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IT-Enabled Change: Evaluating an Improvisational Perspective

Abstract

This paper presents an empirical study into a hierarchical organization's experience with the adoption and use of an adaptive information technology, in this case a workflow application. The paper takes an improvisational perspective on the change process and assesses it through a case study which examines the organization's experiences in terms of anticipated, opportunity-based and emergent changes to their processes, structure and culture that were enabled by the introduction of the workflow application. The findings build upon Orlikowski and Hofman's Improvisational Change Model by evaluating the model in a different organizational context to that of the original study. The findings reveal that ongoing improvisational changes can occur in hierarchical organizations and that improvisations and adaptations can occur in organizations which adopt adaptive IT provided that ongoing support for change management is forthcoming. The findings also suggest that there is a correlation between the level of customer dissatisfaction and the emergence of any local improvisations regardless of the organization type. This implies that an improvisational perspective may be useful for hierarchical organizations which introduce new technology as the local improvisations which can occur may be leveraged for advantage. The study also raises important questions about the categorization of technologies as adaptive and critically reflects on this aspect of the Improvisational Change Model.

Introduction

The unstable environmental conditions in which modern organizations operate mean that the ability to successfully manage organizational change has become a key competitive asset. Information technology is one of the major enablers of organizational change, making organizational change management an important issue for the information systems field.

This paper will look at on the topic of organizational change management from an information systems perspective. As in the Management In The 90s (MIT90s) study (Scott-Morton 1991), a very broad definition of the term IT is used to include: computers of all types, hardware, software, communications networks and the integration of computing and communications technologies. Specifically, this paper will focus on the Improvisational Change Model proposed by Orlikowski and Hofman (1997), building on it by evaluating the model in a different organizational context to that of the original study. Whereas Orlikowski and Hofman's (1997) work was based on an extended case study of a modern, networked organization that integrated an adaptive technology into its core business processes, this paper presents a case study which examines the experiences of a hierarchical organization which has integrated an adaptive workflow technology into its core business processes.

The paper begins with a brief, introductory review of relevant change management literature, which provides the background for the discussion of Orlikowski and Hofman's (1997) model and the subsequent case study.

Change Management

For modern organizations the ability to manage change successfully has become a competitive necessity (Burnes 1996; Kanter 1989; Peters and Waterman 1982). Organizational change is usually required when changes occur to the environment in which an organization operates. Environmental variables which influence organizations may be political, economical, sociological and technological (Jury 1997).

Although there is a general recognition for the need to successfully manage change in modern organizations, questions regarding the substance of change and how the process can be managed in today's context remain largely unanswered.

The Planned Approach

Dawson (1994) points out that, almost without exception, contemporary management texts uncritically adopt Lewin's (1958) 3-stage model of planned change (see also Burnes 1996). Information systems also draws heavily on this view of change. Consequently, even the most modern models for managing IT-enabled change are also based on the Lewinian (unfreeze-change-freeze) model (Benjamin and Levinson 1993). Lewin (1958) argues that there are two opposing sets of forces within any social system; these are the driving forces that promote change and the resisting forces that maintain the status quo. Therefore, to unfreeze the system the strength of these forces must be adjusted accordingly. In practice the emphasis of practitioners has been to provide data to unfreeze the system by reducing the resisting forces (Dawson 1994). Once these negative forces are reduced the organization is moved towards the desired state through the implementation of the new system. Finally, refreezing occurs through a program of positive reinforcement to internalize new attitudes and behaviour.

The Emergent Approach

The emergent approach is a popular contemporary alternative to the planned approach to the management of change, as it includes processual or contextualist perspectives (Burnes 1996;

Dawson 1994). These perspectives share the view that change cannot and should not be 'frozen' nor should it be viewed as a linear sequence of events within a given time period as it is with a planned approach. In contrast, with an emergent approach, change is viewed as a continuous process. For advocates of the emergent approach it is the uncertainty of the external environment which makes the planned approach inappropriate. Common themes across different supporters of this perspective (such as Dawson 1994; Pettigrew and Whipp 1993; Wilson 1992) seem to include the view that change is a continuous process aimed at aligning an organization with its environment and it is best achieved through many small-scale incremental changes which, over time, can amount to a major organizational transformation.

The Contingency Approach

Another perspective which is relevant to this paper arises from the contingent relationship between an organization and its environment and the need to adapt to that environment (Burns and Stalker 1961). In contrast to both the planned and the emergent approaches, the basic tenet of the contingency approach is that there is no 'one best way' to change. Dunphy and Stace (1993) maintain that a model of change based around a contingency approach can reconcile the opposing views of the planned and emergent theoretical protagonists.

IT-Enabled Organizational Change

Regardless of which model is adopted, the requirement for an organization to change is generally caused by changes in its environmental variables which may be political, economic, sociological or technological (Jury 1997; Scott-Morton 1991). This paper will focus on technology, in the specific form of Information Technology (IT), and will examine the major issues that are particular to IT-enabled change. There is much debate about the importance of IT in organizational change, with IT often seen as an *enabling* technology which cannot by itself *create* organizational change (Markus and Benjamin 1997; McKersie and Walton 1991). Many academics and practitioners would agree that IT-enabled change is different from more general change processes and that change must be managed to be successful (Yetton *et al.* 1994; Benjamin and Levinson 1993). A number of models have been proposed to help organizations understand and manage the change process (see, for example, Benjamin and Levinson 1993), and a number of new IT-enabled change management models are now emerging which are based on the emergent or contingent approaches to change management.

Orlikowski and Hofman's Improvisational Change Model

Orlikowski and Hofman (1997) present an improvisational model for managing technological change built on the belief that IT-enabled change managers should begin with an objective rather than a plan, and respond to conditions as they arise in an ad-hoc fashion. They also argue that traditional Lewinian change models are based on the fallacious assumption that change occurs only during a specified period, whereas they maintain that change is now a constant.

The origins of Orlikowski and Hofman's (1997) Improvisational Change Model can be found in a study by Orlikowski (1996) which examined the use of new IT within one organization over a two year period. The study concluded by demonstrating the critical role of situated change enacted by organizational members using groupware technology over time. Mintzberg (1987) first made the distinction between deliberate and emergent strategies and Orlikowski argues that the perspectives which have influenced studies of IT-enabled organizational change have similarly neglected *emergent* change. Orlikowski challenges the arguments that organizational change must be planned, that technology is the primary cause of technology-based organizational transformation and that radical changes always occur rapidly and discontinuously. In contrast, she maintains that organizational transformation is an ongoing improvisation enacted by organizational actors trying to make sense of and act coherently in the world.

Model Assumptions and Types of Change

The Improvisational Change Model is based on two major assumptions. First, that changes associated with technology implementations constitute an ongoing process rather than an event with an end point after which an organization can return to a state of equilibrium. Second, that every technological and organizational change associated with the ongoing process cannot be anticipated in advance. Based on these assumptions, Orlikowski and Hofman (1997) have identified three different types of change:

(i) Anticipated Change: changes that are planned ahead of time and occur as intended.

(ii) Opportunity-Based Change: changes that are not originally anticipated but intentionally introduced during the ongoing change process in response to an unexpected opportunity.

(iii) Emergent Change: changes which arise spontaneously from local innovation and that are not originally anticipated or intended.

Orlikowski and Hofman (1997) maintain that both anticipated and opportunity-based changes involve deliberate action in contrast to emergent changes which arise spontaneously and usually tacitly from organizational members' actions over time. Furthermore, they contend that the three types of change usually build iteratively on each other in an undefined order over time. They also argue that practical change management using their Improvisational Change Model requires a set of processes and mechanisms to recognize the different types of change as they occur and to respond effectively to them.

Critical Enabling Conditions

Orlikowski and Hofman (1997) suggest that there are certain enabling conditions which must be fulfilled to allow their Improvisational Change Model to be successfully adopted. The first condition is that dedicated resources must be allocated to provide ongoing support for the (inherently continuous) change process. Another enabling condition is the interdependent relationship between the organization, the technology and the change model (see figure 1).

Orlikowski and Hofman's (1997) research suggested that the interaction between these key change dimensions must ideally be aligned or at least not in opposition. They also suggested that an Improvisation Change Model may only be appropriate for introducing open-ended technology into organizations with adaptive cultures. Open-ended technology is defined as technology which is locally adaptable by end users with customizable features and the ability to create new applications.

Orlikowski (1996) concluded that further empirical research was needed to determine the extent to which an improvisational perspective of organizational change is useful in other contexts and how different organizational and technological conditions influence the improvisations attempted and implemented.

Experimental Assumptions

This section will discuss what was expected from the case study by relating the main points of the Improvisational Change Model to any assumptions or preconceptions concerning the research method and the case study site. The aim was to minimize any potential bias in the study by recognizing assumptions or preconceptions before the case study commenced.

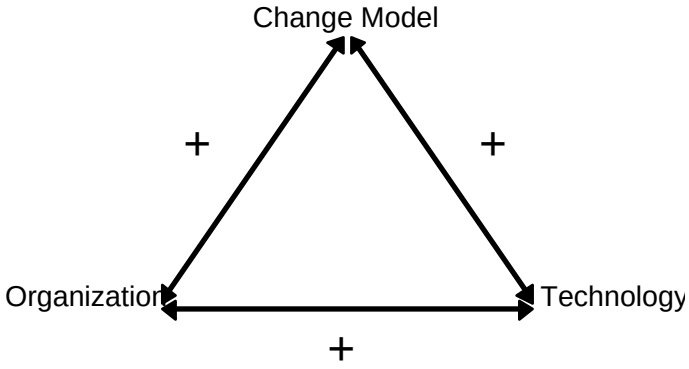

Figure 1: Aligning the Key Change Dimensions (Orlikowski and Hofman 1997, pp.18).

Grounded Theory and Sensitivity

A grounded theory research method was adopted for this study, since it can be used to inductively derive a theory about a phenomenon (see Glaser and Strauss 1967; Strauss and Corbin 1990; Glaser 1994). The grounded theory approach was considered particularly suitable as IT-enabled organizational change is a relatively new research topic. Specifically, it was anticipated that data could be induced from a suitable case study to build upon Orlikowski and Hofman's (1997) Improvisational Change Model.

Site Selection Criteria

Orlikowski (1996) carried out an empirical research study over a two year period at Zeta Corporation (the actual name of the organization was disguised in the study). Zeta is a software company with a Customer Service Department (CSD) which employs 53 people. The CSD has a co-operative, team-oriented culture which are typical characteristics of a network organization (see Brynjolfsson *et al.* 1997). In 1992 CSD introduced the Lotus Notes groupware technology to develop a new Incident Tracking Support System (ITSS). Orlikowski (1996) describes the ITSS as an example of *adaptive technology* , that is more open-ended, generic, and user customizable technology than traditional transaction processing computer systems.

To provide a contrasting organizational context to Zeta, an appropriate case study site would be a hierarchical organization which had integrated adaptive technology into its core business processes and which had been using this technology for approximately two years to allow any improvisational changes to develop.

The Case Study Site

The case study site chosen for this study was called Dex (the actual name of the site has been disguised). Dex is an organization employing 75 people making it similar in size to Zeta Corporation. From our prior knowledge of the organization, it was expected that Dex would be structured as a hierarchical organization, fulfilling the organizational criterion for the selection of a suitable case study site. A summary of the typical features expected from Dex is shown in Table 1.

Hierarchical Organization
Individual Oriented
Controlling Management Style
High Vertical Integration
Vertical Communication
Function Based Workgroups
Multi-tiered Management
Narrow Job Descriptions
Fixed wages for output
Rank-based Authority

Table 1: Hierarchical Organization Features (Brynjolfsson *et al.* 1997).

Quality Workbench, a Microsoft Windows based software package, was first introduced into Dex in 1995 and is hosted on the corporate local area network. Dex's Configuration Manager, with direct responsibility for the introduction of Quality Workbench, described the technology as “an adaptive, flexible and general purpose workflow application which had been integrated into the core business processes of Dex for approximately two years”. Thus, Quality Workbench appeared to fulfil the previously identified technological requirements for the selection of a suitable case study site.

Sensitivity Based Preconceptions

The researchers had a relatively high degree of personal sensitivity relating to the chosen case study site. It was expected that a high degree of sensitivity would be an advantage given the relatively short period for familiarization with the culture of the case study site. It was also expected that this degree of sensitivity would result in a number of preconceptions and, to minimize any resultant bias in the research, it was important that these were recognized before the case study commenced. The preconceptions will be identified and related to the main issues derived from Orlikowski and Hofman (1997) to outline what was expected from the case study.

Improvisational Change Model Assumptions

The Improvisational Change Model is based on the dual assumptions that IT-enabled changes are an ongoing process and that all changes cannot be anticipated in advance. They maintain that there is often a discrepancy between how organizations perceive organizational change and how they implement it. Similarly, it was expected that although the introduction of Quality Workbench into Dex would be perceived to be managed using a traditional planned approach, the enabled changes would be ongoing and not all of them would be anticipated in advance.

Critical Enabling Conditions

Orlikowski and Hofman (1997) suggest that certain, critical enabling conditions must be fulfilled to allow their Improvisational Change Model to be successfully adopted for implementing adaptive technology into an organization. Briefly, the enabling conditions are the provision of dedicated resources to provide ongoing support for the change process and

the alignment of the organization, technology and change model. From our knowledge of the organization, it was expected that Dex would employ a rigid, controlling, management style with high vertical integration, function-based workgroups and centralized decision-making, classing Dex a hierarchical type organization.

As noted in section 3.3, investigations suggested that the Quality Workbench could be categorized as an adaptive technology, making us expect – before the case study commenced – that Quality Workbench would exhibit the typical features of an adaptive technology, shown in Table 2.

Quality Workbench-Enabled Changes

The case study was expected to reveal that the introduction of an adaptive technology, such as Quality Workbench, into a hierarchical organization, such as Dex, would not enable improvisational changes to be enacted within the organization by the manner in which these changes were discovered in Orlikowski's (1996) research. This assumption was grounded in the theoretical sensitivity of the researchers which suggested that the culture of a hierarchically organized, rigidly controlled, workplace such as Dex would not be conducive to improvisational change. This assumption was also based on the personal perception that organizations such as Dex are usually steeped in tradition and as result their culture often makes them highly resistant to change.

Although it was expected that the Improvisational Change Model assumptions would hold for Dex, it was felt that the enabling conditions would not be fulfilled and therefore the case study would reveal no evidence of emergent changes or improvisations relating to the introduction of Quality Workbench. Furthermore, if there were no emergent changes or improvisations, then it was also expected there could be no evidence of any management processes or mechanisms in place to recognize the different types of ongoing change and to respond to them appropriately. Based on these preconceptions, a summary of the expectations of the case study is given in Table 3.

Adaptive Technology Features
Locally Adaptable
Customizable Features
Ability to Create New Applications
Used in Different Ways Within Organization
General Purpose Tool

Table 2: Adaptive Technology Features (adapted from Orlikowski and Hofman 1997).

IMPROVISATIONAL PERSPECTIVE	ZETA (Theoretical Sensitivity)	DEX (Personal Sensitivity)
ASSUMPTIONS		
Change Ongoing	Yes	Yes
Not All Changes Anticipated	Yes	Yes
CRITICAL ENABLING CONDITIONS		
Key Dimensions		
Change Model	Improvisational	Planned
Organization	Networked	Hierarchical
Technology	Adaptive	Adaptive
On-Going Change Support		
Identification Mechanism	Yes	No
Response Mechanism	Yes	No
TYPES OF CHANGE		
Anticipated	Yes	Yes
Emergent	Yes	No
Opportunity-Based	Yes	Yes

Table 3 : Summary of Case Study Expectations.

Data Collection Methods

Data collection at Dex was conducted by a single researcher over an intensive two week period and involved the use of document reviews, a questionnaire, semi-structured interviews and observation. It was necessary to identify a sample population from the 75 Dex personnel that would permit the collection of data within the limited time and would also minimize any possible bias. The chosen population spanned all vertical levels and functional groupings and included: the Chief Executive Officer, senior management, project managers, technical authors, IT specialists, Quality Assurance specialists and administration staff. Table 4 shows a breakdown of data collection methods by employee level and function.

Document Review

The data collection phase of the study began with a general examination of all relevant documentation to provide the researcher with sufficient theoretical sensitivity concerning the role and structure of Dex and the rationale and functionality of the Quality Workbench application, which was implemented to help Dex fulfil ISO 9000 requirements.

It is part of the corporate culture of Dex that a relatively high turnover of staff necessitates good documentation to provide continuity and, therefore, a review of the administration files relevant to the area of study was carried out. This source of data was expected to yield useful information regarding the chronology of events and the historical purpose regarding the introduction of Quality Workbench into Dex. Specifically, a review of the administration files was undertaken to obtain evidence to verify the original purpose for implementing Quality Workbench. The intention was to relate any documentary evidence to the three types of change identified by Orlikowski and Hofman (1997) in order to ascertain which organizational changes were originally anticipated by Dex's management. The administration files yielded a summary of the historical events leading to the implementation of Quality Workbench which is shown in Table 5.

Function/Level	Questionnaires	Interviews	Observations
CEO	1	1	1
Senior Managers	2	2	2
Project Managers	10	10	4
Tech Authors	5	5	2
IT Specialists	1	1	1
QA Specialists	1	1	2
Admin Staff	1	1	2
Totals	**21**	**21**	**14**

Table 4: Data Collection Method by Function/Level.

DATE	EVENT
12 October 1994	Initial contact with providing software company
17 October 1994	ISO 9000 criteria identified
20 October 1994	Quality Workbench demonstration at Dex
11 November 1994	Dex post-demonstration evaluation of Quality Workbench
15 November 1994	Review of Quality Workbench competitors
2 December 1994	Invitation to company to tender quotation
6 January 1995	Contract awarded
15 January 1995	Software received
1 March 1995	Pilot installation at Dex
5 March 1995	Started development of Quality Management System
12 May 1995	Quality Management System completed
26 June 1996	Documentation check
18 September 1996	ISO 9000 accreditation

Table 5: Quality Workbench Project History.

Questionnaire

A questionnaire was used early in the case study to elicit data from the sample population. A covering letter was sent with the questionnaire to explain the confidentiality and purpose of the study to ensure that any information given was accurate and not politically motivated. The primary purpose of the questionnaire was to identify those Dex personnel that had been in the organization before the introduction of Quality Workbench and could comment on the process and structural changes that may have occurred based on first-hand knowledge rather than hearsay. Also, the questionnaire was intended to indicate those functional areas and levels or key employees within the organization that had been most affected by the new technology which would allow the research to target those areas or employees. The questionnaire also indicated the willingness of the participants to be involved in the study and the quality of information that they could contribute. Twenty questionnaires were distributed and returned using Dex's electronic mail system and all of the questionnaires were returned completed before the required deadline. An extra questionnaire was returned voluntarily by an employee who was added to the sample population.

Semi-Structured Interviews and Informal Discussions

Semi-structured interviews were conducted in order to gather more specific information on the concepts that emerged from both the document review and the analysis of the questionnaire data which was completed early in the case study. Semi-structured interviews were considered appropriate to the grounded theory approach as they allowed the interviews to be more generative, however, during the later stages of the research the interviews became more structured as the theoretical concepts were verified. Twenty one interviews were conducted in total, each one lasting approximately forty five minutes and involving the sample Dex population. Specifically, the interviews were designed to focus on the organizational context, technology, change process, anticipated, emergent and opportunity-based changes and generally to identify the common themes concerning any IT-enabled organizational changes. The interviews were also used to determine the frequency and duration of Quality Workbench use to enable a weighting to be given to the data during analysis.

Informal discussions were also carried out with the technical director and software developers from Ideagen, the company which develops Quality Workbench. The purpose of this was to determine the extent of the software change requests that had been instigated by Dex and integrated into the latest versions of Quality Workbench. It was envisaged that this would

reveal evidence of any emergent or opportunity-based changes that had become part of the formal configuration of the technology.

Observation

The working practices of the sample Dex population were observed first hand using a participative approach. This was considered to be the most efficient data collection method as some employees used Quality Workbench relatively infrequently. The data obtained from observation differed fundamentally from the other data collection methods as it was collected first-hand rather than as retrospective data obtained from document reviews or interviews. The purpose of these observations was to verify that the technology was being used in the formal manner intended and to see if any informal changes to working practices had emerged through local adaptations or improvisations.

Initial Data Analysis

An iterative approach to data collection and initial analysis was used which focused on the phenomenon of IT-enabled organizational change within Dex. To enable a contextual evaluation of any organizational changes to be made, initial data collection and analysis directed the research towards comparing Dex's experiences with the main issues raised by the Improvisational Change Model. Specifically, these issues are: the assumptions upon which the model is based, the enabling conditions that allow an improvisational model to be adopted and the identification and classification of any Quality Workbench-enabled changes.

Improvisational Change Model Assumptions

At Dex, anecdotal and documentary data revealed that Quality Workbench-enabled changes to the unit's processes, culture and technology were an ongoing process which started with the implementation of the technology in March 1995 and were still occurring. Moreover, the case study itself raised a number of important issues which it is envisaged will lead to further changes to the unit's structure, processes and technology in future. The case study also revealed that the Quality Workbench-enabled organizational changes were not all anticipated in advance and that a number of opportunity-based and emergent changes were implemented (discussed in section 5.3).

Critical Enabling Conditions

Orlikowski and Hofman (1997) maintain that interdependent relationships exist between an organization's context, technology and the change management model and that these must be aligned, or at least not in opposition for their Improvisational Change model to be successfully adopted. Initial data collection and analysis was, therefore, directed towards examining these key change dimensions within the context of Dex and the introduction of Quality Workbench.

Data obtained from documents and interviews revealed that the Dex management uses a controlling management style with high vertical integration, function-based workgroups and centralized decision making. Dex exhibits all of the features of a typical hierarchical organization noted by Brynjolfsson *et al.* 1997 (and shown in Table 1).

Although Quality Workbench had been described by the Dex Configuration Manager as an adaptive technology, examination of the User Manual, the Dex Quality Management System Work Instructions and a consultant's report revealed that Quality Workbench does not fulfil the criteria for adaptive technology (summarized in Table 2). Particularly, adaptable technology is typically used in different ways across an organization which was not the case with Quality Workbench.

It was difficult to determine the type of change management model which had been adopted during the implementation of Quality Workbench. A document review revealed corporate files containing a project plan based upon a typical Lewinian planned approach to change management. However, although this was the plan, semi-structured interviews revealed that in practice it was agreed among senior management that the successful implementation of Quality Workbench required a degree of ongoing adaptations as the organization learned to use the workflow capabilities of the application. Furthermore, administration files and interviews revealed that, as a major customer of Ideagen (the Quality Workbench developers), the Dex management realized that it had very strong influence which was used to effect changes to the functionality of Quality Workbench thus formalizing their organizational adaptations. These points indicate that an improvisational management model was adopted by Dex, based initially upon a planned approach which in practice evolved into an improvisational approach at the organizational level.

Orlikowski and Hofman (1997) argue that using an improvisational model for managing technological change requires ongoing-support in the form of a set of processes and mechanisms to recognize the anticipated, opportunity-based and emergent changes as they

occur and to respond effectively to them. Initial data analysis indicated that Dex had provided on-going support for changes enabled by the introduction of Quality Workbench. The data revealed that the Dex management had identified an early requirement for ongoing support for their quality management system which included Quality Workbench. The data also showed that a Quality Management System (QMS) Configuration Manager was established to provide ongoing support. Analysis of the terms of reference for the QMS Configuration Manager showed that his responsibilities included the adaptation and configuration of Quality Workbench. Administration files verified that the QMS Configuration Manager had provided ongoing support for Quality Workbench. For example, the QMS Configuration Manager had conveyed Dex software change requests to Ideagen for implementation in later Quality Workbench versions. The Configuration Manager had then adapted the organization to these opportunity-based changes by reviewing the working practices of Dex and formalizing the resultant changes.

Quality Workbench-Enabled Changes

In order to consider the Improvisational Change Model in the context of Dex, data was collected to establish if the introduction of Quality Workbench had enabled changes to the structure, processes, culture and technology of the organization and if so to categorize each change as either anticipated, opportunity-based or emergent. All data collection techniques were used for this and a summary of the Quality Workbench-enabled changes is shown in Table 6.

The initial data analysis revealed that Quality Workbench had not enabled any structural changes to be made to the hierarchical organization of Dex. However, a number of changes to the organizational practices, culture and technology were identified and categorized.

As expected, anticipated changes occurred to Dex's processes and culture, however, two anticipated changes did not occur. The first was to migrate the organization to a paperless office concept; there was considerable hard-copy documentary evidence to prove that this had not been achieved. Also, it was anticipated that Quality Workbench would help to achieve organizational cohesion through a unified document configuration system, however, the questionnaire and subsequent interviews revealed that one department in particular exhibited signs of relative autonomy within the organization.

The data also indicated that the identified opportunity-based changes occurred to Dex in response to the organization deliberately taking advantage of the unexpected functionality of

Quality Workbench. The potential for the process changes was generally recognized by the implementation team early in the project the exception being the use of a contract document database as a source of corporate information. The changes made to the technology itself were generally driven by user software change requests to address perceived unsatisfactory features after initial implementation and a number of these changes were ongoing at the time of the case study.

A number of changes were identified and categorized as emergent changes when the initial analysis indicated that these changes arose spontaneously from local innovations. These emergent changes will be explained in detail in section 6.2.3.

Data Analysis and Interpretation

This section will discuss the findings resulting from the analysis and interpretation of the case study data. In particular, it will focus on the issues raised when the case study expectations and assumptions were not supported by the findings. The section will begin by examining the implications of the unanticipated differences between Dex's organizational and technological context and the critical enabling conditions of the Improvisational Change Model. The section will then examine the reasons for the unexpected anticipated, opportunity-based and emergent changes that occurred to the practices, culture and technology of Dex following the introduction of Quality Workbench.

QWB-ENABLED CHANGES	TYPE	COMMENT
STRUCTURE		
None		
PRACTICES		
Automated Workflow	Anticipated	
Document Configuration Control	Anticipated	
Paperless Office	Anticipated	Not Achieved - Hard Copies of QMS Procedures Used Throughout
Electronic Document Viewing	Anticipated	
Quality Audit Scheduling	Anticipated	
Audit Non-Conformity Tracking	Opportunity	
Customer Database	Opportunity	
Customer Complaints System	Opportunity	
Task Knowledgebase	Opportunity	Basic knowledge-base
Task Knowledgebase	Emergent	Initial Orientation
Proxy Document Authorization	Emergent	Informal System Use
Document Check Out	Emergent	Informal System Use
Manually Amended Documents	Emergent	Informal System Use
CULTURAL		
Departmental Cohesion	Anticipated	Not Achieved - specific dept Semi-autonomous
'Right First Time' Attitude	Anticipated	'File and Forget' Documents
TECHNOLOGY		
Changes Made		
Multiple Databases	Opportunity	driven by specific dept
Menu Terminology	Opportunity	Configuration Manager Driven
Proxy Document Authorization	Emergent	Legitimized Informal System Use
Document Check Out	Emergent	Legitimized Informal System Use
Changes In Progress		
Macro Facility	Opportunity	
Hyperlinking Documents	Opportunity	
Free-Text Document Search	Opportunity	

Table 6: Summary of Quality Workbench-Enabled Changes.

Critical Enabling Conditions

Although Quality Workbench had been described by the Dex Configuration Manager and workers at other levels in Dex as an adaptive technology, other data gathered during the study (from relevant documentation and interviews with users) suggested that Quality Workbench was a non-adaptive technology (when viewed against Orlikowski and Hofman's (1997) definition). This disparity can be explained by considering the different stakeholder perspectives of the Configuration Manager and a typical Quality Workbench user within the organization. The Configuration Manager had a significantly higher level of system access than any user and, from this global perspective, the application could be adapted significantly more than a user's access privileges permitted. Furthermore, the Configuration Manager had a great deal of influence on how the system was used by the organization and the Configuration Manager incorrectly perceived organizational adaptation to be synonymous with technological adaptation. The conflicting views of the technology raise interesting issues for the study and the Improvisational Change model: should the data suggesting that Quality Workbench is non-adaptive lead to a re-framing of the study since is could be argued that the study was looking at both different organizational and different technological contexts from the original; does the lack of a definitive perspective on the nature of the technology raise a difficulty with the model which needs to be considered. These issues will be discussed in more detail in the final section of the paper.

It was expected that Dex would have adopted a conventional change management model based upon the planned approach. However, the findings revealed that in practice an improvisational management model was adopted. This was similar to the phenomenon identified by Argyris and Schon (1978) who pointed out the inconsistency between espoused theories and practical theories in use. The Dex management perceived that they were following a planned change model while in reality the model was unavoidably improvisational to deal with unanticipated and ongoing IT-enabled changes that emerged.

The case study findings also revealed that the key change dimensions of Dex, shown in Figure 2, were not aligned and, therefore, not conducive to the successful adoption of an improvisational change model. Consequently, the case study was not expected to reveal evidence of any ongoing support in the form of management processes or mechanisms which recognized the different types of Quality Workbench-enabled changes and responded to them appropriately.

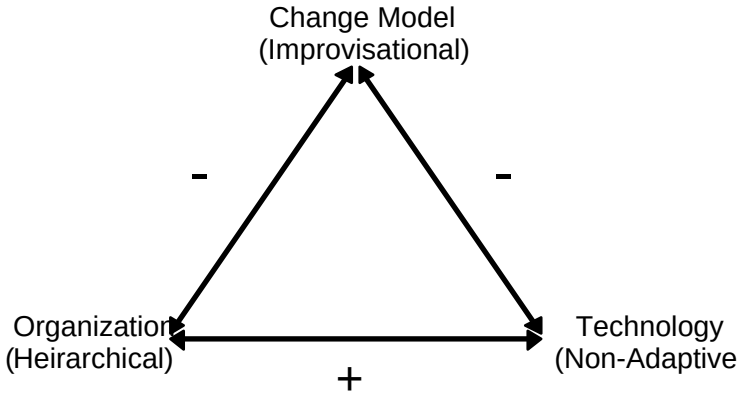

Figure 2: Dex Key Change Dimensions (adapted from Orlikowski and Hofman 1997, pp.18). The key change dimensions show the technology as non-adaptive, in response to the data that emerged during the study and in contrast to the original expectation.

However, contrary to expectations, the case study revealed that the Dex management had identified an early requirement for ongoing support for the introduction and ongoing adaptation of Quality Workbench and, consequently, a Configuration Manager was established within the organization. This function was undertaken by an existing member of Dex and as a result no structural change occurred. The data analysis indicated that, without the ongoing support provided by the Configuration Manager, neither opportunity-based nor emergent changes could have been formally implemented due to the non-adaptive nature of the technology at the local level. This supported Orlikowski and Hofman's (1997) view of ongoing support being a critical condition for enabling the adoption of an improvisational change model.

Quality Workbench-Enabled Changes

It was expected that a number IT-enabled changes would have occurred to the structure of Dex following the introduction of Quality Workbench. However, although the workflow capability of Quality Workbench had *enabled* structural changes to be made to the hierarchical organization of Dex, the management had deliberately not *created* any changes. The case study findings indicated that Quality Workbench was procured for a specific purpose to fit into the existing organizational structure and, therefore, Quality Workbench-enabled structural changes were considered undesirable. This policy was rationalized by one senior manager who stated:

> "it's never a good idea to procure commercial off-the-shelf software that requires organizational changes to be made".

The case study findings indicated that the Dex management had determined that the perceived adaptability of Quality Workbench would allow the technology to be adapted to fit the existing structure of the organization and, therefore, a deliberate 'resistance-to-change' policy was adopted regarding the organizational structure.

Anticipated Changes

Several Quality Workbench-enabled anticipated changes occurred to the working practices, or processes, of Dex which were subsequently implemented. However, one anticipated change which did not occur was the 'paperless office' concept. Quality Workbench did not permit multiple documents to be accessed concurrently which is a frequent user requirement;

also many users found it difficult to absorb information when reading documents on-screen. Consequently, hard copies of documents were often printed and a process-change solution was instigated to avoid document configuration problems by ensuring that all printed documents had a footer appended automatically by Quality Workbench stating that the document was valid for only seven days.

Another anticipated change was also not realized. It was expected that a cultural change would occur to improve organizational cohesion following the implementation of Quality Workbench and the resultant unification of working practices. However, one department in particular perceived that Quality Workbench had produced an adverse effect on the cohesion of the organization. The case study findings indicated that the core business practices of the dissatisfied department were dependent on Quality Workbench more than any other department and, therefore, the shortcomings of the technology were much more significant to that department.

Opportunity-Based Changes

A number of opportunity-based changes occurred to Dex's working practices, or processes. The Quality Workbench database facility was used for archiving all documents released in support of each contract. As the documents are often similar, it was soon realized that this database could be used to provide a basic corporate knowledge-base to avoid 'reinventing the wheel' for each contract.

A major impediment when accessing the corporate knowledge-base was that Quality Workbench did not provide a free-text search facility on the archived documents. A basic keyword search facility was available, however, this relied on the document author manually selecting and appending keywords to each document. Users identified a requirement for: a free-text search tool; a macro facility to automate complicated keystroke sequences; and a hyperlinking facility between database documents. The Configuration Manager initiated software change requests to address these shortcomings and these opportunity-based changes will become a formal feature of the technology with the next version of Quality Workbench.

Emergent Changes

It was expected that the case study would reveal no evidence of emergent changes or improvisations. However, the findings revealed that a number of changes did occur that were not planned or anticipated when Quality Workbench was introduced. Furthermore, these changes occurred tacitly over time and arose spontaneously from local innovations. Using Orlikowski and Hofman's (1997) definitions, these changes were categorized as emergent Quality Workbench-enabled changes.

The case study disclosed one local improvisation: the corporate knowledge-base was used informally by new employees to acquire an initial feel for the required documentation standards and also to provide templates for new contract documentation. Although there was no collusion on this matter, each department had spontaneously adopted this as an informal working practice.

The case study findings also revealed two improvisational changes which emerged from local, informal adaptations to the working practices of Dex. Quality Workbench was intended to be used for active document configuration and users were required to edit documents within the application. However, the limitations of the technology compelled many users to unofficially edit documents outside the application and only to submit them when the amendments were completed. It was also intended that document approval and authority for release would be granted using the workflow capability of Quality Workbench, however the study revealed that many users would authorize their own documents using proxy authorization, granted unofficially by their superiors, to circumvent the authorization procedures. These emergent, procedural changes had all resulted from initial user dissatisfaction with the technology; as one senior manager observed:

> "when Quality Workbench was first introduced the initial problems were so bad that the current problems are considered acceptable".

Orlikowski (1996) showed that many of the improvisations in her study were initiated by the initial, unsatisfactory features of the technology. The findings from this research supported this view. For example, when the response of the Quality Workbench system was unacceptably slow, users improvised and an informal process emerged whereby documents were 'checked out' of the configuration control system to be amended outside the application.

The case study revealed that the local, improvisational changes that emerged over time were later legitimized as organizational-wide changes through a formal software change request process. These emergent changes will become a formal feature of the technology with the next version of Quality Workbench.

Research Findings

Hierarchical Organizations And Ongoing Improvisations

Orlikowski and Hofman (1997) contend that their Improvisational Change Model is a suitable lens for network organizations and that it may not be suitable for cultures that do not support experimentation and learning; these are features that are typically found in more rigid, hierarchical organizations. This study focused on a hierarchical organization in order to evaluate the improvisational perspective in a contrasting organizational context.

This research did not reveal evidence of any IT-enabled structural changes and it is concluded that this was due to the inherent culture of the rigid, hierarchical organization and a deliberate policy of resistance to change. However, the findings did reveal that a hierarchical organization was conducive to local improvisations which resulted in emergent process changes in the form of informal systems usage. These informal practices were later formalized and integrated into the organizational processes and the technology itself was adapted as a result. The local improvisations which emerged could not be formally implemented as the technology was found during the study to be non-adaptive (contrary to initial perceptions), nevertheless, the changes were enacted through the provision of ongoing support which adapted both the organization and the technology. This research concludes that improvisational changes can occur in hierarchical organizations and that these changes can be implemented successfully using an improvisational perspective provided that ongoing support is available.

User Dissatisfaction and Local Improvisations

The case study revealed that the emergent process changes, which were eventually formalized as technological changes, had all resulted from initial user dissatisfaction with the technology. The culture of the hierarchical organization discouraged informal uses of the technology, even to the extent of documenting operating procedures in detail. However, local improvisations still occurred to circumvent the initial technological deficiencies. The findings revealed that these improvisational changes occurred because the level of user dissatisfaction was greater than the cultural influence of the hierarchical organization. Therefore, this research suggests that there is a correlation between the level of user

dissatisfaction and the emergence of any local improvisations regardless of the organization type.

Non-Adaptive Technology and Local Improvisations

Orlikowski and Hofman (1997) maintain that their Improvisational Change Model is most appropriate for open-ended, customizable technologies. This study set out to look at the same technological context, looking at the use of an adaptive-technology. Initial data gathered across a range of users of Quality Workbench in Dex prior to the final selection of the case study site suggested that the Quality Workbench system presented an adaptive technology, in line with Orlikowski and Hofman's (1997) definition. However, during the detailed data collection, it emerged that the capacity for adaptation of the technology at the end-user level was restricted. This meant that the study actually provided findings for both different organizational *and* technological contexts, though this was not the study's original intention.

The findings revealed that local improvisations to the processes did occur to compensate for the unsatisfactory features of the technology. Although the non-adaptive nature of the technology at the end-user level prevented these local improvisations from being formally implemented, they later became formal, organizational-wide improvisations which were integrated into the processes and technology of the organization. This research concludes that local improvisations can occur in organizations that adopt non-adaptive IT although the technology cannot be adapted to formally implement the emergent changes. However, the improvisations can enable organizational-wide changes to be implemented when ongoing support for change management is forthcoming.

Orlikowski and Hofman's Improvisational Perspective in Context

Orlikowski and Hofman (1997) maintain that change is typically an ongoing process comprising opportunities and challenges that are not all anticipated at the start in contrast to traditional, Lewinian models of technical change. Orlikowski and Hofman (1997) also contend that a significant factor contributing to the difficulties of managing IT-enabled change is the discrepancy between the way people perceive technical change and the way that they actually implement it. The findings of this research agree with these assertions. The case study revealed that unanticipated improvisations occurred in a hierarchical organization and also that ongoing support was essential for the change process. Furthermore, although the

organization's management perceived that it had adopted a traditional change model, the data suggests that it had in fact adopted an improvisational approach to implement the improvisations that emerged.

The findings of this research showed that Orlikowski and Hofman's (1997) critical enabling conditions were not satisfied by the case study organization. Ongoing support for the change process was provided, however, the key change dimensions of the organization were actually in opposition as shown in Figure 2. Nevertheless, the findings revealed that a number of local improvisations did occur. Also, although the organization perceived that it was using a planned change model, in practice the change management model that it did use was unavoidably improvisational to deal with the unanticipated and ongoing IT-enabled changes which emerged. This suggests that an improvisational perspective may be useful for hierarchical organizations which introduce new technology as the local improvisations which can occur could be leveraged for advantage.

The change in perception of the workflow technology on which this study was founded (from adaptive to non-adaptive) raises important issues about the Improvisational Change Model, particularly with respect to its application in hierarchical organizations. Even with criteria such as those provided by Orlikowski and Hofman (1997), is often not clear how a technology should be classified. There may be competing stakeholder perspectives on the nature of the technology related to their organizational roles and/or interaction with the technology. The technology is unlikely to be neutral and constantly viewed throughout the organization and will therefore be difficult to categorize, particularly with a simple dichotomy. This suggests that richer characterisations of the technology may need to be made in studies of this sort and that development of the Improvisational Change model may arise from studies around these characterisations. We feel that this is particularly important in hierarchical organizations where there are likely to be step changes in responsibilities which lead to widely different views of technology associated with access and use privileges. Hierarchical organizations may also be more likely to impose centrally a view of the technology, its capabilities and what constitutes its normal use. This too could contribute to incorrect views of the technology and its nature being formed – this may explain perceptions at Dex, where all users that we questioned incorrectly judged the technology as adaptive against the defining criteria.

Summary

The objective of this research was to build upon Orlikowski and Hofman's (1997) Improvisational Change Model by evaluating the model in a different organizational context to

that of the original study. Orlikowski and Hofman's (1997) Improvisational Change Model has been extended by this research with insights from existing formal theory and with interpretations from a contextual case study which contribute to the general understanding of the improvisational perspective of IT-enabled change.

This research concludes that improvisational changes can occur in hierarchical organizations and that these changes can be implemented successfully using an improvisational perspective provided that ongoing support is available. Also, local improvisations can occur in organizations that adopt non-adaptive IT although the technology cannot be adapted to formally implement them. However, the improvisations can enable organizational-wide changes to be created when ongoing support for change management is forthcoming. The findings also suggest that there is a correlation between the level of customer dissatisfaction and the emergence of any local improvisations regardless of the organization type.

The findings of this study agree with Orlikowski and Hofman's (1997) assertions that change is typically an ongoing process and that a significant factor contributing to the difficulties of managing IT-enabled change is the discrepancy between the way people perceive technical change and the way that they actually implement it. The findings also suggest that an improvisational perspective may be useful for hierarchical organizations which introduce new technology as the local improvisations which can occur could be leveraged for advantage.

Orlikowski and Hofman (1997) suggest that their alternative Improvisational Change Model may only enable organizations to take advantage of the enabling capabilities, emerging practices and unanticipated outcomes associated with the use of new technologies. There has been limited research into the potential benefits of adopting an improvisational perspective of IT-enabled change and this is clearly an area worthy of further research which would inform both the social and computer sciences. This issue may become more pertinent as the ability to manage change successfully is likely to become a key competitive strength of all organizations regardless of their organizational or technological contexts. This research suggests that adopting an improvisational perspective of change management may have a wider application then originally envisaged. However, it also raises issues around the characterization of technology in models of this sort and suggests that richer views of the technology may be not only appropriate but also necessary to avoid confusion brought about by the often competing technological and organizational perspectives of stakeholders in organizations being studied.

References

Argyris C and Schon D A (1978), *Organizational Learning*, Massachusetts, Addison Wesley.

Benjamin R I and Levinson E (1993), *A Framework for Managing IT-Enabled Change*, Sloan Management Review, (Summer) pp.23-33.

Brynjolfsson E, Renshaw A A and Van Alstyne M (1997), *The Matrix of Change*, Sloan Management Review, (Winter) pp.37-54.

Burnes B (1996), *Managing Change: A Strategic Approach to Organisational Dynamics*, Pitman.

Burns T and Stalker G M (1961), *The Management of Innovation*, Tavistock, London.

Dawson P (1994), *Organizational Change: A Processual Approach*, Paul Chapman Publishing.

Dunphy D and Stace D (1993), *The Strategic Management of Corporate Change*, Human Relations, **46** (8) pp.905-920.

Glaser B G (1994), *Basics of Grounded Theory Analysis: Emergence Versus Forcing*, Mill Valley, California, Sociology Press.

Glaser B G and Strauss A (1967), *The Discovery of Grounded Theory*, Chicago: Aldine.

Jury G M (1997), *Managing Technology: The Environment in Which Technology is Managed*, IEE Engineering Management Journal, **7** (1) pp.27-32.

Kanter R M (1989), *When Giants Learn to Dance: Mastering the Challenges of Strategy Management and Careers in the 1990s*, Unwin.

Lewin K (1958), *Group Decisions and Social Change*, In Swanson G E, Newcomb T M and Hartley E L (eds): *Readings in Social Psychology*, Holt, Rhinehart and Winston, New York.

Markus M L and Benjamin R I (1997), *The Magic Bullet Theory in IT-Enabled Transformation*, Sloan Management Review, (Winter) pp.55-68.

McKersie R B and Walton R E (1991), *Organizational Change*, in Scott-Morton M S (ed), *The Corporation of the 1990s: Information Technology and Organizational Transformation*, Oxford University Press.

Mintzberg H (1987), *Crafting Strategy*, Harvard Business Review, (July-August) pp.66-75.

Orlikowski W J (1996), *Improvising Organizational Transformation Over Time: A Situated Change Perspective*, Information Systems Research, **7** (1) pp.63-92, March 1996.

Orlikowski W J and Hofman J D (1997), *An Improvisational Model for Change Management: The Case of Groupware Technologies*, Sloan Management Review, (Winter) pp.11-21.

Peters T J and Waterman R H (1982), *In Search of Excellence: Lessons from America's Best Run Companies*, Harper and Row, London.

Pettigrew A and Whipp R (1993), *Understanding the Environment*, in Mabey C and Mayon-White B (eds), *Managing Change*, Open University/Paul Chapman Publishing, London.

Scott-Morton M S (1991), ed, *The Corporation of the 1990s: Information Technology and Organizational Transformation*, Oxford University Press.

Strauss A L and Corbin J (1990), *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Sage Publications, London.

Wilson D C (1992), *A Strategy of Change*, Routledge, London.

Yetton P W, (1994), *Computer-Aided Architects: A Case Study of IT and Strategic Change*, Sloan Management Review, (Summer) pp.57-67.

List of Figure Captions

Figure 1: Aligning the Key Change Dimensions (Orlikowski and Hofman 1997, pp.18).

Figure 2: Dex Key Change Dimensions (adapted from Orlikowski and Hofman 1997, pp.18). The key change dimensions show the technology as non-adaptive, in response to the data that emerged during the study and in contrast to the original expectation.

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