A new framework for managing IT-enabled business change

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Abstract. *Although information systems and technology (IS/IT) investments have always caused varying degrees of business change, the main purpose of many of today's IS/IT implementations is to change the business and/or organization in some significant way. However, most organizations' approaches to managing IS/IT developments have changed little in the last 15–20 years and are heavily dependent on methodologies of IS/IT development and associated project management principles. The philosophy being adopted by many organizations today is that there are few IS/IT projects (some infrastructure investments only) that do not cause business changes and therefore they are really 'business projects involving IS/IT'. This exploratory research set out to devise a new framework for 'IT and change' management, which is more appropriate to today's realities than traditional approaches. The initial framework was derived from 'first principles', then adapted and further developed by applying and testing it in a range of real projects in organizations. This paper summarizes the results of that work.*

Keywords: Change management, IS/IT, project management

INTRODUCTION AND OVERVIEW

The work described here was instigated in 1997 after the completion in 1996 of a 3-year programme of research and development on the topic of 'Managing the Benefits of IT'. 'Benefits management' was defined as 'the process of organizing and managing such that the potential benefits arising from the use of IT are actually realized'. Before 1997, a new process, adapted from TQM concepts, was devised and tested in the sponsoring organizations. The work was based on the premise that IT alone delivers few benefits — the benefits mainly arise from changes made in processes, activities, working practices, structures, etc. that IT enables. The results of that earlier work have been published as Best Practice Guidelines (Ward & Murray, 1997) and in practitioner reports (e.g. Ward & Taylor, 1996). During that earlier research, a major survey of 60 large organizations (Ward *et al.*, 1996) identified that less than 10% of the organizations had in place a comprehensive benefits management process, and that few organizations planned for and actively managed the business changes throughout the

investment lifecycle; change management activity was usually instigated when the IT component was delivered, in reactive rather than proactive mode. This was a major reason for low realization of the potential benefits available or even the more limited set of benefits used in the investment justification. The fact that only 25% of organizations regularly review the benefits delivered at the end of developments implies that active benefits management is not encouraged in the majority of organizations.

Parallel research (McGolpin & Ward, 1997) of factors affecting success in 'strategic IS' investments identified benefits management processes as a key differentiator between success and failure. That research also identified the pre-existence of an organizational 'change management' approach, not particular to IS/IT investments, as equally important. This last conclusion was also supported by research into business process redesign practice (Braganza & Myers, 1997).

Following this earlier work, the 'IT and change' research project set out to gain a better understanding of the issues affecting the outcome of IT-enabled change initiatives and to develop and test a change management framework for increasing the potential for success in a variety of change contexts.

This paper summarizes the results of that research, carried out in 1997, during which a new management framework was developed and tested by studying the realities of three large, complex projects in sponsoring companies as well as documented case studies (e.g. Jelassi *et al*., 1994; Dhillon, 1997).

THE NEED FOR NEW THINKING

That IT has a key role in enabling business change is well established (see, for example, Zuboff, 1988; Davenport & Short, 1990; Venkatraman, 1991; Teng *et al*., 1994). Earl (1992) argues that real business benefit only arises when either IT investment is supplemented by other business changes or business change drives combined investment in IT and other resources. To quote Earl, 'in the successful change projects, IT may have been the key enabler, but the business benefits derived from understanding the business, committing it to change, and aggressively pursuing the end not the means.' IT can, therefore, relate to the business change at a number of levels:

- the change may need IT to *initiate* it — i.e. it creates the opportunity for change;
- the change may need IT to *facilitate* it — i.e. it is an integral component of the change;
- the change may need IT to *support* it — i.e. it is required to effect the implementation of other changes; *or*
- IT may cause unexpected changes to occur!

The purpose of the research was to study the particular issues of IT-based change initiatives and create a specific framework for IT and change that is more than a subset of change initiatives in general, i.e. to address the questions 'what is different about IT-enabled change and how might the involvement of IT affect the nature and outcome of the change?' and therefore 'are new concepts and tools needed to deal with IT-enabled change initiatives?'.

In particular, the research project focused on how existing approaches, methodologies and techniques could be blended together to address the management issues across all the facets of IT-enabled change projects. Earlier research on benefits management (Ward *et al*., 1996) had identified that many organizations felt that existing methodologies [e.g. project management (69%), systems development (75%), investment appraisal (70%), etc.] were not effective in ensuring IS/IT investments were successful (the figures refer to the percentage of organizations *not* satisfied).

We should not necessarily conclude that such methodologies are inadequate *per se*, but that they may not always be used successfully or in the right context. A possible reason is that they are approaches developed by the IS/IT community to enable IT-based systems to be implemented successfully (i.e. to conform to specification, cost and time targets) rather than embrace the totality of issues to be managed if sustained beneficial change in the business or organization is to occur (Earl, 1992). They are primarily used to reduce the chance of investment failure and are important in that role (Willcocks & Margetts, 1994; McGolpin & Ward, 1997) to reduce the risks of producing inappropriate application content. However, as Willcocks & Margetts (1994) explain, 'methodologies' do not deal with many risks inherent in the 'context' of the investment. More comprehensive methodologies, designed to address the inception stages of investments more effectively (e.g., ETHICS, MULTIVIEW and soft systems) can improve the process but still focus on 'content', albeit a wider concept of content, rather than business and organizational context.

Benefits management methods, which relate outcomes to business changes needed, address the context issues to some degree and certainly engage the business managers in the process more effectively than most IS/IT development methods. Indeed, a number of organizations have used benefits management initially to *stop* projects that would not have delivered identifiable benefits. This in itself reduces the risk associated with other concurrent projects and increases the overall net contribution achieved from IS/IT investments.

The organizations who sponsored this research already used a range of methodologies, but needed to understand how to use them in combination to increase success in ever more complex projects and also to find ways of bridging the gaps among them. During the research, some 25 different types of methods/techniques were identified and assessed in theory and practice (where possible) in relation to the framework as it evolved (for a summary, see the Appendix). The aim of the research was not to supplant existing methodologies but rather to provide a broader framework in which they can be deployed to best effect.

A starting point for the research was the proposition that existing methodologies have particular limitations when applied to projects involving a significant degree of change to the business. Clarity about the nature and source of these limitations emerged as the research proceeded and their removal eventually became the foundation of the new framework (Elvin, 1999). The essential aspect of the new approach was a change of perspective from one that is primarily concerned with engineering an IT application to one that brings about prescribed change in the state of the business.

The framework was derived from 'first principles', based on an understanding of what needs to be done to create effective business change. In developing the framework, a terminology was

used based largely on soft systems and benefits management definitions because these seemed to address the range of concepts most coherently and ensured that the research started from 'first principles' in studying the projects rather than from a base of the unwarranted assumptions, perceived to be implicit in IT methodologies.

THE ENVIRONMENT OF CHANGE — CONCEPTS AND TERMINOLOGY

This section describes the terms used in the 'IT and change' project. A 'rich picture' of an IT and change project is shown in Figure 1. In this picture, an organization is seen as a dynamic system operating in its social or economic environment to achieve its stated ends. Within the organization, day-to-day activities take place to satisfy the organization's social or economic purpose. The nature of its activities is continuously evolving as the organization constantly adapts to changes in its environment.

A need for change arises when the current actual state of an organization is seen to be problematic, or will become so at some time in the future if no action is taken to address the situation. Missing or not yet grasping an opportunity is in this sense a 'problem'. The people concerned (the 'owners') therefore have an intent to take action to address the problem. The action taken will be exceptional in that it will be over and above the normal day-to-day activities of the organization — an intervention intended to deflect the organization from its 'natural' course of evolution into a new and different state in which the problem is perceived not to exist. A new state of the organization is the intended outcome — the 'ideal future situation'.

The intervention will consist of a set of actions designed to give rise to the required outcome. The owners will not generally carry out the actions personally but will empower a secondary

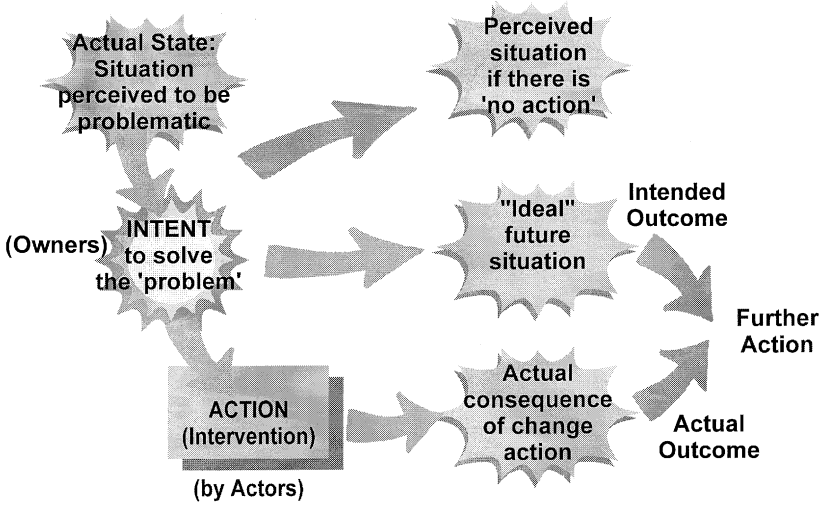

Figure 1. IT and change — a rich picture.

group (the 'actors') with that responsibility. In deciding which actions to initiate, the actors will consider what has to be changed (i.e. the content of change) and the means by which the changes are to be effected (i.e. the process of change).

The current state of the organization is the context in which the intervention is conceived. The organization has a history and exists within an external social and economic environment. Thus, at its inception, the intervention has a context that has three components:

- historical events giving rise to the current state of the organization;
- internal state of the organization;
- external environment of the organization.

However, once initiated, the intervention begins to change the organization and therefore its own context. Moreover, the context will evolve during the course of the intervention. Hence, the intervention and its context are mutually interdependent, and if the outcome is to be predictable the interaction between the intervention and its context needs to be understood.

The content of change is the set of actions under the direct control of the actors. However, a successful intervention may require, or depend on, changes taking place in the context. The actors cannot enforce such changes, but will need a means by which influence can be brought to bear to ensure that the changes take place as required.

The changes that the intervention brings about will impact on various people in the organization and possibly external parties (the 'stakeholders'). These will form a broader community than the owners and actors and it is not safe to assume that all stakeholders will be positive about the changes or see the changes as beneficial, even if they are from a broader organization perspective. Some stakeholders may have the power to resist the changes or, at least, reduce the effectiveness of the intervention. This is a critical aspect of change management in general, and although the framework includes 'stakeholder analysis' techniques (after Benjamin & Levinson, 1993) it was not feasible to study all stakeholder behaviour in detail in this research.

THE NATURE OF IT AND CHANGE INTERVENTIONS

An initial conceptual model was derived from the strategic change work of Pettigrew & Whipp (1991), considering their three dimensions of content, context and process. This was adapted to match the particular nature of IT-enabled change as described above, and the model used during the study is shown in Figure 2.

The purpose of an intervention will be to specify and effect the content of change that delivers an outcome that satisfies the intent. This will be achieved by the process of change. The objectives of the intervention will be to achieve particular observable and measurable characteristics of the outcome (the benefits) that are perceived to satisfy the intent. These relationships are summarized in Figure 3 and were derived from earlier benefits management research (Ward & Murray, 1997).

A successful intervention will be one in which the process achieves the intent by appropriately reconciling the content, outcome and context. Whereas all types of intervention will eventually

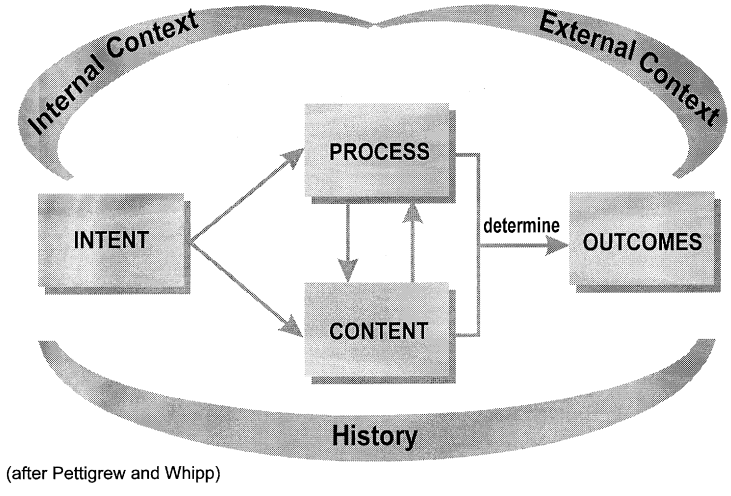

Figure 2. A change model.

have to converge on implementing both business and IT content that will deliver the intended outcome, their starting points and therefore the process adopted may vary considerably.

Although in essence all requirements for change derive from the organizational context, three sources of intent can be identified characterized by what is known at the outset of the intervention:

- context driven: the reason for starting is clear;
- outcome driven: the goals/objectives are clear;
- content driven: what has to change is clear.

(Content is either or both business activity/process and systems/technology.)

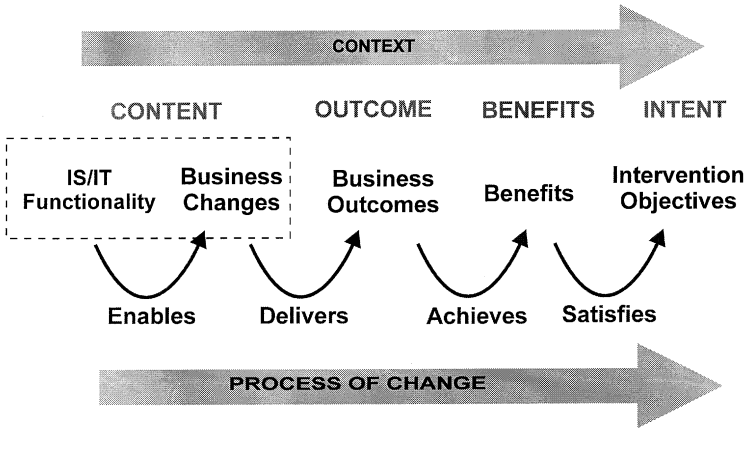

Figure 3. Satisfying the intent.

The origins of the intent should influence the process by which the intervention will be carried out. In many cases, the intervention will have a mixed source of intents — or will appear to have — and it is important to clarify and agree the nature and origins of the intent early in the intervention process.

Context driven

This type of intervention arises out of the view that something in the business and/or organization is 'not right' and needs to be improved. There may be no driver other than the feeling that 'we have to do something'. Initially, the outcome and both IT and business content may well be very vague.

The intent will be driven by the need to remove the 'problem'. Therefore, in the initial phases of the intervention, the focus will be on visualizing an outcome in which the 'problem' ceases to exist, followed by an identification of the content that will deliver the outcome, subject to the sensitivity of the context.

Examples of this type of intervention are restructuring, relocation or business re-engineering initiatives, which will affect and be affected by the existing IS/IT and planned investments. One of the projects studied, a new management control system to make a major restructuring effective, was primarily context driven

Outcome driven

These interventions are driven by a clear vision of the outcome and are often opportunity seeking. With this clear vision, the intervention can focus on identifying the content of the change that will deliver the outcome subject to its viability in the context.

An example of this type is one of the projects studied in this research: a new planning and control system to improve the return on investment of advertising and promotion expenditure.

Content driven

In this case, there is a need to do something in a different way; consequently, the content of change is clear. The need may be driven by external factors, such as legislative changes or the removal of support for existing, obsolescent equipment, or by internal drivers, such as a need to move to new technology. When the focus of attention is so strongly on the content of change, the benefits may be much less clear and the outcome may be vague or undefined. The key questions will therefore be about the sensitivity of the intervention to the context and an analysis of what will be the likely outcome.

The 'year 2000' problem, many infrastructure projects and application replacements fall into this category. The third project studied, the replacement of old retail branch systems with more modern technology, was essentially of this type.

CHARACTERISTICS OF THE INTERVENTIONS — EVIDENCE FROM THE CASES

The three projects can be summarized as follows, although the details are confidential.

Project A involved the introduction of an organization-wide accounting and control system following a major rationalization and centralization programme after privatization. This involved the replacement of a range of existing (incompatible) systems by a large software package and was accompanied by a major process redesign exercise to make the new organization structure effective. This was a *context-driven* project primarily because of the prior restructuring and downsizing programme, but clarifying the outcome and content aspects were critical issues.

Project B was a Europe-wide implementation of sales and marketing package software to provide a manufacturing company with a more competitive, integrated approach to focusing sales and marketing expenditure on the most profitable segments of a large, changing market. This project was primarily *outcome driven* — specific areas of benefit were targeted — but success required considerable business change as well as new technology and systems.

Project C was in essence a simpler project, primarily *content driven* in that the main component was the replacement of old branch retail systems, but there was also a corporate need to obtain better control across the retail network. The project involved high-cost technology investment and the intention was to obtain 'significant' business benefits, although it was never entirely clear what these were or how they were to be obtained.

The research method was essentially a participative, longitudinal study, although there was an element of action research because the organizations (sometimes) acted upon the understanding gained as the research progressed. The authors attended project progress meetings in the organizations, reviewed project documentation as it evolved, and recorded occurring issues, events and decisions in relation to the framework components. Four focus group workshops were held during the research, attended by the case study project managers, at which the project experiences and evidence were compared and synthesized, and from which the framework components and relationships were developed and refined. Initial review of published cases (e.g. Jelassi *et al.*, 1994; Dhillon, 1997) had elicited substantive issues of relevance to the framework development. Many of these had also been identified in the previous benefits management research (Ward *et al.*, 1996).

The projects were studied in parallel for between 8 and 10 months during 1997, and the report for the sponsors was produced in November 1997. One of the projects was still not fully implemented at that date because of delays outside the control of the project (contextual issues!). None of the projects was completely successful, although in each case some benefits were achieved.

In each of the projects studied, the understanding of the nature and source of the intent was in reality far from clear, and in all cases the standard process adopted altered the nature of the intervention in order to fit the process, and in doing so failed to deal adequately with issues affecting success.

More specifically, a number of problems could be seen in most of the cases studied.

Combining the business and IT knowledge sets

In all interventions, a successful outcome will depend on matching the need for business changes with the development of IT functionality. The interdependency between the business activities and the IT application prevents the business and the IT content being dealt with separately and independently. It is this very interdependency that, according to Morris (1996), gives IT-based change initiatives their particular characteristics and hence difficulty. The knowledge of the content of the business processes and IT activities resides in different constituencies, and that there has often been an historic lack of empathy between the business and IT professionals needs to be recognized. All of this makes it difficult to combine the knowledge sets needed to envisage and realize a successful outcome and, if not managed, leads to fragmentation of the content of change into two disconnected streams of activity. This fragmentation occurred in all three projects, in spite of attempts to set up project governance structures that were intended to reconcile and combine the business and technical knowledge sets.

IT content dominates the process

The size and complexity of the IT content can dominate the intervention and force a content-driven approach to the intervention, even when it is essentially context driven or outcome driven. This is particularly so if the IT actors become introspective and lose sight of the intervention's intent and objectives. The sum of the content will then fail to deliver the expected outcome. Thus, the process needs to be adjusted so that these issues and tendencies become visible and are therefore addressed as they affect the course of the intervention.

This content domination emerged in all three projects. In the retail system, unsurprisingly, it drove the project from the beginning. In the other two, it developed more slowly, based on the increasingly urgent need 'to specify requirements' in order to utilize IT resources effectively within the project timescale.

Different views of a 'successful' outcome

Although the nature of the contribution of IT content will vary in the overall scope of the changes, achieving a successful outcome for the intervention will always depend in part on implementing appropriate technology (hardware, software, applications, etc.). Satisfying the intent requires conformance to business requirements in both design and performance. However, for many projects a successful outcome has been seen only as producing a 'system' or providing technology, not as its beneficial use in the organization. Whereas in two of the projects success was clearly understood by all as more than an IT implementation, the IT components proved more complex than anticipated, causing both IT and business staff to focus on resolving technology and system issues and neglect the other change requirements on which the benefits depended. Attention to the benefits was only resumed once the IT content was largely implemented.

Whether the original need for change was context, outcome or content driven, the process for

managing the intervention is often biased towards the IT content — focusing on the technology's attributes, performance, IT resources, costs, etc. The intervention becomes unbalanced, with non-technology issues being neglected until the IT content is complete, i.e. it drifts into being content driven for most of the intervention. This can lead to an IT solution that is inappropriate owing to changes in contextual factors or the perceived most beneficial outcome, such that the intent is at best only partially satisfied.

Dealing with uncertainty

Even if it is possible to envisage an outcome that will satisfy the intent, there is no guarantee that the specified content will deliver the outcome or that, by the time it is delivered, the outcome will be the right one for the context at that time. Consequently, the process of change needs to be adaptable to cope with an evolving context and to incorporate periods of learning to overcome shortfalls in the state of the organization's knowledge.

Nevertheless, the intervention is expected to satisfy its objectives and associated time and cost criteria. Overindulgent learning can generate out-of-control activity with consequential spiralling cost and timescales. The process of change must have the right balance between *learning* and *control* to ensure that the learning that occurs is only that which is necessary to deliver the required outcome (unless learning is — or becomes — an integral aspect of the intent).

Conventional project management is a powerful tool, but it has a limitation when applied to organizational change initiatives. It is essentially a control tool that depends on an assumption that all knowledge about the 'goals, ways and means' of the project, task or activity can be gathered before action is taken. It relies on the application of control through a negative feedback loop to enable the process to converge upon the predefined deliverables. To be used effectively in organizational change situations, it needs to be adapted to incorporate learning processes to complement its control process (see Figure 4).

In an 'ideal world' of perfect transformations and static context, the project plan would consist of an ordered set of activities, which when carried out would deliver a content that would bring about the intended outcome. The project manager would only need to control the vagaries of the human element of the plan to ensure that the intent was satisfied. This is represented by the lower part of Figure 4. Unfortunately, the world is less than perfect, and the design process by which the intent is transformed into the content via the envisaged outcome is less than ideal. In the upper part of Figure 4, mode 1 learning occurs with the realization that the planned content is not going to bring about the desired outcome. A response is then to modify the planned content to one which is more likely to do so. Mode 2 learning occurs when it is realized that the planned outcome will no longer satisfy the intent or when the intent itself has evolved. In this case, it becomes necessary to review the whole basis of the intervention.

Many of these problems, observed in all the cases, resulted not just from an unsuitable intervention process but especially from inadequate or inappropriate involvement of the key stakeholders, often as a result of a lack of clarity of roles in the process. This was true even in case B, where the organization was using the benefits management approach on a strategic

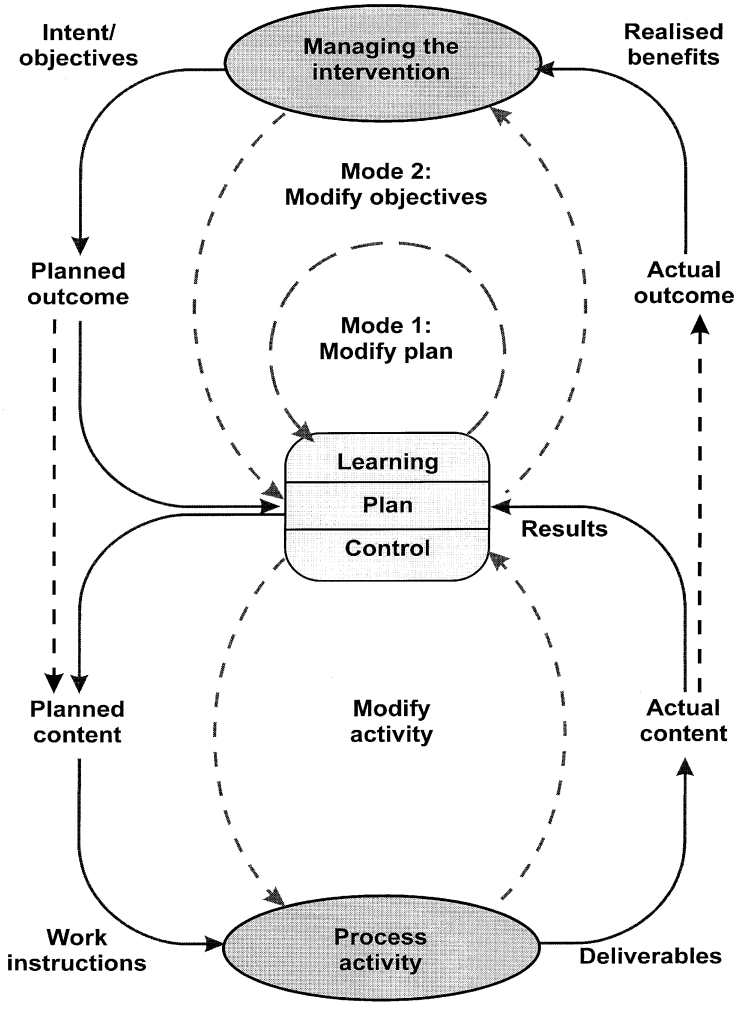

Figure 4. Learning and control.

project in which business, IT and steering group roles were clearly defined, on paper at least. In particular, the complexity of the business content, in which significant organizational and process changes had to be designed, demanded far more effort and time than the business managers expected. The IT content could, therefore, not be finalized, and incorrect assumptions were made to avoid cost and time overruns. This led to considerable later rework. Most significantly, the steering group failed to interpret and address a number of contextual issues which emerged during the project. This forced a major reassessment of the scope of the project in relation to other strategic initiatives, again leading to significant delays and costs.

THE MANAGEMENT FRAMEWORK

Underlying principles

The framework described in outline below was developed to address both the conceptual issues identified and the actual problems that occurred during each of the projects studied. In particular, it had to:

- recognize that the three sources of intent gave rise to different starting points for the intervention;
- provide for the intent of the intervention to be articulated and understood, and ensure that a process was constructed that was able to satisfy the intent;
- enable the appropriate ownership of the required outcome and content to be accepted by stakeholders who were willing and able to ensure that they were achieved;
- allow for the interdependence of and co-ordination of the four streams of the intervention (context, business content, IT content and outcome) via the process adopted;
- be able to apply learning and control in the appropriate balance throughout the lifecycle of the intervention.

Framework model — introduction (see Figure 5)

Although the components are linked in a linear fashion and the 'arrow of time' provides a sequential driver, the interdependence of context, outcome and content will require a degree of back-tracking among the components to ensure that the intervention maintains a proper balance across the four streams of activity.

The project report to the research sponsors provided detailed guidance on how to manage the intervention at each stage through the lifecycle, e.g. what is involved, tools and techniques to use, outputs, etc. There is not space to include all that detail here, but the full report is now available and researchers interested in this topic can obtain a copy. The main purpose of each of the stages in the framework are described below, with a brief overview of some of the new concepts.

A number of factors affecting the outcome that recurred in the cases studied are given in tables at the end of each section. The factors were derived from previous literature (see Appendix for key sources), but were realigned to the framework based on their actual relevance to the cases.

1. Determine the intent

The purpose of this stage is to determine why change is needed, to set realistic expectations about potential outcomes and to gain commitment to the intervention. This requires an understanding of the drivers for change and whether they originate in the context of the business, are to achieve particular performance improvements/outcomes, are due to business or IT content problems/opportunities, or are a combination of these. In particular, it is critical to

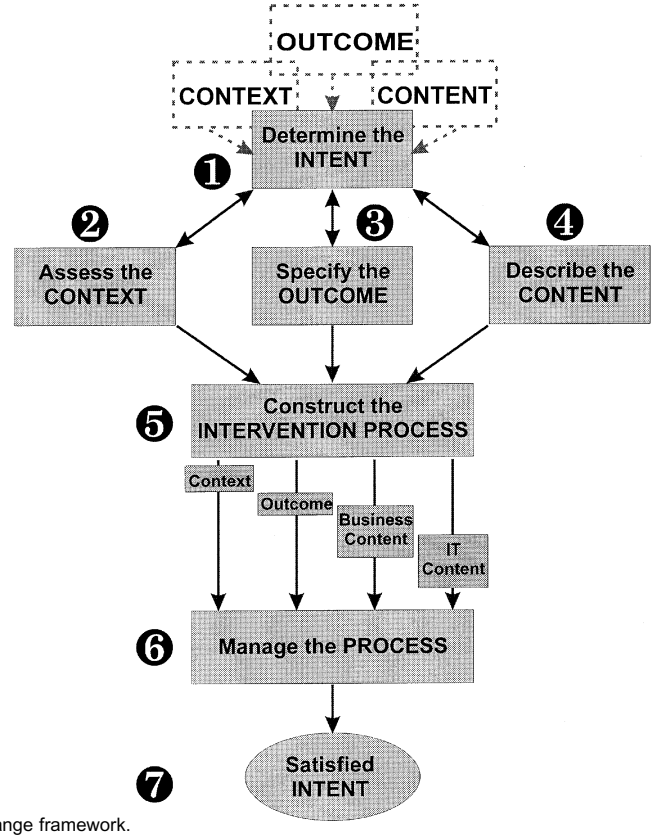

Figure 5. IT and change framework.

determine the degree of dissatisfaction with the current situation as perceived and agreed by the key stakeholders. From this analysis, objectives for the intervention can be set, commitment to action obtained and the appropriate set of activities put in place to carry out stages 2–4.

The best sequence for carrying out stages 2–4 depends on the primary driver (context, outcome or content). From the research evidence, the suggested best sequence is as follows, although it is recognized that it will be an iterative process in order to achieve a comprehensive balanced view.

Context driven

The starting point is a clear understanding of why the intervention is needed. The next step should be to clarify and specify the outcome required and then to describe (i) the business content and (ii) the IT content of the changes needed to achieve that outcome. The process

should then return to reassess the results of these against the context within which the intervention was initiated.

Sequence: *context* to *outcome* to *content* to *context*.

Outcome driven

Knowing the overall outcome required, the next step should be to define the detailed benefits implied by the specified outcome and the business changes needed to deliver those benefits. The process should then consider the various stakeholder perspectives on the range of benefits received in relation to the extent of business changes implied — assess the context before describing the content of the business and then IT changes in detail.

Sequence: *outcome* to *context* to *content*.

Content driven

Whether the content is primarily business or IT, the next stage should be to define the outcome expected or required from the changes, which will relate the changes to the benefits that should result. The process should then assess the context within which the outcome and content have to be delivered before finalizing the scope of the content.

Sequence: *content* to *outcome* to *context* to *content*.

This emphasizes the point of this stage: to determine the objectives of the intervention so that the outcome can be described in terms of benefits, and the required business and IT content understood in relation to the objectives within the prevailing organizational context (Table 1).

Table 1. Determine the intent: success factors

	Cases		
	A	B	C
Overt involvement of the senior management owners who make explicit the drivers for change	++	+	0
Definition of the problem/opportunity in terms of the degree of dissatisfaction with the current situation	++	++	+
Engagement of key actors — the beneficiaries of the changes	+	+	0
Identification of stakeholder interests — supportive, negative and hostile	–	–	–
Establishment of a management structure (for stages 2–4)	+	++	+

The following key explains the effect of the factor in each case:

++, the factor was understood and dealt with successfully;

+, the factor was recognized and dealt with adequately;

0, not observed in the case;

–, the factor was not dealt with effectively leading to project problems;

– –, the factor was never satisfactorily dealt with and reduced the project success. This coding is used in Tables 1–6

2. Assess the context

The overall purpose is to understand the organizational and business context within which the intervention objectives have been set and identify and address the issues which will affect the organization's ability to achieve them.

For example, issues to be addressed in the context are:

- the readiness of the organization to respond to the changes required to resolve the problem or grasp the opportunity in this intervention — including the degree of dissatisfaction with the current situation;
- the extent to which uncertainties in the context are likely to affect or influence the outcome of the intervention;
- the relationship between this intervention and other change initiatives under way or planned;
- to ensure everyone involved in or affected by the intervention understands the implications of the desired outcome and is able to contribute appropriately.

As mentioned above, this would normally be done after defining the outcome (step 3), but where the intervention is entirely context driven thorough initial assessment of the context may be a prerequisite to identifying the potential benefits (Table 2).

3. Specify the outcome

The purpose of this stage is to define the particular benefits which will be obtained when the objectives are achieved. Each benefit needs to be expressed in terms of where it will occur, who will benefit, who is responsible for its delivery and how it will be measured. In addition, the types of business and enabling changes needed should be identified in relation to each of the intended benefits. Enabling changes include the key IS/IT functionality required (but not a detailed specification for the system).

Table 2. Assess the context: success factors

	Cases		
	A	B	C
Ensure that the intended outcome, objectives and benefits are appropriate for this intervention in the foreseeable context	++	++	+
Understand the organization's capability to actually carry out the intervention and identify areas where knowledge or skills are lacking and need to be developed	0	+	–
Involve the key stakeholders in a structured, open and honest debate to elicit the factors and assess their specific relationships to the intervention and their likely impact	+	–	– –
Allocate responsibility for action by the owners or the appropriate stakeholders	+	+	–

See Table 1 for key.

The key to success is the construction of a benefits dependency network (an example of which is shown in Figure 6), which identifies all the benefits implied by the intervention objectives and the main changes needed to achieve them. This depends on the constructive involvement of the key stakeholders, especially the owners of the problem and the actors who have to deliver the solution. A workshop process is essential to ensure understanding of each stakeholder's viewpoint and to utilize their collective knowledge to produce a rigorous and comprehensive network and subsequent business case.

It is critical that all benefits are owned by someone, a beneficiary, and that relevant measures are identified to ensure that it will be clear whether or not, or to what degree, the benefit has been realized (Table 3).

4. Describe the content

During the intervention process, two streams of content — i.e. *what* will change — will have to be defined in detail and then made to happen. These are described as IT content and business content, and responsibilities will be allocated accordingly. The purpose during this stage of the framework is to define in outline the business and IT developments (and their inter-dependencies) that are needed to deliver the benefits required of the intervention and identify responsibilities for more detailed design and planning of the developments and changes.

Essentially, the purpose is to describe/envisage what will be the situation when the problem no longer exists or the opportunity is exploited, and what will have changed in business and IT terms.

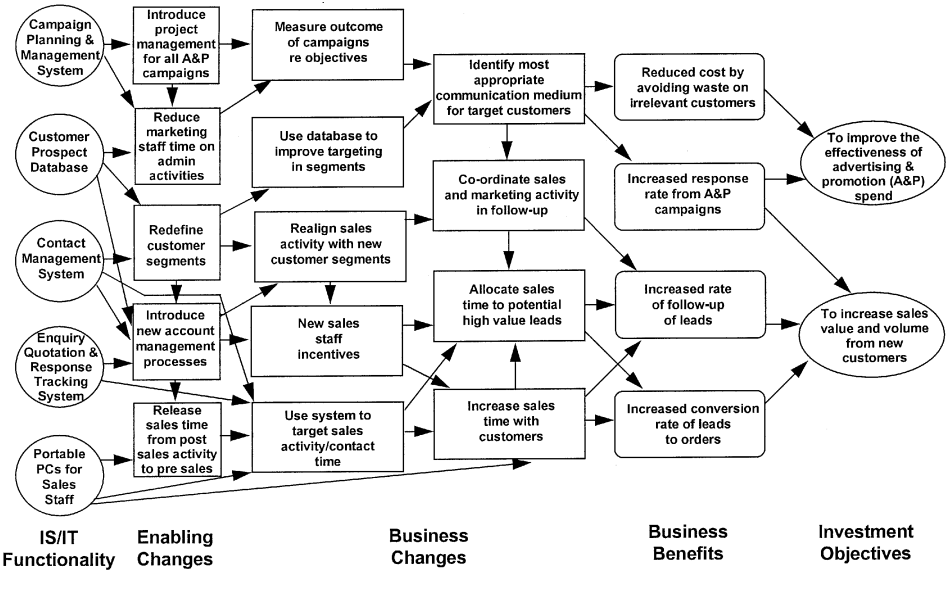

Figure 6. Example of (part of) benefit dependency network — sales and marketing systems (one of the case studies).

Table 3. Specify the outcome: success factors

	Cases		
	A	B	C
Use a workshop process to reconcile viewpoints and share collective knowledge	++	++	–
Identify all the benefits implied by the intervention objectives and the main changes needed to achieve them	+	+	+
Involve all the key stakeholders, especially the owners of the problem and the actors who have to deliver the solution	+	–	0
Ensure that all benefits are measurable and that each is owned by its beneficiary	+	++	+
Produce careful, accurate documentation, in the form of a benefits dependency network, of the outputs of the process	+	++	+

See Table 1 for key.

It is also important to set initial criteria for measurement or assessment of whether the change components have been carried out successfully, thus enabling dependent changes to proceed (Table 4).

5. Construct the intervention process

The purposes of this stage are essentially to:

- reconcile the implications of the outputs from stages 2–4 above and describe the nature of the intervention explicitly in terms of the outcome expected, the content of the changes and the contextual factors affecting success; a way of addressing this is explained below;
- identify and make explicit current shortfalls in the state of knowledge about any part of the intervention;
- define the most appropriate approach to managing the intervention project, allowing for the range of issues to be addressed;

Table 4. Describe the content: success factors

	Cases		
	A	B	C
Understand the full scope of the changes — and their inter-relationships — needed to satisfy the objectives	–	–	0
Focus on requirements not designs or solutions	0	–	– –
Maintain a tolerance for ambiguity and a degree of uncertainty	–	–	0
Facilitate collaboration between business managers and IT specialists to ensure that the business and IT contents are complementary	+	+	–

See Table 1 for key.

- identify clear responsibilities and roles for the execution and control of the streams of activity and effective co-ordination and reconciliation of those streams;
- assess the degree of risk involved in the intervention and to define steps to mitigate the possible impacts;
- produce the full business case for the intervention and a plan which will satisfy the intent in a relevant time scale.

Reconciling the outputs from steps 2–4

The process adopted in stages 2–4 should ensure a degree of consistency because the output of one will have driven the next stage to a large extent, but a summary assessment of the nature and extent of the changes required is a useful crosscheck of the outputs.

The approach suggested here is based on the work of Venkatraman (1991), from which the 'change analysis' heptagon at the centre of Figure 7 is derived. Surrounding the core heptagon are the contextual issues that may influence or impact the intervention during the project duration. These will have been derived from step 2 and need to be reconciled with the changes described in the heptagon itself — based on the output from steps 3 and 4. The changes are analysed according to whichever of the seven components they affect.

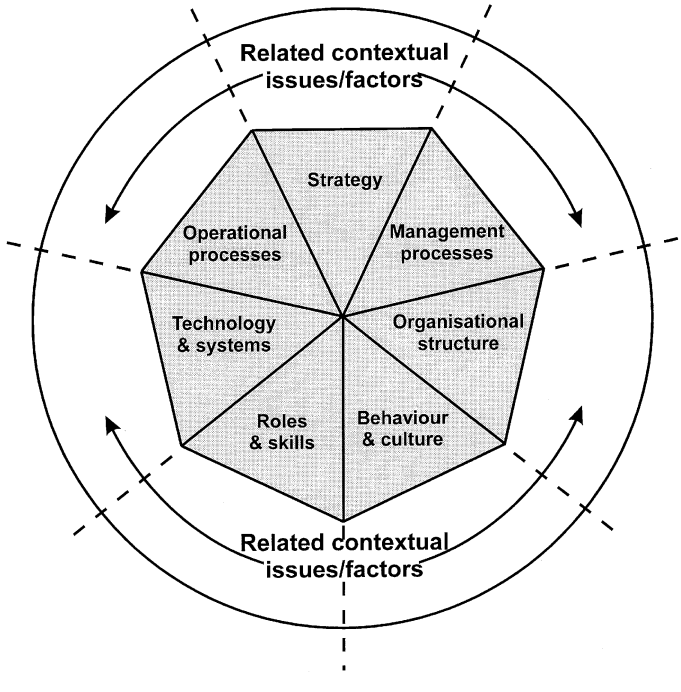

Figure 7. Change analysis heptagon.

These components are as follows.

Strategy: the changes imply a new/modified business strategy or component of it.
Structure: changes to the organizational structure are needed to produce the required outcome.
Operational processes: the changes affect specific business processes, which can be internal or related to trading partners.
Management processes: new or modified management, planning or control processes are needed.
Technology: describes the key aspects of the IS/IT components of the change (or other technologies involved in the change programme).
Roles/skills: the changes require new/revised roles to be established or new skills developed in the business (and/or in trading partners).
Culture/behaviour: attitudes and behaviour have to change in order to deliver the benefits.
Having described the change programme in terms of the heptagon, further work is useful:

- to align contextual factors that need to be addressed or monitored in the outer circle to assess their potential impact or influence;
- to assess the severity/complexity of the changes in each segment, e.g.
  - minor impact — should be dealt with by normal management activity during the project;
  - significant impact — require specific attention by the line management affected;
  - major impact — require senior management involvement because of the difficulty of the change and the effect on the outcome.
- to reconcile the intervention as now understood with the original intent by considering whether the extent of required changes is justified to overcome the problem and achieve the intervention objectives. This will be a subjective judgement based on the original owners of the intent who may not have appreciated the implications of their drive for change. It may provide an opportunity to review the scope of the intervention, by redefining the objectives to those that can be achieved by a feasible amount of change (Table 5).

6. Manage the process

The purpose of this component is to carry out the activities of the intervention, to monitor them and, if necessary, modify them so that the intervention converges on an outcome that satisfies the intent, while recognizing that the actual outcome may differ somewhat from that conceived at the outset. Some possible reasons for the final outcome being different from that originally conceived are:

- difficulty in initially envisioning the intended outcome, particularly if it is very different from the current situation;
- designing the content that will actually deliver the intended outcome;
- perceptions of the intended outcome evolving through either stakeholder learning or responses to changes in the context;

Table 5. Construct the intervention process: success factors

	Cases		
	A	B	C
Pooling and structuring the knowledge of all relevant stakeholders	0	–	– –
Explicit consideration of all known risks, 'disbenefits' and areas of uncertainty	+	–	–
Setting up management structures, roles and responsibilities tailored to the specific needs of the intervention	+	++	+
Documentation and publication of the benefits plan and the key decisions on which the intervention is based	–	+	–
Production of a communication strategy for the intervention to ensure all affected parties understand what is intended, why and what is expected of them	+	+	–

See Table 1 for key.

- changes in the context requiring or enforcing modifications to the content;
- changes in the context prompting the realization that the outcome *now* required or actually feasible is no longer that originally being targeted.

If not managed, these factors constitute a risk that the intervention will fail to satisfy the intent even though the planned content is delivered. It is therefore necessary, in this component, not only to:

- carry out the activities in order to deliver the content of change *and* focus continuously on the outcome of the change and benefit realization, but also to:
- respond to changes in the context that might change the intent
- understand at any time what is driving the process and adjust the control behaviour accordingly
- maintain the balance across the intervention streams so that the intent is satisfied
- maintain the appropriate balance between control and learning so that the intervention converges on an outcome that satisfies the intent.

The type of control mechanism chosen must match the nature of the intervention itself. In the cases studied, the project management approach was predetermined and the intervention was force fitted into the 'standard' project management methodology. Simon (1995) classifies control systems into four types, which encourage *performance*, *initiative*, *innovation* or *contribution* in the intervention management. From an understanding of the behaviour required, an appropriate control mechanism can be selected.

In Figure 8, we have structured these control styles according to the mindset of the 'owners' of the intervention (generally, the organization's senior management) into two dimensions:

1 the degree to which the owner can be specific about the nature of the content and of the outcome needed to satisfy the intent. This ranges from the owner having an explicit picture that

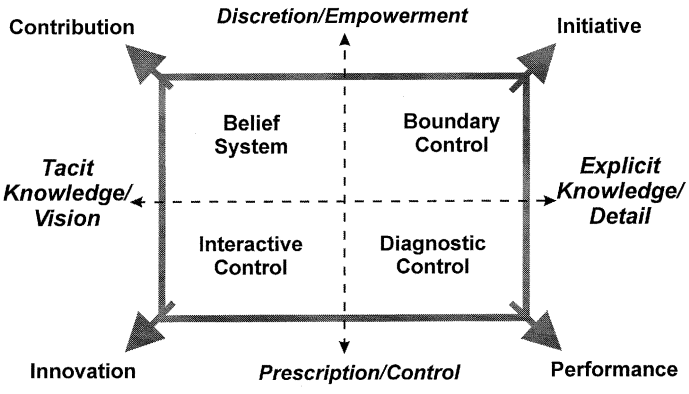

Figure 8. Change process control styles (after Simon, 1995).

can be described in detail to the other extreme in which the owner has only a tacit vision of the outcome;

2 the extent to which the owner is prepared to empower the actors. At one extreme, the actors will be fully empowered to use their discretion to achieve the outcome, whereas at the other the owner will wish to exercise control over the means by which the actors achieve the outcome.

Diagnostic control is appropriate where the outcome can be clearly specified and measured, the content is well understood and contextual factors are not important. *Boundary control* implies a clear target outcome, with few contextual influences where the choice of means is left to the actors. *Interactive control* is appropriate where the outcome is initially unclear and will evolve by matching the possible changes to the context to identify what is feasible and desirable. *Belief system* instils a set of values in the intervention actors to resolve the problem (usually contextual) in an acceptable way — it is often used in combination with boundary control. Each of the approaches relates to a different type of intent, i.e. the drivers for change, and enables the intervention management process to be aligned with the nature of the intent. Moreover, different forms of control may be appropriate at different stages of the intervention as certainty about the means of satisfying the intent evolves (Table 6).

7. Satisfied intent

The goal of the intervention is to satisfy the intent — the intervention objectives established in 1 above. Therefore, the purpose of this stage is to review the degree to which the objectives set have been achieved and the criteria for success met, in both content and outcome, and to identify reasons for any objectives not being achieved. However, during the process of the intervention, those objectives may have been modified (and agreed to have been modified) for specific reasons. This review should include the rationale and consequences of any revisions during the process and consider the success of the intervention against both the original intent and any modified intent, and the reasons for the degree of success achieved.

Table 6. Manage the process: success factors

	Cases		
	A	B	C
Monitor the project characteristics continually to ensure that the process and control regimes remain fit for the purpose	+	–	–
Take early action to remove uncertainties or gaps in knowledge	0	–	+
Make explicit the interdependencies of the business and IT contents	+	–	–
Ensure that the process remains focused on delivering the benefits that will satisfy the intent	+	+	0
Ensure that all allocated roles and responsibilities are fulfilled	–	– –	–

See Table 1 for key.

The purpose of any such review is essentially fourfold:

1 to determine the results of this particular intervention, both positive and negative, and identify any unexpected outcomes;
2 to identify action to be taken after the intervention either to deliver further available benefits or overcome resulting problems;
3 to understand the reasons for relative success or failure in order to improve the chances of success in other IT-enabled change projects;
4 to understand the particular contextual and process management factors that influence the organization's ability to succeed in any other change initiatives (Table 7).

SUMMARY AND CONCLUSIONS

The prime purpose of the study was to develop a management framework that addresses the increasingly complex range of issues affecting IT-based change initiatives. A particular need, as argued by Earl (1992) and others, is to include non-IT managers and professionals throughout the process, as appropriate, to ensure the intervention integrates and balances the IT and business change aspects effectively to achieve a successful overall outcome. The framework attempts to bring together existing good practice from a range of sources and test its applicability via a set of case examples and in relation to initial issues presented by the projects and those that emerged during their evolution.

Table 7. Satisfy the intent: success factors

Plan to hold review meetings as soon as is feasible after implementation of the changes
Involve all stakeholders — and ensure everyone prepares statements of their views before the meetings
Focus on the achievement of the intervention's objectives and the reasons for success and/or failure
Learn for future interventions rather than attribute blame — ensure attention focuses on what can be done in the future

These factors were not specifically observed in these cases because of the research timescale — they are from previous benefits management research (Ward & Murray, 1997).

There is considerable emphasis in previous research on the importance of both senior management commitment/sponsorship (e.g. Beath, 1996), stakeholder involvement, e.g. via 'soft systems methods' (see, for example, Checkland & Scholes, 1990; Wilson, 1990) and active management of benefits (e.g. Farbey *et al*., 1993; Ward *et al*., 1996). This research attempted to incorporate these concepts together into an overall management framework along with the more widely used approaches to systems development and project management. In particular, the work focused on the early stages of projects to provide a better structure for assessing and understanding the dimensions of different types of interventions in relation to the business and organizational drivers for change. Constructing an intervention process which aligns more appropriately to the nature of the changes required should improve the chances of a successful outcome. One conclusion is that by understanding the origins of the need for change and their inter-relationships — context, content, outcome — the intervention process should and can be designed, structured and managed in ways which address the inherently different characteristics of the range of IT-enabled change projects undertaken in organizations today.

This work was essentially an exploratory study and developed a diagnostic framework for understanding how, when and why projects run into difficulty, and even fail. However, the ideas, structure and models developed to date could be used by other researchers to study the realities of a wide range of complex projects in which IT design and implementation and business changes are interdependent in determining investment success. The framework has already been used in practice and tested in a commercial research programme [The Impact Programme (1998) 'Achieving the Benefits from Software Package Enabled Business Improvement Programmes'] in which eight major package implementation projects in a range of industries were studied. The framework proved an effective diagnostic tool in explaining the relative success and failure of the projects and was adopted as the core structure on which the 'Best Practice Guidelines' and detailed 'Project Diagnostic Questionnaire', resulting from that work, were developed.

Further research using the new framework is planned in 1999. The next step is to be a programme of action research to test whether the framework constitutes a model of best practice for the conduct of IT-enabled change initiatives.

In carrying out this research, there are two complementary goals:

- to enhance the body of practical knowledge and experience that currently constitutes accepted best practice in the management of IT-enabled change;
- to analyse and understand observable behaviours and their respective outcomes in either a diagnostic or predictive sense within a variety of project contexts, i.e. to explain why 'best practice' actually works.

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REFERENCES

Avison, D.E. & Fitzgerald, G. (1995) *Information Systems Development. Methodologies, Techniques and Tools.* McGraw-Hill, Maidenhead.

Beath, C.M. (1996) The project champion. In *Information Management: the Organisational Dimension,* Earl, M.J. (ed.), chapter 17. Oxford University Press, Oxford.

Benjamin, R.I. & Levinson, E. (1993) A framework for managing IT-enabled change. *Sloan Management Review,* summer, pp. 23–33.

Braganza, A. & Myers, A. (1997) *Business Process Redesign — a View from Inside.* International Thompson Business Press, London.

Braganza, A., Price, J. & Weiss, O. (1995) *Brief Summary of Theoretical Models used in the BPR Research Project.* ISRC–BPR95014, Information Systems Research Centre, Cranfield School of Management, Cranfield.

CCTA Publication (1995) *Post Implementation Review — Reviewing IS/IT Projects and Business Change*. HMSO, London.

Checkland, P. & Scholes, J. (1990) *Soft Systems Methodology in Action.* John Wiley & Sons, Chichester.

Davenport, J.H. & Short, J.E. (1990) The new industrial engineering: IT and business process redesign. *Sloan Management Review*, summer, pp. 11–27.

Dhillon, G. (1997) The clinical information system: a case of misleading design decisions. In *Cases in IT Management in Modern Organisations,* Khosrowpour, M. & Liebowitz, J. (eds), chapter 20. Idea Group Publishing, Hershey, PA.

Earl, M.J. (1992) Putting IT in its place: a polemic for the nineties. *Journal of Information Technology*, **7** (2), 100–108.

Elvin, R. (1999) Managing information systems projects: the need for a new approach. In *Proceedings of the 4th UKAIS Conference*, University of York, 7–9 April, pp. 159–167. McGraw-Hill, Maidenhead.

Farbey, B., Land, F. & Targett, D. (1993) *IT Investment. A Study of Methods and Practice.* Butterworth-Heinemann, Oxford.

Jelassi, T., Dutta, S. & Valentine, N. (1994) BP Chemicals commercial system: a strategic transition. In *Strategic Information Systems — a European Perspective*, Ciborra, C.U. & Jelassl, T. (eds), chapters 6–8. John Wiley & Sons, Chichester.

Kaplan, R.S. & Norton, D.P. (1996) Using the balanced scorecard as a strategic management system. *Harvard Business Review,* Jan–Feb, 75–85.

McGolpin, P. & Ward, J. (1997) Factors Influencing the Success of Strategic Information Systems. In *Information Systems: an Emerging Discipline,* Mingers, J. & Stowell, F. (eds), chapter 11. McGraw-Hill, Maidenhead.

Morris, P.W.G. (1996) Project management: lessons from IT and non-IT projects. In *Information Management. The Organisational Dimension*, Earl, M.J. (ed.), chapter 15. Oxford University Press, Oxford.

Pettigrew, A. & Whipp, R. (1991) *Managing Change for Competitive Success.* Blackwell Business, Oxford.

Simon, R. (1995) Control in an age of empowerment. *Harvard Business Review*, **73** (2), 80–88.

Teng, J.T.C., Grover, V. & Fieldler, K.D. (1994) Redesigning Business Processes using IT. *Long Range Planning*, **27** (1), 95–106.

Venkatraman, N. (1991) IT Induced Business Reconfiguration. In *The Corporation of the 1990s*, Scott Morton, M.S. (ed.), pp. 122–158. Oxford University Press, Oxford.

Ward, J. & Griffiths, P. (1996) *Strategic Planning for Information Systems.* John Wiley & Sons, Chichester.

Ward, J. & Murray, P. (1997) *Benefits Management: Best Practice Guidelines.* ISRC-BM97016, Information Systems Research Centre, Cranfield School of Management, Cranfield.

Ward, J. & Taylor, P. (1996) *Realising the Business Value of IT: Managing the Benefits.* Bull Enterprise Analysis Series no. 7, Bull Informations Systems Ltd., Brentford.

Ward, J., Taylor, P. & Bond, P. (1996) Evaluation and realisation of IS/IT benefits. An empirical study of current practice. *European Journal of Information Systems*, **4** (1), 214–225.

Willcocks, L. & Margetts, H. (1994) Risk and information systems: developing the analysis. In *Information Management: The Evaluation of Information Systems,* Willcocks (ed.), chapter 11. Chapman & Hall, London.

Wilson, B. (1990) *Systems: Concepts, Methodologies and Applications*, 2nd edn. John Wiley & Sons, Chichester.

Zuboff, S. (1988) *In the Age of the Smart Machine.* Basic Books, New York.

APPENDIX: TOOLS AND TECHNIQUES IN RELATION TO FRAMEWORK (SUMMARY)

Tools/ Techniques	Relevance/Value at each Stage							Main Reference
	1	2	3	4	5	6	7	
1. PEST/5 Forces/SWOT Analyses Competence Analysis	✓	✓						Ward & Griffiths (1996)
2. Critical Success Factor Analysis	✓✓	✓						Ward & Griffiths (1996)
3. Balanced Scorecard	✓✓	✓						Kaplan & Norton (1996)
4. Driver Analysis	✓✓	✓	✓✓				✓	Ward & Murray (1997)
5. Value Chain Analysis	✓	✓		✓				Ward & Griffiths (1996)
6. Process Mapping/Activity Analysis	✓			✓✓				Braganza *et al*. (1995)
7. Application Portfolio	✓✓	✓	✓		✓✓			Ward & Griffiths (1996)
8. BPR Web	✓	✓		✓				Braganza *et al*. (1995)
9. Stakeholder Analysis	✓	✓✓	✓	✓	✓		✓	Benjamin & Levinson (1993)
10. Soft Systems Methods	✓	✓✓	✓	✓✓				Checkland & Scholes (1990), Wilson (1990)
11. Change Initiative Diamond		✓✓						Braganza *et al*. (1995)
12. Change Attributes Matrix		✓		✓				Braganza *et al*. (1995)
13. Benefits Dependency Network		✓	✓✓	✓✓	✓	✓✓	✓✓	Ward & Murray (1997)
14. Benefits Structuring Matrix			✓✓	✓	✓✓	✓	✓✓	Ward & Murray (1997)
15. Change Analysis Heptagon					✓✓	✓	✓	Venkatraman (1991)
16. Project Roles & Responsibilities			✓	✓	✓✓	✓✓	✓	Beath (1996)
17. Project Management Methodologies					✓✓	✓✓	✓	Simon (1995)
18. Systems Development Methodologies				✓✓	✓✓	✓	✓	Avison & Fitzgerald (1995)
19. Prototyping/Pilots				✓	✓	✓✓		Avison & Fitzgerald (1995)
20. Risk Assessment Techniques					✓✓	✓✓		Willcocks & Margetts (1994)
21. Rapid Application Development (RAD) Tools				✓	✓	✓✓		Avison & Fitzgerald (1995)
22. Joint Application Design (JAD) Workshops				✓	✓	✓✓		Avison & Fitzgerald (1995)
23. Post Implementation Reviews (PIR)							✓	CCTA Publication (1995)
24. Project Evaluation Reviews (PER) inc QA & Project Management Review						✓	✓✓	CCTA Publication (1995)
25. Benefits Management Reviews						✓	✓✓	Ward & Murray (1997)

✓✓, An essential tool/technique in the stage; ✓, a potentially useful tool/technique.