners and educators as well. On a practical level, guidelines for managers that help in the identification of organizational changes, which have the potential to influence IS development, implementation and operation will be developed. Recommendations for carrying out subsequent IS evaluation and audits will also be included.

In addition the theoretical framework may help define a structure for teaching IS. It could for example, be used to explain the various trends in Management Support Systems that appear to reflect the emergent nature of today's organizations.

EXPECTED DIFFICULTIES

Ethnography generates a large amount of data that needs extensive and lengthy analysis using a suitable framework (Myers 1999). It will take several iterations before the researcher can be confident that all aspects have been considered and that the interpretation of the data is correct. The researcher is aware of the historical context of the case study. There is, however, the danger that events are interpreted with the benefit of hindsight. On the other hand as knowledge increases issues may become clearer and can be placed into their context.

Separating the influence of structural changes from that of other factors may pose a problem and it may prove difficult to differentiate between symptoms and problems. The role of the informal organization as well as the influence of organizational culture is at this stage unknown, but could increase the complexity of the data analysis.

THE NEXT STEP

Detailed investigation of areas such as user participation and organizational memory will be conducted in search of an appropriate theoretical framework. In-depth data analysis based on the framework adapted from Leavitt will be the next step in the research process. Follow-up interviews with key stakeholders in the case study organization are planned. A literature review focusing on relevant material from IS and organization theory will follow. Several iterations within the action research learning cycle (Appendix) are anticipated as part of the exploration of the issues. The researcher aims to complete the research within the next 18 months.

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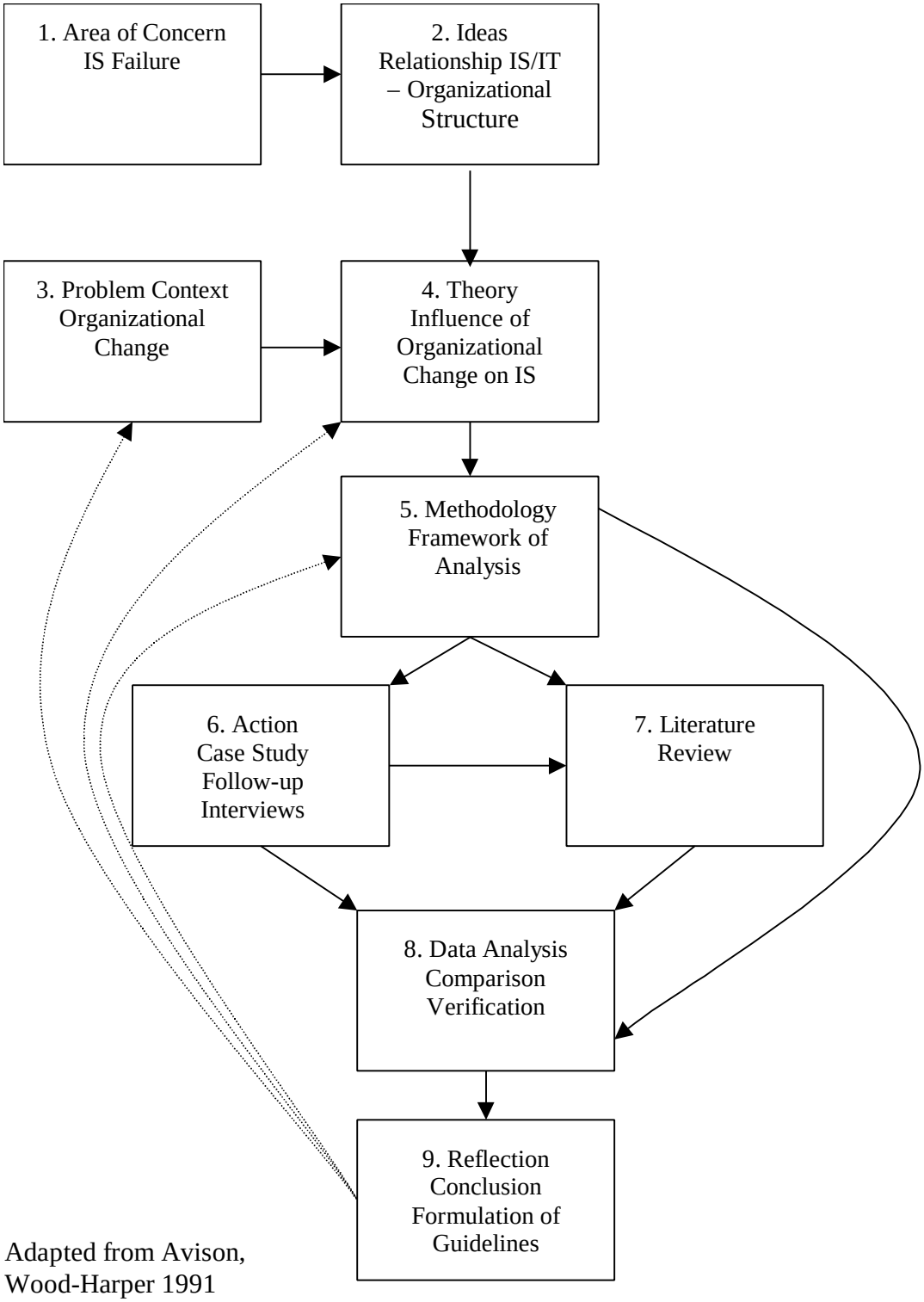
APPENDIX

Action Research Learning Cycle



Adapted from Avison, Wood-Harper 1991

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