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December 2004

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Michael Williams
Swansea University

Janet Williams
University of Glamorgan

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Michael D. Williams

Swansea University, UK

m.d.williams@swansea.ac.uk

Janet Williams

University of Glamorgan, UK

Jwillia3@glam.ac.uk

ABSTRACT

As organizations continually implement changes to their information and communication technologies (ICT) infrastructure, change has become an increasing part of "business as usual". Managers are routinely requested to justify expenditure, explain business benefits, and provide ex-ante and ex-post evaluations of ICT initiatives. Ex-ante evaluation is defined as predictive evaluation, and is often based upon quantitative measures such as financial predictions. However, the perception that many organizations are underperforming with regard to the effectiveness of ICT suggests that an approach to ex-ante evaluation employing both qualitative and quantitative components is appropriate. This paper presents a framework designed to facilitate qualitative evaluation of the likely impact of an information system by analyzing a series of key themes derived from a study of the literature of change and change management. The paper concludes with an application of the framework to an ICT development, the intention being to assess the validity of the theoretical framework proposed.

Keywords

Ex-ante evaluation, change management, qualitative evaluation

INTRODUCTION

Change may nowadays be viewed as a normal condition associated with the use of information and communication technologies (ICT) within organizations. New products are continuously being installed, and are often accompanied by changes in the user base and location, and/or in the core business or ICT strategic plan. Indeed, as organizations evaluate and implement changes to their ICT systems and infrastructure, change has become an increasing part of *business as usual*. Despite this activity, it is often the case that ICT-related investment does not deliver value or meet business objectives (Fitzgerald, 1998). This perception of widespread ICT failure is not new, being described by Fincham (2002) as a longstanding problem, reflecting a general incapacity to deliver. This suggests that existing forms of ICT evaluation may not be entirely appropriate. Given the acknowledged link between ICT and change, and the need for appropriate ex-ante evaluation techniques, it is reasonable to argue that we should make use of existing theories of change in assisting us to construct new approaches to evaluation. This paper presents a framework designed to facilitate qualitative evaluation of ICT initiatives by analyzing key themes derived from a study of the literature of change and change management. The paper comprises four sections. The following section presents a summary of the argument that change and ICT are inextricably linked. We then present a discussion of the need for new approaches to ex-ante evaluation, and argue that given the importance of the concept of change in ICT projects, we should make use of theories of change to assist us in constructing approaches to evaluation. Thirdly, we present a framework for ex-ante evaluation derived from the extant change management literature. Finally, we present details from a case which serves as a means of testing the validity of the theoretical framework proposed.

CHANGE AND ICT: INEXTRICABLY LINKED

ICT is no longer viewed as a technical 'service', but is considered an integrated organizational process (Robson, 1997), and following prolonged periods of heavy investment, most organizations are now fundamentally dependent upon their ICT infrastructures and the systems they support (Ward and Peppard, 2002). Despite heavy investment on the expectation that such activity will result in organizational value and benefit, there is widespread and growing concern that ICT investment alone does not deliver value or meet business objectives (Fitzgerald, 1998). *Real* benefit occurs only when ICT investment is accompanied by necessary business change (Gibson, 2003). According to Ward and Elvin (1999), such change can occur at a number of levels, being initiated, facilitated, or supported by ICT, or being caused unexpectedly by ICT.

Additionally, we may add that change may impact upon the ICT infrastructure itself in the form of new versions of existing software, or new products being installed. ICT may therefore be the enabler of change, or may itself be the subject of change. What is clear is the continuous and inextricable linkage between ICT and change. Furthermore, it is noticeable that reasons motivating ICT change often found in the literature can generally be seen to correspond to Reddin's (1975) motivating factors for organizational change, thus reinforcing the view that ICT-related change often causes or is motivated by organizational change.

THE NEED FOR EX-ANTE EVALUATION OF ICT INITIATIVES

Evaluation may take various forms and approaches depending upon the emphasis required, or the decision-making involved (Owen, 1993). For instance, ex-post (retrospective) evaluation is usually concerned with value assessment of ICT systems as implemented in terms of both financial and non-financial measures (Remenyi, 1999), while ex-ante evaluation is defined as predictive evaluation, often based upon quantitative measures such as financial projections.

Although managers are routinely requested to conduct ex-ante and ex-post evaluation of ICT initiatives in order to justify expenditure and explain business benefits (Torkzadeh and Doll, 1999), it is often the case that investment does not deliver value or meet business objectives (Fitzgerald, 1998). It is generally accepted that ICT investment can be both costly and risky (Robson, 1997), but this factor alone should not account for the perception that organizations underperform with regard to efficiency and effectiveness of ICT. This perception of widespread ICT failure is not new, being described by Fincham (2002) as a longstanding problem, reflecting a general incapacity to deliver.

The reasons for underperformance are varied, but according to Gibson (2003), ICT "failure" is either technology or business related. Technical problems (such as projects expanding due to scope creep, or becoming bogged down due to the complexity of integrating products, legacy systems, and new data), can generally be contained and corrected prior to significant negative business impact occurring. However, business problems (such as not developing new workflow processes, not adapting the structure of the organization, and keeping the old cultural practices in place even when they impede the new ways of working) are not easily rectified.

According to Ward (1996), many ICT-related investments appear to proceed without formal appraisal and risk management techniques, and few organizations appear to have clear procedures for evaluating ICT. This suggests there is a need for increased attention to be focused upon ex-ante evaluation. Although both ex-ante and ex-post evaluation are of value, ex-post is concerned with the situation after implementation, and any problems identified will already be in a "live setting" and potentially causing negative impacts. Appropriate ex-ante evaluation, while not claimed to be a panacea, will serve to redress this situation, assisting in identification of circumstances that might otherwise remain undetected, subsequently developing into instances of Gibson's (2003) technical or business related failure.

Given the link between ICT and change, and the need for the development of appropriate ex-ante techniques, it is reasonable to argue that we should make use of existing theories of change to assist us to construct approaches to evaluation. This is not to suggest that existing approaches are inapt, but that new approaches can be usefully developed to supplement those in existence.

The remainder of this paper focuses upon such a development – a theoretical framework designed to facilitate qualitative ex-ante evaluation of ICT systems by interpreting the initiative in terms of a series of themes derived from the literature of change and change management.

A FRAMEWORK FACILITATING EX-ANTE EVALUATION OF INFORMATION SYSTEMS

In theory, the aim of change is to facilitate the achievement of objectives by the replacement of some item (such as a, strategy, system, or practice) with a better one (Fullan, 1991). Although management literature is replete with discussions on individual and organizational transformation, no approach appears noticeably more successful than the others (Argyris, 1998). It is not the intention of this paper to portray yet another approach to managing change, but to present a framework that facilitates greater understanding of an given instance of change.

Phases of Change

Early work on change viewed the process as being primarily linear, however, many early efforts were unsuccessful due to failure to match the innovation with the environment. Change is now viewed differently, the emphasis being on the process of introducing change, and the context in which the change will be placed. Such changes are sometimes referred to as *second order* – permeating deep into structure and culture.

Nowadays the change process tends to be viewed as series of overlapping phases; *initiation*; *implementation*; and *institutionalization*. These phases correspond to the *preparation*, *acceptance*, and *commitment* activities of Connor (1992), and also exhibit similarities to Lewin's (1951) much cited work involving *unfreezing*, *changing*, and *refreezing*. The framework for ex-ante evaluation presented in this paper is based upon this three-phase perspective, and is illustrated in Figure 1.
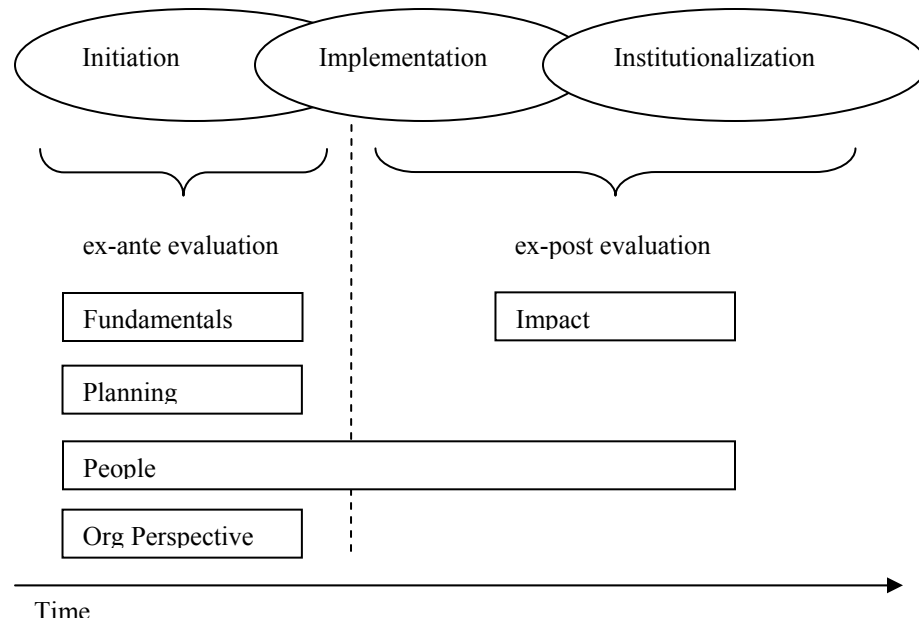

Figure 1. Framework based upon Phases of Change

Initiation is concerned with beginning work, and involves developing commitment toward the innovation.

Implementation is concerned with putting the innovation into action, with a major change often occupies a period of between two and three years.

The emphasis during *institutionalization* or *continuation* is on seeing the innovation integrated into daily life, and no longer considered as something new.

Figure 1 illustrates that ex-ante evaluation takes place largely during initiation (consideration of the people aspects should continue to take place before and after implementation). Although there is potential for overlap in the early parts of implementation, this is limited as the change is in use for most of this phase, and is thus available for ex-post evaluation.

According to Hopkins, Ainscow and West (1997), initiation involves developing commitment toward the innovation, the key activities being to make the decision to commence the process, and to review the existing situation with regard to the innovation. The question of whether to start the process is influenced by a range of factors, including; existence and quality of, and access to innovations; external and internal support; availability of resources such as adequate funding; quality of the environment provided by the organization. Fullan (1991) suggests it is the combination of these factors that is important rather than their mere existence, the best initiations exhibiting "*three R's of relevance, readiness, and resources*". Relevance includes the interaction of the need and clarity of the innovation, and what the innovation is perceived to offer. Readiness concerns the organization's capacity to develop and exploit an innovation, whereas resources involves the aggregation of and provision of adequate support for the innovation. Hopkins *et al.* (1997) and Fullan (1991) recommend that a combination of the following make for successful initiation: strong advocacy from those who understand and support the innovation; need; active initiation to start the process; a clear, well-structured model for proceeding.

Fundamentals

Motivation for Change

Pressures to change can emanate from a range of sources, and are part external and part internal. External pressures may be viewed as economic, social, technological and political, while Reddin's (1975) motivating factors may be viewed as internal

pressures. We may also differentiate between mandatory and voluntary change, a distinction held by Becher and Kogan (1992), who in referring to planned and unplanned change, combine aspects of the debates on internal/external pressures and voluntary/mandatory change. Unplanned change (which tends to be accepted rather than actively opposed) occurs when external forces impose adjustment upon an organization. Planned change generally originates from higher levels within an organization, is often in response to environmental pressures, is based on coercion, and is more likely to arouse conflict or contention than unplanned change.

Value and Feasibility

Fullan (1991) extends the discussion of motivation for change by raising two fundamental but complex questions; who benefits, and how sound or feasible is the idea/approach? These themes of value and soundness can be extended to include consideration if the sources of change are to be trusted on the grounds of who benefits or apparent feasibility. Fullan (1991) argues that not all change constitutes development, and the merit of change cannot be taken for granted. We should strive to find the meaning in innovations, and be suspicious of those that do not make sense.

Subjective and Objective Meanings

The discussion of the meaning of change can be extended to include subjective and objective meanings. From the subjective perspective, those most affected often have least motivation to believe in change, as they often perceive that there are few incentives, and potentially large costs involved in finding out whether a modification is worthwhile.

From an objective perspective, change may be defined as being multidimensional, involving possible use of new materials, new approaches, and alteration of beliefs. For authentic change to occur, it must occur along all three of these dimensions.

Planning Issues

According to Leavitt (1964), change can generally be induced by affecting one or more of five variables; people, structure, technology, task, culture. However, there is no generally accepted theory to explain the change process, nor any well-validated prescription for bringing it about. Management literature is replete with discussions on transformation, and numerous accounts have been proposed as to how change may be implemented. Much material appears to represent variations on a similar theme (although the terminology used differs), and according to Argyris (1998), none appears noticeably more successful than the others. Clarke and Meldrum (1999) criticize top-down approaches to change whereas Fullan (1994) offers a more refined view, arguing that neither top-down nor bottom-up strategies work in isolation, and a more sophisticated blend of the two is required.

People

Change has the potential to complicate life for people, regardless of its motivation, desirability, or method of implementation. Indeed, Fullan (1991) argues that all real change involves loss, anxiety, struggle, uncertainty, being lost, and confronting more information than can be handled. The impact of change on individuals, and the meaning that individuals give to their involvement in the change process has also been given much consideration in the literature. Harris (1989) describes how change can cause temporary confusion, and that persons respond to change more positively when they have understanding of its purpose and consequences. Nanus (1992) points out that change may alter long-standing working relationships, and argues that we "*fear the unknown*" often with very good reason. This theme is echoed by Hopkins *et al* (1997), who describe the experience of change as being "*individually threatening and disconcerting*". Upton and Brooks (1995) describe change as being by its very nature, "*destabilizing, as 'givens' disappear and long-held beliefs become questionable*".

The Organizational Perspective

Taking into account the protean character of change and the complexity of the phenomenon, it is scarcely surprising that change may be viewed from a number of perspectives. This section discusses change from three organizational perspectives; technological, political, and cultural. There are however, other viewpoints and approaches to the categorization of change, many of which overlap with those discussed here - for instance those which suggest analyzing from the perspectives of innovation *per se*. It is important to acknowledge that no single perspective of the change process has a monopoly of the truth, and that the use of multiple viewpoints can provide a valuable lens through which to view the change process.

The technological perspective assumes a rational view of the world, and portrays change as being predominantly sequential and instrumental (Becher and Kogan, 1992). Although some authors distinguish between coercive, rational and persuasive strategies, their perspective is primarily one in which change is carried out according to a pre-ordained plan. The

technological perspective remains the strategy most used by centralized organizations (Hopkins *et al*, 1997), being illustrated by the Research, Development and Diffusion (RD&D) model which consists of a series of stages involving a centre-periphery tactic.

Political perspectives assume the existence of alternative and competing rationalities (Slater, 1985), and this central position of contention suggests that in many situations, predicting reaction to change is relatively straightforward. Indeed, management may employ different approaches to gain the support of various groups and individuals - the term *micropolitics* is often used to describe the tactics used to seek power and influence to further interests.

The cultural perspective of change may, according to Hopkins *et al* (1997), be viewed as the antithesis of the technological perspective. Models of change adopting a cultural perspective are concerned with the social settings in which the innovation occurs and demonstrate commitment to the everyday reality and cultural norms that are disturbed when innovation threatens.

RESEARCH METHODOLOGY

Research Strategy

As the purpose of this study was to appraise the usefulness of the framework in ex-ante evaluation of change, we employed an interpretive case study approach (Orlikowski and Baroudi, 1991). The case study is the method of choice when the phenomenon under investigation (in this case, the instance of change) is not readily distinguishable from its context (Yin, 1993). The unit of analysis facilitates comparison of results with those from cases that focus upon the same unit of analysis (Yin, 1993), and given that our aim was to assess the validity of the framework (and implicitly gauge potential for generalized use), the unit of analysis was the change initiative. The study was conducted in a public-sector organization replacing its financial system (hence implementing changes to its information systems infrastructure and working practices). Details of the organization have been anonymized in order to disguise the research site and protect the positions of participants.

Data Collection

Gaining access to an organization can be a combination of good luck, strategic planning and hard work (Bryman, 1989), and in the case of this research, it was a combination of all three elements. One of the authors had been employed by the organization for nine years, and thus had relatively open access. In total, three months were spent "in the field", carrying out observation (which Patton (1990) suggests permits the understanding of events to an extent not possible through interview alone), semi-structured and informal interviews, and analyzing documents. Approximately 10 meetings were observed, and 30 semi-structured interviews conducted (in addition to informal interviews). Interviews conducted with a range of operational and support staff, across all grades. Documents analyzed ranged from minutes of meetings to individual memos and e-mails. At all times during the field work, the emphasis was on gathering data that related to the framework, and hence focused upon gaining understanding of the motivation, value, meaning, planning aspects, organizational perspective, and people aspects of the change.

Data Analysis

Data gathered during the interviews were used to create detailed accounts of the initiation period from user and management perspectives. These accounts were then used to develop a series of role-ordered matrices which summarized the perceptions of the participants within each of the components of the framework. The matrices were combined with data gathered from observation activities and documents in order to develop a deeper understanding of what actually occurred during the initiation phase of the change. In order to reduce researcher bias, both data and investigator triangulations were used (Patton 1987) to increase the robustness of results.

APPLYING THE FRAMEWORK: EVIDENCE FROM A CASE

Initiation – general comments:

Initiation is concerned with agreeing an agenda, beginning work, and developing commitment toward the innovation. In this case there was little *visible* evidence that active initiation had taken place, and no evident advocacy (or project championing) from senior staff. This low-profile approach appeared to be accompanied by the lack of a project plan. However, investigations revealed that a comprehensive plan did exist, but users were unaware of it.

There was indication that key factors identified by Hopkins *et al* (1997) as being necessary for successful initiation were present; The organization had access to quality innovations (in terms of a system that suited its needs), enjoyed internal

support from senior management, and a suitable environment (in terms of technical infrastructure and user skills-base) existed. In terms of Fullan's (1991), three Rs of relevance, readiness, and resources, ex-ante evaluation raised a number of concerns. The need for the new system (relevance) was not made clear to users. This left much of the user-base viewing the new system with cynicism some time before it was introduced. The organization's capacity to develop and exploit the innovation (readiness), was not in doubt (despite the lack of support from the user-base), neither was the issue of resources. Therefore although the change initiative appeared well placed to succeed in terms of readiness and resources, some concerns existed over relevance.

Fundamentals

Motivation

Despite senior management being of the opinion that the change was motivated by technical needs (therefore representing an instance of Becher and Kogan's (1992) unplanned change) remarkably, none of the user-base appeared aware of the reasons for the introduction of the new system. This resulted in a majority of users viewing the project as planned change (Becher and Kogan, 1992) and (as this form of change is often associated with conflict or contention) consequently becoming suspicious of the development.

Value and Feasibility

Value and feasibility were unclear to users, and as became apparent during our investigation, to all within the organization apart from a small number of members of senior management. Suspicion among staff toward the project was a clear manifestation of a group adopting Fullan's (1991) philosophy that we should judge changes in terms of who benefits and apparent feasibility, and be apprehensive of those that do not "make sense".

Subjective and Objective Meanings

The project resulted in new materials (the system) and approaches (working practices), but there was little evidence of altered belief. Thus, from an objective perspective, the change was not fully embedded (a second order change), but given the relatively early timing of the study (in change management terms), this finding was unsurprising. The subjective meaning of change is aligned to the views of those most affected, as they often perceive there to be large costs involved in finding out whether a modification is worthwhile. Results from ex-ante evaluation indicated that users were unconvinced of the merits of the new system.

Planning Issues

Management employed a detailed plan which was top-down in nature. Notwithstanding criticisms of Clarke and Meldrum (1999), this was not a noteworthy drawback despite the fact that it reinforced the view that the project was an instance of planned change. However, the period chosen for going live coincided with major organizational restructuring, which resulted in users adopting the view that management were either not fully in control, or that there was a hidden agenda. Extensive debate took place within the management team over whether the timing was appropriate, with a strongly-held view that such timing could undermine the success of the project. However, the project leader disagreed even though he conceded that there was little time available for training and familiarization with the new system.

People

Lack of consultation and poor communication throughout this project indicated that the people aspects were almost entirely ignored. Although management claimed they maintained channels of communication via meetings, memoranda, newsletters and e-mails, the user base claimed they were kept uninformed, and as a result, experienced many of the negative emotions (including anxiety, uncertainty, confusion, shock, and denial) described in the change management literature during this period.

Three areas appeared to cause particular discomfort for the user population; training, communication, and planning. Training was criticized in terms of the limited amount available, the restricted scope, and the large group sessions. Timing of training was unfortunate in taking place some weeks after the system went live.

Users criticized communication in terms of both timeliness and use. Although management attempted to keep staff informed, their efforts did not appear successful. Management admitted that they were overwhelmed at times by the effort required in keeping users informed of developments.

Many problems encountered during the project (including training and communication) can be partly attributed to the planning process, and to the pressure to meet deadlines. Although there was awareness of the organizational restructuring project, there was no evidence that this had any impact on the timing of the finance project. Indeed, the attitude of the project leader in refusing to consider alternative timescales (thus avoiding a clash with the implementation of the restructuring procedures) is questionable.

Organizational Perspective

The organizational perspective adopted was closely based upon the RD&D model, hence a primarily technological perspective of change was adopted. This use of a centre-periphery model was unsurprising, given that it represents the strategy used by most centralized organizations when implementing policies (Hopkins *et al*, 1997).

DISCUSSION AND POST IMPLEMENTATION COMMENTS

Results from the ex-ante evaluation indicated that the project did not exhibit any major causes of concern, neither the technology nor business related problems identified by Gibson (2003) being evident. Indeed, senior management appeared to conduct much of the initiation process in a thoughtful and diligent manner, thus increasing the chances of success.

The lack of a visible initiation event, project plan, and advocacy contributed to different perceptions of the project being held by management and the user base. While management implicitly viewed Fullan's (1991) three Rs of relevance, readiness, and resources as being in place, the user-base did not accept the relevance of the project - an issue that at least in part can be attributed to a lack of communication between management and users. In this ex-ante evaluation, poor communication is a continuing theme, the framework highlighting poor management of the people aspects as giving most cause for concern. Indeed, a lack of information provided to users can be seen to be a direct or indirect cause of the majority of difficulties experienced during the initiation.

Concerns (from the user perspective) included a lack of awareness of the motivation for change, unconfirmed value and feasibility of the new system, a lack of apparent relevance of the proposed change, unproven subjective meaning of the project, and the apparent lack of sensible planning. Given these issues, it is understandable that discontent developed during initiation.

In summary, ex-ante evaluation indicated that initiation was successful, but that implementation would not proceed without incident due to high levels of resistance among users. This indeed proved to be the case as although the system was implemented on time, it was subsequently viewed with cynicism and skepticism for some time. User resistance could have been much reduced had the people aspects of the project been managed appropriately.

We previously argued in this paper that appropriate ex-ante evaluation may serve to assist in the identification and correction of circumstances that might otherwise remain undetected and subsequently develop into instances of Gibson's (2003) technical or business related failure. We also posited that we should make use of existing theories of change in assisting us construct approaches to ex-ante evaluation in order to supplement those already in existence. We conclude this section by arguing that the theoretical framework we have presented may be usefully employed to carry out qualitative ex-ante evaluation of ICT systems by interpreting the initiative in terms of change and change management themes. The example presented in this paper illustrated the value of the approach when applied to a real world situation, identifying the key areas of concern, and correctly predicting that despite insistence from the use-base to the contrary, the project would be implemented successfully.

CONCLUSIONS

Given the integral position of ICT in organizational processes, and the fact that most organizations are now fundamentally dependent upon their ICT infrastructures and the systems they support, effective ex-ante ICT evaluation is clearly an important activity. This, coupled with the view that true business benefit from ICT occurs only when ICT investment is accompanied by necessary business change suggests that it is highly appropriate to exploit the literature on change when developing new approaches to ICT evaluation. This paper presents has presented such an evaluative framework, being based upon theories of change and corresponding to a three phase model of change implementation. We have endeavored to test the validity of the framework by applying it to a real-world instance of systems change. Results indicate that although the framework is not a panacea (and we recognize the limitations of a single study), it can assist in identifying areas of concern that have routinely caused problems in change management projects. In the example case provided, use of the framework identified key areas of concern and correctly predicted that the project would be implemented successfully. Given that our

aim was to assess the validity of the framework and gauge the potential for generalized use, we are currently working in applying the framework to further scenarios. Results obtained to date are encouraging.

ACKNOWLEDGMENTS

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