A conceptual model of information system implementation within organisations

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A Conceptual Model of Information System Implementation within Organisations

A thesis submitted in fulfilment of the requirements for the award of the degree

DOCTOR OF PHILOSOPHY

from

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by

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Abstract

Information technology (IT) enabled information systems (IS) are widely used within most organisations today. Since the introduction of IT enabled IS in the 1980’s, there have been numerous reports of problematic and failed implementations. The implementation stage has been emphasised as the stage in the IS life cycle where a large number of issues arise, and the implementation phenomenon has been widely studied. Despite this research focus, there is still not a consensus within the IS research community about what factors lead to implementation failure, and what factors facilitate implementation success.

There are many studies that examine the use of IS through models of user behaviour, typically focussing on explaining the variance of a particular variable such as usage frequency. Two such studies raised questions that were important in framing this thesis. Venkatesh, Morris, Davis, G. and Davis, F. (2003) asked whether or not efforts put into understanding factors that contribute to increased usage actually help predict IS success, and to what degree systems considered to have been successfully adopted are actually successful from an organisational perspective. Jaspersen, Carter and Zmud (2005) suggested that research should look further than simple dependent variables such as usage, and that uptake of system features might be a better indicator of implementation success. Further, it was suggested that the implementation outcome might be influenced by behaviours and factors that occurred after the installation of IS, and that few models of implementation actually contained a post-adoptive stage.

In order to answer these and other questions concerning the implementation of IS within organisations, a longitudinal, qualitative study of the implementation of an enterprise wide IS within an organisation was conducted using the ethnographic methodology of participant observation. The focus of the study was the impact of individual and group behaviour on the implementation success of IS. This focus necessitated exploration of the concept of implementation success, its measurement and how implementation success is perceived throughout an organisation.
An important outcome from this study was a Conceptual Model of Information System Implementation within Organisations (CMISIO). The CMISIO, based upon observations from the study, describes implementation as a multi-faceted phenomenon guided within organisational constraints to achieve a pre-determined organisational fit. Organisational fit captures the notion of success, which was seen to vary depending upon the perspective of an observer within the organisation. In this way implementation success was seen to be a multi-faceted phenomenon. The intent of the model was not to reduce the implementation phenomenon to components, but rather to capture those organisational factors that lead to site-specific variations in IS implementation.

There were a number of important findings from the study that have relevance for both IS researchers and practitioners. The IS implementation process can take much longer than is widely reported. Studies that only focus upon a part of the process might fail to capture salient factors that are important in the overall implementation outcome.

Evidence to support the importance of Jasperson et al.’s (2005) adoption phase, as well as a later phase of adaptation was found. Adaptation, where organisational users adapt the new IS to their particular needs, can take months or years, and a lack of organisational support within this phase can lead to eventual implementation failure. An IS within an organisation is only special for a certain time, and management focus can shift before the implementation process has been completed.

The organisational climate that exists at the time of implementation provides constraints that IS project teams must recognise and work within. Elements of the organisation’s culture can also be important factors in understanding motivations behind behaviours that may be either supportive of or detrimental to the implementation. The study found evidence that some behaviours seen as negative towards the IS implementation were likely motivated by psychological reactance (Brehm, 1966), where individuals react to real or perceived threats to their organisational freedom. The reactance was generated by factors not just associated with the IS, and this finding suggests that in order to predict the implementation outcome within an organisation it is necessary to understand factors other than those directly associated with the IS being implemented.
Finally, the scientist-practitioner model used within psychology was suggested as a working model that could be used to help integrate the large body of IS research into organisations. The model focuses on the integration of science-based research and day-to-day practice whereby each informs the other through involvement. This proposal addresses a perceived gap between the researchers looking at IS on the one hand and practitioners implementing IS within organisations on the other.
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# ABBREVIATIONS

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<tr>
<td>MFHRIS</td>
<td>The system implemented at the study site. Maintenance, finance, and HR information system.</td>
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<td>IT</td>
<td>Information technology; the computer-based equipment that support the information system.</td>
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<td>IS</td>
<td>Information system; the system implemented to gather and provide information.</td>
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<tr>
<td>IS Group</td>
<td>The department that exists within most organisations that looks after the day-to-day running of IT-enabled IS.</td>
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<td>Go Live</td>
<td>A practical term used widely by IS/IT practitioners for the time or day when a new system is activated. Implementation activities typically work towards a Go Live date or time.</td>
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<tr>
<td>Legacy system</td>
<td>The system(s) that had been in use and is now being replaced in the implementation project.</td>
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PUBLICATION AND CONFERENCE PRESENTATIONS ASSOCIATED WITH THIS THESIS


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Matthias, T. Information System Implementation and the Scientist-Practitioner Model.
STATEMENT OF ORIGINAL OWNERSHIP

I, Thomas Michael Matthias, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Psychology, Faculty of Health and Behavioural Sciences, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institute.

Thomas Michael Matthias
October 2009
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Chapter 1
Introduction

1.1 Thesis Overview

This thesis is based upon a longitudinal study of the implementation of an information system (IS) within a manufacturing organisation. The focus of the study was upon the behaviours of those associated with the implementation within the organisation, and how those behaviours impacted upon the implementation outcome. Few studies have covered the longitudinal life cycle of an IS implementation within an organisational setting to the extent of this study such that long term outcomes can be observed and related to salient organisational antecedents. Further, few studies have sought to include the wider organisational factors that were addressed in this study.

The purpose of this chapter is to introduce and provide an overview of the thesis. This chapter will also introduce an argument identifying the need in both research and practice for a meta-theoretical perspective, expressed as a conceptual model, describing the impact of group and individual behaviour upon the implementation of information technology (IT) driven IS within organisations. The model is aimed at bridging a perceived gap between IS research and the experience of those involved with the implementation of IS within organisations (Chiasson & Davidson, 2005). The conceptual model was not conceived prior to the study. The intent was to allow the outcomes of the study of the implementation phenomenon to suggest the form of the model.

Implementation, in particular, is emphasised as the stage in which a large number of IS issues arise (Nelson, 2007; Broeng, 2006; Lapointe & Rivard, 2005; & Jasperson, Carter, & Zmud, 2005) but surprisingly implementation is a stage in which user involvement is often limited. Seppala and Tuominen (1993) studied peoples’ experiences in the use and implementation of IT in the printing industry, one of the most rapidly computerised sectors of industry in Finland at the time of their study. They found that, even though the majority of respondents found computerisation to
be positive, criticism was directed towards the implementation, with approximately half of the employees interviewed reporting that they did not have an opportunity to express their opinion about changes associated with the new system.

This chapter is divided into sections, beginning with a general discussion of IS within organisations today, focussing upon IS implementation, followed by a preview of current perspectives of the success and failure of IS implementations. Of interest is the question how, if at all, the behaviours of users and their associates at various levels within an organisation affect the success or failure of IS implementation.

Next, theories of organisational behaviour relevant to IS within organisations are introduced to highlight an organisational perspective of IS implementation. This perspective is often minimised or missed in studies of IS implementation. An overview of the various theoretical frameworks that may be fruitful to adopt in this research area is presented. The research problem and its significance, focussing upon the need for a higher-level conceptual model describing IS-related behaviour, is introduced, followed by the parameters within which the thesis was approached. Finally, a brief description of the remaining thesis chapters is given.

The high cost of the failures of IT-driven IS to industry has been commonplace and widely reported for many years (see for example Ginzberg, 1981; Bowen, 1986; Lyytinen, 1987; Myers, 1994). There have been numerous research studies that have explained or examined elements of implementation within certain contexts (Davis, 1986; Orlikowski & Gash, 1994; Garrity & Sanders, 1998b; Venkatesh, Morris, Davis, G. & Davis, F., 2003). As yet there does not seem to be a widely accepted explanation for the determinants of implementation success, or an explanation for numerous implementation failures across a wide spectrum of organisational contexts (Markus & Saunders, 2007; Fowler & Horan, 2007; Alter, 2006; Oz, 2005).

Two perspectives show promise for a way forward. First, the emerging body of research in the area of systems-related occupational health and safety (Cox, Tomas, Cheyne & Oliver, 1998; Harvey et al., 2002; Kelloway & Day, 2005) parallels measurable improvement in the safety performance of
organisations (World Steel Association, 2009). A successfully implemented OH&S system provides positives for people at all levels within an organisation, i.e., reduced costs and reduced risk of litigation at a managerial level accompanied by a safer workplace for the employees. Not all IS hold such universal benefits (Horvath & Andrews, 2007; Lee, Cheung, & Chen, 2004; Sherif & Vinze, 2003) and this distributed benefit might be an important factor in predicting an implementation outcome. Progress in the area of systems-related occupational health and safety has been associated with effort to understand the organisational dynamics within which they exist.

Second, the scientist-practitioner model in the area of psychology suggests ways to bring the benefits of IS research back into the organisations at which the research was originally focussed, by adopting an IS research-practitioner orientation. The scientist-practitioner model (Belar & Perry, 1992) offers an integrative approach to science and practice wherein each informs the other in an iterative process. Psychologists are encouraged to adopt a research orientation in their practice, and ensure that practical relevance is incorporated into their research. Further, the scientist-practitioner model suggests that in practice psychologists should seek to understand current research and seek to apply it in practice, to conduct their practice whilst thinking like a scientist and to be actually involved in doing research.

1.2 Information systems within organisations

The day-to-day operations of large organisations are complex. Most organisations and enterprises rely to some extent on IT driven IS to manage the numerous facets of their operations, with Enterprise Resource Planning (ERP) systems being the reference systems for large organisations (Grabot, 2005). Enterprise wide IS typically connects all areas of the organisation, including disciplines such as finance, maintenance, logistics and training. IS provide data, which can be analysed to review facets of an organisation’s performance. Information can also be generated from such systems to assist in decision-making at many levels within an organisation.

Organisations consist of people interacting in a variety of roles. Typically there are numerous interfaces between IT-enabled IS and people at all levels of
an organisation. Somers and Nelson (2004) identified twenty-two classes of 'key players' involved in various activities across the implementation stages of an IS. These key players included management at various levels, the project team, trainers and system vendors. It is possible that the different groups have differing perspectives on the implementation process.

1.3 Perspectives of implementation success and failure

Each year there are numerous instances of organisations implementing new IS or upgrading existing systems. Since the introduction of the organisational or enterprise wide IS in the 1980’s there have been numerous instances of IS failures and the potential causes of these failures have been widely studied (Standish Group, 1999). Given that such interest in IS failure has been maintained for an extended period of time, it is perhaps surprising to find that there is still not widespread agreement in the research community as to what constitutes IS success and IS failure and how best to conceptualise and measure IS success and IS failure (Garrity & Sanders, 1998a; Garrity & Sanders, 1998b; Kanellis, Lycett & Paul, 1998).

*Figure 1.1. Windows of Perception*
It may be that IS success and IS failure are not necessarily outcomes at either end of a continuum, and this will be further discussed in Sections 5.3 and 5.4. It is suggested that the lack of widespread agreement about IS success and failure could be due to different perspectives of the phenomenon of IS implementation adopted by organisational observers. Conceptually, this can be represented as differing windows of perception as shown in Figure 1.1.

Different people within the organisation would view the phenomenon of IS implementation from within their organisational paradigm, and it can follow that this gives them different views of what implementation success or failure can mean. Some organisational observers are necessarily blind to the overall picture. Consider, for example, that a maintenance worker inputting breakdown costs might not be able to appreciate how the aggregation of such costs right across the business enables senior management to make more informed decisions at budget time. From the maintenance worker’s perspective, the time intrusion of the data input might be perceived as a negative outcome, but from the senior management perspective the better informed decisions are perceived as beneficial for the business.

Short-term success or failure with respect to IS in organisations is sometimes judged (Fowler & Horan, 2007) by how “well” a new system is implemented, e.g., did the organisation get what they paid for, did the implementation go to plan and are system users actually using the new system in the way that the organisation planned? The utility of such IS are ultimately measured though in the quality of decisions made, or by measures of organisational success such as profit or customer satisfaction.

IS are typically only one component of an organisation’s operation, and a system’s success depends ultimately on the interaction of people with the system within the organisation. As stated, the implementation will be described with a conceptual model. One of the aims of the conceptual model is to capture aspects of these organisational interactions and to describe how they relate to the implementation process.

Fowler and Horan (2007) have recently questioned whether or not IS implementation success is in fact the ‘other side’ of implementation failure. In their exploratory study they found a considerable overlap between factors
associated with both IS success and failure, leading to a view that at least in some ways IS success and failure may be linked.

Rather than ask, “Why do projects fail?” it may be more useful to ask, “What components and behaviours are necessary to maximise the likelihood of implementation success?” Psychology has, for example, provided much in the understanding of ‘abnormal’ behaviour by attempting to define normal behaviour (Sahakian, 1986), albeit with some difficulty. The understanding of ‘is’ helps to more clearly understand the ‘is not’.

1.4 Organisational behaviour and information systems

1.4.1 The research perspective

Walker, Pressick-Kilbourn, Arnold and Sainsbury (2004) suggest that human activities cannot be separated from the context in which they occur. This approach underpins the perspective adopted in this study where the implementation behaviours are studied in the organisational context in which they occur.

Up until the end of the 1980’s investigators such as Voss (1988) concentrated on looking for the source of IS implementation problems either within the organisation as a whole, or within the software itself, with fewer studies focussing on aspects of the user. From the mid 1980’s there was an increase in research that focussed on people as IS users, and into ‘user’ models that could aid in predicting implementation success.

Davis (1986 & 1989), who focussed on Fishbein and Ajzen’s (1980) Theory of Reasoned Action (TRA), derived a user-focussed model, the Technology Acceptance Model (TAM). This model suggested that the acceptance of IS could be explained by a combination of the user’s perceptions of the usefulness and the ease of use of the IS in question. Since this work there has been a greater realisation that system users, as individuals or in groups, are active agents contributing to implementation success or failure.

Davis’ (1986 & 1989) TAM has been much researched and modified (Legris, Ingham, & Collerette, 2003) to the extent that recently Venkatesh et al. (2003) were able to propose a ‘unified’ model based upon the TAM that is
reportedly able to describe up to 70% of the variance in user behaviour. Venkatesh et al. suggest that further research needs to be carried out to determine if usage actually results in positive outcomes, i.e., to determine “the degree to which systems perceived as successful from an IS adoption perspective are considered a success from an organisational perspective” (Venkatesh et al., 2003, p. 470). This is an important question, i.e., will the effort put into understanding factors that contribute to increased usage from an IS user perspective help to predict ways to increase success in IS implementation?

The context in which technology is implemented is likely to be important in predicting user behaviour. If so, models such as the TAM need to be placed within a broader context, as they are only describing one particular facet of behaviour, i.e., they are pieces of a bigger picture. Therefore one of the aims of this thesis is to formulate a broad, conceptual model that can identify, amongst other things, to what extent does variance in usage behaviour influence implementation over a broad array of contexts. This is consistent with Venkatesh et al.’s (2003) finding with respect to their model that “further work should attempt to identify and test additional boundary conditions” (Venkatesh et al., 2003, p.470).

Hartwick and Barki (1994) reflected upon the IS research community's inability to demonstrate any actual benefit from either user involvement or participation in system development that might be reflected in increased system usage. The weakness of positivist models such as the TAM and TRA in an organisational setting is that they are valid under the caveat of ‘all other things being equal …’, whereas it is often the ‘other things’ that organisations have to make equal that are of interest.

Context with respect to organisations has been examined through studies of both organisational climate and culture. According to Bock, Zmud, Kim and Lee (2005) ‘climate’ refers to a contextual situation that occurs at some definable point in time, and that the contextual situation frames the behaviours of organisational members, whereas ‘culture’ is a broader term describing an evolving context within which we can examine specific situations or climates.

It is common for the terms ‘culture’ and ‘climate’ to be used to describe the same phenomena, or to be used without definition. This will be further
explored in Section 3.2.2. Considering culture and climate leads into an exploration of the organisational perspective of behaviour and IS.

**1.4.2 The organisational perspective**

Many large organisations today have their own IS resources. IS implementations can therefore be carried out in house as a project, or might be contracted to the software vendor or their recommended support resources. Within the IS industry the process of implementation, run along the lines of a project in most cases, tends to follow fairly basic recipes (Adept, 2007; Beatty & Williams, 2006; Hallows, 2005; James, 2004).

According to Hallows (2005, a successful project is one “that delivers the expected results” (p. 6). Typically the systems people, those responsible for the IS itself, talk about project implementation in terms of metrics such as schedule milestones, scope and budget. From an organisational perspective the bottom line for the client lies in achieving their expected benefit in terms of deliverables such as lower stocks, more efficient customer service, reduced staff numbers or increased profit, after all this is why they made an investment in the IS.

These perspectives infer that a project can come in on time and within budget, however if it fails in achieving the deliverables then the investment was wasted. Similarly, even if a project runs over in terms of cost and timing, as indeed many do, but still achieves the deliverables then the end evaluation will be one of success. This point brings into focus an important question for models of user behaviour: how does user perceived success, often studied by those with a focus on ‘system’ concerns, relate to organisational success?

Perhaps this is why texts concerning IS project management (Schwalbe, 2002; Hallows, 2005; & Rivard, Aubert, Patry, Pare and Smith, 2004) pay little attention to the user-behaviour approach. This is not to imply that understanding user behaviour is not important in itself, or indeed is not a factor in overall IS implementation success. Rather, we need further work to put it into perspective, and, moreover, there appears an opportunity to bring the research perspective more in line with that of practitioners working within organisations. Obtaining dual perspectives of the implementation phenomenon suggests that an interpretive approach might be appropriate for this thesis.
1.5 Theoretical frameworks and an interpretive approach

Rogers’ (1995) model of Diffusion of Innovations (DOI) has been used widely as a framework to study software and IT implementation (Moore & Benbasat, 1996; Gregor & Jones, 1999; Kautz & Larsen, 2000). Diffusion is considered as the process by which an innovation, a new IS package, for example, is spread throughout a social system primarily through effective communication. The DOI offers a useful framework to support the observations of implementation within an organisational setting.

The concept of technological frames, or interpretations, of technology is a useful perspective with which to view IT implementations, and in particular to analyse problematic implementations. According to Orlikowski and Gash (1994) when the technological frames of the key groups in an organisation differ, then it is possible that there will be problems with the use of the technology in question, and therefore understanding people’s interpretations of technology is important in understanding their interactions with the technology. According to Klein and Myers (1999) an interpretive approach is particularly suited when the researcher seeks to understand human behaviour in an organisational or social context. An interpretive approach has been adopted in this thesis, initially guided by the DOI framework.

1.6 Research problem and significance

Researchers who have adopted a positivist approach to understanding IS implementation have often chosen a specific element of IS usage as the dependent variable. Legris et al. (2003) identified in their meta-study that in 11 out of 22 studies based upon the TAM, self-reported usage frequency was chosen as the dependent variable. Venkatesh et al. (2003) continued this long running thread by choosing usage frequency as the dependent variable upon which their unified model focussed.

Such studies though are often limited by an absence of research demonstrating their validity and utility, as rarely is usage frequency linked explicitly to either IS success or failure. Venkatesh et al. (2003) suggest that further research needs to be carried out to determine if usage actually results in
positive outcomes, and that future work should identify and test boundary conditions within which their model might be valid.

Jasperson et al. (2005) observed that past researchers tended to examine factors such as use simplistically in terms of usage frequency rather than capturing aspects such as the patterns of use regarding the features of a particular system. Jasperson et al. suggest that specific patterns of usage within particular contexts might be more predictive of work system outcomes than a measure such as usage frequency, but this has not been demonstrated.

Although aspects of IS adoption such as user behaviour are likely to influence the outcome of IS implementations, there is likely much more to the explanation. Bailey and Pearson (as cited in Legris et al., 2003) found 39 factors that reportedly affect IS satisfaction from a user perspective, and the list includes factors such as the user’s feeling of control and top management involvement.

There is a need to understand where and how, in the totality of systems implementation, IS related behaviour has impact. This need is based on two observations. First, there has been 20 years or so of positivist studies into user behaviour and yet there seems to be no significant change in the status of organisational IS implementation success. Next, researchers are offering ever more complex models to explain the variance of factors such as usage frequency and other aspects of IS behaviour, and yet this research is not in general being picked up by the IS community in a practical sense.

Effort is required to generate a conceptual model of IS implementation which can locate the numerous predictive models that have been constructed over the past 20 years of study. The conceptual model should be such that it can define the operating boundary conditions of predictive models such as the TAM, and accommodate both qualitative observation and quantitative studies. The notion of boundary conditions suggests that explanatory models may only be predictive within certain parameters.

Finally, as researchers, we need to describe the theory and assumptions that underpin models that are derived from correlational studies. Models based upon correlation are interesting, but without demonstration or explanation to show how they relate to the phenomenon of IS adoption many will remain as
interesting only to the research community (Rosemann & Vessey, 2008). Perhaps after 20 years or so of research the research community needs to take steps to address issues that prevent this body of work from making a difference in future implementations.

In order to address the shortcomings of previous studies, and to take up the research challenges put forward in recent studies by Venkatesh et al. (2003) and Jasperson et al. (2005), an interpretive approach was adopted in this thesis. Based upon a longitudinal study of a major IS implementation within a large manufacturing organisation, people performing different functions were accessed across different organisational levels and different sites in order to identify the salient parts of a conceptual model describing IS implementation and adoption.

The conceptual model proposed in this thesis could be used as a diagnostic tool for advising implementation teams of the most appropriate approach given the operating organisational climate. It would address questions such as what organisational state are the potential users located in with respect to IS implementation, and therefore what behavioural changes are necessary to facilitate optimal implementation. The conceptual model is intended to be useful for both the IS researcher/academic community and for IS practitioners.

The study was prompted by a number of research questions raised in previous studies:

From Venkatesh et al. (2003):
(i) What is the link between user acceptance and individual or organisational outcomes?
(ii) What boundary conditions define the validity and utility of correlation-based models?
(iii) Does increased usage actually result in positive organisational outcomes across a wide range of organisational contexts?

From Jasperson et al (2005):
(iv) What types of post-adoptive behaviour trigger technology sense making?
(v) What possible output variables, if indeed any, are suitable for the study of IS implementation in an organisational setting?

Given the reported poor track record of IS implementation:

(vi) Why are organisations continuing to invest in IS? Is it that the traditional measures of success, such as usage frequency, are not consistent with what organisations are really experiencing? Perhaps implementation failure, provided it can be recovered within the organisation’s abilities, is acceptable to the organisation?

(vii) Will the effort put into understanding factors that contribute to increased usage from an IS user perspective help to predict ways to increase success in IS implementation?

Specifically this study seeks to answer the following research questions:

1. Are commonly used dependent variables such as ‘use’ related to implementation outcome?

2. Will the effort put into understanding factors that contribute to increased usage from an IS user perspective help to predict ways to increase success in IS implementation?

3. What is the context within which models of systems related behaviour are applicable and useful?

4. Why do projects fail? It would seem that the answer to this question depends on the perspective of the observer, and their definition of success.

5. Why are organisations continuing to invest in expensive IS, given the reported poor track record of system implementation over a number of years? Is it that the measures of success often studied are not consistent with what organisations are really experiencing?

6. ‘IS success’ is not a concept that has been defined in a way that is widely accepted. How is IS success conceptualised, can it be quantified or is it dependent on the observer’s perspective?

Finally an important outcome of this study will be:
7. A conceptual model to describe organisational factors that influence the implementation of IS within organisations.

The need for a conceptual model is further supported by a consideration of possible study variables. Can implementation be described by a dependent variable such as implementation success? It will be argued throughout this thesis that implementation success is in fact a multi-faceted concept resulting from varied organisational perspectives, and that past research has often focussed upon and quantified one particular facet over others.

Venkatesh et al. (2003), for example, recommend that further work was required to identify and evaluate boundary conditions within which their model of IS usage was salient. Their model was based upon the prediction of one facet of IS, i.e., usage frequency, which they proposed as an indicator of IS success. One of the aims of this research is to delineate the domains and environments within which models relating behaviour to IS implementation success are applicable.

1.7 Thesis scope and key assumptions

The intent of this section is to briefly introduce the parameters that are relevant to this thesis. Definitions are offered for the key concepts and objects studied, followed by a brief discussion of the thesis scope and limitations, and the key assumptions made by the researcher in carrying out and reporting this work.

1.7.1 Definitions

IS success and failure will be addressed in detail Chapter 5. In order to facilitate an understanding of how these terms are used in this thesis up until that point, the following definitions are offered.

*IS success*: IS success describes when an IS has been correctly installed, is now up and running, and is delivering the organisation’s expectations of that system. There are different facets to the organisation’s expectations, including, for example, the perspective of the user and that of the senior manager who does not use the system per se, but relies upon the output. It is possible that a new IS can be poorly installed, but in the long run can still
deliver organisational success, and conversely an IS can be installed but not deliver the outcomes that the organisation expected.

**IS failures**: IS failure describes when an IS does not deliver the organisation’s requirements, or does so in such a way that it cannot continue to do so over time. The IS might be replaced by a better alternative, or users may not continue to use the system as required over time so that eventual failure might take some time to occur.

**Post adoptive behaviour**: Jasperson, et al. (2005) define post-adoptive behaviour as “behaviours made by an individual after an IT application has been installed, made accessible to the user, and applied by the user in accomplishing his/her work activities” (p.531). This definition is used in this thesis. The period of time that follows on from IS implementation is the period when the benefits of the organisation’s investment in the IT are realised, but it is also the time when problematic implementations become visible. Time and budget overruns are also requested and realised within this period. For example, considering the implementation of a customer management application, McPherson (2006) speculates that “over half the total cost … occurs after the software is up and running” (p. 36). For this reason, the behaviours of users and their peers in this post adoptive phase is of interest in understanding implementation success and failure.

**Adaptation**: In order for IS to be fully implemented, there is likely to be a period, after post-adoption, and possibly months to years in duration, when the users modify and adapt certain elements of the IS to achieve specific outcomes in their specific work areas. This phase has been termed adaptation.

**Information system (IS)**: One definition of an IS (Wood-Harper, Antill & Avison, 1985) would be, “a system to collect, process, store, transmit, and display information” (p.3). A subset of this would be computer or IT-enabled IS. This thesis is concerned with the interactions of people with such systems and how the interactions influence system success, but not with the hardware or software engineering aspects such as systems development.

In the context of this thesis, a more focussed definition within the above would be “A coordinated effort on behalf of an organisation to collect data,
which is then translated into information used by the organisation to assess organisational outcomes, or to facilitate decision making”.

**Conceptual model:** This definition of a conceptual model has been taken from a source other than IS literature on the basis that it more accurately covers the way that this term is used in this thesis, and on the basis that conceptual models offered by this source are aimed at both the research community, and for practical application.

The Austrian Central Institute for Meteorology and Geodynamics (ZAMG, 2008) makes widespread use of conceptual models in order to present differing data onto a defined grid. Their definition of conceptual models has been adopted for this study:

A conceptual model describes essential features of a phenomenon and identifies the principle processes taking place.

In this study, the phenomenon is the implementation of an IS within an organisation, and the principle processes are behavioural. Adopting the ZAMG definition further to this area of study, a complete conceptual model of the implementation phenomenon should provide a:

- Definition of the phenomenon in terms of features recognisable by observations, analysis or validated simulations;
- Statement of the controlling behavioural processes which further enables an understanding of the factors that determine the evolution of the phenomenon;
- Guidance for predicted conditions or situations that will likely arise, and tools for predicting displacement from the expected path of evolution.

For the IS practitioner, a conceptual model should provide help in understanding and diagnosing problems with the implementation, a synthesis of available information and a basis for extracting signals from complex patterns. Ideally, a conceptual model should provide the IS practitioner with a forecast method in a turbulent organisational environment with the possibility of filling in gaps in data.

**Information technology (IT):** The hardware and software that enables an IS. Of particular interest in this study was the move from a previous generation
Microsoft DOS® based maintenance system to the newer generation Microsoft Windows® based system.

*User behaviour:* Observable or recordable behaviours made by the organisation’s system users in, on or associated with the IS being studied. In a psychological sense, behaviours are not the same as cognitive outputs such as beliefs, values and opinions, although it may be argued that behaviours are influenced by these other factors (Philipchalk & McConnell, 1994).

*The IS industry:* The collection of businesses and contractors who make a living by developing, supplying and maintaining IT-enabled IS.

*Hierarchy:* a system of nested groups as represented, for example, in an organisation chart where employees are grouped into departments, which are in turn grouped into higher-level organisational units. This is contrasted with a network, which emerges from the bottom up and where individuals function as autonomous nodes and in effect building their own relationships and ‘structure’ (Wright, 2007).

### 1.7.2 Scope and limitations

The focus of this thesis is upon human behaviour within organisations and its impact upon the implementation of IS. The interpretive approach adopted does not impose reliance upon a distinct theoretical position per se, but rather allows the researcher to adopt different ways of looking at the phenomenon under study. Walsham (1993) suggests that “there are no correct or incorrect theories, but there are interesting and less interesting ways to view the world” (p.6).

Broadly in line with a phenomenological approach, the phenomenon of a major IS implementation has been described in a longitudinal fashion with as little interpretation as possible during the data gathering phase. Interpretation of the phenomenon captured has then been attempted through lenses provided by previous research approaches with the aim of identifying a higher-level conceptual model within which to locate the different approaches.

Certain biases cannot be avoided of course and necessarily flavour both the description of the phenomenon and its interpretation. Whilst the primary
focus of the study was upon implementation and post-adoptive behaviours, it was recognised that in an organisational context, there would likely be pre-implementation factors influencing the post-adoptive behaviours, hence the longitudinal study commenced some six months before implementation.

The IS that was the focus of this study was one of a number that the host organisation implemented or upgraded during the longitudinal study period. There were also a number of significant organisational changes and reorganisations that occurred during this time period, so it was not possible to carry out this study outside of these broader contextual influences.

The employees of the host organisation at all levels were included in the study, along with the IS implementation team which included many contractors, key customers and suppliers who were impacted by the implementation, and employees of the parent company at other sites who had been impacted by previous implementations. No effort was made to evaluate the actual IS implemented, as it was a proprietary product which had been used both successfully and unsuccessfully by many other organisations around the world.

Access was given to the internal communications of the host organisation, which to a large extent meant emails, along with the project documentation from proposal through to the post implementation review. Where possible interviews with employees were recorded and later transcribed, but this was not always possible. Email communication was commonly used across the organisation, and employees and many vendors had access to this technology, which they regularly used.

1.8 Thesis guide

The thesis is organised broadly into four sections. The first section, which includes this introductory chapter, covers the background theory and relevant literature in the area of user behaviour and IS implementation. The literature review initially covers IS/IT and then psychological studies of individual and group behaviour, how those behaviours are seen in an organisational context and then how these learnings have been incorporated into IS research. The review was configured in this way in order to provide an overview for those IS readers without a background in psychology.
Chapter 2 discusses the historical and present context of information technology, IS and finally IT-enabled IS within organisations. Chapter 3 is a summary of relevant perspectives of human behaviour and causality, i.e., why do we think people do what they do in certain circumstances. This summary is included as a number of IS studies present explanatory models based upon established theories and models of behaviour drawn from psychology. The purpose of this chapter is to assist in the clarification of these models. The notions of organisational culture and climate are also explained in Chapter 3.

Chapter 4 focuses upon salient research into the interactions between people and IS within organisations. Chapter 5 presents a theoretical perspective on the notions of implementation success and failure, along with ways of quantifying them, followed by an argument for the need for a broad conceptual model within which competing models of implementation success can be located. Possible forms for the conceptual model are explored in Chapter 6, focussing on the desire to generate a model that would offer utility for both the IS researcher and the IS practitioner. Finally, Chapter 7 summarises relevant research frameworks and applicable methods to carry out the study described in this thesis. Ethical considerations for the study within the organisation are discussed.

Section 2 outlines the qualitative, longitudinal study of the implementation of an enterprise wide IS in a large Australian based manufacturing organisation. Chapter 8 covers the research methods used and the approach to analysis of the interviews and observations. Chapter 9 summarises the longitudinal study with the subsequent interpretation and analysis of the study covered in Chapter 10. Two novel findings for the field of IS research within organisations are discussed. First, evidence for the influence of psychological reactance in an organisational setting is presented (Matthias & Caputi, 2008). Second, the notion of ‘tacit success’, i.e., success defined by organisational behaviour, which may or may not be a result of analysis of the implementation in question, is offered as an alternative perspective for implementation success.

Section 3 focuses on a conceptual model to assist in the understanding of IS related behaviour within organisations. The conceptual model proposed in
Chapter 5 is presented and discussed in Chapter 11, following on from the analysis of the longitudinal study, and from shortcomings suggested by authors of previous studies. The emphasis in the presentation of the conceptual model is as an explanation of the implementation phenomenon aimed to be of practical use by organisations in future implementations, and aspects of this approach are discussed in Chapter 12.

The thesis concludes with an overall discussion, and implications for further studies in Chapter 13. Opportunities to verify and make use of the proposed conceptual model in organisational settings are identified.

Information about the organisation in which the study was carried out, and about the IS studied, will be summarised in a separate report for the host organisation for future IS implementations. Some of this detailed information is of a confidential nature and may not be suitable for wider distribution.

The background review of literature for this study begins with an examination IT-enabled IS within organisations in Chapter 2. In order to understand the current status of IT-enabled IS within organisations, it is necessary to examine the technology that supports the systems, and how IS is used in organisations, including the problematic implementation phenomenon.
Chapter 2
IT-enabled Information Systems within Organisations

“... the creative effort required to achieve effective implementation is not always fully appreciated by the people directly involved in introducing new technology”. Fleck, 1994, p. 637.

2.1 Introduction

Paul Swain (2008) observed that, “IT has to be an enabler of change, not an impediment” (p.28). This perspective reflects a widely held view within organisations that in the past IT-enabled systems have been seen to impede organisational change in some way, and that often IT-enabled systems are introduced as an element of change or even as the visible instrument of change within an organisation. Whatever the strategic intent of a new or upgraded IT-enabled IS within an organisation, the implementation and consolidation through adoption of the system will involve, depend upon and impact people.

It is perhaps difficult today to think of IS within organisations without considering the IT that supports it. Given that a focus of this thesis is organisational behaviour, it is necessary to define the phenomena to which this behaviour may at some times be directed, as there may be situations when the technology is seen differently to the system that it supports, e.g., when looking at computer anxiety and its impact on systems implementation. For this reason a brief summary of IS and IT within organisations is given prior to discussing IT-enabled IS.

The rapid development and subsequent deployment of computers and associated IT from the late 1960s onwards has impacted organisations and the world of business. IT has not just made business systems more efficient, but has enabled a whole range of business improvements such as e-commerce possible (Alter, 2002). In the world of business, IT-enabled IS are now becoming the norm in many areas such that it is not possible for organisations to do business without them.
The intent of this chapter is to summarise both historical and current perspectives of IT-enabled IS within organisations, i.e., what is the situation today and how have we arrived here. First, IS and their place within organisations are discussed with emphasis on the view that computer based technology is a vehicle to facilitate IS, and that IS per se do not necessarily need to be IT-enabled. Second, the arrival of computers and their impact on organisations is discussed. Research about the interactions between people and IT is introduced. Finally, IT-enabled IS are described with an emphasis on their implementation within organisations.

This chapter, along with Chapter 3 which describes perspectives of individual and group behaviour, provides the background to Chapter 4, which addresses previous research into the interactions of people with IT-enabled IS within organisations. The chapter begins with an introduction to organisational systems, not all of which are IT-enabled.

IT-enabled IS are a subset of organisational systems. Looking at systems at this broader level illustrates some important facets of IS, in particular the notion of boundaries. IS are a subset of general systems designed to satisfy specific organisational requirements. Many examples of IS today are IT-enabled.

2.2 Systems

Systems can be thought of at a high level as a collection of things showing complex, dynamic interdependency, which are difficult, if not impossible, to break down into linear processes (Smith & Milan, 2007). Whilst systems can be discretely described, as phenomena they can't be separated from the environment or context within which they occur. One way of defining systems is to delineate the boundaries of the system, which are the limits within which the description is valid, as a means of showing what is included or excluded from the definition.

Systems thinking is an analytic process used to illuminate the structures and processes that lie behind and support higher-level systems. This technique
is often used within organisations when the output of a system is unacceptable, and it is not obvious where an intervention can be made.

An example of the systems thinking approach is the CATWOE method (Smith & Milan, 2007). Within this approach a system is considered from the perspective of the key people involved in order to look for relevant interactions. The key players from the CATWOE model are shown in Table 2.1, which describes their perceived roles in systems operation. This model is introduced here to illustrate two important points. First, within an organisational context there are likely to be people other than system users and designers who are influential in the implementation outcomes of new systems. Second, notions of system success and failure need to include the perspective of the customers who will be the beneficiaries of the system, and this perspective is sometimes overshadowed by the view of the owners who have the power to change the outcome of a systems implementation.

Table 2.1 CATWOE definitions

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C - The customer</td>
<td>The beneficiaries of the system</td>
</tr>
<tr>
<td>A – Actors</td>
<td>Those who use or “do” the system</td>
</tr>
<tr>
<td>T - Transformation processes</td>
<td>The actual conversion of input to output</td>
</tr>
<tr>
<td>W – Worldview</td>
<td>The perspective that makes the system meaningful within some broader context</td>
</tr>
<tr>
<td>O – Owners</td>
<td>Those who could stop the system, or in the Context of this study, those who could change the implementation outcome</td>
</tr>
<tr>
<td>E – Environmental constraints</td>
<td>Elements which define the limits of the system</td>
</tr>
</tbody>
</table>

After Smith & Milan, 2007

2.3 Information Systems

IS are widely used in most organisations today. The primary purpose of such systems is to provide organisations with timely information that “allows managers in organisations to concentrate on and devote creative energy to their prime tasks” (Silva & Backhouse, 1997, p. 389). The ‘system’ part of an IS can be thought of as a way of defining a set of interacting components (Avison &
Fitzgerald, 1995). The system might be about people, objects or procedures and it is composed of the components relevant to the system as opposed to those of the environment within which the system exists, i.e., the system has definable boundaries.

An IS within an organisation provides information about the organisation’s activities that is useful to the organisational members in some way. IS within organisations might relate to payrolls, project planning, maintenance and many more components that an organisation needs to know about. IS could be broadly categorised into transactional processing systems, the most common, decision support systems, expert systems and office support systems (Avison & Fitzgerald, 1995, pp. 4-5).

Alter (2002, p. 7) presents four themes that IS of today share:

1. Businesses operate through systems run by people using information.
2. People within the businesses participate in all the major phases of building and maintaining these systems.
3. Advances in IT that been the driving force for much of business innovation in recent years.
4. The success of IT-enabled systems is never guaranteed, even when the latest technology is used.

The first theme is important, as the reality of IT-enabled systems is a fairly recent phenomenon, whilst organisations and businesses have been using IS for thousands of years. The participation of organisational members in most aspects of IT-enabled systems is also a rather recent phenomenon, and one still not widely practiced. Finally, the reality that IT-enabled systems are not always successfully implemented is central to the study rationale.

Both practitioners and theoreticians have studied IT-enabled IS since the 1950’s (Wood-Harper et al., 1985). Perspectives studied include, for example, technical problems and successful practices associated with the systems (Myers, 1994; Berchet & Habchi, 2005), strategic implications of such systems for enterprise and organisational success (Ginzberg, 1981; Markus & Robey, 1983; Nardon & Steers, 2008), and how IT-enabled IS affect the nature of
clerical work within organisations (Gasser, 1986; van der Veer & Mulder, 1988; Medcof, 1996).

The implementation of IT-enabled IS has become a fairly specific area of expertise within the IT industry. There are many texts (see, for example, Schulte, 2004; Fallon, 1995) offering approaches and roadmaps to follow. Schulte (2004) was motivated to write about implementation due to the observation that many project managers find that the methodologies that they are taught do not prepare them for the reality of their experience.

The accelerating changes in the IT that enables many organisational systems has meant that newer and more capable IS are available for organisations to use. It is worth looking briefly at the IT that supports the IS to get an idea of what the changes have been.

2.4 Information Technology

H.G.Wells (1937) discussed the future development of a World Brain and predicted, “The whole human memory can be, and probably in a short time will be, made accessible to every human being”. The development of the World Wide Web, which itself has been enabled by rapid developments in computers and associated electronic technology, has realised Wells’ bold prediction.

A similar revolution has occurred in industry where today most organisations rely to some extent on computer-based IT, whether it is to support enterprise wide systems or even to enable simple purchase transactions in small businesses. The rise and subsequent dependence of computers has been rapid and dramatic, and not without some issues when considering the people-computer interface.

2.4.1 The rise of the computer

In 1977 Scientific American devoted a special issue to the topic of microelectronics and the phenomenon of the personal computer. Noyce (1977) described the advances in electronic technology that had occurred over the previous decade as a revolution. Ever smaller electronic components were designed to perform increasingly complex functions at higher speeds and at lower costs.
This revolution enabled the construction of computers with greatly enhanced abilities to store, process and display information. Most importantly, computers moved from being large units, often geographically isolated from their users, to smaller computers dispersed to the actual sites in which their usage and output was needed.

Kay (1977) suggested that by the 1980’s adults and children would have access to personal computers “about the size of a large notebook with the power to handle virtually all their information-related needs” (p. 231). Whilst he may have been out by a few years, Kay accurately predicted what we now take for granted. Kay was slightly off the mark in predicting where he thought the notion of a personal computer would lead. Kay further predicted “adult and child users must be able to get it to perform useful activities without resorting to the services of an expert” (p. 231).

What has been observed is that computers require ongoing expert guidance, leading to a vibrant industry where third party companies provide the software to enable the personal computer to do a myriad of tasks. It is uncommon that individual users direct the personal computer to do their individual bidding, except in research or developmental endeavours.

The computer of today is the result of numerous technical advances that have occurred primarily over the last 70 years or so. Some of these advances are described in Table 2.2. The advances noted in Table 2.2 show that within two years of Kay’s (1977) article, the first commercial spreadsheets and word processor were available, and third party software running on universal platforms has been the status since that time.

The focus of this study is on behaviour associated with the implementation of IT-enabled IS within organisations. A perspective of people interacting with IT is now introduced.

2.4.2 People and IT within organisations

The widespread use of computers in society and the associated use of IT within organisations is a fairly recent phenomenon. IT-enabled systems within organisations became widespread in the late 1950’s and throughout the 1960’s
as the computer and associated computer applications became increasingly available (Avison & Fitzgerald, 1995).

Table 2.2 Advances in computer development

<table>
<thead>
<tr>
<th>Year</th>
<th>Advance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1640</td>
<td>Pascal’s adding machine</td>
<td>The first commercial calculator, a hand-powered adding machine.</td>
</tr>
<tr>
<td>1939</td>
<td>Atanasoff’s digital computer.</td>
<td>Built at Iowa State University between 1936 and 1939, the computer is not patented, but in 1973 the patent for the computer is awarded to Atanasoff.</td>
</tr>
<tr>
<td>1947</td>
<td>Transistor</td>
<td>Availability reduced the size and accelerated the development of computers.</td>
</tr>
<tr>
<td>1953</td>
<td>IBM 701 Computer</td>
<td>IBM enters the game.</td>
</tr>
<tr>
<td>1954</td>
<td>Fortran</td>
<td>First high level programming language.</td>
</tr>
<tr>
<td>1958</td>
<td>Integrated circuit</td>
<td>The arrival of the computer chip. Once made available by Fairchild Semiconductor in 1961, within 10 years all computers use these instead of transistors.</td>
</tr>
<tr>
<td>1973</td>
<td>Networking</td>
<td>Metcalfe and Xerox introduce Ethernet computer networking.</td>
</tr>
<tr>
<td>1978</td>
<td>VisiCalc</td>
<td>First spreadsheet application.</td>
</tr>
<tr>
<td>1979</td>
<td>WordStar</td>
<td>First word processor.</td>
</tr>
<tr>
<td>1981</td>
<td>IBM PC</td>
<td>Personal computer revolution begins.</td>
</tr>
<tr>
<td>1984</td>
<td>Apple Macintosh</td>
<td>Affordable home computer with a graphical user interface (GUI).</td>
</tr>
<tr>
<td>1985</td>
<td>Microsoft windows</td>
<td>Microsoft GUI for IBM computers.</td>
</tr>
</tbody>
</table>

People and computers can be thought of in terms of their relative strengths and weaknesses in an organisational setting (Alter, 1999). People are good at the ‘big picture’ and tasks that involve understanding a situation and imagining alternatives. Computers are machines that are good at repetitive tasks that require consistency, speed and the “execution of unambiguous instructions” (Alter, 1999, p. 227).

Often, the introduction of IT within an organisation involves conflicts that arise when the IT produces benefits in one area with consequences that negatively impact people in another area. Some examples of these positive and negative impacts drawn from Alter (1999) are shown in Table 2.3.
Table 2.3 Positive and negative impacts of IT-enabled IS

<table>
<thead>
<tr>
<th>Innovation</th>
<th>Positive impact</th>
<th>Negative impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computerised system for monitoring truck usage</td>
<td>Increased efficiency through better use of equipment and time</td>
<td>Reduced feeling of autonomy; feeling of being distrusted</td>
</tr>
<tr>
<td>Use of autopilots</td>
<td>Greater safety and consistency</td>
<td>Mental disengagement of pilots; de-skilling</td>
</tr>
<tr>
<td>Automation of insurance claims</td>
<td>Greater productivity in claims processing</td>
<td>Decreased social interaction at work; feelings of alienation</td>
</tr>
<tr>
<td>Proliferation of electronic information</td>
<td>Ability to disseminate and use the information more effectively</td>
<td>New opportunities to steal the information and to use it illegally</td>
</tr>
</tbody>
</table>

After Alter (1999, p. 254)

Researchers have looked at the human-computer interface since the 1980’s from a number of perspectives, in order to address some fundamental questions. How does the widespread use of computers within an organisation change the workplace (Gasser, 1986; Crouch & Nimran, 1989; Orlikowski & Robey, 1991; Medcof, 1996)? Are there attributes of individual users within an organisation that will facilitate their ability to actually use the IT that enables the systems (Gist & Mitchell, 1992; Smith & Salvendy, 1993; Brosnan, 1998; Hackbarth, Grover, & Yi, 2003)? Do IT-enabled systems need to be designed by, and for, the end users (Baroudi, Olson & Ives, 1986; Lynch & Gregor, 2004; Worley, Chatha, Weston, Aguirre & Grabot, 2005; Adept, 2007)? Is there something special about the implementation of an IT-enabled system compared to any other major organisational change such that the differences could help explain the perceived poor track record of IT-enabled systems implementation (Ginzberg, 1981; Markus, 1983; Lyytinen, 1987; Goodhue & Thompson, 1995; Soffer, Golany, & Dori, 2005)?

Medcof (1996) argued that the degree to which the use of computers within an organisation can either positively or negatively affect job characteristics depends upon the relative amount of time spent using the computer, the nature of the work done on the computer and the nature of the work done apart from the computer. Data entry, for example, was described as a simple cognitive activity associated with low job quality, and so “the more one
does data entry on the job, the lower the overall quality of the job” (Medcof, 1996, p. 201).

Looking at the impact of computers within a workplace, Crouch and Nimran (1989) suggested that the lack of natural light that was often a necessity in order to view the computer screens at that time would be an inhibitor to good work performance. On the other hand, the availability of new technology and the subsequent increased accessibility of information in a timely manner were seen as facilitators of good work performance. Gasser (1986) proposed that it was the “fluid organisation of work around computing” (p. 221) and in particular how the computer usage related to the primary work of the user that shaped the character of the computer use more than the technical design of the system.

From the perspective of an individual user or potential user of a new system, it would be fairly obvious that gains associated with a system cannot be realised unless the system is actually used (Hackbarth et al., 2003). There have been many studies that have looked at user attributes and subsequent system usage.

Davis (1986 & 1989) addressed the notion of system usage in his Technology Acceptance Model (TAM), which predicts, other factors being equal, that a potential user would be more likely to continue to use a system that they perceive to be both easy to use, and useful. Whilst system usage is only one component of overall system success, this perspective perhaps more than any other has been widely researched over the last twenty years or so (Legris et al., 2003). This research, along with other behaviour related studies, will be examined in more detail in Section 4.3.

The constructs of computer anxiety and self-efficacy have been examined extensively in order to explain computer usage (see, for example, Gist & Mitchell, 1992; Brosnan, 1998; Hackbarth et al., 2003). Computer anxiety describes the fear that a person experiences when faced with the possibility of using a computer-based system. Users generally overcome their initial fears through familiarisation with the technology over time, provided that the fear does not prevent them from using the technology at all. Brosnan (1998) suggests that “as many as one third of the individuals within most populations experience computer anxiety to some degree” (p. 223).
Self-efficacy describes the extent to which an individual considers that they have the ability to carry out a specific task. Higher self-efficacy correlates with a number of work-related performances including the adaptability to new technology (Hill, Smith & Mann, 1987, cited in Gist & Mitchell, 1992). Self-efficacy can be increased through targeted training. Brosnan (1998) concluded that computer anxiety had a direct effect on a person’s ability to perform a task, whilst self-efficacy impacted the way that a person approached the task.

A person’s experience with computer-based technology within an organisation can be viewed as a subset of how people encounter organisational change in general. Rogers’ (1995) model of Diffusion of Innovations (DOI), for example, has been used as a framework to study software and IT implementation within organisations. Research based upon this model has shown that users progressively make sense of a new system based upon their unique experiences within their particular setting, and that acceptance of the new system takes time to construct. This finding leads into the specific phenomena of IT-enabled IS within organisations.

2.5 IT-enabled systems in organisations

IT-enabled systems are common throughout most organisations today. The early business applications were designed to improve basic business activities such as customer record keeping, sales reporting and payroll and involved “copying, retrieving, filing, sorting, checking analysing, calculating and communicating” (Avison & Fitzgerald, 1995, p. 17).

Many of the early implementers of IT-enabled systems were computer programmers with expertise in the systems that they developed, and not necessarily skilled in communicating with end users. It was frequent that new systems proved to be more costly than originally estimated and often arrived later than indicated, and it was unusual that systems were implemented as part of long-term, well-planned strategies (Avison & Fitzgerald, 1995).

The trend within organisations since the introduction of IT-enabled systems has been a greater appreciation of the importance of systems development from an end-user perspective. Organisations now employ systems analysts who better understand the organisational and business needs along
with technical analysts who design system solutions to meet the organisation’s needs. Resource planning systems lie at the complex end of organisational system solutions.

2.5.1 Enterprise resource planning systems

According to Guffond and Leconte (2004) an Enterprise Resource Planning (ERP) system can be defined as “a tool assembling and integrating all data and management skills which represent the firm’s activities” (cited in Berchet & Habchi, 2005, p. 589). In a recent edition of Computers in Industry dedicated to ERP systems, Grabot (2005) suggested that ERPs have “progressively become the reference solution for companies’ IS, whatever their activity, the world over (p. 507).

The adoption of an ERP is considered to be an innovative step for organisations as it typically involves improving businesses across the board, implementing best practice and often major integration of functional groups within the organisation. ERPs came about essentially by expanding the Manufacturing Resource Planning systems of the 1980’s to other organisational systems such as finance, sales and HR (Berchet & Habchi, 2005).

The main reason given for the worldwide success of ERPs is their “capacity to address the information needs of all departments and functions across a company onto a single computer system (Grabot, 2005, p. 507). Despite this success, there are still organisational, social and economic issues associated with ERPs in many situations.

ERPs are often referred to in a negative sense reflecting the experiences of many organisations that experience problematic system implementations. ERPs often cost a significant amount of money yet sometimes provide meagre returns, possibly due to the fact that the organisation’s users do not initially have a clear working knowledge of what the system does or how it works (Motwani, Subramanian & Gopalakrishna, 2005). One of the main issues is how to align what is generally a generic software package with the particular requirements of a business in its own environment (Soffer et al., 2005).

ERP systems are not always successfully implemented, and as they are costly to purchase and implement, the failures are widely reported. Often the
issue is a gap between the organisation’s required functionality and the system’s capability in delivering it.

This “misfit” is exacerbated when dealing with ERPs as by nature they are often more complex due to many factors including “cross-module integration, data standardisation, adoption of the underlying business model ("best practices"), compressed implementation schedule, and the involvement of a large number of stakeholders” (Soh, Kien & Tay – Yap, 2000, p. 548).

Soh et al.’s (2000) recognition of the large number of stakeholders involved in IS implementation indicates that there are likely numerous interactions occurring during implementation. These interactions are the behaviours to be examined in this thesis during the IS implementation.

2.5.2 IS implementation

IS implementation, and in particular the implementation of ERPs in large organisations, is a key issue for organisations. Whilst many of the problems that organisations encounter in IS implementation have been identified and studied, it is still the case that “their origins are often multiple and complex” (Worley et al., 2005, p. 620).

Following their study of a systems implementation within a university, on the one hand Worley et al. (2005) suggested that organisations would increase implementation success by focussing on the needs of the people within the organisation. On the other hand, Somers and Nelson (2004) identified a taxonomy of the key players across an organisation over an ERP project life cycle and did not identify users as members of this taxonomy.

Ngai, Law and Wat (2008) conducted a meta-analysis of literature examining the critical success factors in the adoption of ERP systems across ten different countries. They categorised implementation challenges into four broad groups from the perspective of Asian businesses adopting what was seen as a Western innovation. Cultural issues, functionality requirements, expertise of the implementation teams and ERP practices were the four categories developed.

One measure of the effectiveness of implementation according to Silva and Backhouse (1997) is how well the system has become part of the
organisational furniture, and would be referred to as ‘how things are done around here’. Such a status for an IS within an organisation indicates that it is no longer considered an innovation, but is largely unnoticed and exists as just one of a number of tools that allow organisational members to do their work.

If being part of the furniture indicates a level of organisational stability, then this stability can be taken as one indication of a successful system implementation. Stable systems need less effort to manage, freeing people to do the organisation’s work. This concept will be revisited in the context of organisational climate in Chapter 3.

2.6 Conclusions

Whilst this thesis is concerned with IS implementation related behaviour, the purpose of this chapter was to describe the IS towards which the behaviour was relevant. Following on from the rapid rise in the supporting technology, IT-enabled IS have become widespread within enterprises and organisations today. Due to a number of factors, but strongly related to the continuing evolution of this supporting technology, the implementation and adoption of IT-enabled systems remains an unpredictable phenomenon.

Researchers and systems practitioners have yet to come up with an agreed approach to maximise the chance of implementation success, and the causes of failed implementations are seen to be numerous and varied. It could be concluded that there are likely to be a number of factors, none of which is necessary and sufficient in itself to guarantee success, required to support a successful implementation. Similarly, even when the factors that would in one circumstance support implementation success are present, there may be other organisational factors that could lead to poor adoption or even failure.

The factors supporting success, and those that can lead to failure may be different. Whatever the factors are, it is accepted that organisational behaviour will be the vehicle through which salient factors are operationalised. The focus of this thesis was the behaviours of individuals and groups within an organisation before, during and after the implementation of an IS.
Chapter 3 provides a summary of relevant perspectives about, and theories of, behaviour. The perspectives have been drawn primarily from the field of psychology. Many models relating behaviour to implementation outcome within the IS research discipline are based upon models of behaviour adapted from psychology. The review of these psychological explanations for behaviour was considered necessary to make sense of the study observations of IS related behaviour within the study organisation.

Research question 2 concerns factors that contribute to systems use, and it is important to be able to understand aspects of behaviour that may be general, or not IS specific, in order to recognise behaviours that may be peculiar to IS implementation within organisations. Much of the organisational context referred to in research question 3 is related to individual and group behaviour, and hence an overview of current psychological understanding of these aspects is presented in Chapter 3 to help address these questions.
Chapter 3

Behaviour: Perspectives on why people do what they do

“Work is the most important social activity that people engage in outside the home”.
Statt, 1994, p. 397.

3.1 Introduction

The focus of this thesis is the behaviour of people in and around IS implementations within organisations, and how that behaviour can be used to explain observed variations in IS implementation success. Some researchers consider that implementation failures are rarely due to the technology or the system, and are more likely to be caused by human or organisational problems (Avison & Fitzgerald, 1995). Many often-cited models of system related behaviours, such as Davis’ (1986) TAM and its numerous derivatives discussed in Chapter 4 are based upon well-researched psychological models of behaviour. Davis’ (1986) TAM, for example, is based upon Fishbein and Ajzen’s (1980) TRA. Other studies combine diverse perspectives to come up with composite models that reportedly offer more explanation of the variance in the chosen dependent variable.

Psychological perspectives of individual and group behaviour that are relevant to IS within organisations are summarised in this chapter, in order to provide a background to the IS models discussed in Chapter 4. Only those models that are considered relevant to IS models will be discussed, and therefore this chapter will not provide an exhaustive review of psychological models of behaviour.

3.2 Why people do what they do

Psychology as a science “focuses upon behaviour, and the physiological and cognitive processes that underlie it” (Weiten, 2007, p. 18). Following on from
the foundation studies of William Wundt in the late 19th century, psychology has evolved through a number of paradigms in its quest to understand individual and group behaviours. Organisations consist of people, behaving as individuals and as members of groups, and psychological perspectives of behaviour have much to offer in understanding those behaviours. In particular, when focussing on the role that individual and group behaviours play in IS implementation, psychology provides a platform and a number of perspectives that the researcher can utilise to observe and understand IS related behaviour.

Differing perspectives on behaviour can be examined through the numerous theories of personality within psychology. Whilst theories of personality differ, it could be argued (Hergenhahn & Olson, 1991, p. 6) that behaviour likely results from some combination of common factors as shown in Table 3.1. Ultimately for the study of IS within organisations, we need to decide if there is something special about IT-driven IS within organisations, that would lead us to require different or more complex theories to explain the behaviours of people associated with the IS, and how these behaviours can contribute to implementation and overall success or failure.

Table 3.1 Elements that may contribute to personality

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics</td>
<td>Personality influenced by heredity (supported by twin studies).</td>
</tr>
<tr>
<td>Traits</td>
<td>People possess character traits, some of which are inherited, whilst some are learned. Traits combine to determine personality.</td>
</tr>
<tr>
<td>Culture &amp; Society</td>
<td>Personality is the result of the societal roles that one plays.</td>
</tr>
<tr>
<td>Learning</td>
<td>Our personality is the result of life rewarding, and hence reinforcing, certain behaviours. This leads to the notion that behaviour can be shaped.</td>
</tr>
<tr>
<td>Personal choice</td>
<td>Free will. Whilst individuals may experience the same conditions, it is the meaning that they attribute that makes the difference.</td>
</tr>
<tr>
<td>Unconscious mechanisms</td>
<td>Unconscious, underlying causes of behaviour. In some ways, the opposite to free will.</td>
</tr>
<tr>
<td>Cognitive processes</td>
<td>How do we perceive, retain, transform and act upon the information that we receive from the environment?</td>
</tr>
</tbody>
</table>
An associated concern for researchers in the field of IS within organisations is just what can be learned by asking people about themselves? Learning theorists such as the behaviourists say that such endeavours are not only unnecessary, but can be invalid when it comes to predicting future behaviour. Many qualitative studies about IS rely upon peoples’ self reports to generate numerical data, and use them as reliable and valid measures of behaviour.

Finally, theorists must address one of the core questions that underpin the notion of personality, “how consistent is human behaviour”? Personality theorists would argue that behaviour based upon a person’s makeup is predictable, and hence personality is the summary of the consistency of individual behaviours, across time and situation. This is important when considering to what extent we can generalise quantitatively derived models of behaviour around IS implementations that incorporate personality measures, and what are the boundaries to the validity and utility of such models.

Organisational culture and climate are mentioned in numerous texts concerned with IS implementation. The notion that culture can provide motivation for behaviour links with the psychodynamic theory of behaviour, and in particular to Jung’s (1966 & 1995) concept of the collective unconscious.

3.2.1 Psychodynamic theory of behaviour

Psychodynamic theory’s most famous proponent, Sigmund Freud, has in some ways become synonymous with many people’s understanding of psychology. The purpose of this discussion is not to go into psychodynamic theory in any great detail, but to point out that concepts based upon a psychodynamic perspective are used implicitly within organisations in a number of areas, and also as explanations for IS related behaviours in some studies. As a general rule, we need to be aware of the theory that we are using as explanation, as theories generally rely upon certain assumptions that may or may not be applicable to situations under study, and competing theories may rely on assumptions that are not compatible.
The psychodynamic view is strictly deterministic, meaning that all of our behaviours, including our thoughts and feelings, are not brought about by chance. Behaviours can be explained if we are able to identify the unconscious driving forces that determine them. Carl Jung (1969) built upon Freud’s foundation, although he and Freud parted company acrimoniously in 1912 (Hergenhahn & Olson, 1999, pp. 69-70) over differences in certain aspects of the psychodynamic approach. Jung saw that life’s primary goal is to achieve self-realisation, and this was the master motive in human behaviour.

At the core of the psychodynamic perspective is the belief that behaviour can be motivated by ideas of which individuals are not aware, i.e., unconscious motivation (Hergenhahn & Olson, 1999). It is common for texts about IS implementation to mention organisational culture as a motivational force that exists within organisations, and which needs to be factored in to implementation plans (see for example Fallon, 1995). Used in this way, culture is not just convenient shorthand with which to describe organisations. The concept of organisational culture has similarities to Jung’s notion of the collective unconscious.

Jung (1995) identified common themes arising in the hallucinations and fantasies of his patients and in the myths, legends and religions of varying cultures. He suggested the existence of a collective unconscious, the inherited storehouse of memory and experience resulting from millions of years of evolution, and that this collective unconscious is common to all humankind. Jung is suggesting that in some ways our behaviour is motivated by this collective unconscious, and that the collective influence can be observed through our culture.

Freud’s concept of anxiety (Nye. 1981, pp. 30-34) and the ways in which people deal with it, the so-called ego defence mechanisms, can be encountered in the area of IT use, particularly with respect to the notion of computer anxiety (Abd-El-Fattah, 2005). Freud described reality anxiety as an actual threat from a person’s environment where, for example, the person may be confronted with new IT, which may erode their confidence in doing their job within an organisation. Anxiety serves as the stimulus to take action to alleviate the
threat. This action may be a simple step such as undertaking training to master
the new IT and hence neutralise the threat.

Organisational culture and climate are further discussed in Sections
3.2.2.3 and 3.2.2.4. The psychoanalytic approach also has been specifically
directed at work related behaviour by considering psyche at work.

3.2.1.1 Psyche at work

Elliot Jaques (Jaques & Cason, 1994; Jaques, 1998) developed a widely
used model for organisational behaviour referred to as the *Requisite
Organisation*. According to Jaques, there is a widespread tendency to under-
estimate the impact of the organisation itself in the success of businesses, and
that those organisations which are organised around the capabilities and
potential of people will be more successful.

Jaques (1998), who came from a medical background and was trained in
psychoanalysis, was particularly sensitive to how an individual would react to a
requirement to adhere to prescribed conditions, and was aware that certain
organisational structures were not supportive of optimum performance. Given
that today’s organisations now embrace IT-enabled IS as part of the way that
business is done, it may be that there is an optimal organisational ‘structure’
supportive of the systems that are the subject of this study. How individuals
react to the requisite behaviours imposed by IT-enabled work systems merits
examination within the context in which they occur.

3.2.1.2 Behaviour in context

The interaction of situation and context with behaviour has become a
much researched topic across a number fields of recent times with, for example,
a recent edition of European Psychologist devoted entirely to examining
motivation in real-life, dynamic and interactive environments, contrasted with
controlled studies using selected groups (Jarvela & Volet, 2004). Context with
respect to organisations has been examined through studies of both
organisational climate and culture.

According to Bock et al. (2005) ‘climate’ refers to a contextual situation
that occurs at some definable point in time. The contextual situation frames the
behaviours of organisational members, whereas ‘culture’ is a broader term
describing an evolving context within which we can examine specific situations or climates.

3.2.1.3 Organisational culture

Culture is a frequently encountered term in IS literature. According to Motwani et al. (2005), “When ERP software fails, it is usually because the company did not dedicate enough time or money to training and managing culture change issues” (p. 530).

From a philosophical perspective, culture can be defined as “the way of life of a people, including their attitudes, values, beliefs, arts, sciences, modes of perception, and habits of thought and activity” (Blackburn, 1994, p. 90). Sociologists generally offer a broader definition where culture includes everything that is socially, rather than biologically, acquired (Scott & Marshall, 2005).

Cultural anthropologists describe three levels of cultural influence: learned patterns of behaviour, patterns of thought and perception and aspects that act below the conscious level. This third level, the unconscious influence, is closest to the Jungian idea of the collective unconscious.

Dalmau (1994) suggests that it is possible to identify ‘layers’ in the way organisations exist, much like the layers you could unearth by excavating an archaeological site. The visible ‘topsoil’ would correspond to an organisation’s practices and procedures, highly visible and easy to access. The organisation’s purposes and directions, often expressed as the corporate mission, lie deeper down and support this outer layer but often you have to dig around to make this deeper layer visible. These two layers can be thought of as making up an organisation’s climate. Often people refer to this as the organisation’s culture, but for the purpose of this thesis climate will be differentiated from culture.

According to Dalmau (1994), if you are able to dig even deeper, and often this ‘digging’ involves listening to stories and exposing organisational myths, you can identify a much deeper layer, referred to as one of “identity and unity” (p.26), within which is held the organisational members’ dreams, hopes and fears. This much deeper layer, in conjunction with those above, comprises organisational culture.
It is not surprising that safety researchers seek to understand how this deeper layer might influence safety behaviour, hence the frequency of reference to culture in safety literature. Bock et al. (2005) suggest that quantitative survey-based research is only able to access the shallow layer of organisational climate, whereas we need to use qualitative techniques to access the deeper layer of organisational culture.

Organisational culture became popular in the 1980’s primarily through management texts seeking to explain the difficulties experienced by western organisations in dealing with economic forces and the challenge of apparently successful Japanese organisations in similar environments (Scott & Marshall, 2005). Statt (1994) defines organisational culture as the “ideas, values, assumptions, beliefs, and crucially, meanings” that employees share (p.400).

The concept that an organisation’s culture can provide psychological motivation to change behaviour, and that culture derives from the shared meanings that organisational members attribute to events is important. This notion implies that learning about an organisation’s culture would involve accessing the member’s shared meanings through direct observation and dialogue as other forms of data gathering would likely be too superficial. For the IS practitioners, this should at least alert them to consider, before they suggest ‘changing the culture’ to support a particular IS implementation, that this very culture likely contributes to making the broader organisation what it is at present, and that assessing the culture may take time. Organisational culture can be an asset to the implementation if supportive.

IT-enabled IS are common in the field of safety management. There are a number of studies of organisational safety (Harvey et al., 2002; Cox et al., 1998) that seek to explain safety related behaviour in terms of organisational culture. Harvey et al. (2002) suggest that culture is “a learned set of values that may take the form of practices interpreted through rules and norms of behaviour” (p.18). According to Cox et al. (2002) we need to understand an organisation’s culture for safety in order to make sense of safety systems and related outputs.

For an IS implementation it would be extremely unlikely that a project team could hope to change the organisation’s culture within the typically short
timeframes that characterise implementations. What is needed is an understanding of the current climate within which the IS will be implemented, and some basic understanding of where the organisation is in its cultural journey. In this way, the implementation team can be aware of likely problem areas ahead of time and plan to work to address them.

The term culture is used to describe a wide spectrum of behaviour-related phenomena within organisations. Sometimes (Fallon, 1995) culture is used synonymously to describe a widely held belief that organisations are somehow hard wired to resist change. Fallon (1995) suggests, “Everyone is a prisoner of the organisation’s culture” (p.236), and further, “An organisation’s culture is hard to change. Old work habits are deeply ingrained, so trying to bring quality to the implementation process can be a daunting task” (p.266). But is culture necessarily the enemy of implementation?

It is likely that there are situations when an organisation’s culture can in fact be an enabler. It is possible that when an implementation team thinks that they have ‘changed the culture’, they have in fact modified, for a short time, the organisational climate, such that when the culture re-establishes itself after implementation, the changed climate no longer favours the new IS. Evidence for supportive organisational culture and short-term changes in organisational climate were sought in the longitudinal study.

3.2.1.4 Organisational climate

According to James et al. (2008) organisational climate is seen as the aggregate of the shared psychological meanings of an organisation’s members, or specifically, organisational climate can be defined as, “the overall meaning derived from the aggregation of individual perceptions of a work environment” (p. 15). In this way climate remains the property of the organisational members, and if, within a work unit, there is general agreement, then this aggregated perspective that we call organisational climate can be seen to characterise that work unit.

Climate can be viewed as having a single dimension, i.e., a climate for something (Schneider, 2000, cited in D’Amato & Zijlstra, 2008). The something could be, for example, safety, innovation or the implementation of a new
system. Culture is seen as multi-dimensional (Glisson & James, 2002) capturing the notion that culture underlies the aggregate of many climates within one organisation, and contributes to behaviour in a broad sense.

Research into safety climate (Burke, Chan-Serfin, Salvador, Smith, & Sarpy, 2008) has generally focussed upon the employees’ perceptions of their work environment. Studies into safety culture have generally focussed upon the values and the assumptions of the organisation with respect to safety, emphasising the role of organisational norms and social influences.

The perspective that climate is sourced from the imposed meanings of individuals derives from the cognitive psychological view of behaviour, discussed in Section 3.2.3. As mentioned previously, an organisation’s practices and procedures, supported by the organisation’s purposes and directions, can be thought of as the organisational climate (Dalmau, 1994), or the ‘way that things are done around here’.

Whatever the origins or underlying motivators for behaviour within organisations, many observed behaviours are of a social nature. Even geographically separated behaviours such as Internet usage can conform to predicted patterns of social behaviour (Neufeld & Fang, 2005).

3.2.2 Social psychological models in IS research

Numerous theories and constructs are used to describe and explain IS-related group behaviour in organisations. The following is a brief summary only of the main ones encountered in IS research. Two main themes are described in the section. First, ways in which the presence of others can influence the behaviours of individuals are addressed. Second, perspectives on the ways in which groups behave are discussed.

3.2.2.1 Social influence

Social influence (Vaughann & Hogg, 2002) is the process in which “attitudes and behaviours are influenced by the real or implied presence of other people” (p.177). Social behaviour is characterised by norms, which are patterns of behaviour typical or representative of a group or a society (Reber & Reber, 2001). It turns out that norms are important sources for conformity, as people in social situations tend to behave as the majority behaves.
Whilst there is a tendency to conform to group norms, conformity is reduced when one is not being observed. The driving force behind conformity can be the desire to obtain social approval, or to seek validation of one's social identity linked to being a member of a specific group.

3.2.2.2 People in groups

From the perspective of social psychology, people who define themselves collectively as such define a group. Group attitudes and behaviours are guided by the norms of the group (Vaughan & Hogg, 2002, Chapter 8, pp. 199 - 229). Group membership often includes the sharing of goals, some level of mutual interdependence and influence, and traditionally face-to-face interaction, although the widespread use of electronic media, in particular the World Wide Web and mobile phone technology, has called in to question the requirement for face-to-face interaction to be necessary for group behaviour.

For a number of reasons, in general people tend to perform well-learned tasks better in the presence of other people, but conversely will perform new or poorly learned tasks worse when in the presence of others. Allport (1927) termed this effect social facilitation, and suggested that the mere presence of others not involved in the task could influence the person performing the task. This effect has been demonstrated for a number of species, not just our own.

In the 1960's Zajonc (cited in Vaughan & Hogg, 2002) offered an explanation for social facilitation in that the physical presence of others instinctively caused physiological arousal that provided motivation for habitual performance. If the task were well learned, then the motivation would facilitate good performance, but if the task were novel or poorly learned, then the motivation would facilitate poor results.

Social behaviours can also be explained by accepting that people are active agents, and that behaviour occurs after some degree of cognitive analysis. Such cognitive analysis is described by social cognitive theory.

3.2.3 Social cognitive theory

Social psychology (Eiser, 1980) seeks to answer simple questions about observed behaviour such as why people act towards each other in the ways that they do, why people hold and report certain attitudes and why people
accept certain societal and organisational roles and then conform to their particular rules of conduct. According to Bandura (1986), “New technologies are transforming the nature and scope of human influence” (p. xii) and as such Bandura has adopted the broad social perspective of social cognitive theory to explain the transformation. Behaviours within, around and towards organisational systems, in particular seemingly irrational behaviours such as resistance to IT-driven systems are behaviours that can be focussed upon through the perspective of social psychology.

During the second half of the twentieth century the so-called cognitive revolution within psychology suggested that people mediate the effects of environmental stimuli on human responses (James et al., 2008). The cognitive approach to social psychology (Eiser, 1980) is supported by some fundamental assumptions about people.

Most importantly, people are seen as individuals who actively process information, such that the individual experience of any stimulus depends upon how the individual interprets that stimulus. It is also assumed that the interpretation depends not just on attributes of the stimulus, but also upon the perceiver’s expectations and standards by which comparisons and categorisations are made. This perspective can be useful in explaining the variance in behaviours observed when employees within an organisation encounter the same phenomenon of an IS implementation.

Some authors combine the social cognitive approach with other perspectives in order to develop models capable of explaining the variance in some aspect of IS usage. Lin and Huang (2008) for example, combined social cognitive theory with the concept of task-technology fit to explain the variance in knowledge management system usage. Task-technology fit considers that the set of technological characteristics of the task is a major factor in determining the usage of the system in question.

Some IS research utilises techniques that relate people’s attitudes to their behaviour. This would then enable behaviour to be predicted by eliciting attitudes, and the work of Ajzen and Fishbein (Ajzen, 2005; Fishbein & Ajzen, 1980) is key in this area.
3.2.3.1 Predicting behaviour from attitudes

Attitude is a loosely defined term, even within psychology. It is used to indicate that someone has feelings of like or dislike, attraction or repulsion, and so on towards some issue, person or object (Eiser, 1980). Attitude describes an orientation directed towards something. Reber and Reber (2001) note that multiple definitions of attitude exist within the field of psychology on the basis that the domain of reference for this term is broad and complex.

The term originates from the Latin “aptitudo” meaning fitness, used to describe someone’s fitness to engage in some form of behaviour. Quantitative studies using attitudes as an indirect indicator of future system usage are widespread within the field of IS research (see for example the metastudy by Legris et al., 2003).

It is often assumed in IS research that the statements that a person makes can represent the person’s attitude towards something and that we can obtain a person’s attitude through their self-reports (Eiser, 1980). Further, we assume that attitudes can tell us something about how the person will behave in relation to those attitudes. This belief is a cornerstone of political and market research involving attitudes, where the information obtained is used to predict election outcomes and future sales, and as mentioned above, in survey work around IS.

Ajzen and Fishbein’s (Ajzen, 2005; Fishbein & Ajzen, 1980) TRA describes how the likelihood of behaving in a certain way correlates with a person’s intent to enact that behaviour, which in turn correlates with the person’s behaviour specific attitude. The behavioural intent is also influenced by the person’s assessment of how others expect them to perform, termed their subjective norm.

The effectiveness of a person’s behavioural intention, as it results from attitudes and subjective norms, depends upon the specificity of the beliefs to the behaviour in question, and also how stable the beliefs are over time. Beliefs are antecedents to the constructs of ‘attitudes’ and ‘subjective norms’ in the TRA model.

Subsequent to the TRA, Fishbein and Ajzen (1980) found that to some extent the volitional control a person has over their behaviour, due to the
person’s beliefs about resources and opportunities, was also a factor in developing behavioural intention. The TRA was expanded to the Theory of Planned Behaviour (TPB) shown in Figure 3.1. As with the TRA, beliefs are antecedent to the constructs of ‘attitude, ‘subjective norms’ and ‘perceived behavioural control”. This perspective would seem to be highly relevant to the assessment of user behaviours in IS adoption, in particular in a mandated setting where volitional control is challenged.

Figure 3.1 Theory of Planned Behaviour

Bagozzi and Yi (1989) argued that the degree to which a person’s intentions were formed mediated the way in which attitude influenced behaviour in the TRA and TPB. When intentions were well formed, they mediated the effects of attitudes on behaviour, as described by the TRA. Poorly formed intentions allowed attitudes to have a direct influence on behaviour.

Some behaviour is explained if we consider that people process information about possible outcomes, which they strive to achieve. Such behaviour is termed goal directed behaviour.

3.2.3.2 Motivation and goal directed behaviour

According to social cognitive psychologists (Bandura, 1986), behaviour is “extensively regulated by its effects” (p. 228). People are inclined to repeat or adopt behaviours that bring some form of reward or positive consequence. The nature of the positive consequence can be a tangible external reward, but can also be some observed consequence in the future, or perhaps even to attain an opportunity that the person has created for himself or herself.
Individuals have the ability to process information about the likelihood of future outcomes, so they sometimes choose to adopt behaviours consistent with the self-perceptions of their capabilities and ability to sustain a course of action or to generate an outcome. Tolman (1923, cited in Bandura, 1986) first suggested that reinforcement actually builds expectancy, a cognitive outcome, rather than strengthens habits. Expectancy theory applied to an organisational context implies that organisational members operate in a way that would maximise, or help them attain, what they perceive as organisational rewards connected to certain work behaviours (Weiten, 2001).

Bagozzi (2007) argued that technology acceptance rests on a core of decision-making that could be described by the action of four basic constructs, i.e., goal desire, goal intention, action desire and action intention. These constructs form the basic stages between goal setting and striving to attain the goal, and according to Bagozzi (2007) this makes “goal-directed behaviour the centre of focus for user acceptance” (p. 250).

An individual’s assessment of his or her self-efficacy in interfacing with IS can influence how he or she behaves towards the IS. Changing self-efficacy is one of the aims of pre-implementation training.

3.2.3.3 Self-efficacy

Self-efficacy can be defined as “expectations that we have about our capacity to succeed in particular tasks” (Vaughan & Hogg, 2002, p. 121) and can in itself provide positive or negative motivation. According to Brosnan (1998) self-efficacy towards a computer related task is related to one’s level of anxiety towards the task, actual experience of the task and vicariously through observation of others attempting the task.

Opportunities to attempt a task, and to observe others performing the task in question, along with verbal persuasion can increase one’s self-efficacy and increasing self-efficacy is the basis of some IS training strategies. Compeau and Higgins (1995) found that higher self-efficacy correlated with both outcome expectations and performance in a learning task involving word processing.
Focussing upon IS implementation as innovation can put behaviours into perspective, and is related to the social cognitive approach. Roger’s (1995) work in this area is widely cited.

3.2.3.4 Social diffusion and innovation

Rogers’ (1995) Diffusions of Innovations (DOI) model is an application of the social cognitive concept of diffusion to the adoption of innovations within IS research. Bandura (1986) describes diffusion as a means of explaining how ideas and social practices spread within and between groups of people, and notes “extraordinary advances in the technology of communications … have transformed the social diffusion process” (p. 142). Because of the global influence of technology, social practices, ideas, values and behaviours are being modelled around the world.

According to the diffusion process (Bandura, 1986, pp.142 – 181), new ideas are initially introduced to people through some form of notable example. Initially, apart from the behaviour of so-called ‘early adopters’, the uptake of a new idea can be slow. Through observation of the behaviour of early adopters, others form opinions as to the benefits of the new idea, and it can fail to be further adopted, or if seen as useful or desirable enough, can be further adopted. This stage of further adoption typically occurs at an accelerated rate until the majority of the potential adopters have taken on the new idea, at which stage the uptake slows.

Previous research has been focussed upon the individual characteristics of those in the different stages of adoption, particularly in the advertising world where there is a vested interest in getting people to adopt new products, and early adopters are desirable for a new product. The new innovation is considered to pass through a number of ‘stages’, shown in Figure 3.2, before it can be either adopted or rejected. Davis’ (1989) TAM stages are also shown for later comparison.

In the knowledge stage, a potential system user finds out about the system and gains some initial understanding of how it works. Next, in the stage of persuasion, a user forms either a favourable or unfavourable attitude to the system in question. In the final stage before actual use, the decision stage,
activities are undertaken which lead to the adoption or rejection of the innovation. In the implementation stage, if a potential user indeed gets this far, the system is actually put to use. Finally, in the confirmation stage, reinforcement for a decision to adopt the system occurs.

Figure 3.2. Stages of the Diffusion of Innovations model with Davis’ (1989) Technology Acceptance Model stages mapped

This conceptual framework was adopted in the data-gathering phase of this study. It served as a preliminary framework for accommodating the longitudinal observations and interviews, without the necessity to adopt a particular theoretical stance whilst the implementation phenomenon was being described.

Social cognitive theory identifies two processes within social diffusion, each with different determinants. The process of acquisition, in which knowledge about the new idea is gained, is seen to be a function of modelling where people observe the new styles of behaviour associated with the idea, and make a preliminary evaluation of its likely effects. Adoption, based upon the notion of observational learning, describes the process whereby new ideas are promulgated, and is seen to rely on a number of psychosocial factors.

In the early stages of diffusion, the process of symbolic modelling is the main way in which new ideas are dispersed, and people get early exposure to the potential risks or benefits. In societies, this is often done through the media, but this may not be the case for new IS within organisations where the idea and its evaluation may occur at one level, whereas the users of the IS may be at a
different level, and the use of the new IS may be mandated. People who model new ideas often motivate as well as inform, partly because they weaken the behavioural constraints of more cautious potential adopters (Bandura, 1986, p. 146).

Obstacles to the process of idea diffusion have also been studied. Resistance to new ideas can stem from a requirement to expend energy to learn new behaviours associated with the idea adoption that an individual is reluctant to expend. Negative behaviour directed towards new ideas, or within the scope of this thesis, towards IS within organisations, could also be explained by the concept of psychological reactance discussed in the next section.

3.2.4 Psychological reactance
This section is extracted from a paper included in the proceedings of the IFIP8.2 Conference held in Salford, UK in 2007 (Matthias, Miller, Caputi, Jayasuriya, & Willis, 2007), and also a paper prepared for the APS Conference held in Hobart, Australia in 2008 (Matthias & Caputi, 2008).

According to Brehm (1966), if a person’s freedom to behave as they choose is threatened in some way, then they will become motivationally aroused to either re-establish the lost freedom, or to ensure that there is no further loss. This hypothetical motivational state is referred to as psychological reactance.

While resistance is defined as behaviour against compliance, psychological reactance is a motive to behave to recover a lost freedom, and may result in behaviour against compliance. It is argued that negative behaviours, which contribute to the poor record of IS implementation, likely contain some element of psychological reactance and that the latter may be brought about by threats directly or indirectly related to the implementation at hand.

An understanding of the interactions between system implementation, broader contextual influences such as organisational climate and the formation of reactance, offer an opportunity to base interventions in strategies that avoid
or minimise the motive to adopt negative behaviours. This offers opportunities to enhance the implementation of IS in organisational settings.

3.2.4.1 Introduction

Resistant behaviour associated with the implementation of IS has been described by a number of authors. Ang and Pavri (1994) considered ‘resistance to change’ as an end user attitude operating at an individual level within an organisation. Lapointe and Rivard (2005) suggest that resistant behaviours occur as a result of perceived threats that arise from the interaction between initial conditions and a given phenomenon, in this case the implementation of an IS.

Examples of resistant behaviours included passive resistance, sabotage, not using the system and oral defamations. Hartwick and Barki (1994) also observed that some users begrudgingly accepted that they would have to use a mandated IS, behaviour that they termed ‘unwilling compliance’.

It is suggested that, in an organisational setting, ‘negative’ behaviour directed at an IS may also be situationally generated, perhaps as a reaction to an act of mandate, rather than as a result of aspects of the system in question. Brehm’s (1966) Theory of Psychological Reactance is proposed as an explanation for such negative behaviour, i.e., when a specific freedom is eliminated, or threatened with elimination, an individual may be motivationally aroused to recover the freedom.

The freedom threatened in the case of mandated IS usage could be a loss of job control, or perhaps the replacement of an existing system to which a user has some level of investment or allegiance. Reactance could be expressed in negative behaviours such as incorrectly or inefficiently using the new system so as to preserve the sense of control.

Psychological reactance is seen as a motive to behave negatively towards something that the individual focuses upon, i.e., the object is not necessarily part of the causal mechanism. This is different to the concept of resistance, which describes negative behaviour towards a phenomenon such as an IS implementation (Marakas & Hornich, 1996). Recognising psychological reactance in an organisational setting should enable us to formulate strategies
to minimise or negate its motivational impact, and thereby improve the success rate of systems implementation.

3.2.4.2 Psychological reactance

According to Brehm (1966), most of the time people hold a belief that they are relatively free to behave in the ways that they choose. It can be argued that given some level of knowledge about oneself and the environment freedom to choose is potentially beneficial in terms of survival. It follows then, that if a person’s freedom to behave as they choose is threatened in some way, then they will become motivationally aroused to either re-establish the lost freedom, or to ensure that there is no further loss. This hypothetical motivational state is referred to as *psychological reactance*.

Brehm further argues that the size of the psychological reactance is a direct function of (1) the salience or importance of the threatened freedoms, (2) relative proportion of free behaviours that are threatened or eliminated, and (3) where there is perceived threat only, the size of the threat. In any social situation, there will always be a number of competing pressures influencing the way that people choose to behave. If, for example, the magnitude of reactance is less than the social pressure to comply, then the person will do what is suggested, albeit in a less enthusiastic way than if there was no reactance component.

Psychological reactance is a motive, which may result in observable negative behaviour. It is proposed that reactance is a likely underlying motivational state to a number of non-compliant activities that potential IS users engage in, and perhaps the source of dissatisfaction experienced by users when they are seen to comply with usage at a minimum level.

Whilst Brehm’s theory does not emphasise individual differences (Brehm & Brehm, 1981, pp.213-228), it can be accepted that different life experiences would generally shape an individual’s perception of what freedoms they have and value as being important. This perception would have direct influence over the amount of reactance aroused in a given situation.

It is reasonable to assume that in a given context, such as an organisational setting into which an IS is introduced, there would be individual
differences in the amount of any psychological reactance generated by the setting. People would experience the IS with different levels of reactance induced motivation.

3.2.4.3 Reactance in an organisational setting

People in an organisational setting are exposed to many influences. For the majority of workers their “psychological workplace” (Statt, 1994, p.25) is an organisation of some type, and organisations are characterised by three common attributes. People within organisations share a social identity or sense of belonging in some way. The activities of the people in an organisation are coordinated so that they interact with each other in what is supposed to be a supportive and complementary manner. The reason for the coordinated interaction is to accomplish the stated goals of the organisation.

Organisations are not just about what people collectively do, but inherently involve who the individuals are, what they want, or how they feel about things. The freedom to choose what to do and how to do it is likely to be one important aspect of work in organisations, and threatening such freedom can be the source of psychological reactance.

Given these organisational influences, looking at IS from an organisational perspective thus brings into focus social factors, as well as business and technology factors, organisational behaviour and organisational culture and climate. Past research has identified a number of aspects of organisations that contribute to the success of IS implementation.

Rivard et al. (2004) discuss system adoption in terms of organisational transformation and identify four pieces of the transformational “puzzle”, namely, strategy, structure, the IS itself in terms of its place in the organisation, and aspects of leadership. Within the framework defined by these factors however, live the perceived freedoms of individual users that may or may not be disrupted by any implementation activities. Any perceived loss of freedom, whether it arises from the nature of the IS, the implementation or from existing social factors, can result in negative behaviours towards the implementation.

If we look at this organisational landscape through the lens of reactance, we can see that there are many situations where individuals can experience
actual or threatened loss of freedom when new systems are introduced into a work environment. Broeng (2006), for example, suggests that the task of ERP implementation is typically bigger than initially estimated, and one of the major issues is that of “ownership”. The new system will likely need to be re-sold internally as often the nature of jobs can be changed, and “uncommitted people can derail the process very quickly” (p.35). Lack of “ownership” of a mandated system, e.g., where the user cannot foresee that they can comfortably integrate the system within their work practices, is likely to be perceived as a threatened loss of freedom and hence will trigger reactance.

In terms of systems research, it is likely that researchers have noted reactance-driven behaviour, but not recognised it as such. In a study of safety culture attitudes in a highly regulated environment (Harvey, et al., 2002) the authors describe hierarchical situations whereby management expect “compliance with regulations” and utilise downward instruction, whereas shop floor workers are characterised as “being resigned to high levels of prescription” with a minimum of participation in the workplace (Dake, 1992, cited in Harvey, et al., 2002, p.21). The workers are described as being “fatalist” (Dear, 1995, cited in Harvey, et al., 2002, p.21) and their varied adherence to safety system requirements is attributed to this mindset.

Such an organisational setting would likely generate differing levels of reactance induced motivation, and varied levels of adherence to safety systems by the workers might be better understood through this lens; an apparent loss of freedoms brought about by adherence to the new safety system expectations. This observation suggests that considering organisational behaviour as a special combination of factors might be a useful perspective.

3.2.5 Organisational behaviour

Organisational behaviour, a special combination of groups and individuals moving in a coordinated way towards some end goal, has been explained through numerous perspectives, including some of the psychological ones described in previous sections of this chapter. Organisations themselves have been looked at metaphorically (Morgan, 1986) as machines, organisms, cultures, political systems, and in numerous other ways.
The metaphor of the machine is common within manufacturing organisations given the nature of the work, and the qualifications of the people who work there. People within the organisation arrive and leave at set times, perform set functions, can be replaced if they fail to perform, and management thinks in terms of outputs, efficiency and unit costs.

Some of the perspectives already discussed in this chapter have been used to explore the behaviours of people in organisations. According to Luthans (1992), the study of organisational behaviour is more specific than the broader approach of psychology in that it seeks to offer management ways to predict and control human behaviour within organisations.

This perspective highlights two significant factors within organisations that need to be considered. First, the people involved in organisations are often there to do things, for money, and second, that there are groups and individuals who are charged with directing other groups and individuals to do the organisation’s work. In order to fully understand the behaviours of people within organisations it would seem necessary to consider broader organisational factors which may include aspects of culture, group dynamics, job stress, power and politics. It is also evident that the nature of work has changed over time.

3.2.5.1 The changing nature of work

According to Statt (1994) “work is the most important social activity people engage in outside the home” (p. 397). This longitudinal study was carried out within a steel works that had been operating on the site since 1936, and some of the employees encountered had more than 30 years of continuous service on this site. It was expected that their experiences of work, of systems, with computers, and with IT-enabled IS would flavour their behaviours to some extent.

Donkin (2001) suggests that the nature of work has changed much over the last fifty years. Whereas in the past we understood work to be what we were paid to be doing, today it is sometimes difficult to think of what we do as work, and often the benefits to our employer are not all that clear.

In the past we left our work behind, today with the widespread use of computers and mobile phones the boundary between work and home are
sometimes blurred. With respect to computers and IT, Donkin (2001) is not sure that the promised rewards of their use have been realised, “… instead they (working people) find themselves ensnared by the demands of communication. Voice mail, e-mail, the pager, and mobile telephones are suffocating the working environment” (p. xxiii).

3.3 Conclusions

The material covered in this chapter has by necessity only scratched the surface of a number of the perspectives presented, especially in the area of social behaviour. Accepting that, it was considered necessary to expose the reader to these perspectives in order to provide the background for the IS specific models and perspectives covered in Chapter 4.

It is likely that within an organisation elements of culture and climate would contribute to the context and outcome of an IS implementation within an organisation, and research questions 2, 3 and 4 need to be evaluated with reference to these factors. Similarly, the possibility that psychological reactance generated from within the organisation, but not necessarily linked to the IS, could influence the implementation outcome needs to be considered. Each of these factors needs to be captured in a conceptual model for IS implementation.

Chapter 4 discusses ways in which researchers have explored IS implementation, and in particular IS implementation within organisations. Whilst the main focus is upon IT-enabled IS, recent studies of successful safety systems and the types of organisations that support them is also presented. It may be that IS implementation success requires a special combination of organisational factors to enable success, and that failure may be linked to the absence of such factors. This body of work relates directly to research questions 1 and 2 and highlights models that seek to explain specific aspects of IS implementation, yet sometimes fall short of defining the utility of such models to understanding the overall IS implementation success.
Chapter 4

The interactions between people and information systems within organisations

“If you have great talents, industry will improve them; if you have but moderate abilities, industry will supply their deficiency.” (Joshua Reynolds, 1769).

4.1 Introduction

The intent of this chapter is to examine IS models that use facets of behaviour to explain IS implementation outcomes. These models relate to the IS and behaviour discussed in Chapters 2 and 3. Of particular interest are the frameworks within which previous research has been carried out, what assumptions have been explicitly or implicitly made by the researchers and how useful in a practical sense are the outcomes to organisations and enterprises.

Research about organisations and the IS that support them is summarised, including recent research about occupational health and safety. Apart from any desire on the part of organisation’s management to look after a valuable asset, their employees, there are increasingly more and more laws and legislations making it mandatory for organisations to provide safe systems of work. This has resulted in numerous studies of IS in a safety context.

Reason’s (2000) research into safety systems within organisations suggests that there is something distinctive about organisations that support successful safety systems. This position further suggests that implementation success may involve much more than carrying out a successful IS project and managing the users, and may involve broader, organisational factors. The perspectives covered in this chapter lead into theoretical implications, and the need for a conceptual model, which are discussed in Chapter 5.

4.2 Organisations and information systems

Ginzberg (1981) observed that up until the start of the 1980’s, considerable effort had been put into attempting to understand the
organisational characteristics that would contribute to the success or failure of systems development efforts. Organisational characteristics are difficult to change, and so much of the effort was directed at describing and measuring the development activities.

Implementation problems were often linked to resistance to change on behalf of the intended users, and numerous theories to explain such resistance were offered (Markus, 1983). According to Markus (1983) some of these theories were offered by practitioners as informal rules of thumb, whilst some supposedly relied upon scientific theory or research findings. Of the theories available, Markus (1983) wrote, “Some are mental models that form the basis for actions but are rarely articulated or explicitly examined for consistency and completeness; others are more formal models with clearly spelled-out connections” (p. 430). This mix of practical and research-based knowledge can be observed in implementations today.

Kling and Iacono (1984) examined mature IT-enabled IS and found that the metaphor of organisational politics helped them to understand aspects of the system’s success. They suggested, rather than the system satisfying the organisation’s needs being the reason for its longevity, that key organisational players used the notion of the system’s efficiency to push the system in directions that increased their own organisational power and control. Systems fit within the organisation, and as such, need to be looked at within this context. The notion of fit as success will be further examined.

Gasser (1986) observed a number of strange phenomena related to the use of computers within organisations, for example, in the way that people knowingly use “false” data to obtain desired analytical results by tricking their systems, and how organizations come to rely upon complex, critical computer systems despite significant, recurrent, known errors and inaccurate data (p. 205). Gasser argued that the very use of computers within organisations presented people with numerous low level problems on a day-to-day basis.

Whether or not such problems are addressed depends upon the resources that people are able to draw upon, and the relative organisational power that they command. Some users are not in a position to access the assistance that they know they require to benefit the organisation.
Gasser (1986) even suggested that it was the “fluid organisation of work around computing” (p. 221) and not the technical design of the system per se that was the key factor in shaping the use of computers in organisations. Whilst Gasser’s observations were recorded twenty years previously, preliminary observations made at the study site (Matthias, 2005) suggest that they are still relevant to this thesis. Evidence was also observed that different groups, consistent with Orlikowski and Gash’s (1994) concept of technological frames, held differing views of what seemed to be the same IS.

4.2.1 Technological frames

Orlikowski and Gash’s (1994) concept of technological frames, or interpretations of IT, was introduced in Chapter 1. When the technological frames of the key groups in an organisation differ, then it is possible that there will be problems with the use of the technology in question, and therefore understanding people’s interpretations of technology is important in understanding their interactions with the technology.

Key groups within an organisation with respect to IT implementation would include managers, IS designers and the users themselves. This perspective shares along with other social cognitive theories the premise that people interpret their world and consequently act upon that interpretation, and suggests that organisational members “make sense of and assign meaning to their environment, organization, and tasks” (Orlikowski & Gash, 1994, p.176).

The frames concept can be extended to describe how people become stuck within their frames and find it difficult to reframe organisational aspects, for example a new IS, when necessary. Also, Orlikowski and Gash (1994) suggest that within organisations there is likely to be the existence of shared ‘core’ beliefs, consistent with Dalmau’s (1994) description of organisational culture. These core beliefs can generate behaviour that can support or hinder implementation.

Further, according to Orlikowski (2000), when a user chooses to use a technology, they make a cognitive choice about how they will interact with that technology. The concept that a user, or potential user, makes a choice about IS use is important when considering IS within an organisational context. Choice
within an organisational context might depend upon whether the IS use was voluntary or mandated.

4.2.2 Mandatory and volitional behaviour

The use of a particular IS within an organisation will be influenced by the degree to which it is mandated, although the degree to which any system within an organisation is mandated is difficult to define for all users. For this study, use of the IS was mandated. The legacy systems were in fact disabled prior to the new IS being activated so for most users, there was no alternative other than to use the new IS.

The use of a mandatory Safety Reporting System, SRS, at the study site was investigated prior to this study (Matthias, 2005). It was found that usage frequency was not a sufficiently meaningful variable to capture the usage of SRS as the degree to which SRS was used varied from department to department according to the level of mandate across the site. Even within a particular department, some people obeyed the mandate whilst others chose not to do so. Combining a number of measures to come up with a multi-dimensional measure of how well SRS was used better described the adoption of SRS. The measures chosen to describe the quality of SRS use were timeliness, completeness and issue close out.

Similarly even a direct mandate, such as “all monthly credit card reporting will be done via new system X” might mean that some employees get another employee to do their monthly reporting, or get someone to assist them, so you could not be sure that even by obeying the mandate, that certain credit card holders were even using system X.

Fully mandating the use of an IS within an organisation can bring about two behavioural consequences. First, as has been described in Section 3.2.6.2, there is the possibility that mandated behaviour might be perceived as a loss of freedom, and so generate motivation to recover that freedom through psychological reactance.

Second, mandating IS use can bring about cognitive dissonance within the user if the mandate generates inconsistent attitudes for the user (Festinger & Carlsmith, 1959). In order to lower the dissonance, over time, some users
would change their attitudes to either the mandate or the IS. Dissonance Theory has been applied in many studies, and although the findings are largely supportive of Festinger and Carlsmith’s theory, the results are sometimes mixed (Weiten, 2007).

Rawstorne (2005) compared mandatory and voluntary usage of IT in organisational contexts and found that simple models explaining usage intention explained more of the intention variance in the mandated condition than in the voluntary condition. This finding was attributed to the observation that mandated behaviour may be more stable than voluntary behaviour in the early part of an implementation. It is generally in the early stages of implementation that organisational support and focus are at the highest level, which may help to explain the observed stability.

Few studies have focussed on implementation outcomes over a long time frame. Observing an organisation over a time span of months to years would likely detect changes in organisational focus. One area where systems are generally mandated strongly within organisations, and where focus is maintained over long time frames, is occupational health and safety. Reason’s (2000) work in this area is widely cited.

4.2.3 The Human Error Model

Professor James Reason is a leading researcher in the area of occupational health and safety, and specifically in studying accidents and injuries within organisations, including the study organisation. Reason (2000) argues that accidents are related to human error, and that the problem of human error can be looked at in two ways, i.e., the person approach and the systems approach. According to Reason, each approach “has its model of error causation and each model gives rise to quite different philosophies of error management” (p. 768).

In the Person approach, Reason describes how unsafe acts, i.e., errors and procedural violations that cause accidents, are considered to arise primarily through the unacceptable mental processes of the individual (2000, p.768). The individual is blamed for inattention, carelessness or recklessness in carrying out their duty and interventions aimed at reducing the unwanted variability in human
behaviour are used to rectify the situation. A number of the IS studies described in Section 4.3 focus upon the person, and look to explain, through qualitative models, the variation in IS usage in order to improve the success of IS implementation. Reason links organisations that use the Person approach with poor safety performance.

The Systems approach that Reason advocates rests on one fundamental premise, i.e., “humans are fallible and errors are to be expected, even in the best organisations” (2000, p. 768). Errors are thought of as consequences of broader, organisational, system-related issues rather than as causes.

Important technologies within an organisation should possess barriers and safeguards to ensure that they run reliably, and when an adverse event occurs, organisations should ask how and why the barriers and safeguards failed. By focussing on the individual origins of error as a person problem, the organisation can miss the opportunity to identify the problems from a systems context.

From a systems perspective Reason has looked at organisations that operate in hazardous environments yet have fewer than expected adverse events. These organisations were the nuclear aircraft carriers of the US Navy, nuclear power plants and air traffic control centres and are characterised by their “complex, demanding technologies and their need to meet periods of high demand” (Reason, 2000, p. 770). Reason has distilled the attributes of these highly reliable organisations into the salient organisational characteristics shown in Table 4.1.

According to Reason (2000) highly reliable organisations can be thought of as “prime examples of the systems approach” (p. 770). Given that such organisations need to remain chronically uneasy, and that this is not a comfortable state for people to work in, then the organisational culture to support the unease becomes very important. The organisation provides the employees with constant reminders of the need to be afraid and with the training to deal with unexpected events. Highly reliable organisations look to grow a culture that supports employees to constantly strive to improve their systems and make them as robust as possible, i.e., a culture that supports systems success, not an organisation that just implements systems.
[Note: I have retained Reason’s use of the term culture here, but in light of the argument offered in Chapter 3, perhaps reliable organisations maintain a climate that supports systems, believing that in the long term they will develop a culture that will sustain the climate implicitly.]

Table 4.1 Attributes of highly reliable organisations

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems are dynamic</td>
<td>Safety is preserved by timely human adjustments</td>
</tr>
<tr>
<td>Non-events are important</td>
<td>“Successful” outcomes rarely call attention to themselves. We can learn from near misses</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Ability for the organisation to reconfigure itself to suit local circumstances. In the routine mode they are controlled by the conventional hierarchy but in an emergency control shifts to the expert on the spot</td>
</tr>
<tr>
<td>Shared vision</td>
<td>Members understand the big picture. Essential to support the adaptable behaviour required in times of emergency</td>
</tr>
<tr>
<td>Preoccupation with the possibility of failure</td>
<td>They expect errors so they train their workforce to recognise them and rectify or recover from them. Instead of making local repairs, look for system reforms.</td>
</tr>
</tbody>
</table>

After Reason (2000)

Reason’s attributes of a highly reliable safety organisation, shown in Table 4.1, can be translated into the attributes of a hypothetical, highly reliable IS implementing organisation. The organisational systems that support the implementation would be dynamic and supported by timely human adjustments. Previous successful implementation outcomes would be analysed for learning relevant to future implementations.

The organisation would adapt to the special requirements of a major implementation and control would transfer to the local IS experts if needed. All employees would be exposed to the organisational ‘big picture’ for the new system. Finally, the implementation team would expect errors, and so train employees to recognise and recover from them.

Reason suggests that we should view a failure within an organisation, which leads to an accident, from a system approach and not from a person approach. This is relevant to this study as one of the central questions, i.e., “Why do projects fail? It would seem that the answer to this question depends
on the perspective of the observer, and their definition of success”, addresses this issue.

If we adopt the Person approach, that failures can be the result of the behaviour of individuals, then our research into IS failure and success would focus upon such behaviour. If we concede that there could be similarities within organisations between Reason’s systems failures that can lead to accidents, and the sorts of IT-enabled IS studied in this research domain, then it is also possible that the success or failure of such IT-enabled IS could depend upon upstream systematic factors.

In order to explore these possibilities, it is useful to look at research into organisational or upstream systems that support the embedded IS, and the people interactions that they facilitate. This has become a major area of research in itself.

4.3 Research about people and IT-enabled information systems

The interaction between people and computers has become an area of study in its own right within experimental psychology (van der Veer & Mulder, 1988) and has obvious importance for the IS research discipline. Interacting through computer screens presents people with new ways of visualising information, new ways of representing information and possibilities within systems in areas such as artificial intelligence and expert systems. Broader, systems related behaviour, where the IT is an enabler of the system, has been researched widely through a number of perspectives.

4.3.1 Early studies

Experience with IT-enabled systems up to the 1980’s was that it was common to observe varied outcomes when IT-enabled systems were introduced into organisations and enterprises. As has been previously mentioned, investigators such as Voss (1988) looked for the source of implementation problems either within the organisation as a whole or within the new systems themselves. At this stage there were few studies focussing on the experience of the people who interacted with the systems.
The increase in research that has focussed on people as systems users, much of which has followed on from the seminal work of Davis (1986) into ‘user’ models that could aid in predicting implementation success, has been maintained since the mid 1980’s. Despite this continued research focus, there still remains an apparent gap between research outcomes and the varied experience of organisations with implementations. Much of the research focus has been upon certain facets of IS implementation such Davis’ (1986) focus upon use without linking the facet to implementation outcome.

4.3.2 The Technology Acceptance Model

Davis (1986) conceptualised and demonstrated through correlation that a person’s intention to use novel software was more likely when the potential user judged the software to be both easy to use and useful. Davis’ TAM, which was based upon Ajzen and Fishbein’s (1980) TRA, has facilitated numerous further studies based around its constructs (Legris et al., 2003).

Davis (1986) introduced his empirical study of the acceptance of IT by reflecting on how anticipated performance gains in industry were often not realised due to the reluctance of users to accept and use available IT systems. He also suggested that research had been constrained by the lack of high quality measures for what he called the key determinants of user acceptance.

In a two-part study, Davis (1986) first looked at the factors influencing software use by 120 users of two systems at IBM’s Toronto development laboratory, and second, assessed how 40 paid student participants reacted to two new software packages. In this part of Davis’ study, the participants were given a one-hour ‘hands-on’ demonstration of two new software packages, and then assessed via questionnaire about their perceptions of how easy the software was to use, how useful they thought that it would be to them and finally their intention to use it.

Davis (1986) suggested that two factors, perceived usefulness (PU) and perceived ease of use (PEOU), were key predictors of either usage, or intention to use software. Davis defined perceived usefulness, as “the degree to which a person believes that using a particular system would enhance his or her job performance” and perceived ease of use as “the degree to which a person
believes that using a particular system would be free of effort" (p.320). The study also suggested that PEOU influenced usage indirectly through PU.

Davis' (1986) model, shown in Figure 4.1, was one of the first that focussed quantitative methods onto the issue of IT-enabled systems adoption. In the early laboratory studies ‘anticipated usage frequency’ was chosen as the dependent variable that Davis’ models explained. Since Davis’ early work, there have been numerous studies that have extended the basic TAM.

![Figure 4.1. Davis (1986) Technology Acceptance Model](image)

**4.3.3 Extensions to the Technology Acceptance Model**

Davis, Bagozzi and Warshaw (1989) expanded the original TAM study to look at the model’s ability to explain behaviour after the software had been used as well as intent to use. Essentially, PEOU and PU are considered as playing mediating roles between antecedents to attitude or external variables, and the probability of system usage. Their study found that peoples’ perceptions of usefulness influenced both their intentions to use software and its subsequent adoption, explaining more than half of the usage variance after 14 weeks. This model has been frequently evaluated and further researched since its proposal.

In their study of the antecedents of PU and PEOU, Venkatesh and Davis (2000) conducted longitudinal field studies in four settings, i.e. a medium-sized manufacturing firm, a personal financial services department, a small accounting services firm and a small international investment-banking firm. For each setting, intention and the usage determinants with respect to a proprietary software were measured initially and then usage was measured by self-report at
three time intervals i.e., pre-implementation, one month post-implementation and three months post-implementation.

Venkatesh and Davis (2000) found that they were able to increase the explanatory power of the TAM by considering both social influence (subjective norm, voluntariness and image) and cognitive instrumental processes (job relevance, output quality and result demonstrability), essentially the components of, or perhaps antecedents to, PU and PEOU. Their model is shown in Figure 4.2, and is often referred to as the TAM2.

The formulation of the TAM2 reflects the theme of many such studies. Researchers were looking for antecedents to PU or PEOU or attempting to include variables that would reflect the local context. In a recent study of the TAM in a police setting for example, Colvin and Goh (2005) also used focus groups to formulate and pre-test for likely important factors, and found that a TAM supplemented with the context significant factors of information quality and timeliness enabled them to achieve better explanation of uptake of a new computer technology than could be obtained with the TAM alone.

![Figure 4.2. Venkatesh and Davis' (2000) modified Technology Acceptance Model (TAM2)](image)

Ventakesh et al. (2003) reviewed eight prominent models of user acceptance and formulated their unified theory of acceptance and use of technology (UTAUT) based upon elements from across the eight models,
basically constructing a model that maximised the new model's predictive power of usage variance. The basic concept underlying the models reviewed, and hence the resulting UTAUT model, is shown in Figure 4.3, with the ultimate goal being to understand and explain the variance in usage of the chosen system.

![Figure 4.3. Basic concept underlying user acceptance models](image)

Venkatesh et al. (2003) argued that researchers often faced a choice of models explaining the variance in usage or intention to use a system. They identified a need to review and synthesise from these models a unified view of technology acceptance. Their unified model is empirically constructed, not theoretically justified, and was constructed from elements of a number of perspectives: TRA, TAM, a Motivational model, the TPB, a Model of PC Utilisation, Roger's (1995) DOI and elements of Social cognitive theory.

![Figure 4.4. Venkatesh et al.'s (2003) UTAUT model](image)

Venkatesh et al's (2003) research model is shown in Figure 4.4, and as can be seen, incorporates components of other models combined into a
‘comprehensive’ model. The subsequent model was empirically validated and reportedly able to explain up to 70% of the variance of usage intention.

Venkatesh et al. (2003) cite some important limitations with their model. The authors operationalised each of the model’s core constructs by only using the highest loading items from each scale and report that such ‘pruning’ can lose facets of the constructs and threaten content validity.

Venkatesh et al. (2003) recommend that the measures for UTAUT be considered as preliminary only, and that future work should identify and test boundary conditions within which this particular unified model might be valid. Importantly, the study concludes that “while it is often assumed that usage will result in positive outcomes, this remains to be tested” and that “little or no research has addressed the link between user acceptance and individual or organizational outcomes” (p.470). Specifically, future research should examine the degree to which IT systems liked and highly used by users are considered successful from an organisational perspective.

Other studies using the TAM have generally reported moderate success in predicting or explaining IT system usage. Taylor and Todd (1995) studied 786 potential users of a computer resource centre using the TAM and two variations of the TPB, and found that all three models performed well in terms of fit, and were roughly equivalent in terms of their explanatory power. Roberts and Henderson (2000) used the TAM to investigate the use of computers by 108 government workers in the Australian Public Service and found moderate support for the model. Intuitively the model makes sense: in the absence of other factors, a user would be more likely to take up or continue to use IT that they perceive is both easy to use and useful to them.

Legris et al. (2003) conducted a review of the usage of the TAM between 1980 and 2001 and examined 22 studies. Their overall finding was that the TAM was generally able to explain about 40% of the variation in system usage, but that the results were not totally consistent or clear. Their conclusion was that often there were significant factors not included in the models. In 11 of the 22 studies examined, usage was measured via self-report, typically with 2 or 3 items about frequency of use and the amount of time spent on the system. Only one study used a system generated usage measure.
There are numerous studies that use the TAM as the basis for including local or study specific external variables. Hong, Thong, Wong and Tam (2002) studied the use of Hong Kong University’s open library by 585 users with a TAM based model, and developed a research model shown in Figure 4.5. Factors included were computer self-efficacy, knowledge of search domain, relevance, terminology and screen design as components of PU and PEOU.

![Figure 4.5 Hong, Thong, Wong and Tam’s (2002) modified Technology Acceptance Model]

Whilst models such as Davis’ (1986) TAM have generally focussed upon one facet of implementation such as usage frequency, little work has been done to demonstrate how factors such as usage relate to overall systems success. Jaspersen et al. (2005) have addressed this in their study of post-adoptive behaviours.

4.3.4 Conceptualisation of Post-adoptive Behaviours

Jaspersen et al. (2005) have offered a ‘comprehensive’ conceptualisation of post-adoptive IT use based upon the observation that users typically only use a narrow set of the available features of IT-enabled work systems, and that overall systems success can be improved if users are encouraged to expand their usage. Significantly, the researchers suggest, “that most ERP life cycle models lack an explicit post-adoption stage” (p.526), and because of this
failures tend to be attributed to inadequate training and/or inadequate change management.

Jasperson et al. (2005) identify three aspects of post-adoptive IT use, i.e., prior use, habit and a feature-centric view of technology, that have been generally overlooked in previous studies as the basis of their model. A feature-centric view of technology was chosen on the basis that researchers tend to focus on 'the IT' as a whole and not as a collection of specific feature sets, although the point was made that “a simple increase in the number of features used may not necessarily correlate with an increase in performance outcomes” (p.529). Jasperson et al.'s conceptual model is shown in Figure 4.6.

Figure 4.6. Jasperson et al.'s (2005) conceptual model of post-adoptive behaviour

Jasperson et al (2005) drew upon theory from Orlikowski and Gash's (1994) concept of technological frames and from Roger's (1995) DOI model in formulating their model. They also used the what they call the 'underlying premise' of Venkatesh et al.'s (2003) UTAUT which they then applied to post-adoptive behaviour, i.e., within a particular time and context, it is the individual's intention to engage in post-adoptive behaviour which best predicts an individuals actual post-adoptive behaviour.
Jasper et al.’s (2005) study poses a number of interesting questions, which the authors offer as a challenge to future research. What situational factors induce users to engage in self-learning intervention, as opposed to work-directed interventions? Researchers have tended to examine prior use simplistically in terms of frequency rather than capturing the patterns of use regarding the features of a particular system, but are specific patterns within particular contexts any more predictive of work system outcomes than use frequency? This aspect is addressed in this thesis.

Finally, given that most of the “post-adoptive life cycle is without management attention and direction”, (Jasperson et al, 2005, p.548), the authors recommend that organisations look to active management of the post-adoptive phase of IT-enabled work systems. Further, one area that needs addressing is the collection of data on the post-adoptive phase of projects to enable further study. The longitudinal design used in this thesis was selected to cover the post-adoptive phase, and beyond, in detail as Jasperson et al. (2005) have suggested.

4.4 Conclusions

Researchers have examined implementation and adoption issues with IT-enabled IS since such systems were widely adopted from the 1970’s onwards. Whilst some researchers have examined behaviour, they have mainly focussed upon the usage intentions of users or potential users. Organisational aspects have also been examined, but previous research has not tended to focus upon the roles of all of those potentially influential to implementation within an organisation. This is important for research questions 1, 2 and 3 as this omission implies that there are broader factors to consider when implementing IS and in explaining the implementation outcomes.

For the numerous correlational models based upon Davis’ TAM, and those variants that followed the TAM, there has been a tendency to explain only facets of implementation such as usage frequency without showing how the chosen facet relates to overall implementation success. It may be that understanding the implementation outcome requires an understanding of the many facets that define the implementation, and that these facets collectively
determine the outcome. Further, little work has been done to delineate the boundary conditions within which quantitative models that define certain facets are predictive.

The period after implementation referred to by Jasperson et al (2005) as the post-adoptive period has received relatively little focus in past studies. A longitudinal study that followed the course of an implementation through this period and beyond might illuminate the implementation phenomenon further, and this is one of the aims of this study. This longer time frame has implications for research question 4 in attempting to explain failure, and why do some projects fail.

A higher-level conceptual model that can locate previous research within the broader organisational context, as suggested in research question 7, would be a useful tool for both the researcher and the practitioner alike. For the researcher, the conceptual model would help to identify boundary conditions within which predictive models are salient. For the practitioner, the conceptual model could identify where implementation assistance should be focussed, and would allow practitioners to modify their project strategy according to particular organisational factors.

This chapter, and the previous two chapters, have raised a number of issues that need to be discussed before proceeding with the longitudinal study. Is an interpretive approach appropriate and useful in this area of study? It has been observed that there is not widespread agreement as to what IS implementation success and failure mean, and it is unclear if they can be defined in such a way that they can be quantified, for example to use as the dependent variable in a quantitative study. These issues will be explored in Chapter 5 as rationale for the proposed conceptual model.
Chapter 5

IS success, failure and the need for a conceptual model

“What puzzles us is that people remain so willing to speak and write as though the overall effects of computing technologies were a foregone conclusion, as though they could be determined a priori”.

5.1 Introduction

This chapter presents an argument for the position that the outcome of an IS implementation within an organisation is likely to result from aspects of both the IS, in particular the way that the implementation was approached, and aspects of the organisation into which the IS was being introduced. It would then follow that implementation success or failure would likely rely on and/or include the impact of factors outside of the IS or the implementation project effort. Further, models that focus only upon aspects of the IS without considering the organisational context within which the IS will be implemented will likely lead to an incomplete or incorrect prediction of the outcomes.

The notions of implementation success and failure lay within broader, philosophical questions concerning the social experience of change brought about through the use of technology and whether or not this technology is impacting on people’s work experience. Attewell and Rule (1984), for example, argued that virtually none of the studies carried out to date had shown evidence for “computer-induced social change” (p. 1185). This thesis will not cover these broader philosophical issues around change, but will focus upon the phenomena of systems implementation and the evaluation of implementation success and failure.

This chapter begins by addressing the method of reduction as a means of understanding IS implementation within organisations. It will be argued that the complexity of implementation within an organisation at first needs to be addressed in an interpretive way. This interpretive understanding is considered necessary in order to make sense of quantitative models that rely on reducing
this complexity, but often do so without explaining within what assumptions or boundary conditions the quantitative model is relevant. At first, the notion of an interpretive approach leading to a conceptual model seems at odds. It will be argued that the form of the conceptual model to be developed is such that it can highlight the reasons for site-specific outcomes, rather than to reduce these specific outcomes to a reduced summary.

Next follows a discussion of implementation success and implementation failure and how, if at all, such constructs can be quantified. Thinking about quantification leads into methodological questions. Can we, at best, hope to understand the process of implementation through explanatory models, or can we adequately quantify implementation to the extent that we can develop predictive models about implementation success? Gregor’s (2006) analysis of theory in IS is reviewed in this context.

Questions about quantification are followed by a summary of perspectives of implementation success and failure, and the introduction of the novel concept of tacit success. Finally, the need for a new conceptual model based upon a detailed longitudinal study of an IS implementation is argued. The model should incorporate elements of both the implementation effort and the broader organisation. The intent of the new conceptual model is to assist IS researchers in locating specific quantitative models within the broader implementation phenomenon, and to assist IS practitioners in making sense of the wealth of IS research that is now available.

5.2 The problem of reduction when studying organisational behaviour

One approach to understanding a complex phenomenon is to deconstruct it into easily understood ‘components’, and then to gain knowledge of the whole through summing the collective knowledge of the parts or components. This approach is often adopted in the area of IS research through developing quantitative models that explain the variance of some measurable component of the system. In order to make sense of the parts, it is necessary to have at least some concept of the whole, and where the parts fit into the whole. Bernsten, Sampson and Osterlie (2004) clarify this point succinctly:
The primary problem facing any empirical researcher is the wealth and complexity of the real world. The hypothetic-deductive research model ‘solves’ this by reducing the scope of the empirical enquiry. The controlled experiment is a good example of such a reduction, where the empirical world is reduced to a set of independent and dependent variables, subjects, and the treatments applied to the subjects. The ontology of this research philosophy is that the real world can be divided into small bits that can later be reassembled into a complete picture (p.3).

An issue with quantitative models within IS research is that often the researcher does not attempt to place the particular model back within the complexity from which it was reduced. This step is necessary to demonstrate validity and utility of the model, and will enable those working within the complexity, for example, practitioners, to make use of the research.

A positivist approach to studying IS has been widely adopted by researchers. In this context, positivist is used to convey an approach that seeks to describe and predict through the use of quantitative models, rather than focussing on hypothetical explanations (Leahey, 2004). Positivist studies generally require some level of reduction of the phenomenon under study, and selection of some facet to use as the dependent variable, in order to generate quantitative models.

5.2.1 Perceived shortcomings with positivist studies

There have been many studies of user behaviours associated with IS implementation in organisational settings. Though the methodologies used have been varied, there has been an apparent bias towards the adoption of a positivist (empirical-analytic) approach, and this bias is reflected in the proportion of studies published from a positivist perspective.

Positivist studies are commonplace in the IS research area, and more numerous than qualitative studies. Palvia, Pinjani and Sibley (2007) reported that of 737 articles published in Information and Management journal between 1998 and 2005, 13.98% were in the topic area of IS usage, with a focus upon predictive quantitative models. Only two articles (0.27%) addressed theory of management information systems and 2.17% addressed IS implementation. In terms of methodology, survey research was most used, far exceeding other
methodologies, with 41.54% of the 479 research oriented articles using this approach. The qualitative methods of case study and field study ranked second and fourth in terms of frequency, albeit at the much lower percentages of 9.81% and 8.56% respectively.

Whatever the approach chosen, it should be consistent with the researcher’s understanding of both the ontology and epistemology of the area under study. There are many studies where either a positivist or reductionist approach is used, and where the chosen approach is implicitly accepted as being appropriate without clarification. In an editorial addressing the role of theory in manuscripts submitted to *MISQ*, Markus and Saunders (2007) observed that often submissions lacked a sound theoretical foundation or reflected a “literature-driven” approach rather than being based upon theory.

The research approach to be used at first represents an ontological problem, i.e., as researchers observing complex behaviour in organisational settings, how can we establish the reality and enumerate the sorts of phenomena that we label as systems oriented behaviour (Mackay, 2003)? The starting point that we have is the behaviour to be explained, but as soon as we begin to describe and record such behaviour we impose our own methodological perspectives.

The epistemological question framed for psychologists, i.e., how can we gain and test sure knowledge of the determinants of action and of mind and how it operates (Mackay, 2003), lies at the root of quantitative models of user behaviour. Some quantitative models are generated from survey-derived responses to questions and are established using correlational techniques. In these cases ‘truth’ follows on from probability, but the variance not explained often seems problematic, especially when the conceptual constructs are offered as ‘theory free’ explanation for observed behaviours.

To break this down further, if we generate numbers from survey responses, and then offer them into statistical packages such as SPSS, we are using rules based upon algebra and logic to generate numerical output. We can fall into a leap of faith that comes when we use the machine output, which is not based upon meaning or reference, to arrive at ‘factors’ that are then offered up as explanation. But without stating the theory that underpins the output, what
we have is description, and not explanation. Provided the researcher identifies the theory that underpins the statistically derived models, as for example in explaining the use of Ajzen and Fishbein’s (Ajzen, 2005) TRA and TPB to generate a model such as Davis et al.’s (1989) TAM, then we can proceed. Assumptions that underpin the behaviours described by the TRA and TPB need to be compatible with how the behaviour is described by the TAM. It is not sufficient to argue that a statistically significant relationship implies an explanation.

A model such as Venkatesh et al.’s (2003) UTAUT based upon items selected from eight prominent models of user acceptance seems more problematic. Having a model that was empirically validated and reportedly able to explain up to 70% of the variance of usage intention is interesting, but without being aware of the theory and assumptions that underpin it then generalising from within the boundaries of the study can be difficult.

Finally, we need to address an issue which arises from studies which start out by citing an organisational need for better IS implementation, but then proceed without identifying a link between the study focus and findings and the perceived organisational need. Venkatesh et al. (2003), in their study of IS usage, conclude that “while it is often assumed that usage will result in positive outcomes, this remains to be tested” and that “little or no research has addressed the link between user acceptance and individual or organizational outcomes” (p.470).

Specifically, Venkatesh et al. (2003) recommend that future research should examine the degree to which IS, considered successful at a user level, is considered successful from an organisational perspective. An interpretive approach is considered the best way to accomplish this.

### 5.3 Interpretation as a means of understanding

According to Boland (1985), interpretive research is based upon an assumption that what we can know about social systems is through our own social constructions such as language and through the shared meanings that we ascribe to them. Interpretative research is based upon phenomenology and the hermeneutic approach, where the emphasis is on the meaning of text. It
follows then that a key consideration for hermeneutic analysis is the collection of value-free text to interpret.

In an ontological sense, the characteristics of an interpretive approach reflect firstly internal realism, i.e., reality is an inter-subjective construction of the shared human cognitive apparatus (Walsham, 1993). Secondly, it is characterised by subjective idealism, i.e., each person constructs his or her own reality. This approach addresses the concern discussed in Section 5.2.1 about using a reductionist perspective, which asserts that complex behaviour can be reduced without loss of meaning.

The terms interpretivist, phenomenologist and constructivist are often used interchangeably and mean similar things (LeCompte and Schensul, 1999). The salient point that is shared between all three is the “social construction of reality” (p.48). In order to more clearly define the epistemological approach to the reader in this thesis, the research approach will be described as interpretivist throughout.

Interpretive research is not necessarily concerned with dependent and independent variables, but instead looks at the full complexity of people's sense-making in dynamic situations (Kaplan & Maxwell, 1994). Holloway and Jefferson (1997), for example, conclude that interviews designed to elicit narratives are actually more meaningful than interviews based upon question and answer techniques. Intuitively this makes sense as question and answer interviews rely on the researcher asking the 'right' questions, and as such are extremely value laden.

The implicit and explicit values of the researcher play an important role in IS research, as it is in practical terms not possible to generate value-free observations of organisations being studied (Jarvinen, 2005). Aulin (1982, cited in Jarvinen, 2005) suggests that observations are parts of reality mapped onto the observer's consciousness, and in this way we get information about the world. The things that we chose to observe, and how we map them are the subjective “front end” to any objective or positivist study into IS implementation within organisations.
Take for example the concept of psychological reactance (Brehm, 1966) discussed in Chapter 3. Brehm initially posited psychological reactance as a cognitive explanation for observed behaviour, where situation provided a motivational desire to recover lost freedom, or to prevent further erosion of freedom. More recent studies have posited a person's propensity to experience reactance as a personality trait. The measurement of reactance, for example using Hong and Faedda's (1996) reactance scale, derives from the belief that reactance is a behavioural trait. Within this paradigm, researchers look for evidence of reactance, the entity, instead of observing some behaviour, and positing Brehm's notion of psychological reactance as a possible explanation for the observed behaviour.

Figure 5.1. An ontological blueprint for interpretive research (Packer, 2009)

Consider the representation of the phenomenological projection shown in Figure 5.1 (Packer, 2009). As researchers, we look to gain an understanding of a phenomenon under study, in this case IS adoption, by projecting the actual behaviour onto our chosen research background. The projected background can vary between researchers, hence the need to describe and share to arrive at a collective understanding.

Using an interpretive approach necessarily leads to site-specific descriptions for the phenomenon under study, given that the projection is context rich. It might seem at odds with this approach to attempt to capture a
generalised form of implementation within a conceptual model, given the site-specificity that results from the approach. Rather than the conceptual model seeking to reduce the site-specific nature of the phenomenon, the model is intended to capture those elements that provide for the variability, and to summarise sources of local specificity.

Conceptually, we capture artefacts of user behaviour such as interview commentary, and record them as evidence of the behaviour under study, or, expressed another way, we move from ‘the observed being’ to our conceptualisation of the ‘meaning’. How we capture and describe such behaviour leads on to a discussion about the structural nature of theory in IS research (Gregor, 2006).

5.4 Theory in IS

Gregor (2006) examined the structural nature of theory and models in IS research. Gregor emphasised that developing theory is a research endeavour carried out by academics and that developing theory “sets us apart from practitioners and consultants” (p. 613). It will later be argued in this thesis that a separation between research and practice is not desirable, and may in fact contribute to the continuing poor track record of implementation within organisations despite research endeavours. Psychology’s scientist-practitioner model discussed in Chapter 13 is offered as one solution to this perceived problem. Nevertheless, Gregor has identified a useful perspective on theory types that clarifies the types of theories and models encountered in IS research.

Gregor (2006) uses the term theory in a broad sense to capture “conjectures, models, frameworks, or body of knowledge” (p. 614). Under this broad definition, Gregor has developed the taxonomy of IS theory types shown in Table 5.1. Using this taxonomy, the conceptual model to be developed in this study would be formulated at the explanation level, with the aim of describing an implementation phenomenon (what is), the organisation’s rationale for investing in the IS (why), and by longitudinal observation the sequence of events that occurred (how, when and where).
### Table 5.1 Theory types in IS research

<table>
<thead>
<tr>
<th>Theory type</th>
<th>Distinguishing attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis</td>
<td>Say what is. Essentially analysis &amp; description.</td>
</tr>
<tr>
<td>Explanation</td>
<td>Say what is, how, why, when, and where. Provides explanations, but does not attempt to predict with any precision. No testable propositions.</td>
</tr>
<tr>
<td>Prediction</td>
<td>Says what is and what will be. Predictions with testable propositions, but not well developed causal explanations.</td>
</tr>
<tr>
<td>Explanation &amp; prediction</td>
<td>Says what is, how, why, when, where, and what will be. Provides predictions, testable propositions and causal explanations.</td>
</tr>
<tr>
<td>Design &amp; action</td>
<td>Says how to do something. Explicit predictions.</td>
</tr>
</tbody>
</table>

After Gregor (2006, p. 620)

Whatever the level of theory offered, it is still a requirement for the researcher to argue aspects of generalisation and causality where applicable. Gregor (2006) notes that in terms of generalisation, varying degrees of generalisation are possible in all levels of theory, and as such has not used this as a primary characteristic of classification.

It is argued that implementation is in fact a multi-faceted phenomenon and that many predictive models are focussing upon only one facet, e.g., use as the dependent variable in Venkatesh et al.’s (2003) UTAUT model. Given that the implementation phenomenon is acted out within the complexity of an organisation and under the influence of context specific constraints such as organisational climate and culture, it remains to be seen if models of the ‘explanation and prediction’ type could be expected to do more than explain some particular facet of implementation without becoming extremely complex.

For practitioners, the emergent conceptual model should define the likely areas that require focus when conducting an implementation project within an organisation, and suggest a time scale to use when allocating resources. Use of the emergent conceptual model in this way should direct focus upon two important implementation issues, i.e., success and failure.
5.5 Analysis of implementation success and failure

It is common for studies of IS to begin by quantifying the considerable sums of money invested in such systems, and to highlight the poor track record of implementation success (see for example, Nah, Tan & Teh, 2004; Jasperson et al., 2005). Implicit in this type of introduction is the inference that the particular study can contribute knowledge that can itself contribute to improving the implementation experience, although few studies argue specifically how this would occur. In order to focus an empirical study in the area of implementation success, the researcher needs a reliable and valid measure of success.

In some cases the cause of a failed implementation might be somewhat straightforward. Consider two hypothetical implementation projects undertaken by an organisation. The first project follows a course of actions that will inevitably lead to an unsatisfactory outcome, even though the organisation does not realise the outcome will be unsatisfactory until it occurs. Perhaps the system chosen does not have the functionality required to expand with an expanding organisation, or will not interface with other systems within the organisation. Basically, the implementation plan is flawed in some way.

The second implementation follows a course of actions that should lead to a successful outcome, but something unforeseen occurs that causes the end result to be unsatisfactory. Perhaps in this case a key person became unavailable, or the required training was not resourced.

Post implementation analysis of both unsatisfactory results should highlight two very different scenarios. In the first case, the realisation should be that ‘unsatisfactory’ was the expected outcome. In terms of rational problem solving (Kepner & Tregoe, 1997) this would be classified as a start up problem, and we should ask upon what criteria and with what assumptions was the IS implementation undertaken.

In the second hypothetical case, once the cause of the deviation from the plan was identified and steps taken to control for its effect, then the next time the plan is enacted this should lead to a satisfactory conclusion. Identifying the cause of the problems may enable a post-implementation intervention to
recover the situation. In this second scenario looking for the cause of the failure makes sense.

There are obvious steps in analysis that should be taken if one is interested in explaining the failure of a particular IS implementation. This is not the same as defining the necessary and sufficient factors that facilitate IS success: this is a much more difficult task.

Unfortunately, it is frequently the case that studies identify factors thought to be related to success, for example, usage frequency, but do not explain how they contribute to success. Popular models such as the TAM (Davis, 1986) could be subsumed under the banner, ‘all other things being equal, usage frequency correlates with the user’s perceptions of the system’s ease of use and usefulness’. Increased usage is implicitly linked with system success.

In an organisational setting, where indeed usage can be mandated to a certain extent, it is the definition of the ‘other things’ that need to be controlled that is likely important. Studies which identify factors such as use that enhance or contribute to IS success are in fact useful, but their utility may be in the area of system optimisation rather than as stand alone explanations of success or failure.

Ginzberg (1981) observed that most of the key decisions that will impact upon how a user perceives a new system are made in the definition phase, well before the system is implemented, and yet this phase was typically the least resourced component of the overall project. Ginzberg suggested that in this initial phase decisions that will have the greatest impact on whether or not users ultimately accept the new system are made. Since these early observations, more attention has been given to the definition phase of projects (Avison & Fitzgerald, 1995), yet the issue of problematic implementation remains.

Southon, Sauer and Dampney (2003) examined the causes of the failure of a large IT system within the public health area and found that, even though the same system had been implemented successfully elsewhere, and had indeed been pilot tested, it still failed to deliver the expected requirements. It was found that a number of organisational specific factors that included
implementation strategy, organisational decision-making, ownership of the program and management skills, amongst others, each contributed to the failure. None of these factors were about the chosen IS per se.

Sauer (2003) acknowledged that the early studies on IS system failures focussed on simple causes, such as the competency of individuals. Even when the studies became broader in their cover, it appeared that organisations learned little due to the reluctance of organisations to learn from, or become involved in such studies.

Some textbooks aimed at systems practitioners claim to have distilled the essential factors that will give implementers a degree of control over an implementation project that will in turn enhance the likelihood of implementation success. Fallon (1995) identifies two “keys to success” (p. 5) for implementing systems within organisations. The first key addresses a perceived need to build support for the new system across the divisions that may exist within an organisation in order to reduce resistance. The second key addresses the notion that, in general, organisations will value getting a new system up and running quickly. It would seem that Fallon (1995) is using a definition of implementation that could be alternatively termed installation, which seems focussed on completing the project, rather than achieving the organisation’s deliverables.

In order to arrive at a predictable implementation outcome, it would seem that organisations need to be able to articulate what success, both for an implementation and success overall, looks like. Organisations also need to be in control of the salient factors which influence or facilitate IS success, and to try to manage these factors in the implementation process and afterwards. This assumes, of course, that IS implementation success is a phenomenon that can be described, defined and attained. It follows that IS researchers and organisations need an appropriate definition of success that is quantifiable.

5.5.1 Can we quantify implementation success?

A survey of company executives by Ernst and Young (Breshnahan, 1996, cited in Garrity & Sanders, 1998a) indicated that IS success could be measured at an operational or service level by three criteria, i.e., delivered on
time, delivered on budget and user satisfaction. This finding is somewhat interesting coming from company executives given that an IS project can achieve all three criteria but still not achieve the business deliverables. Conversely projects can overrun significantly in terms of both time and budget and yet can successfully deliver the business benefits. Perhaps there are different success measures appropriate to different levels of the implementation within organisations?

The measures in Table 5.2 were proposed by Garrity and Saunders (1998a) as an example of IS success at various levels of a hypothetical supply chain. As mentioned in Section 5.5, there has been little investigation of how well, if at all, individual measures of success can predict organisational implementation success. Equivalent success measures from this study are also included in Table 5.2 for later comparison.

### Table 5.2. Information systems success measures

<table>
<thead>
<tr>
<th>Garrity &amp; Saunders Measures</th>
<th>Study Observed Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firm or Organisational Level Measures of Success</strong></td>
<td></td>
</tr>
<tr>
<td>Market share, profit, ROI</td>
<td>One system across the business sites</td>
</tr>
<tr>
<td>Revenue from new products and services</td>
<td>Employees doing similar tasks the one way</td>
</tr>
<tr>
<td>Efficiency relative to competitors</td>
<td>A system with vendor support</td>
</tr>
<tr>
<td>Operating cost, system availability, response time</td>
<td></td>
</tr>
<tr>
<td>Function or process level of success</td>
<td></td>
</tr>
<tr>
<td>Operating efficiency of functional areas</td>
<td>Integrated functions, better analysis</td>
</tr>
<tr>
<td>Reduced process cycle times</td>
<td>Project and maintenance costs</td>
</tr>
<tr>
<td>Reduced costs</td>
<td>connected</td>
</tr>
<tr>
<td>Well-integrated process</td>
<td>Transactions more readily audited</td>
</tr>
<tr>
<td>Individual measures of success</td>
<td></td>
</tr>
<tr>
<td>User satisfaction</td>
<td>None anticipated or quantified</td>
</tr>
<tr>
<td>User information systems satisfaction</td>
<td></td>
</tr>
<tr>
<td>Utility of the system</td>
<td></td>
</tr>
</tbody>
</table>

After Garrity and Saunders, 1998a

If indeed it is not practical to define a single, quantifiable construct for implementation success, then it will be necessary to work with a multi-faceted view of success. This approach could mean that the explanation of desired implementation outcomes would be via a number of qualitatively derived models
based upon detailed understanding of the implementation phenomenon. It is necessary to consider organisational perspectives of implementation success and failure as they may differ from the research perspective.

5.6 Organisational perspectives of implementation success and failure

There have been numerous studies over the last 20 years or so, which have attempted to shed light upon the poor track record of IS implementation within organisations. Many focus upon some particular aspect of the implementation, for example, frequency of system usage as the dependent variable. Few studies make explicit the logic by which the chosen aspect links to implementation success and most assume that understanding variation in the chosen aspect will necessarily link to improved implementation.

According to Hallows (2005) a successful IS project is one “that delivers the expected results” (p.6). Typically the systems people, those responsible for the IS itself, talk about project implementation in terms of metrics such as schedule milestones, scope and budget. From an organisational perspective the bottom line for the client lies in achieving their expected benefit in terms of deliverables such as lower stocks, more efficient customer service, reduced staff numbers or increased profit, after all this is why they made an investment in the IS.

What this means is that a project can come in on time and within budget, but if it fails to achieve the organisation’s goals and not deliver the expected outcomes then the investment was wasted. Similarly, even if a project runs over in terms of cost and timing, as indeed many do, but still achieves the deliverables then the end evaluation will be one of success.

Finally, success can be viewed from the perspective of the system users in terms of their satisfaction and whether or not they utilise the new software. Garrity and Sanders (1998a) identified four dimensions of user-related IS success.

Task support satisfaction describes the closeness of fit between the user’s job and the IT enabled work system; presumably a close fit would
indicate successful implementation. Quality of work life satisfaction measures the extent to which the IT enabled work system affects a user’s quality of work life and job satisfaction. Interface satisfaction measures the person-machine interface in terms of presentation, format and IT efficiency. Lastly, decision-making satisfaction is a measure of how well the IT enabled work system supports the user’s ability to make decisions and to solve problems.

So why do projects fail? It would seem that the answer to this question depends on the perspective of the observer, and his or her definition of success.

From a project management perspective (Hallows, 2005) one of the main issues associated with implementation failure cited is “bad estimating”, reflected in changes in the project scope or changes that are poorly managed. Another major cause of poor implementation is planning, such that some critical activities are not allowed for in the costs or timelines, and cause chaos when they appear.

The Standish Group (1999) cites lack of user input, incomplete and changing requirements as the top three reasons for project challenges. According to Broeng (2006), the task of ERP implementation is typically bigger than initially estimated, and one of the major issues is that of ownership. The new system will likely need to be re-sold internally as often the nature of jobs can be changed, and “uncommitted people can derail the process very quickly” (p.34).

It is rare in an organisational setting that the cause for IS project failure is cited as low usage frequency, though low usage may be a result of a poor implementation. It is suggested that issues such as cost estimating, project management and scope change lie within the other referred to in all other things being equal in Section 5.3. Talking about such issues within an organisation exposes the researcher to the organisational members’ common language, often linked to shared organisational metaphors.

5.6.1 Organisational metaphors and IS success

Organisations can develop, through the adoption of metaphors (Hill & Levenhagen, 1995), a common language that to an observer can be a window
to the organisation’s culture (Dalmau, 1994). A suitable operational metaphor for an organisation is that of a machine. When outcomes are not as desired, then this must be because of a failure of the machine, and the failure must have an identifiable cause. Deviations from plan can be analysed. The organisation as a machine can be conceptualised in terms of the machine’s output and efficiency. A system, viewed within such an organisational metaphor, is seen as an enhancement to the machine. The new system can be costed, its impact can be quantified, and it can be installed and turned on. From an organisational perspective this makes sense. Along the same lines, if an IS fails to deliver as expected, then the system has failed and is deemed to be faulty.

When an organisation needs to make sense of a new phenomenon such as a significant IS project, or to refresh its vision of the environment in which a new IS will be located (Hill & Levenhagen, 1995) then the machine metaphor has limitations. Indeed this is the case for any system of which people are an integral part, for example, safety systems. We can conceptualise safety through the emergence of an appropriate safety culture (Cox et al., 1998) in order to capture the notion that such a phenomenon cannot be installed, it has to develop over time in an appropriate climate.

According to Dietz (2006), “The distinctive property of organizations is that the active elements are human beings” (p. 60). It may be that a key component of the integration of new systems is the way that the organisational members adapt the new system to the organisation as well as how they adopt the new system per se.

Perhaps the appropriate organisational metaphor for the people perspective would be that of a journey. An organisation can be perceived as a connected group of people moving in the same direction towards a common goal. An IS would need to be acquired, people would need to be made aware of how to use it, it would be carried along so long as it was accepted as being useful – otherwise it would represent excess baggage. Its impact would perhaps not be immediately obvious, and its success would be judged in how well it enabled the organisation to move towards its goal.

The metaphor of a journey considers the people within an organisation to be playing important roles, rather than being components in the machine
analogy. One outcome of being on a collective journey is the way that people begin to read meaning from the collective movement and from the tacit behaviour of others on the journey.

5.6.2 The concept of tacit success

The influence of the tacit behaviour of managers within organisations can be profound. Dalmau (1999) describes the “unconscious but nevertheless real” interpersonal transactions that occur within organisations and notes that these behaviours can contain and transmit a large amount of information between people (p.4).

Dalmau (1999) has drawn upon the work of John Sherwood in analysing the success or failures of managers as they move into new organisations, and in particular has noted how organisational phenomena can sometimes be tacit rather than stated. According to Dalmau employees within an organisation will derive more information from the actual and symbolic behaviour of a new manager, than they will from the manager’s verbal utterances. Within an organisational context, the success of an IS implementation may be tacitly indicated through the subtle behaviours of the organisation’s management, rather than stated, and that studies of IS implementation success within organisations should take this into account. This notion will be further explored in Section 10.4.2.

Taking into account the complexities associated with IS implementations within organisations, it is not surprising that many researchers have opted to study particular facets such as usage frequency in detail, as this type of study is perhaps more suited to the research endeavour. If research is to provide practical learning there needs to be a broader model that covers both the IS specific behaviours, within the context of broader organisational behaviours, across the total life cycle of an IS implementation within organisations.

5.7 The need for a conceptual model

Numerous studies have opted to explain some attribute of IS such as usage frequency (Davis et al., 1989) or feature use (Jasperson et al., 2005), and have generated quite complex models (Venkatesh et al., 2003) in order to
do so. Little, however, has been done to demonstrate how an understanding of an attribute such as usage frequency relates to overall IS success, or indeed why companies continue to invest in IS per se given the poor track record of implementation.

Venkatesh et al. (2003) suggest that further research needs to be carried out to determine if usage actually results in positive outcomes. This is an important question, i.e., will the effort put into understanding factors that contribute to increased usage from an IS user perspective help to predict ways to increase success in IS implementation within an organisation? Such a question could be asked for other facets of IS, apart from use.

This area of research could be clarified by the development of a conceptual model which would allow the numerous studies of IS phenomena and IS-related artefact to be put into broader context. There is need for an empirically derived and validated organisational model to explain the complex array of behaviours associated with IS implementation, which would also address the gaps identified by previous authors.

The focus of the conceptual model should be in understanding the relevant organisational behaviours and interactions and interpreting them from a behavioural perspective, not in attempting to reduce the factors that lead to the site-specific outcomes noted. Caution needs to be shown in reducing the complex behaviours to models that explain certain attributes of implementation or adoption. This reduction can lead to an overall loss of meaning, such that models with reportedly sound statistics are of little practical utility.

A conceptual model for IS implementation would be of practical use in the IS area to guide both the research effort, and to direct practitioners in adopting the research outcomes. Under such direction, for example, a model such as Venkatesh et al.’s (2003) UTAUT could be useful to organisation’s who need to understand factors that would enable the expanded use of a particular IS in order to gain business benefits from its use. Note that the conceptual model is to be developed to account for the site-to-site nature of IS implementation variation. Practitioners equipped with the conceptual model would be prepared to identify and work with the organisational sources of implementation outcome variation.
5.8 Conclusion

Today, IS are both necessary for, and embedded within, organisations. Organisations are complex entities, in which there are many systems, some of which are IT-enabled, but more importantly organisations feature complex people interactions. Perhaps the best way to understand IS within the complexity of an organisation is to imagine that organisations are on a metaphorical journey. The people on that journey will in the long run deliver the implementation outcome through their behaviours in and around the IS, in particular through their adoption behaviours. Success will be attributed differently according to the position of the people within the organisation, and according to their perspective of the IS within the context of the organisation’s journey.

Organisations need to know what factors will increase the likelihood that a chosen system will contribute to the organisation’s success. It is unlikely that there would be a single, or even a small number of factors that will ensure implementation success. It is more likely that there are numerous factors, the salience of which will depend on the system, the organisational climate and the collective behaviour of the people involved.

In order to develop the conceptual model described previously, it is necessary to approach the study of an IS implementation within an organisation from within an appropriate research framework. For this study an interpretive approach has been chosen. A priori consideration must also be given to possible forms for the conceptual model, if the model is to be of use for both researchers and practitioners. It may be that traditional ‘statistical’ research models are not appropriate in this context. These issues will be covered in Chapter 6.
Chapter 6

Possible forms of a conceptual model

“Without research outcomes relevant to practice, the very existence of a research discipline could be questioned because the discipline could well lack impact beyond its own (academic) community.”
Rosemann and Vessey, 2008, p.2

6.1 Introduction

The proposed conceptual model for describing group and individual behaviour and its impact upon IS implementation success is intended to satisfy a number of criteria. The conceptual model should be able to place the models that it subsumes within a broad organisational perspective such that the boundary conditions for those models are highlighted. This was a challenge raised by Venkatesh et al. (2003).

Also, the conceptual model should be able to account for the diversity in implementations found in different sites, i.e., the model is not meant to reduce the implementation phenomenon to some core elements. The resultant conceptual model should also facilitate the differing IS perspectives as discussed in Section 1.3. It is anticipated that this would provide benefit in two areas.

For the IS practitioner, such a conceptual model should provide guidance for where to look for deeper understanding of perspectives within an organisation and where in the life-cycle of an IS implementation the particular project is at a point in time. For the IS researcher, the conceptual model can provide guidance as to how a particular research project fits into an organisational context, and this should assist the researcher ensuring that the project is more relevant and useful to the IS community.

A number of different forms of models are now reviewed. The intent of this review is to suggest possible formats for the thesis conceptual model, by highlighting the sorts of models that are of interest to both researchers and practitioners in the IS field. Ideally the conceptual model should satisfy both perspectives. It may be that complex research models that rely on the reduction
of the broader implementation phenomenon might not be useful for IS practitioners in an organisational context. If so, the ideal model should look to engage at the level of explanation (Gregor, 2006) described in Section 5.2.3.

6.2 CATWOE

Smith and Milan’s (2007) CATWOE conceptual model for analysing systems was introduced in Section 2.2. The intent of this model was to describe the various perspectives of key people in a system setting, and to look for the key interactions that influence the system outcome.

The key perspectives described in Table 2.1, i.e., those of the customers (C), actors (A), transformation processes (T), worldview (W), owners (O) and environmental constraints (E) form a useful template to guide participant observation within the organisation. As an example of the CATWOE process, a simple activity, the painting of rented property by a contractor, is given. The CATWOE elements would include:

- C - the tenant (or the property owner?)
- A - the painting contractors (and the tenant?)
- T - unpainted property to painted property (realisation of increased value?)
- W - painting house will enhance appearance (and value?)
- O - property owner
- E - the painting process whilst the property is being used, in the neighbourhood.

It can be seen that even in this simple example, it is not completely obvious who “owns” some of the key perspectives. The customer in terms of the immediate outcome could be the tenant, as they will obtain the immediate psychological gratification from the newly painted property, but the longer term or tangible benefits clearly belong to the property owner. The property owner clearly pays for and owns the outcome, but would the contractor keep this in mind when interacting with the tenant during the painting process?
among people, which have been captured and represented by the arrows in the diagram. The steps within the inner, blue box in Figure 6.1 are involved in the ‘doing’ task, analogous with designing and implementing an IS within an organisation. Those within the outside box include the ‘doing’, but add the monitoring and intervening, and would be analogous to the organisational ‘management’ perspective within the IS implementation. The way that success is defined and evaluated within the blue box might be different to the owner’s view of overall success once factors such as total cost and revised property values are taken into account.

![Figure 6.1 Mapping of the property painting exercise (Smith & Milan, 2007)](image)

This model is convenient shorthand for identifying the key people and interactions involved in the system under study. Along similar lines, but in a far more detailed manner, Wood-Harper et al.’s (1985) Multiview approach is more consistent with the sorts of research models encountered in quantitative IS studies.
consistent with the sorts of research models encountered in quantitative IS studies.

### 6.3 The Multiview approach

Wood-Harper et al.'s (1985, p.8) ‘Multiview’ approach is presented as a set of five perspectives defining IS prior to implementation, and is an example of the integration of different perspectives. The authors combined the perspectives of human activity systems analysis, socio-technical systems, conventional data analysis and structured analysis (Checkland, 1984; Mumford, 1981; Land & Hirscheim, 1983; Rock-Evans, 1981; Shave, 1981; Gane & Sarson, 1979; & de Marco, 1979, as cited in Wood-Harper et al., 1985). The Multiview approach suggests the following types of questions:

1. How is the computer system supposed to further the aims of the organisation installing it?
2. How can it be fitted into the working lives of the people in the organisation that are going to use it?
3. How can the individuals concerned best relate to the machine in terms of operating it and using the output from it?
4. What information system function is the system to perform?
5. What is the technical specification of a system that will come close enough to doing the things that have been written down in the answers to the first four questions?

Clearly, questions one to four should be addressed prior to the specification of a system, and relate holistically to the organisation, the people and the expected deliverables. Attempting to answer and address issues arising from these questions during implementation would be difficult, suggesting that they should be addressed prior to the implementation.

The stages and inter-relationships of Wood-Harper et al.’s (1985) Multiview model are shown in Figure 6.2. These stages are meant to describe the progressive development of an IS and seek to cover both human and technical aspects of the design. The boxes represent analytic stages, and it is noted that human activities are separated from system entities and functions.
Figure 6.2 Multiview model for IS implementation (Wood-Harper et al., 1985, p.17)

The design stages represented by the ellipses capture both the systems and the interfaces. Finally, the arrows highlight the relationships between the components. The outputs, represented by the dotted arrows, provide the design template and provide answers to the organisational and system related questions shown in Table 6.1.

Table 6.1 Methodology outputs from the Multiview model

<table>
<thead>
<tr>
<th>Outputs</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social subsystem</td>
<td>How will it affect me?</td>
</tr>
<tr>
<td>Roleset</td>
<td>Will my job change?</td>
</tr>
<tr>
<td>People tasks</td>
<td>What will I have to do?</td>
</tr>
<tr>
<td>Human-computer interface</td>
<td>How will I work with the computer?</td>
</tr>
<tr>
<td>Recovery subsystem</td>
<td>What happens when it goes wrong?</td>
</tr>
<tr>
<td>Monitoring subsystem</td>
<td>Is the system performing according to specification?</td>
</tr>
<tr>
<td>Information retrieval subsystem</td>
<td>What information will I get?</td>
</tr>
<tr>
<td>Application subsystem</td>
<td>What will the system do?</td>
</tr>
<tr>
<td>Inputs &amp; outputs necessary for non-application subsystems</td>
<td>Will it affect anything else?</td>
</tr>
</tbody>
</table>

(Wood-Harper et al., 1985, p.18)
The Multiview approach is useful in that it offers systems developers a comprehensive view of both the organisational and individual user's needs in the early stages of system design, and emphasises the reality that the subsystems actually overlap and influence each other. Emphasising the users’ requirements in terms of systems outcomes at this early stage of system design is seen as a positive step and should increase the likelihood of post-adoption success. Considerations such as “How will it affect me?” and “What information will I get?” both important to the end user, are sometimes not addressed or given sufficient importance in the design stages of an IS.

The Multiview perspective is a useful model with which to facilitate the observation of IS within organisations from the perspective of a particular IS development or project. Whilst the model interfaces with the broader organisation, it perhaps does not place the phenomenon of a particular IS implementation within the broader organisational context. Such a placement is required to answer, for example, questions about whether or not the implementation was successful at an organisational level.

Few models look beyond the implementation phase to identify factors that are important for long-term success at an organisational level. Hakkinen and Hilmola (2008) have generated a research model for studying implementation that at least looks at the post-implementation 'shakedown' phase.

**6.4 ERP evaluation during the shakedown phase**

Hakkinen and Hilmola (2008) studied how user evaluations of ERP system success could be used to track down the source of problems during the ‘shakedown’ phase of system implementation. The shakedown phase referred to the phase immediately after implementation when numerous problems were still being experienced.

Hakkinen and Hilmola’s (2008) overview of the implementation process is shown in Figure 6.3. It can be seen that the model looks at a very short time frame after implementation, and Hakkinen and Hilmola considered the ‘onward and upward’ phase after shakedown as relatively problem free, i.e., once past implementation shakedown the outcome is relatively assured.
### Figure 6.3 Overview of the ERP implementation process in the after-sales division (Hakkinen & Hilmola, 2008)

Jasperson et al. (2005) have argued the importance of the post-adoptive phase in IS implementation studies, and few, if any, studies have looked past this post-adoptive phase. Without long term focus, it is not possible to determine if the organisation's desired outcomes have in fact been achieved with the relatively short time focus of models such as that of Hakkinen and Hilmola (2008).

Hakkinen and Hilmola (2008) offer a number of interesting observations about IS implementation within organisations. Three factors, i.e., "sufficient user skills, data reliability and intra-organisational communication" (p. 73) were found to be significant in obtaining a positive outcome from the implementation. Downstream operations were impacted by the issues generated by upstream units in the information flow within the organisation.

Finally, different groups within the organisation had different views on what they perceived as success. A widely cited model within the IS research area is DeLone and McLean's model of IS success (Petter & McLean, 2009). This model is reviewed on the basis that it has received considerable attention over the past 15 years.

### 6.5 DeLone and McLean model of IS success

DeLone and McLean published their model for IS success approximately 15 years ago, and since that time it has been widely studied and has found...

<table>
<thead>
<tr>
<th>Chartering phase</th>
<th>Project phase</th>
<th>Shakedown phase</th>
<th>Onward &amp; Upward phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepartion</td>
<td>Configuration</td>
<td>Stabilisation</td>
<td>Maintenance &amp; upgading</td>
</tr>
<tr>
<td>Analysis</td>
<td>Roll-out</td>
<td>Monitoring &amp; evaluation</td>
<td>Monitoring &amp; evaluation</td>
</tr>
<tr>
<td>Design</td>
<td></td>
<td>March 2004</td>
<td>Not covered in the study</td>
</tr>
</tbody>
</table>

2002-2003 Largely co-ordinated at a corporate level by a separate project organisation; planning and user training in the after sales division in Autumn 2003

February 2004 Roll-out in the after-sales division covering 14 ERP modules and covering 18 key business processes

March 2004 Shakedown phase in the after-sales division
support through a number of studies (Petter & McLean, 2009). The model is shown in Figure 6.4.

Figure 6.4 Delone and McLean model for IS success (Petter & McLean, 2009)

The Delone and McLean model, like those of Davis (1986) and Venkatesh et al. (2003), focuses upon the individual through system use and user satisfaction without considering the broader context within which both the IS and the users exist. Also, along the lines of the progression of Davis' (1986) TAM, subsequent authors have looked to add to the original DeLone and McLean IS model in order to broaden its applicability (Petter & McLean, 2009).

One of the requirements of the thesis conceptual model is to be of relevance to IS practitioners. The practical relevance of the Human Error Model described in Chapter Four (Reason, 2000) is usually explained via the 'Swiss Cheese Model'. This is an attempt to convey the salient points of the Human Error Model to practitioners and management within organisations. This explanation is popularly discussed within the study organisation.

6.6 The Swiss Cheese Model

Reason's (2000) Swiss Cheese Model is meant to portray how an accident trajectory can penetrate defences, barriers and safeguards. This analogy has been used to explain accidents and accident prevention widely throughout the study organisation, and although the picture is simple, it facilitates a conversation about safety that can be carried out at many levels of detail.
There is no doubt that this model has motivated further research, but its primary intent was to generate discussion and to foster shared meaning. Reason's (2000) Swiss Cheese Model has been widely used in organisational discussion groups to seed discussion, as it can readily understood by people of varying academic backgrounds, and refers to real factors such as safety hazards and accidents as outcomes. It may be that in order to bridge the perceived gap between IS research and IS practice, a simple conceptual model such as the Swiss Cheeses model is appropriate to facilitate useful dialogue.

Discussion about the model centres on the defences, barriers and safeguards aimed at preventing accidents that exist within an organisation. These aspects of the organisation's systems include engineered components such as alarms, people systems with trained operators and simple procedures and administrative controls. However good the systems are, there will always be holes. The model is shown in Figure 6.5 in the form that it is commonly shared in organisational settings.

*Figure 6.5 The Swiss Cheese Model (Reason, 2000)*

The point of the model is to illustrate that an accident can occur if the holes in the various systems line up, and that the holes come about through active failures, i.e., unsafe acts through slips, lapses and violations, and through
latent conditions, i.e., mistakes in systems design. The Swiss Cheese Model has been proposed to facilitate discussion about these factors within the organisation rather than to serve as a research model.

6.7 Conclusion

Ideally a conceptual model that will be useful to both the research community and to IS practitioners should satisfy a number of criteria. The conceptual model should be broad enough to capture the total domain of behavioural influence upon IS implementation, and not reduce the complexity of the implementation phenomenon such that explanation of the site-to-site variation is lost.

Smith and Milan’s (2007) CATWOE conceptual model has shown that the domain would likely include more than just the system designers and users. The conceptual model should be detailed enough to locate the numerous IS research models and perspectives within the IS research domain but also capable of being broad enough to facilitate discussion at various levels of complexity, and to bridge the gap between research and practice.

In an organisational context, a conceptual model should be able to explain how the organisational climate and culture impact IS implementation, if indeed they do. It is likely that different groups within an organisation would hold different perspectives of, and expectations for, the new IS, and these perspectives and expectations may vary dependent on the climate and culture. Hakkinen and Hilmola (2008) found evidence that different groups viewed implementation success differently.

Models that only focus upon a facet of the IS, such as usage frequency, are likely of limited utility to IS practitioners, and may be best suited to ‘fine tune’ IS once implemented. The lack of discussion of such limited models in texts aimed at IS practitioners supports the notion that they are not of primary interest to the IS practitioner community.

Most importantly, a conceptual model for describing group and individual behaviour within an organisation, and its impact upon IS implementation outcome, needs to offer plausible explanation for the way that organisational
behaviour impacts the implementation outcome. The plausible explanation can be discussed by both researchers and practitioners alike, and provide a common platform to allow both groups to interact. Reason’s (2000) Swiss Cheese Model, whilst based upon sound research, has had its major impact as a model offering explanation that can be discussed at many levels within both the safety research community, and by safety professionals and workers in organisations.

The combination of models discussed in this chapter suggests possible forms for the conceptual model to be developed from the longitudinal study. Chapter 7 explores conceptual frameworks and applicable methods for the longitudinal, interpretive study.
Chapter 7

Research framework and applicable methods

“The research data with which the participant observer works consist basically of human meanings interpreted through the observer’s communications with his subjects”.
Bruyn, 1966, p.160

7.1 Introduction

This chapter explains the rationale for adopting a qualitative approach, specifically Bruyn’s (1966) participant observation, to address the research questions. Participant observation as a study methodology has certain shortcomings with respect to validity. These issues are discussed, and triangulation via alternate sources of data to confirm the observations is suggested to improve the study validity. Triangulation involves combining one or more research methods within the one study (Myers, 1997).

Frameworks to guide the participant observations are explored, and Rogers’ (2005) DOI model has been identified as a suitable framework to use in this context. The life cycle of an IS implementation within an organisation can exceed months, and given the challenge raised by Jasperson et al. (2005) to include post-adoptive behaviours, a longitudinal study design is suggested.

Conceptual frameworks to guide a longitudinal study and within which to locate the qualitative observations and assertions are explored in Section 7.2. An outline of the research methods considered, and the qualitative research techniques chosen, is given in Section 7.3. Finally, a discussion of ethical considerations in given in Section 7.4.

7.2 Conceptual frameworks

The intent of the qualitative, observational study presented in this thesis is to describe the behaviours of organisational members associated with the implementation of an IT-enabled IS within an organisation, on the basis that these behaviours are likely linked to the implementation outcome. In this thesis the term implementation includes all of the organisational activities from when
the IS was chosen, through installation, and includes post-adoptive behaviours as suggested by Jasperson et al. (2005).

Conducting an observational study within an organisation requires structure in the beginning to guide the initial observations. Without some form of guidance, the volume and diversity of subject matter may initially present no obvious pattern. Structure is also initially needed to provide a ‘skeleton’ upon which to locate observations and findings.

Previously reviewed models such as Davis’ (1986) TAM, Venkatesh et al.’s (2003) UTAUT and Jasperson et al.’s (2005) model were considered, but they focus only upon one facet of the implementation and were not thought to be broad enough in their organisational coverage to be useful in this study. Roger’s (1995) DOI Model and Braa and Vidgen’s (1999) IS framework were chosen as suitable starting frameworks.

The research has elements of action research, but lacks one key aspect, i.e., a deliberate intent on behalf of the participants to observe, reflect and modify behaviours. At an International Symposium on Action Research (Altricher et al., 1991, p.8, cited in Perry and Zuber-Skerritt, 1992) the three key aspects of action research were listed, i.e.,

- A group of people working together;
- Involved in the cycle of planning, acting, observing and reflecting on their work more deliberately and systematically than usual; and
- A public report of that experience (such as a thesis).

The important criterion for action research is that the workgroup are all involved in the plan/act/observe/reflect cycle. Action research is “… deliberate, systematic, critical, emancipatory, rigorous and public” (Perry & Zuber-Skerritt, 1992). The study described in this thesis would not fit into this description, as there was no attempt to review and modify the implementation during or as a result of this study.

A grounded theory approach at first looked promising, especially given the desire to establish a conceptual model based upon the study observations. The reasons why this approach was not used in this study are discussed.
7.2.1 Diffusion of Innovations Model

The stages of Rogers’ (1995) DOI model, introduced in Section 1.5, were adopted as an encouraging starting template with which to observe the IS implementation within the study organisation for two main reasons. First, in order to be in the best position to observe the salient behaviours in and around an IS implementation within a large organisation, the researcher must have some concept or template to guide his or her attention, at least in the early phases of the research. Second, Diffusion Theory has been used widely in the field of IS studies by a number of researchers (See, for example, Moore & Benbasat, 1996; Gregor & Jones, 1999; Kautz & Larsen, 2000).

The DOI model predicts that within an organisation there are likely to be behaviours salient to the success or failure of the new IS that are acted out well before the new system is actually implemented, implying that any longitudinal study also needs to be started before implementation in order to be able to observe these behaviours. The DOI model has been adopted as a template for the expected implementation stages on the basis that it likely reflects the temporal stages of the implementation throughout the organisation, rather than as the core theory for how the IS system as an innovation diffuses into the organisation per se.

From the DOI model, it is expected that within the organisation there will be an initial period, some time well before the implementation date, that employees become aware of the new IS. Unlike the Knowledge period from the DOI model, this period will be broadened to include individuals within the organisation who may not be potential system users, but who may have impact upon the outcome of the IS implementation. Similarly, the longitudinal flow of subsequent stages, i.e., Persuasion, Decision, Implementation and finally Confirmation will be used to guide the observations during the study. These broad stages likely encompass the behaviours to be observed, at least in the period of initial observation, based upon observations made in previous studies.

The problems associated with methodological reduction have been described in Section 5.2. Ideally, the framework used to study the broad phenomenon of IS implementation within an organisation should consider issues of prediction through reduction and understanding through interpretation.
Along these lines, Braa and Vidgen's (1999) IS framework has been chosen to define the research approach.

7.2.2 An IS research framework

Braa and Vidgen (1999) have developed a useful framework for researching information systems in-context based upon the belief that "the primary laboratory for information system research is the organization" (p. 25). The organisational setting provides access to aspects of the work, the management and the technology as it co-exists. Braa and Vidgen argue that it is very difficult to understand the complex interactions that occur in an organisational setting out of context.

Braa and Vidgen (1999) conceptualise IS research as either 'positivist', i.e., reducing the area of investigation in order to make reliable predictions and explanations, or 'interpretivist' which is concerned with making a reading of the situation in order to understand what is happening and why. Researchers are reminded that the very act of researching within an organisation moves the researcher into a position in which he or she can potentially influence the outcome, or become in effect a change agent. The interplay between the three elements is shown in Figure 7.1.

\[\text{change} \quad \text{intervention} \quad \text{prediction} \quad \text{understanding}\]

*Figure 7.1. Braa and Vidgen's (1999) IS framework for the organisational laboratory*
The points of the triangle, i.e., prediction, change and understanding, represent the ‘ideal’ research outcomes. This is particularly relevant to this thesis as the intent is to understand the various aspects in which behaviour affects IS implementation, and then develop a conceptual model to pull together those various aspects. The thesis study was carried out from within the implementation project team, and so concerns about change through intervention are most relevant.

Understanding is described as an outcome of an interpretive approach, prediction is facilitated by a reductionist approach and change results from an interventionist orientation. Braa and Vidgen (1999) have shown the model as a constrained space because they argue that in reality, regardless of the research method chosen, all three dynamics co-exist, “albeit with differing mixes and emphasis” (p. 28).

The empirical approach chosen in this thesis locates closest to the ‘understanding’ apex of Braa and Vidgen’s (1999) conceptual triangle as the intent is to experience and describe in detail an IS implementation as a phenomenon onto which existing models of implementation success and failure can be mapped. Opportunities to explain facets of the implementation by reducing elements in a way that they can be qualitatively modelled can then be identified.

The basic assumption of the reductionist approach is that the reduction can be carried out without an overall loss of meaning. Inappropriate reduction can contribute to a loss of focus on the phenomenon under study, a problem that becomes “most acute when social psychologists try to explain group processes and inter group relations (Vaughan & Hogg, 2002, p. 17).

7.2.2.1 Understanding for explanation

It may be that in an organisational context, the ability to explain the outcomes of implementation projects rests more with an understanding of the broader organisational context, rather than with the ‘traditional’ emphasis of prediction via more narrowly focussed quantitative models. The quantitative models still provide useful information within the organisational context, but
without placing them within an organisational context, it may not be possible use them to generalise with confidence.

Qualitative techniques offer a way to capture a range of salient predictors of implementation outcome, without the need for methodological reduction, in order to produce an explanatory model. In order to use qualitative methods to explore implementation as a multi-faceted phenomenon, it is necessary to consider appropriate aspects of reliability, validity and utility.

7.2.2.1.1 Reliability

Reliability is traditionally thought of in statistical terms as the “consistency of assessment by the data collection tool” (Viney, 1987, p. 164) but this definition is of course appropriate to situations in which the experimenter uses a tool to measure. Viney suggests that in a qualitative context, reliability is more about interpersonal agreement or public verifiability, and that even the criteria of consistency of assessment over time might be inappropriate.

Given that the experimenter’s experience of events unfolds over time, it follows that there will be some degree of learning through the very process of data collection. Viney (1987) goes as far as suggesting that when it comes to the study of human experience, “no static picture can be grasped” (p.165).

7.2.2.1.2 Validity

Validity is “more concerned with accuracy than consistency” (Viney, 1987, p. 166). Kelly (1991) suggests that validity is a measure of how well the chosen data collection method can tell us what we actually know to be true. The problem for validity of explanation within an organisational context is that in order to generalise from the findings of a study carried out within a particular organisational context to another organisational context, we need to be able to describe the total context within which the explanation is offered. A model offered as explanation needs to incorporate ways in which to convey the context of organisational factors.

Within the context of IS implementation success, there is not widespread agreement as to what constitutes that success. From a modelling perspective, if we cannot clearly define the object that we are modelling, then we cannot be in a position to assess how valid the model’s predictions are. A valid explanatory
model of IS implementation outcome requires an explicit description of the various facets of implementation success within organisations.

7.2.2.1.3 Utility

The theme of the 2008 Australasian Conference on IS (ACIS), i.e., "Transforming Research into Practice", reflects concerns that the discipline of IS research faced a challenge of making research relevant to practice. It is quite common that textbooks or guides to systems implementation reflect practical experience rather than IS related research, so it is apt that the utility of IS research be examined in a practical context.

It may be that IS related research requires some form of vehicle to enable it to be useful in a practical sense. One of the aims of this thesis is to formulate a conceptual model of IS implementation within organisations to assist in the integration of research and practice. In order to be useful the thesis conceptual model will need to be applicable to both the researcher community and to IS practitioners, as well as to those within organisations who may be encountering IS implementation for the first time.

Myers (1997) advocates that 'qualitative' is not simply a synonym for 'interpretive' in the context of IS research. Myers' conceptualisation of the underlying assumptions for qualitative research, shown in Figure 7.2, suggests that qualitative research can in fact be positivist, interpretive or critical. The key to interpretive research is that it does not predefine dependent or independent variables as in a positivist approach, but focuses on the complexity of social systems, and making sense of situations as they emerge.

![Figure 7.2 Underlying philosophical assumptions (Myers, 1997)](image-url)
The thesis is based upon a longitudinal study of an implementation within an organisation, in order to produce a detailed description of the implementation phenomenon. The detailed description will be used to construct a model to explain the implementation phenomenon. The chosen approach is similar to a grounded theory approach (Urquhart, 2001), but with one major difference that will be described in Section 7.2.3.

7.2.3 Grounded theory

The research methodology of grounded theory was developed by Glaser and Strauss as a systematic method to derive theories of behaviour from empirical data (Urquhart, 2001). Grounded theory has become an accepted qualitative approach to IS research, and is also popularly used in the field of health research.

The basic aim of grounded theory is to generate a theory inductively commencing with empirically obtained data or observations. Researchers are challenged to set aside their theoretical ideas to focus initially on the observed behaviours of those in the phenomenon under observation. Theories are generated from the data acquired through field studies in order to define possible relationships between concepts under study.

Data analysis typically proceeds through identifying categories and then looking for connections between them. Data collection proceeds until new theories emerge which can then be tested. It may be that initially there is more than one plausible theory, hence the need to test against the known data. According to Urquhart, (2001, p.107) data analysis moves from the initial step of open coding in which categories are identified, and finishes with selective coding around an emerging storyline. Reporting can be via a narrative framework or by stating a set of propositions.

One aspect in which the present study differs from grounded theory is the requirement of grounded theory to begin with empirical observation within an area of study, and then let theories emerge inductively. This thesis looks to develop an explanatory conceptual model to locate existing theories, rather than to develop theory in an inductive way.
An advantage for the use of a grounded theory approach in IT studies (Baskerville & Pries-Heje, 1999) is that it is relatively easy for laypeople to understand how the predictions and explanations offered fit the situation with which they are familiar. This advantage is not solely the outcome of a grounded theory approach, but is associated with studies in which the subject matter is the phenomenon of interest, and not just a research approximation of the chosen phenomenon.

7.3 Applicable methods for this study

This section describes the qualitative approach chosen. Bruyn’s (1966) participant observation methodology offered the suitable combination of openness and rigour with which to approach this study. Different approaches within the overall methodology are discussed.

7.3.1 A qualitative approach

Phenomena associated with IS have not been straightforward for the research community to address. Lee, Liebenau and DeGross (1997) suggest that IS phenomena, “have defied the power of traditional research approaches to explain how individuals, groups, organizations, nations and society as a whole can harness computer technology to serve humanity” (p.2). In this context, Lee et al. use traditional research approach to indicate a quantitative approach to the IS phenomena. Where in the past qualitative research was seen by some as opposing a positivist approach, researchers such as Braa and Vidgen (1999) have argued that within the field of IS research there needs to be a dynamic balance between qualitative, positivist and action approaches. In this context the action approach captures the learning associated with change through intervention.

Qualitative research methods are particularly suited to “understand people and the social and cultural contexts within which they live” (Myers, 1997). IS within organisations involves people moving within the social and cultural contexts of the organisation within which they work.

One of the challenges for qualitative researchers within organisations is the need to be aware of, and to cope with, the subjectivity that accompanies
qualitative research within the complexity of an organisation. Trauth (1997) offers several lessons for the qualitative IS researcher learned from using a qualitative approach in studies in the US, Ireland and The Netherlands. Accepting the likelihood that the researcher will encounter aspects of organisational culture that they are not a part of, the researcher needs to seek alternative viewpoints of both the study observations and the interpretations made about them. Good sources of perspective are the researcher’s social network of people who work within the organisation or in the related IS sector (Trauth, 1997).

In terms of gathering study data from organisational members, Trauth (1997) suggests that the researcher needs to be constantly aware that they must work within an internal continuum that stretches from the person, a ‘new’ member of the organisation, to the researcher, a disconnected observer. Being too much the person and not enough the researcher runs the risk of “alienating the informants” (p. 231) whilst being too much the researcher and not enough the person could blind the researcher from realising their prior assumptions were preventing them from observing the ebb and flow of the organisation in action.

Participant observation was chosen as the particular qualitative method for this study for three main reasons. First, this methodology allowed sufficient freedom to move beyond the boundaries of previous studies; this was considered necessary in order to develop a conceptual model within which to locate those studies. Second, the method chosen needed to have sufficient rigour such that the findings would be both reliable and valid. Whilst participant observation can lead to problems with validity through subjectivity, validity can be enhanced through triangulation, which has been used in this study. Lastly, the research outcomes need to have utility for both the organisation and the IS research community.

Conducting the study within an organisational context using participant observation methodology provides concrete relevance to the study organisation at the first point, and through proper inference should be able to be generalised to other organisations. Answering current questions from within the research community is one of the primary motivators for this study.
7.3.2 Participant Observation Methodology

Bruyn’s (1966) participant observation methodology provides the researcher with a set of procedures that “can be tested for its capacity to yield findings that are both meaningful and verifiable” (p. 198). The objective of participant observation, in common with other research methods, is to provide valid and reliable knowledge about behaviour in context, in this case, the behaviour of people within an organisation in and around an IS implementation. Bruyn (1966) described three “task roles” (p. 6) for researchers working in social settings, shown in Figure 7.3.

Bruyn’s ‘traditional empiricist’ role maps onto Braa and Vidgen’s (1999) reductionist approach aimed at generating models that enable prediction as a research outcome. When current systems researchers such as Venkatesh et al. (2003) comment that we need to identify the boundary conditions within which their empirically derived models are applicable, they are reflecting upon the need to understand where, in the big picture, their models are located. This requires interpretation, shown as the ‘understanding’ apex in Braa and Vidgen’s model, and this corresponds to the task role of ‘participant observer’ in Bruyn’s conceptualisation. The research orientation chosen for this study was that of a participant observer, with a desired outcome of the theorist, i.e., the formulation of a conceptual model to convey the explanation.

![Bruyn's (1966) task roles](image)

*Figure 7.3 Bruyn’s (1966) task roles*
Zelditch (1962) recognised that the researcher using the method of participant observation actually employs three methods in the course of a research study. First, the researcher plays the role of a participant observer. In order to build up a complete picture of a potentially complex event, the participant observer seeks to both form a “configuration” of many properties of the same object at the same time, Zelditch refers to this as detailing an “incident”, and also to describe the sequence of incidents with this incident over time to build up a “history” (p. 567). More information can then be gained by observing the properties of a number of units over time.

Second, the researcher takes the opportunity to interview informants about the incidents observed. Zelditch (1962) suggests that informants should be interviewed on the basis that the informant is “reporting information presumed factually correct about others rather than about himself; and his information about events is about events in their absence” (p. 569). Third, the researcher should take advantage of enumerations, i.e., direct, repeated, countable observations and samples.

Each method under the umbrella of participant observation has its strengths and weaknesses, where, for example, informant interviews are suggested to be particularly suited to gathering information about institutionalised norms and statuses. The relative strengths and weaknesses are summarised in Table 7.1, with “prototype” meaning the recommended technique for a particular information type.

Bruyn (1966) has suggested that the participant observer approach should adhere to some broad “rules” (p. 13), which are briefly summarised as follows:

1. Participant observers should interact with the people within the system being studied in face-to-face relationships, and share their “life activities and sentiments”.
2. The participant observer should attempt to be part of the day-to-day life of the people under observation and participate in their culture where possible.
3. Ultimately the role of the participant observer “reflects the social process of living in the society” (p. 20).
### Table 7.1 Methods of obtaining information

<table>
<thead>
<tr>
<th>INFORMATION TYPES</th>
<th>METHODS OF OBTAINING INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enumerations and samples</td>
</tr>
<tr>
<td>Frequency distributions</td>
<td>Prototype and best form</td>
</tr>
<tr>
<td>Incidents, histories</td>
<td>Not adequate by itself; not efficient</td>
</tr>
<tr>
<td>Institutionalised norms and statuses</td>
<td>Adequate, but inefficient</td>
</tr>
</tbody>
</table>

After Zelditch (1962).

In order to do justice to Bruyn’s (1966) rules the researcher needs to be aware of the temporal phases of the research. For example, when the researcher ceases to be a newcomer in the group then the researcher’s role will change as their social acceptance changes. This is an example of how a person’s experiences likely reflect their social context.

In contrast to a strictly qualitative approach, quantitative methods in this area of research can be thought of as providing variables that go beyond visible behaviour, eventually to provide understanding through correlational models used for prediction. Davis’ (1986) TAM illustrates this point. Factors such as the user’s perception of ease of use cannot be observed, and have to be elicited through survey responses. Studies such as Venkatesh et al. (2003) ask questions about the utility of correlational models. For example, does a model that explains variation in usage frequency within a given set of parameters offer useful information about implementation success? How could such a question be answered?

Participant observation is aimed at identifying the shared meanings of people within the phenomenon of interest, with the ultimate aim of accurately describing the configuration of all of the shared meanings within the phenomenon of interest. The conceptual model developed in this thesis will look
to answer the “what does this model mean” type of questions that accompany quantitative models.

Participant observation is not just about description. The participant observer, like their empirical counterpart, is also interested in explanation, and as such also needs to operate at the level of theory. The intent of using participant observation in this thesis is to produce a conceptual model aimed at explanation. Whilst participant observation requires disciplined procedures and precise terminology, it also requires a certain style that is characterised “more by the observer’s sensitivity to what he sees than by what he believes others will ordinarily see, more by the observer’s special interests in studying the social scene than by purely scientific interests” (Bruyn, 1966, p. 201).

Bruyn (1966, pp. 206-233) recommends that participant observers follow systematic procedures in order to deliver structured studies, and these recommendations have been captured in a set of points aimed at maximising the subjectivity and objectivity of participant observation. Objectivity has been broken down to reflect both the character of the knowledge, and the conscious experience of the participant observer. These points are summarised respectively in Tables 7.2 and 7.3.

Table 7.2 Bruyn’s (1966) guide to adequate subjectivity

<table>
<thead>
<tr>
<th>Facet</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Record the different temporal phases of the research. The observer’s opportunities and acceptance will vary throughout a longitudinal study.</td>
</tr>
<tr>
<td>Place</td>
<td>Record the experience that people have with their physical environment.</td>
</tr>
<tr>
<td>Social circumstance</td>
<td>Take note of and record the experience of people under contrasting social circumstances.</td>
</tr>
<tr>
<td>Language</td>
<td>Observe and record the experience of learning the symbolic forms of language which bear upon the social meaning of the study.</td>
</tr>
<tr>
<td>Intimacy</td>
<td>Record how the observer experienced and encountered both psychological and social openings and barriers in seeking accurate interpretations of privately held social meanings.</td>
</tr>
<tr>
<td>Consensus</td>
<td>How were the social meanings confirmed in the context of the culture studied?</td>
</tr>
</tbody>
</table>
Adequate subjectivity conveys that the researcher has taken enough care to ensure that the observations made are reliable. Another user, using the same methodology, should be in a position to make similar observations of the phenomenon to those of the researcher. Adequate objectivity assures that the researcher has taken steps to confirm, through subject matter experts and prior research, that the observations made are a valid representation of the phenomenon under study.

Participant observers necessarily must move within the phenomenon that they are studying. Whilst formal permission from both the organisation and the University of Wollongong Human Research Ethics Committee can be obtained, there is still the issue of permission from the social groups within which the observer must work that needs to be negotiated, and to a large extent this comes down to an issue of observer style.

Table 7.3 Bruyn’s (1966) guide to objectivity

<table>
<thead>
<tr>
<th>Facet</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge: Empirical facts</td>
<td>Relate the research findings to empirical facts and contemporary theory, i.e., objectivity should increase as one perspective is brought to bear upon the findings from another perspective.</td>
</tr>
<tr>
<td>Sociohistorical context</td>
<td>Relate the research findings to other social contexts, with the aim of broadening the perspective accurately.</td>
</tr>
<tr>
<td>Consciousness: Distortion</td>
<td>First, record those signs of distortion which appear to disrupt the process of neutrally interpreting social meanings, i.e., the observer must be able to describe social phenomena without morally judging them. Second, record those signs of distortion that appear in the process of interpreting and evaluating data.</td>
</tr>
<tr>
<td>Distance</td>
<td>Record the extent to which the observer’s own personal needs and interests are the same as or different from those in the study. Problems can arise when the observer achieves a relationship too close to the people studied.</td>
</tr>
</tbody>
</table>

Organisations themselves present some unique considerations for researchers attempting to study IS from within. The very act of moving within the phenomenon under study relates to Dalmau’s (1999) description of ‘John
Sherwood’s Dance’. This analogy was developed to show how moving into an organisation can be likened to learning a new dance. People within the organisation move together in certain ways, much like the steps of a dance, and the newcomer first needs to learn the dance before they are accepted into the organisation.

This level of acceptance is what Bruyn (1966) was advocating for the researcher. Presumably once the researcher becomes part of the organisation in this way, they will then have access to a layer of meaning that simple observation will not allow.

The methodology of participant observation should generate rich data about the implementation phenomenon. Triangulation through alternative sources of data as recommended by Zelditch (1962) will be used to enhance the validity of the observations and to address possible issues with subjectivity.

In order to make this data useful, a conceptual model for IS implementation based upon the data will be constructed. The intent of the conceptual model is not to reduce the interpretation of the implementation; rather it is to identify those factors that contribute to the site-specific observations. The conceptual model is aimed at both researchers and IS practitioners, so an appropriate form of the model needs to be selected.

Given that the study focuses upon behaviour in a real life setting, there are ethical and privacy issues that need to be considered. These issues are summarised here.

7.4 Ethical and privacy considerations

In order to conduct this longitudinal, qualitative study within the chosen organisation for research purposes there were a number of important aspects from both ethical and privacy perspectives that needed to be addressed. Permission was obtained from the organisation to use the IS implementation as a vehicle for the author’s PhD study, and the organisation also requested that the research be formulated into a report suitable for use within the organisation to help improve future implementations. In order to satisfy the organisation’s requirements for confidentiality, the thesis has been written without identifying the organisation.
Ethical conduct of the study was reviewed and approved by the University of Wollongong Human Research Ethics Committee as an extension to the author’s undergraduate project, which preceded this study. Specific approval was obtained for modifications to the procedure such as using project related Emails as the data for thematic analysis via Leximancer, to be discussed in Chapter 8. Care was taken to separate day-to-day observations and interactions, where the people contacted were described by their organisational function, from formal and semi-formal interviews, where specific permission to include the dialogue and observations for the study was sought.

The author had previously worked in other areas of the organisation, and worked as a member of the IS implementation team for this study. This role was an enabler for the chosen study methodology, i.e., participant observation, but care had to be taken to remain as objective as possible as has been discussed in the first part of this chapter. Braa and Vidgen’s (1999) study has highlighted the ability to change the outcome of an implementation through intervention, and this was something that had to be balanced through being both the observer and a participant in this study.

7.5 Conclusion

Within the desire to provide an accurate description of the phenomenon of an IS implementation within an organisation, a participant observer needs to ensure objectivity in both method and reporting. This necessitates the ability to record and interpret subjective meanings within a framework designed to be as objective as possible. Roger’s (1995) DOI model has been chosen as the roadmap to guide the longitudinal study so that the broad stages of implementation can be identified. The method of participant observation will be used to describe the IS implementation within the organisation as it is capable of facilitating a broad enough interpretation of the IS implementation to support the formulation of a higher-level conceptual model.

Ideally a conceptual model that will be useful to both the research community and to IS practitioners should satisfy a number of criteria. The conceptual model should be broad enough to capture the total domain of behavioural influence upon IS implementation, and Smith and Milan’s CATWOE
conceptual model (2007) has shown that the domain would likely include more than just the system designers and users. The model should be detailed enough to locate the numerous existing models and, perspectives within the domain but capable of being general enough to facilitate discussion at various conceptual levels, and to bridge the gap between research and practice. The combination of models discussed in this chapter suggests possible forms for the conceptual model.

The next section of the report details the longitudinal study. Chapter 8 describes the study method and approach to analysis. Chapter 9 provides the study results and Chapter 10 provides an interpretation of the data obtained through participant observation.
Chapter 8

Method and analytic approach

“Social process is not captured in hypothetical deductions, covariances, and degrees of freedom. Instead, understanding social process involves getting inside the world of those generating it”

8.1 Introduction

This chapter describes the study methodology and the approach used to analyse the data collected. People and product names have been removed from this chapter to preserve confidentiality. Where participants have been interviewed or referred to more than once, alias names have been used to enable the reader to follow the thread over time. The IS being implemented was to be taken up by the Maintenance, Finance and HR groups and has been referred to as MFHRIS in the thesis.

8.2 Participants

It is important for the reader to understand the environment and context within which the participants worked during the longitudinal study, and to get some idea of how the participant observations were made. Relevant information about the organisation and the IS implemented is given along with a description of the participants to facilitate this understanding.

8.2.1 The organisation

The organisation within which the study was conducted is a large Australian based manufacturing company. The company has manufacturing sites in Australia and New Zealand, as well as in other countries.

This study focussed primarily on one large manufacturing site in NSW, and by way of contrast to a lesser extent on other sites across Australia. The organisation is structured hierarchically as shown in Figure 8.1.

The New Zealand site and Australian Business # 2 had implemented MFHRIS shortly before the implementation that was the focus of this study at
the NSW Site in Australian Business #1. Approximately half of the implementation team had participated in the two previous implementations.

The IS implementation impacted primarily upon the Finance, Human Resources and Maintenance functions within the businesses. The reporting structure for these functions within the NSW Site that was the focus of this study is shown in Figure 8.2. This reporting structure is similar within the other business units. For this site, the NSW Site manager and his direct reports formed the Site Management Team that functioned independently within the broader business on a day-to-day basis.

![Organisation hierarchy](image)

* Groups involved in this implementation

**Figure 8.1 Organisation hierarchy**

Reorganisations within this organisation are reportedly frequent and a major company reorganisation occurred approximately six months after the Go Live date, where responsibility for MFHRIS moved from reporting into each business unit, to being an overall corporate responsibility. ‘Go Live’ is a term used by IS practitioners to indicate the actual time or date when the newly implemented IS actually becomes operational. The project leader, who was an employee of the organisation, was replaced during the project, prior to implementation, by another employee.
The organisational structure, depicted in Figure 8.2 reflects the situation in place for the majority of the study, up to approximately six months after the Go Live date. The IS was the same throughout the sites and is described briefly as background to the study.

8.2.2 The system implemented

The IS implemented was an integrated business system provided by SAP designed with the corporate goal of enabling and providing a platform for a common set of reporting measures throughout the organisation (Technology Evaluation Centres, 2007). The new system was selected to replace the existing maintenance system, to upgrade the financial system to a newer version of an existing SAP product and to provide a new purchasing system. MFHRIS had been implemented previously in two other parts of the organisation, at the New Zealand site and the Australian Business #2.

The implementation was expected to impact the maintenance community in a major way. This group was numerically larger than the other impacted groups, and MFHRIS was replacing a widely used system. The existing maintenance system had been in place for about 20 years and was used widely throughout the larger manufacturing sites.

The replacement maintenance system was not be merely an upgrade, but required a number of tasks to be done differently, by different people. The
legacy system ran on a mainframe computer with dedicated input terminals and used standard template screens. A small number of the maintenance employees used these dedicated terminals and did not access any other computers during their workday, but most maintenance employees used PC's for a variety of other tasks, including email communication throughout their workday.

The new purchasing system was introduced to some new users, and required a different approach by the users of the previous system. For the employees at the NSW Site, the new system was actually a backward step as they had a highly functional system developed for them by the primary vendor. The new system had been developed for the overall benefit of the organisation, and so a backward step for the NSW Site was justified with this in mind. It will be seen in the study that this aspect had not been shared with the impacted employees at the study site.

The finance upgrade was not considered a major change and required the existing finance users to learn some new functionality for a SAP system that they had used for some time. Most of the financial activities, related to data entry and reporting, were already on enterprise wide IS. Similarly, the HR changes were minimal, once again with an upgrade to an existing SAP product used for payroll and training records. The organisation's stated aims and anticipated organisational impact for the project are presented in Table 8.1.

**Table 8.1 Project aims and organisational impact**

<table>
<thead>
<tr>
<th>Aims:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce risk to the business from ageing and no longer supported systems.</td>
</tr>
<tr>
<td>Deliver the financial benefits attached to the delivery of the new IS.</td>
</tr>
<tr>
<td>Implement the standard IS Programme across the target business units.</td>
</tr>
<tr>
<td>Provide an integrated solution across capabilities to fill current capability gaps.</td>
</tr>
<tr>
<td>Provide the foundation for business and IS vision.</td>
</tr>
<tr>
<td>Reuse New Zealand and Australian Business #2 experience and templates.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anticipated impact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ERP implementation will affect anyone who currently uses Maintenance, Finance,</td>
</tr>
<tr>
<td>HR or Supply systems. The level of usage of these systems will determine the extent to</td>
</tr>
<tr>
<td>which individuals will be affected.</td>
</tr>
<tr>
<td>The project will involve changes to processes and systems and as a result – changes to</td>
</tr>
<tr>
<td>job roles. In addition to impacting employees, the implementation will likely impact the</td>
</tr>
<tr>
<td>interface with vendors and alliance partners.</td>
</tr>
</tbody>
</table>

Extracted from NSW Site presentation (Section 8.2.2 discussion).
The organisation decided, on the basis that it had implemented this system twice previously in similar business units, that the implementation process could be adapted from what had worked previously. This adaptation was referred to as the template approach, and according to the experienced project team practitioners is common practice. This intent is captured in the organisation's guiding principles for the project shown in Table 8.2.

Table 8.2 Project guiding principles

| Template approach: | Implement the IS template without unnecessary modification directly into Australian Business #1, therefore reducing the need for feasibility phase, and moving straight into the execution phase. |
| Reuse: | Reuse project tools and processes from New Zealand and Australian #2 Businesses, therefore reducing costs. |
| Reduced scope of training: | Training will be reduced to the minimum allowable. Playpen systems will be made available to business users early to facilitate quicker system familiarity. |
| Business involvement: | A larger percentage of business resources will be engaged on the project to reduce reliance on external consultants and transfer knowledge more quickly to the business. |

Extracted from NSW Site presentation at Project Initiation

Apart from the maintenance computer terminals, there was no change to the hardware required to support the new systems. Most employees simply had the MFHRIS enabled on their current workstation. The maintenance implementation involved the replacement of the older mainframe terminals with personal computers able to access MFHRIS, along with other applications.

The study participants included people other than those directly involved in using or installing the MFHRIS. It was anticipated that in an organisational context there would likely be others who could influence the outcome of the implementation, and these groups included various levels of management, vendors and other non-user employees.

8.2.3 Study participants

Study participants at the NSW site came from three groups. Within the broad boundaries of participant observation of the IS implementation within the NSW Site, those employees and contractors who were present on a day-to-day
basis could have been potentially observed in the study, though not all were contacted to be participants.

A smaller subset of this total group, who are referred to in the Longitudinal Events Log (see Appendix 1), were contacted on an informal basis to provide contextual information relevant to the observations made within the study. The third group of participants, once again a subset of the total group of employees and contractors who were present on a day-to-day basis, were contacted formally through either one-on-one or small group interviews, or in larger focus group interviews at important stages throughout the longitudinal study. A breakdown of the study participants is detailed in Table 8.3.

The data obtained from the participants at the NSW site was supplemented by clarifying and contrasting data supplied by participants from the New Zealand and Australian #2 Businesses, where the IS had been previously implemented, and the Victorian and Smaller Sites which were part of this implementation. Typically these data were obtained through telephone conversation or via email.

The site employees comprised both male and female employees, with males representing more than 90% of the workforce. The organisation has an ‘aging’ workforce with the average age approximately 48 years, and with more than 50% of employees having 15 years or more service with this organisation.

Those employees in production and maintenance roles typically work twelve-hour shifts, in a pattern alternating between two nights and two days, followed by a four-day break. There was a mix of blue and white-collar workers, with the blue-collar workers in the majority at a ratio of approximately 8:1. Detailed demographics were not considered necessary for the interpretation of the study observations.

Having identified the IS, the organisation and the approach to be used, the longitudinal data collection could begin. The participant observations were facilitated by the organisation allowing the observations to be made from within the project team, and then for some considerable period after the project team disbanded. The study procedure for is described in the next section.
### Table 8.3 Study participants

<table>
<thead>
<tr>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSW Site Management (8)</strong></td>
</tr>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Responsible for the site operations, and would own the local outcome of the IS implementation.</td>
</tr>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>Participant observation and clarifying comments, including emails.</td>
</tr>
<tr>
<td><strong>Number</strong></td>
</tr>
<tr>
<td>Observed 8</td>
</tr>
</tbody>
</table>

| **Maintenance employees from across the NSW and one of the Small site (100)** |
| Description |
| Both staff and wages (hourly) employees, working both 12-hour shifts and day work. MFHRIS replaced the legacy system that had been in place for approx. 20 years. |
| **Method** |
| Participant observation and clarifying comments, including emails. One-on-one interviews, Group interview, Focus group². |
| **Number** |
| 60 |

| **Production employees from across the NSW and one of the Small sites (600)** |
| Description |
| These employees were only impacted in the way that they would order plant consumables with MFHRIS. |
| **Method** |
| Participant observation and clarifying comments. Focus group². |
| **Number** |
| 35 |

| **HR staff (4)** |
| Description |
| A small team consisting of the HR Manager and three HR Specialists; minimal impact from MFHRIS. |
| **Method** |
| Participant observation and clarifying comments. |
| **Number** |
| 4 |

| ** Finance staff (10)** |
| Description |
| The finance team consisted of the Finance Manager and nine Plant Accountants; a minor upgrade from the IS system they were already using, but major impact post-implementation. |
| **Method** |
| Participant observation and clarifying comments. |
| **Number** |
| 10 |

| **Project implementation team (70 across the Australia #1 Business)** |
| Description |
| Comprising IS employees from within the organisation along with IT/IS contractors. Most had worked on the implementations at the NEW ZEALAND and Australian #2 Businesses. Team supplemented by a number of local employees at each site³. |
| **Method** |
| Participant observation and clarifying comments. One-on-one interviews. Group interview. Focus group². |
| **Number** |
| 60 |

Note 1. Refer to Figures 8.1 and 8.2 for where the groups fit into the hierarchy
Note 2. Referred to as Situation Appraisal within the organisation
Note 3. Researcher participated as a Change Agent within the team at the NSW Site
Note 4. Not all of these people were interviewed directly, see discussion in Section 8.2.3
8.3 Procedure

The implementation of MFHRIS within the study organisation was scheduled for a Go Live date of Monday July 2\textsuperscript{nd} 2007. This date was selected by the project team in conjunction with the organisation’s management to coincide with the end of year financial reporting. It was judged that this was the best time to upgrade the financial components of the IS within the overall project as most financial counters were reset at this time, and there would be less data to carry over from the old system to the new one.

Permission was obtained from the organisation to observe the day-to-day activities within and around the implementation project and to access project related information. Where interviews were conducted with individuals, written permission was obtained under the guidelines of the University of Wollongong’s Human Research Ethics Committee. Project related emails received by the researcher during the study were analysed for themes, and prior to their use, the senders were contacted formally for permission to do so.

Planning for the implementation commenced approximately 12 months earlier in mid 2006. The Project Overview is shown in Figure 8.3 (located at the end of the chapter) and shows the various tasks that were planned. Many of the tasks, broken down into the main functions, i.e., technical, deployment, training/transition, design and transition, and management, business readiness and support were designed to proceed in parallel.

The project team comprising employees from within the organisation, along with subject matter experts and experienced trainers on contract, came together in early January 2007 to commence the pre-implementation activities. The researcher joined this team and was primarily involved in communications and training scheduling amongst other tasks at the beginning of 2007.

The researcher participated in the implementation project team and was involved in a number of specific tasks that are shown in Table 8.4. Importantly, for the thesis, this role allowed direct observation of the work environment and access to the management, employees and contractors involved in both the project and the day-to-day running of the operations at the NSW Site as an employee, essential to support the participant observation methodology.
Data were collected over approximately eighteen months, i.e., from approximately six months prior to the Go Live date, through the ‘implementation period’ and then for approximately 9 months after Go Live to capture the ‘post-adoption’ period. The researcher’s formal association with the project ended when the project team disbanded approximately two months after Go Live. The research process continued and the researcher continued to be associated with the implementation at the NSW and Smaller sites helping with numerous implementation issues that arose. In retrospect this was a key involvement as significant important behaviours occurred well after Go Live.

During the course of the study information was obtained from other sites within the organisation to clarify observations and to provide contrast with the study site. This information was obtained through documentation, telephone conversation and email. These data supplemented the participant observations, as part of the triangulation process.

Table 8.4 Researcher role tasks

Communication:
- Communication Strategy/Plan;
- Contact email alias;
- Web Site;
- Newsletters;
- Information Workshops;
- Posters/Flyers;
- Key Messages.

Commitment:
- Maintain commitment from Executive (Project Sponsor, Business Owner, SLT/Steering Committee, Woking Committee, Capability Sponsors, Project Management/project team).

Learning and support:
- Needs Analysis;
- Training Strategy;
- Role Based Curriculum;
- Training & Support;
- Materials;
- Training Schedule;
- Training Delivery;
- Training Support.

Change management:
- Transition Plan;
- Stakeholder Management;
- Change Agent Network;
- Leadership Alignment;
- Impact Assessment.

8.3.1 Participant observations

The intent of the observations was to capture in as much detail as possible the implementation related activities and, given that the project happened within the day-to-day organisational activities, to capture those activities that impacted upon the implementation. By joining in the day-to-day activities of these groups and actually experiencing the differing perspectives it
was hoped that a complete picture of the implementation phenomena could be pieced together. The day-to-day observations were captured in research diaries and then summarised into a Longitudinal Events Log, described in Section 8.3.2.1. The participant observation methodology differed from action research in that there was no attempt made to review the information gathered and to change or improve the implementation during the study.

Bruyn (1966, pp. 133-142) emphasised the importance of understanding metaphors, models and myths as a source of important information. Effort was made to spend as much time as possible ‘in’ the work environment of people impacted by, and part of, the IS implementation. This involved, for example, talking with the site management team at their weekly meetings, being present at some of the employee training, and facilitating sessions to discuss and resolve project related issues.

Spending time in the plant with the maintenance people to see what was involved in their day-to-day work proved to be a rich source of key observations. Visiting the crews during their ‘work-day’ sometimes meant visiting the plant well outside of the traditional ‘9 to 5’ office hours, but the maintenance crews seemingly appreciated this. Observations were captured in the Longitudinal Events Log and clarified further if required. This clarification involved triangulation by seeking other crew’s perspectives on the same observations, checking for the shift management’s understanding, and comparing observations with other members of the project team.

Given that the study organisation had anticipated that this project would also likely impact vendors and alliance partners (see Table 8.1), these groups were contacted during and after the implementation to determine the nature of this impact. Vendors and alliance partners were contacted by telephone and email to get their perspective on events in the NSW Site implementation.

8.3.2 Recorded data

A range of documents relevant to the implementation project was available to review. This range included employee emails, described in Section 8.3.4, project team meeting minutes, site management team minutes, and formal project communications such as the Key Message newsletter shown in
Appendix 17. These documents were used to provide background and intent to the events that unfolded, and to provide a record of issues raised and how they were addressed throughout the project. Where applicable, they have been included in the appendices; otherwise they are referred to in the text. The various sources of data are linked in the Longitudinal Events Log (Appendix 1).

8.3.2.1 Longitudinal events log

The running record of the longitudinal study was recorded in a Longitudinal Events Log (Appendix 1). The log is a record of the participant observations and sources of data according to the date and time, observed participants, a summary of the observation and a research comment relating to the research significance of the observation. Some of the observations related to recorded or transcribed individual or group interviews, and their inclusion in the log was to maintain the temporal sequence.

A number of the observations recorded turned out to be unrelated to the implementation outcome, but that was not obvious at the time. These observations have been retained to demonstrate the level of associated activity that confronts researchers using this approach. O’Reilly (2005) suggests that keeping notes in this fashion facilitates the bringing together of ideas ready for further analysis.

The comments in the ‘My Notes’ column of the log reflect the thoughts of the researcher at the time that the log entry was made. These comments reflect both the study participant observations and the possible links to research in the IS area.

8.3.3 Interviews

Three levels of recorded input were conducted throughout the project. The intent was to either establish a baseline of information from which to carry out further participant observation, or to clarify information already observed. This clarification was carried out primarily to validate the observations made.

8.3.3.1 One-on-one interviews.

Interviews were conducted with prior notification within, or as close as possible to, the employee’s work place. The research study was explained with
information about the study given to the interviewee and permission obtained before proceeding. Study information provided for the interview participants is provided in Appendix 4, and the permission to proceed was captured on Acceptance Sheets provided in Appendix 2. Each interview was recorded and then downloaded onto the researcher’s computer to enable summary and analysis. Nine interviews were conducted in this format, as summarised in Table 8.5.

Table 8.5 One-on-one interviews

<table>
<thead>
<tr>
<th>Person interviewed</th>
<th>Interview intent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate IS Manager</td>
<td>Background to the organisation’s strategies and policies towards IS in general.</td>
</tr>
<tr>
<td>Site maintenance coordinator</td>
<td>How is the new IS being perceived relative to the legacy system that has been used for 20 years at the study site.</td>
</tr>
<tr>
<td>Site Key User Note 1</td>
<td>Assess the experience of being intimately involved with the new IS from prior to implementation, and before the wider organisation.</td>
</tr>
<tr>
<td>Project team training consultant #1</td>
<td>Impressions of the organisation from an ‘outsider’ and view as to the implementation compared to other implementations.</td>
</tr>
<tr>
<td>Project team training consultant #2</td>
<td>Impressions of the organisation from an ‘outsider’ and view as to the implementation compared to other implementations.</td>
</tr>
<tr>
<td>Consultant on another IS implementation within the study organisation</td>
<td>Compare and contrast the study implementation with another implementation within the same organisation.</td>
</tr>
<tr>
<td>Project team lead</td>
<td>Progress of the implementation against the project team’s expectations.</td>
</tr>
<tr>
<td>Site production unit 1 Manager</td>
<td>Perspective of the implementation from within the study site, but from a manager not involved directly with the new IS.</td>
</tr>
<tr>
<td>Site production unit 2 Manager</td>
<td>Perspective of the implementation from within the study site, but from a manager not involved directly with the new IS; compare with other manager’s perspective.</td>
</tr>
</tbody>
</table>

Note 1: Key users are explained in Section 9.3.2
8.3.3.2 Small group discussion

A preliminary study carried out at this site had identified that a number of the wages employees were not comfortable with one-on-one interviews, but were happy to discuss their work in a more informal setting within their workplace (Matthias, 2005). In order to get some background to the issues that employees had, three small group discussions were held and notes were taken during and after to capture the main points raised. The small groups are described in Table 8.6. The intent of the small group discussions was to get a preliminary ‘feel’ for the current climate at the study site prior to the commencement of the implementation, and to look for site-specific issues other than those that centred on the implementation directly.

Table 8.6 Small group discussions

<table>
<thead>
<tr>
<th>Group interviewed</th>
<th>Interview intent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data cleansing team (six maintenance employees) Note 1</td>
<td>What is involved in the task, how does the group perceive it, what else is happening for the maintenance people at the site?</td>
</tr>
<tr>
<td>Study site Key Users (four users) Note 1</td>
<td>How is the Key user role perceived by the other employees, what are the initial impressions of the IS and the implementation.</td>
</tr>
<tr>
<td>Study site maintenance managers</td>
<td>From a maintenance management perspective what issues are generated by the implementation, what other issues are being experienced at the site.</td>
</tr>
</tbody>
</table>

Note 1: Key Users and data cleansing are explained in Section 9.3.2

8.3.3.3 Focus groups or Situation Appraisals

The organisation makes widespread use of Kepner and Tregoe’s (1997) Rational Process tools, referred to as ‘KT’ by the employees in its day-to-day operations. One of the process tools, known as Situation Appraisal, is a method for facilitating a group in a process where concerns about a particular issue can be obtained, grouped and identified for further action.

Situation Appraisal (SA) is defined as an evaluative technique designed to lead to the proper selection and use of particular methods from the suite of analytical methods available. Essentially the use of SA suggests to the user where to begin, how to recognise situations that require action, how to break
apart issues that are overlapping and confusing and finally how to manage a number of simultaneous activities effectively (Kepner & Tregoe, 1997).

The SA approach was adopted on the basis that it allowed validation and clarification of study observations and, as the organisation’s employees were familiar and comfortable with the methodology, it was straightforward to organise the SA sessions. Employees were able to contribute without the process getting in the way.

Eight focus group sessions were run in the Situation Appraisal format, attached as Appendices 9 to 16, as detailed in Table 8.7. The sessions were interactive and followed the sequence: list threats and opportunities, separate and clarify concerns, consider seriousness, urgency and growth, determine analysis and any help needed. Information within the session is captured on A0 size flip charts, and then collated and summarised in the form of minutes.

Table 8.7 Focus groups or situation appraisals

<table>
<thead>
<tr>
<th>Appendix Number</th>
<th>Focus group (number of participants Note 1)</th>
<th>Discussion focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Purchasing pre-implementation (8)</td>
<td>Identify concerns about the new IS.</td>
</tr>
<tr>
<td>10</td>
<td>Purchasing post-implementation (12)</td>
<td>Numerous day-to-day issues being experienced across the site.</td>
</tr>
<tr>
<td>11</td>
<td>Production unit 1 post-implementation (9)</td>
<td>Problems being experienced by new users.</td>
</tr>
<tr>
<td>12</td>
<td>Production unit 1, service shops (1)</td>
<td>Problems being experienced, mainly with orders &amp; receipts.</td>
</tr>
<tr>
<td>13</td>
<td>Production unit 2 post-implementation (3)</td>
<td>User problems with the new IS.</td>
</tr>
<tr>
<td>14</td>
<td>Production unit 2, part 2 clarification (1)</td>
<td>Clarification and observations from Production unit 2 site maintenance manager.</td>
</tr>
<tr>
<td>15</td>
<td>Study site project engineer clarification (1)</td>
<td>Generally no major issues in this area; relate and confirm positive experiences.</td>
</tr>
<tr>
<td>16</td>
<td>Study site issues concerned with paint ordering (14)</td>
<td>Major issues specific to paint ordering associated with the new IS.</td>
</tr>
</tbody>
</table>

Note 1: excluding the researcher
8.3.4 Emails

Communication by email is very common within the study organisation. Over the period of the study, 30 relevant emails were collated for analysis, with the primary purpose to compare and contrast the themes and issues raised by employees before and after the IS implementation. Permission was obtained from 27 of the email senders to use their emails, which were collated anonymously, to carry out thematic analysis. An example of the permission process is included in Appendix 5.

8.3.5 How the methods relate to the research questions.

Theoretical approaches and qualitative methods were used to address the research questions listed in Chapter 1. Table 8.8 shows how the approaches and methods relate to those research questions. Theory and prior studies were two perspectives used to establish the need for both the qualitative study and the conceptual model that followed. These approaches were used a priori to the longitudinal study.

Table 8.8 How the study research questions are addressed by the approaches and methods chosen

<table>
<thead>
<tr>
<th>Approaches</th>
<th>Methods</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>Prior studies review</td>
<td>Participant observation: Events log</td>
<td>One-on-one interviews</td>
<td>Small group interviews</td>
<td>Group situation appraisals</td>
<td></td>
</tr>
<tr>
<td>Question 1</td>
<td>Is use related to success?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question 2</td>
<td>Ways to predict success</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question 3</td>
<td>Models in context</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question 4</td>
<td>Why do projects fail?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Question 5</td>
<td>Organisational investment</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Question 6</td>
<td>What is 'IS' success?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Question 7</td>
<td>Conceptual model</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Timing: a priori throughout pre-implementation post-impl$^\text{a}$
Research questions one to four have been initially argued a priori in the early chapters of this thesis through logic with reference to the literature reviewed in the preceding chapters. Evidence to support the inferences was then looked for in the case study, e.g., it was asserted that psychological reactance, introduced in Section 3.2.4, might be a motivator for potentially negative behaviour, and evidence for this link was specifically sought.

The observations and data collected formed a rich and detailed story of the implementation. It was considered that a narrative of the implementation with supporting data would best capture the phenomenon for further analysis.

8.4 Approach to data analysis

The study observations are presented in the form of a chronological narrative in Chapter 9. The chronological format captures the sequence of observations as they were made so that the reader can get some appreciation of the implementation as it progressed. The narrative style is consistent with a metaphor of the organisational journey described in Section 5.6.1.

The specific observations in the form of the Longitudinal Events Log are included as Appendix 1. These inputs and the accompanying related documents described in Section 8.3, facilitate the broad interpretation of the study presented in Chapter 10. This narrative is supported by text analysis using Leximancer software and triangulation through reference to subject matter experts and follow-up interviews.

Themes or patterns identified from study data can be analysed inductively, the bottom-up approach, or deductively using existing theory or perspective in a top-down approach (Braun & Clarke, 2006). The benefit of an inductive approach is that the themes identified are seen to be linked closely to the data themselves, and this parallels the grounded theory approach. This method facilitates not falling into the trap of using “analytic preconceptions” (p. 83).

A top-down approach tends to provide a less rich description of the phenomenon, but has the benefit of providing a detailed analysis of certain aspects of the data, which may be more suitable for further quantitative
analysis. Having obtained a detailed and comprehensive description of the implementation phenomenon will facilitate future top down analysis.

### 8.4.1 Content analysis

Interviews and observations carried out throughout the study were analysed for organisational and implementation themes that could relate to implementation outcomes. Content analysis of emails using Leximancer, a concept-mapping program (Cretchley, 2007), was specifically used to explore the change in employee focus from before to after implementation. Content analysis is useful in facilitating the description of trends over time, and the comparison of the actual content of communication with that expected (Berelson, 1952).

Leximancer is a computer based, data mining and visualisation tool used to extract information from vast amounts of text (Cretchley, 2007) and was used in this study to extract themes from project related Emails generated before, during and after the IS implementation. Leximancer can generate a visual concept map that displays the main concepts along with their relationships to other concepts, and this facilitates directed searches of the data. The operation for the Leximancer tool is based upon statistical analysis of the linked occurrence of words within the text, and concepts are in fact groups of words that travel together within the text. Sentences are said to contain a certain concept if the accumulated statistical evidence rises above a threshold level.

Consistent with the method of participant observation, and in line with the intent of Leximancer as an analytic tool, the concepts generated via Leximancer are suggestions that need to be validated before acceptance. The reliability of the participant observations can be explored through triangulation. Cross-referencing the concepts with organisational members or subject matter experts can be used to assess the study validity.

### 8.4.2 Subject matter experts

Where possible, references to organisational events were followed up through comments from subject matter experts (SME). In the context of this study, a SME was someone who had either broad or detailed knowledge of events within either the organisation or the implementation.
For example, if a comparison was made to a previous IS implementation, information was sought from people responsible for, or involved in, that implementation for clarification or confirmation of the comments recorded. Where appropriate, technical references were clarified through the appropriate technical SME and recorded in the Longitudinal Events Log.

8.5 Discussion

The approach used in this study was to record the phenomenon of the implementation of an IT-enabled IS within the study organisation using participant observation methodology. Comments and observations were recorded longitudinally over an approximately 18-month period, with as much organisational detail and context as possible. Triangulation through text analysis, reference to subject matter experts and follow-up interviews was used to enhance both the validity and reliability of the participant observations.

The next chapter presents the longitudinal study as a narrative as this format was thought to best give the reader a holistic understanding of the events as they were observed. The observations and comments are then interpreted from organisational and behavioural perspectives in Chapter 10.
Project Overview

Figure 8.3 The project overview
Chapter 9

Implementation narrative

“In the past we brought people in after the implementation to fix up the people issues.”

(Vicky, change management consultant with the project team).

9.1 Introduction

The primary aim of the longitudinal study was to describe in detail the people interactions, and to observe and assess the influence of organisational factors associated with, the implementation outcome of an IT-enabled IS in an organisation. The study observations are presented in the form of a narrative. The events are presented from the perspectives of the project team, the IS users, the site management and through the participant observations of the researcher.

Particular emphasis has been placed upon those behaviours thought to be associated with the outcome of the implementation. The IS itself was not of primary interest, but sufficient information will be given to allow the user to get some appreciation of the magnitude and types of changes that it brought to the study organisation.

Superscript numbers in the text refer to items from the Longitudinal Events Log (Appendix 1). Throughout this chapter, observations and quotations from the study are included within the text where they add value to the explanation. These observations and quotations are indented, and displayed in italics, for example,

What interests my boss, fascinates me.

Maintenance worker.

Learnings relevant to the research questions are summarised at the end of the description of each major period, i.e., pre-implementation, Go Live and post-implementation. The chapter layout is shown in Figure 9.1. Sections are arranged sequentially following the longitudinal timeline from pre-implementation, through Go Live into the post-implementation period.
### Overview [Section 9.2]

<table>
<thead>
<tr>
<th>Longitudinal Stages</th>
<th>Significant Events</th>
<th>Perspectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Project Team</td>
</tr>
<tr>
<td>Pre-Implementation Jan 2007 to Jun 2007</td>
<td>9.3.1</td>
<td>9.3.2</td>
</tr>
<tr>
<td>Situation prior to Go Live [Section 9.3.5]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go Live Week Week 1 July 2007</td>
<td>9.4.1</td>
<td>9.4.2</td>
</tr>
<tr>
<td>Post-Implementation Week 2 July 2007 to Nov 2008</td>
<td>9.5.1</td>
<td>9.5.2</td>
</tr>
<tr>
<td>Illustrative vignettes [Section 9.6]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow up focus groups [Section 9.7]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov 2008</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 9.1** Schematic representation of chapter sections

### 9.2 Main study: Overview

A detailed record of observations and conversations throughout and after the implementation was maintained in research diaries. These observations and conversations were summarised in the form of a Longitudinal Events Log, included as Appendix 1. The pseudonyms for individuals within the study who provided important information, or were quoted on numerous occasions, are listed in Table 9.1. This table relates to the organisational structure shown in Figures 8.1 and 8.2 in the methods section.

In line with Roger’s (1995) DOI discussed in Sections 1.5 and 7.2.1, observations were commenced with the expectation that MFHRIS might conform broadly to Roger’s DOI stages. The *knowledge and persuasion phases*, when potential system users find out about and form attitudes about
MFHRIS, would commence well before the project team commenced their work at the beginning of 2007.

Table 9.1 Pseudonyms for individuals mentioned within the study

<table>
<thead>
<tr>
<th>Alias</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bob</td>
<td>Study Site Manager</td>
<td>Owns the outcome at the study site</td>
</tr>
<tr>
<td>Nick</td>
<td>Project team member</td>
<td>Local expert on the legacy maintenance system being replaced; would become the expert and site resource for MFHRIS; 20+ years employee.</td>
</tr>
<tr>
<td>Mack</td>
<td>Project team Lead</td>
<td>Had been involved in previous IS implementations within this organisation; recently employed.</td>
</tr>
<tr>
<td>Marg</td>
<td>Consultant in the Project team</td>
<td>Employed for this project; had worked for this organisation on the previous implementations less than 5 years experience in this field.</td>
</tr>
<tr>
<td>Vicky</td>
<td>Consultant in the project team</td>
<td>Employed for this project; had worked for this organisation on the previous implementations 20+ years experience in this field.</td>
</tr>
<tr>
<td>Deb</td>
<td>Study Site Mgr's PA</td>
<td>Key user of the purchasing module; as Mgr’s personal assistant is an influential person in the day-to-day operation of the organisation; 20+ years employee.</td>
</tr>
<tr>
<td>Jim</td>
<td>Study site maintenance engineer</td>
<td>On loan to the Project; responsible for data work prior to implementation; key member of the site maintenance community; 20+ years employee.</td>
</tr>
<tr>
<td>Kev</td>
<td>Study site employee</td>
<td>User of MFHRIS purchasing module.</td>
</tr>
<tr>
<td>John</td>
<td>Study site employee</td>
<td>User of MFHRIS finance module.</td>
</tr>
<tr>
<td>Alan</td>
<td>Study site maintenance employee</td>
<td>Wages maintenance employee on day work; user of the legacy and MFHRIS for maintenance; 20+ years employee.</td>
</tr>
<tr>
<td>Bill</td>
<td>Study site</td>
<td>Staff maintenance engineer, recently employed.</td>
</tr>
<tr>
<td>Amy</td>
<td>Consultant</td>
<td>Has spent about 2 years working with this organisation on the implementation of a travel booking system.</td>
</tr>
</tbody>
</table>

The organisation had implemented the IS at other sites and this was known to many people. Some of the new maintenance employees reported that they had experience with MFHRIS from their previous jobs. For the finance group, the IS was an upgrade to a system that they had already been using for some years, so the change was perceived as minimal.\footnote{2,3}
This study commenced in early January 2007, coinciding with the start of the project team activities, so information relevant to the implementation of MFHRIS prior to this time would be obtained through documentation and interviewing those with knowledge of this information. The DOI knowledge phase continued for some weeks after implementation, as some employees were only introduced to the new system after it was up and running. It was anticipated that the behaviour of ‘non-users’ who could ultimately influence the implementation outcome, e.g., the site managers, would also need to be contacted and observed in the extended knowledge phase.

The DOI decision phase, in which potential users make decisions about whether or not they would adopt MFHRIS, occurred within a mandatory context. For many employees MFHRIS replaced the systems that they had been using prior to implementation, as part of their day-to-day jobs. Decisions to ‘reject’ might result in no use, misuse or lead to other negative behaviours. Jasperson et al. (2005), for example, would suggest that new users might be discriminated in their uptake of the new system’s optional features.

Given the length of time that the project ran over, including the formal eight months intervention by the project team, the DOI implementation stage was relatively short. The majority of users would go on-line within a few days of the Go Live date, so this period was expected to be rich in terms of salient behaviours and outcomes, some of which were initiated by behaviours and events leading up to the implementation. The study observations were continued for some eight months after implementation in order to describe the DOI confirmation stage.

Within the framework offered by Roger’s (1995) DOI stages, the observations have been grouped into perspectives that represent those of the key players or groups associated with the implementation. These key players and groups were initially considered using Smith and Milan’s (2007) CATWOE conceptual model for analysing systems, introduced in Section 2.2 and further described in Section 7.4.1.

The chosen CATWOE definitions are shown in Table 9.2. Different levels for the customers and owners have been included to capture the ambiguous nature of these categories within this, and perhaps other, IS implementations.
These definitions suggested that perspectives from the project team, the users, management and finally the participant observer would be appropriate.

Table 9.2 CATWOE definitions for the study

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C - The customer</td>
<td>Level 1: The parent organisation; expectations for accurate and timely financial, maintenance and HR data.</td>
</tr>
<tr>
<td>C - The customer</td>
<td>Level 2: The site management who obtain day-to-day data from MFHRIS.</td>
</tr>
<tr>
<td>C - The customer</td>
<td>Level 3: The users of the system in each area.</td>
</tr>
<tr>
<td>A – Actors</td>
<td>All of those who were observed in relation to the implementation, including the project team.</td>
</tr>
<tr>
<td>T - Transformation processes</td>
<td>The implementation of MFHRIS.</td>
</tr>
<tr>
<td>W – Worldview</td>
<td>The meaning of the implementation of MFHRIS within the broader organisational context.</td>
</tr>
<tr>
<td>O – Owners</td>
<td>Level 1: Those who could stop the implementation, or in the context of this study, those who could change the implementation outcome at an organizational level.</td>
</tr>
<tr>
<td>O – Owners</td>
<td>Level 2: Those who could hinder or assist the implementation, at a site level.</td>
</tr>
<tr>
<td>E – Environmental constraints</td>
<td>Elements of the organisation which define the limits of MFHRIS.</td>
</tr>
</tbody>
</table>

Based on Smith & Milan, 2007

Further to these two chosen frameworks, i.e., Roger's (1995) DOI stages and Smith and Milan’s (2007) CATWOE conceptual model, the study observations allow for the possibility that different people may have differing perspectives of the same phenomenon, described by the ‘Windows of Perception” discussed in Section 1.3. Fitting these three concepts together represents how the participant observations were approached, and how they will be described. This configuration is shown in Figure 9.2.

Within the structure of the organisation, the phenomenon of the implementation is viewed not only by the participant observer, but also by the project team, the organisational customers and the outcome owners. Some of these people are also ‘the observed’ as they are actors in the implementation itself, or are influential in setting the context within which the implementation
takes place. Looking out from the observational framework, it is expected that the DOI temporal stages can be identified, and that the experience of MFHRIS users during the implementation might highlight, or be better understood through focussing on, these stages.

![Diagram](Image)

*Figure 9.2 Conceptual representations of the observers and the implementation*

The description of the implementation will follow this broad framework. First, the implementation is broken down into three broad timings, i.e., pre-implementation, implementation and post-implementation. Within these categories, the perspectives of the key groups suggested by the CATWOE model are described, supplemented by the participant observations and clarifying information obtained. Initially, the observations are guided by the expectations of the DOI stages model. The information following is supplemented by the Longitudinal Events log in Appendix 1. Whilst the focus of this study was not the IS, or the IT that enabled it, a short summary of both aspects is required to provide for the reader the context for the behavioural aspects that were the focus.
The organisation’s master plan for the implementation covered a seven-month period from the start of 2007, when the project team formed and started their work, up until the end of July 2007, four weeks after the scheduled Go Live date. The planned activities were broken down into the functional areas described in Table 9.3.

Table 9.3 Planned activities within the project overview

<table>
<thead>
<tr>
<th>Functional Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>MFHRIS and the enabling IT. Essentially adapting the IS that had been used in other areas of the organisation to the next group of sites.</td>
</tr>
<tr>
<td>Deployment</td>
<td>Installing and activating the IS adapted in the Technical phase.</td>
</tr>
<tr>
<td>Training/transition</td>
<td>Find out who needs to be trained, organise the training, look after the human interface between the Project and MFHRIS with the organisation’s employees.</td>
</tr>
<tr>
<td>Design &amp; Configure</td>
<td>Handle local changes that need to be made to the IS to adapt it to the specific sites.</td>
</tr>
<tr>
<td>Management &amp; Business Readiness</td>
<td>Manage the project and the project team, and transition support to the sites after implementation. This group was not the same as the site management team.</td>
</tr>
<tr>
<td>System Testing</td>
<td>Does the IS work at each site? To be signed off before implementation can proceed.</td>
</tr>
<tr>
<td>Conversion</td>
<td>Modifying the historical data into the form required by MFHRIS.</td>
</tr>
</tbody>
</table>

The critical path shown in the Project Overview Gantt chart (Figure 8.3) delineates those activities that were considered mandatory, i.e., they had to be ‘signed off’ prior to the project continuing. Any delays in these critical path activities would push the Go Live date out, and therefore contribute to budget overruns in dollar terms as the project team would need to be retained, and planned benefits would be delayed.

The ‘sign off’ procedures, to be described later, were complex and detailed. Essentially these procedures involved the project team demonstrating to the organisational management that activities had been completed, and the management formally accepting them. The majority of the project team was based together in the organisation’s IS Department, near to the NSW Site, with the remainder based at the Victorian Site.
Observations relevant to the implementation outcome or considered informative for the emergent conceptual model are now related in narrative format, in temporal sequence. The observations are presented in three major sections, i.e., pre-implementation, Go Live and post-implementation.

9.3 Pre-implementation activities and observations

<table>
<thead>
<tr>
<th>Pre-implementation</th>
<th>Go Live</th>
<th>Post-implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week</td>
<td>Week 1</td>
<td>Week 2 July 2007</td>
</tr>
<tr>
<td>Jan 2007 to June 2007</td>
<td>July 2007</td>
<td>to end 2008 (ongoing)</td>
</tr>
</tbody>
</table>

The organisation, through its corporate IT function, had decided to rationalise the many different systems that had evolved within the different parts of the organisation under the banner of “1 BUSINESS, 1 SYSTEM, 1 WAY” 9. The notion of “1 BUSINESS” captures the desire to have strategic business decisions supported through a single source of data and reporting. “1 SYSTEM” refers to the target of having a single IT platform using common architecture and technology. The idea of “1 WAY” relates to the need for the different businesses to use the IS chosen in a common way and with the configuration provided. The IS chosen to support this strategy was MFHRIS.

The project was officially launched by the project’s executive sponsor, the Australian Business #1 President, at catered functions at the Victorian and NSW sites, although the President was unable to attend the NSW site function in person. The need to achieve the project milestones and to remain under budget was emphasised at the Victorian site function, but was not highlighted at the NSW site function.

A number of tasks associated with MFHRIS implementation, which were shown in Figure 8.3, were carried out in the months before implementation. Brief descriptions of the main tasks are given. Behaviours thought to be important to the success or failure of the implementation relate to the ways in which some of these tasks were carried out.

The implementation was carried out within the overall strategy of a template approach 2,4. This approach meant that the systems and methodology
that had been used in the previous implementations, i.e., within the New Zealand and Australian #2 Businesses, would be used in this implementation, without unnecessary modification and with rigorous scope control. The success of this approach would rely upon two important assumptions. First, it was assumed that the Australian Business #1 was sufficiently similar to the other businesses so that MFHRIS would be readily accepted. Second, there was the assumption that when the template approach was not working, this would be recognised so that scope changes could be identified and the necessary fixes applied.

Vicky, a change management consultant with the project team, related that the two previous implementations had highlighted three areas requiring focus (extracted from the interview attached as Appendix 6). First, transactions within MFHRIS were based upon functional locations, which needed to be created prior to implementation. Essentially the functional locations were coded addresses down the level of detail of equipment parts or service definitions that would allow the allocation and tracking of costs. Previous systems within the organisation did not use such functional locations 10,11,13.

Second, MFHRIS required a database of master data in order to operate. The master data, in the form required by MFHRIS, would have to be converted from the outgoing system’s data, and at some point in time the old system would be disabled and the data transferred. This transfer, or cutover, is shown on the critical path of the Project Overview Gantt chart (Figure 8.3). The data cleansing and creation of the functional locations were time-consuming processes planned to commence in the last few months of 2006. This process involved maintenance people from each area manually going through incomplete transactions and closing out those that were completed, and creating computer codes for the location of each piece of equipment that would be referenced by MFHRIS.

Third, MFHRIS required that every user have a security logon in order to access the organisation’s IT network to use MFHRIS. Creating these security logons would also be a time consuming task, as many of the maintenance users, for example, didn’t have network access profiles to build upon.
Identifying and engaging influential people within the organisation, a task known as *Stakeholder Analysis*, was carried out prior to engaging with the business units. This task was considered important in that it was realised from previous implementations that there are people within an organisation, other than the system users, who are influential in allowing the project to progress, and who can affect the implementation outcome.

The *user analysis*, sometimes referred to as an audience analysis, was the identification of all of those people who would become users of the MFHRIS. An overview is shown in Figure 9.3. The initial analysis identified 1500 potential users of MFHRIS across the Australian #1 Business. Depending upon their intended use of MFHRIS, their experience with similar systems and their computer skills, users would require different types and amounts of training.

![Figure 9.3 User/audience analysis](image)

Referring to Figure 9.3, exposure refers to how much of a workday an employee would spend using the new IS, whilst complexity reflects the level of usage in terms of features and modules. An employee in the primary complex
quadrant, who has a high exposure to many modules, would require a higher amount and more detailed training than an employee in the secondary quadrant. Flowing out from the audience analysis would come the training plan. Referring to research question one, here is an example of where use per se may not be a good indicator of success, as there are different expected use levels within the organisation even for one IS.

The project team identified timely communication to the employees of what was about to happen, and what had been achieved to date, as an important component of the implementation. The project team delivered a comprehensive series of Employee Communications using a variety of media such as email, posters, formal presentations, attendance at key meetings and a project web site. Timings and content were carefully planned and reviewed on the basis of what had worked in previous implementations. Observations from the two previous implementations of this system were that the organisation’s employees tended to react negatively to change when they had no warning, and these communications were targeted to address this shortcoming. These communications were another source of study data.

The worst possible outcome is when people go to training and are upset by what they hear, so we try to tell them early and as often as we can.

Vicky, change management consultant with the project team.

Negative reaction to new systems was considered by many to be associated with an environment of continuous change that existed within the study organisation, hence the need for communication about specific projects such as MFHRIS. Similar comments from consultants working on different projects within the organisation were noted:

I get the feeling that within this organisation there is so much change that people are tired. The new systems are thrust upon them.

Amy, consultant on another IS project within the study organisation.

9.3.1 Significant events

Prior to the formal commencement of the project at the start of 2007, a number of the organisation’s IS/IT employees were involved in the latter stages of the implementation of MFHRIS into the New Zealand and Australian #2 businesses, whilst at the same time preparing for the implementation of
MFHRIS into the Australian #1 Business. At this time, two of the Australian #1 business maintenance and finance employees from the NSW site, along with others from across the business, were involved in an initial audience analysis, meaning that there were at least some people aware that MFHRIS was on the way.

The management teams at the various sites of the Australian #1 Business were briefed about the project in the second part of 2006. The project team requested a number of people from within the various sites to assist in the implementation and to fill certain key roles. Initial communications with the wider workforce took place prior to the end of 2006 in the form of “Key Messages” newsletter, attached as Appendix 17, which provides a useful summary of the project status at the beginning of 2007.

The technical aspects of the project progressed smoothly and to plan. A smooth progression was to be expected given that this was the third implementation of MFHRIS within this organisation in a two-year period. Little of the work around these technical aspects impacted, or relied upon, the organisational employees prior to implementation, except for those working on establishing new functional locations and converting data. Members of the maintenance workforce were seconded to do this work at each site.

9.3.2 Project team perspective

Observations in the pre-implementation phase were focussed upon the behaviours associated with the non-technical activities, which were largely about transition activities, given the smooth progress of the technical activities already noted. The overall transition strategy comprised the three core streams shown in Figure 9.4, with the project team responsible for the support activities through implementation and for one month after Go Live. After this time the organisation’s IS group would provide support.

Change management with respect to this implementation involved the tasks from within the streams shown in Figure 9.4. The emphasis of change management associated with IS implementation has evolved over recent times.
Change management in the past was to do with perceptions that systems come in and people lose their jobs, but now our role has changed more to optimising implementations.

Vicky, change management consultant with the project team.

Transition Strategy
Transition will be managed through three inter-related core streams of activity:

Communication
- Communication Strategy/Plan
- Contact email alias
- Web Site
- Newsletters
- Information Workshops
- Posters/Flyers
- Key Messages

Learning & Support
- Needs Analysis
- Training Strategy
- Role Based Curriculum
- Training & Support Materials
- Training Schedule
- Training Delivery
- Training Support

Change Management
- Transition Plan
- Stakeholder Management
- Change Agent Network
- Leadership Alignment
- Impact Assessment

Support/Help Desk

Figure 9.4 Transition strategy

The project team had learned from previous implementations that during the long process of transition, people’s energy for the project would likely vary. The project team lead had conceptualised this predicted variation, see Figure 9.5, based upon the team’s previous observations. One of the tasks of the project team was to maintain the project momentum during the times of low energy, and to make people aware that the variation in energy was to be expected. The first major task of the project team was to develop the audience analysis, and then use this to formulate the training plan. Essentially the audience analysis breaks down the summary information presented in Figure 9.3 to the employee level so that the background, intended use of MFHRIS and training needs can be established for each individual. This task is commonly identified by those involved in large-scale implementations as being one of the more difficult steps.

The hardest part of the project was identifying who needed to be trained.

Amy, consultant on another IS project within the study organisation.
Organisational energy changes during the typical project phases…

Figure 9.5 Organisational energy changes during typical project phases (from project team)
An early issue came about when the first cut of the audience analysis which was based upon the organisation’s HR records, proved to be inaccurate. This inaccuracy was experienced by other people doing similar tasks within the organisation at this time. One of the facets of MFHRIS would address this very issue and was aimed at facilitating real time amendments to employee records.

*Even if we could get it (employee data), you can’t rely on data being up to date.*

*Amy, consultant on another IS project within the study organisation.*

The inaccuracy in the HR records was associated with the size and geographical spread of the organisation, and the way that HR records were updated. The employees were spread across Australia and New Zealand in many sites, whereas the employee records were centralised. Each year, staff employees go through a performance review process, which enables the HR records to be updated if needed, and the project team had accessed the last consolidated data set.

For both staff and wages employees the HR information associated with terminations and transfers within the organisation tended to follow some time behind the actual movement of people. Several of the employees who were identified in the initial audience analysis were no longer employed by the organisation. Getting employees of the organisation who were seconded to project team to go into each area and obtain the required employee details from the local administration people, and then pooling the results finally obtained the detail required.

In each area of the organisation where MFHRIS was to be implemented, several employees were selected as Key Users. The Key Users were selected by their local managers as being employees who would be frequent users of MFHRIS at a high level, and also on the basis that they would act as local ‘experts’ in the time after implementation.

The Key Users were trained ahead of the other employees and were also involved in project communication activities such as putting up key messages on their local noticeboards. Approximately 200 of the 1500 potential users were selected as Key Users across the organisation, with 36 key users selected at the study site out of a target audience of MFHRIS users of 273. The target
audience numbers changed frequently throughout the implementation, and these numbers were correct at the time that the Key Users were chosen.

The training plan flowed out of the audience analysis, and was therefore delayed whilst the employee details were corrected. The plan identified those who needed training, and what they needed, based upon their expected use of MFHRIS and their past experience. The plan took into account the work patterns of employees, as some were shift workers who would need to be trained on day shift.

When training was carried out on the employee’s rostered day off overtime payments would need to be arranged. The small site employees were trained at central venues. Experienced trainers were hired on a contract basis, and venues and PC’s booked for the duration of the training. The training plan brought each of these elements together. Constant changes in the availability of employees meant that the project team had to hire an administration officer to look after this plan full time for the period of March until August 2007.

Training of the Key Users commenced in April 2007. This first round of training was used to verify the suitability of the facilities and training modules. The training also helped to equip the Key Users with information about MFHRIS and the training that they could share with others in their work places. Training for the majority of employees commenced in May 2007 and continued through the implementation until approximately the end of July 2007.

The project communications were progressively ramped up as the implementation date approached with newsletters and email announcements from the organisation’s sponsor and senior management. Project related giveaways such as stress balls and caps bearing the project symbol were given to those who attended training, whilst those identified as key influencers in the stakeholder analysis were given more expensive items such as travel bags.

9.3.3 Perspective of potential users and employees at the study site

Eight of the study site maintenance employees were involved in the data transition activities from late December 2006 until just before the implementation Go Live date. The data transition was meant to start several months earlier, but the management of the study site had failed to provide the
people required. These maintenance employees were also selected as Key Users on the basis that they would be able to learn about MFHRIS through their involvement in the data transition activity.

The data transition activities involved learning how to use MFHRIS, and also finding out how MFHRIS did things in relation to the outgoing systems and the other systems that it interfaced with. In retrospect, this exposure turned out to be a highly effective training and motivational exercise. The data transition team reported their experience to date as extremely positive, and expressed interest in being further involved with this project back in the workplace. They observed that a number of their workmates would not have had experience with Windows based maintenance systems like MFHRIS. The outgoing system was DOS based and ran on dedicated terminals. Having seen MFHRIS in action, the training made more sense to this group.

The Key User group, who began their training earlier than their workmates, also reported a positive experience with MFHRIS. Most had to negotiate their time to attend their training even though they had notional management approval and had been nominated to fulfil the Key User roles.

Most employees who were exposed to MFHRIS in the period prior to implementation reported that it was a very difficult system to use. The data input screens were not intuitive and the sequence for each task had to be strictly adhered to meaning that it was not possible to take short cuts. For example, each step in the sequence required to raise a maintenance work order as shown in Figure 9.6 required a computer input carried out in strict sequence.

The problem for the maintenance employees was not that MFHRIS was conceptually too difficult to use, it was more the case that it was not user-friendly and compared to the outgoing system it was time consuming. With the outgoing maintenance system, the employees had developed many short cuts to allow them to save time. These employees generally had much to do and considered sitting at a computer to be diverting them from their primary role of maintaining the plant in good operational order.
Figure 9.6 Sequence of steps to raise a maintenance work order
Doubts about using MFHRIS on the job were raised mainly around the time that would be required for inputting the data to enable the transactions to proceed, but despite that the training was favourably received by most of the Key User group. The project team had engaged experienced trainers who had worked with both MFHRIS and this organisation before, and the training materials were of a high standard.

For the wider maintenance user group the pre-implementation experience was not as positive. Most of the maintenance engineers at the study site who were also lower level managers did not attend their scheduled training. This situation was a particularly frustrating thing, as there was no notification of the non-attendance, or re-negotiation of the schedule; people just didn’t turn up. The maintenance managers had key roles to play in the way that MFHRIS cascaded information upwards, for example, in preparing month end reports of maintenance costs. This non-attendance then filtered down to the maintenance employees. Initially there were requests to defer and reschedule training to suit local maintenance events, which eventually led to maintenance employees missing scheduled modules. This behaviour had been observed with the training required for other systems within this organisation.

*A lot of people didn’t bother turning up to the road shows or training … and the new system is significantly different.*

*Amy, consultant on another IS project within the study organisation.*

The HR and finance groups were shown MFHRIS, and were confident that they could use it with little assistance, to the point that they opted to look after their own training. MFHRIS in their areas was an upgrade to the system that currently being used, and also they had interfaced with it in their dealings with HR and finance in the New Zealand and Australian #2 businesses.

**9.3.4 Site management perspective**

The study site management team had been identified through the stakeholder analysis as an influential group key to the successful implementation of MFHRIS. They were briefed about MFHRIS in the second half of 2006, and had been requested to provide a number of people to join the project team up to and during MFHRIS implementation. During this period there
were at least three other significant systems upgrades that impacted on the study site’s resources and its day-to-day operations at certain times.

Several of the requested project roles were not filled, including the important role of site co-ordinator. Early in 2007, one of the project team leads visited the study site to give the management team an update, and to request further help in finding people for the unfilled roles. Contractors could not fill these roles, as knowledge of the study site was a pre-requisite.

The overall reception at the management meeting was reported by the project team lead as hostile, and the project progress was openly criticised around the table. Tasks not carried out prior to MFHRIS team kick-off in January 2007, including data transition, and problems with not filling the requested project roles were “blamed” on the project.

The project team lead felt that the NSW site team were not interested in what was happening with the implementation in other parts of the business, were very critical about the template approach per se, and were not keen to work through the people issues. The behaviours observed did not seem to stem from any explicit issues with MFHRIS, but were more directed at the project team, and in particular the team lead who attended the meeting.

Following on from these comments, two of the site managers were interviewed to try to find out what was causing the apparent hostility. The two Production Unit managers were chosen on the basis that the majority of site employees reported to them, and both managers had been vocal at the meeting reported by the project team lead. The Production Unit 1 Manager was quite positive (See Appendix 7 for a note summary) and even expanded upon his thoughts on integrating MFHRIS into the broader Production Unit 1 operations.

The Production Unit 2 Manager was extremely difficult to contact, with numerous meeting requests not accepted. Eventually catching up for a very brief discussion revealed a number of problems that he had with the MFHRIS project (See Appendix 8 for a note summary). He considered that the approach to training was inflexible in the way that it was delivered, and that his team had other important things to do at the times that training was offered. He
considered that MFHRIS had been introduced without notice and consultation at the study site, a view at odds with previous observations.

9.3.5 Situation prior to Go Live

The training records showed that 1044 employees were selected to participate in some form of training associated with MFHRIS. Those who were only users of the purchasing modules were required to complete a series of computer based training (CBT) modules in areas such as the creation of shopping carts and the approval of purchases. It was anticipated that eighty per cent of these modules would have been completed prior to Go Live, but only fifty five per cent of the required modules had been completed prior to Go Live across the organisation. The Finance and HR employees had generally familiarised themselves with the changes to the systems that they were already using. It was the plant maintenance areas where the most widespread training had been undertaken, as MFHRIS was replacing the legacy maintenance system.

Across the organisation, most maintenance employees had been through the basic training. At the study site, unlike the other sites, few maintenance employees had been through the extended training modules. Most importantly, almost none of the maintenance management had been through their required training modules, and the study site management had only a basic understanding of MFHRIS and how it was to interface with the existing systems.

The functionality of MFHRIS had been tested and demonstrated to be working as required. The tasks associated with system functionality had been broken down into a series of discrete steps, termed deliverables, which were constantly monitored and reported. The progress around these deliverables, shown in Figure 9.7, shows that, as the implementation approached Go Live, both the number of deliverables achieved and the project completion were tracking on target.

Over the weekend prior to the Go Live day, the Project was judged to be at a stage where MFHRIS could be activated. The organisation’s representatives signed off that implementation should proceed as planned.
9.3.6 Participant observations

Perhaps the most important observation relevant to the implementation phenomenon within the organisation was that, apart from the implementation of MFHRIS, there were many other activities happening within the study site competing for the attention and time of those involved in the implementation. The study site’s finance group was being combined with another finance group which meant people were moving into different roles, and being geographically relocated. The site’s finance office was painted and refurnished causing further disruption.

The site’s Production Unit 1 was approaching the end of an important and protracted series of manning reductions, one of which involved the maintenance crews. Part of the management’s case to reduce numbers involved the argument that because the maintenance systems were so stable, there was an opportunity to reduce the numbers of those doing certain maintenance jobs. MFHRIS changes to the maintenance system were in direct opposition to that argument, and reportedly came as a surprise to the plant people. Recall the Production Unit 2 Manager’s comments that he “considered
that MFHRIS had been introduced without notice and consultation at the study site”.

Other information systems were being implemented and changed at the same time. One, a major change to a production planning system, was being progressed by a group who apparently were without knowledge of MFHRIS implementation. When it was learned that both needed the same resources, the planning system change was put on hold until MFHRIS implementation was completed. Other systems changes progressed in parallel.

Day-to-day occurrences such as equipment breakdowns, vendor and supplier related problems, employee issues, absenteeism and employee annual leave could each impact upon people’s availability for training for example. This level of background activity is perhaps not surprising to anyone who has worked within organisations. What was interesting was how, if at all, the organisational activities changed how the different key groups reacted to and interacted with the implementation within this broader organisational context.

*People within this organisation tend to behave a little more aggressively towards change; over time the constant change wears you down.*

Amy, consultant on another IS project within the study organisation.

Drawing upon the analogy of the perceptual windows shown in Figure 9.2, it seemed that different groups viewed the MFHRIS project quite differently. Perhaps the easiest view to understand was that of the project team who appeared to behave as if they weren’t really concerned with any of the local site happenings, except where they directly impacted upon the implementation. When it was pointed out that the study site had a formal change control procedure that was used to ensure that major changes ran smoothly, the response from the project team was to circumvent the procedure, rather than engage with the study site employees. In retrospect, engaging with the study site using the change control approach may have helped the project team in their interactions with the study site management and benefited the implementation in the longer term.

From the project team’s perspective the implementation was a task to be completed, with definable timelines, tasks, budgets and deliverables. Success meant having the deliverables signed off as complete by the business, on time.
and under budget. Sign off meant a successful completion and moving on to the next assignment. Some project team members, such as the Project Manager who was given another role within the organisation in March 2007, moved on even before the project was completed. During a presentation to the study site management, the Logistics Manager reflected that it seemed as if the project team were mainly concerned with installing, rather than implementing, MFHRIS, and took no responsibility for the longer term issues associated with getting it running on a day-to-day basis.

The project team expected employees’ energy levels to wax and wane, and by inference that employees’ behaviour towards the implementation might vary from time to time, as they progressed through the various project phases. What the project team didn’t seem to be aware of was that there were many other organisational reasons why people’s energy might fluctuate, and that these other ‘causes’ could also impact upon the implementation.

The template approach used did not take into account possible local conditions that might mean that changes in the implementation approach were needed. This approach delivered a rigid implementation plan that was not flexed to cater for the organisational climate that prevailed.

One of the study site’s finance employees anticipated some form of negative reaction from the maintenance people at the study site who had been using the existing system for quite a while, as there were things done well in the existing system that MFHRIS would not do. A demonstration of some of the transactional features of the existing maintenance system was arranged for the project team. They were genuinely surprised by the capabilities of the existing system and acknowledged that it was in fact technically superior in some areas, and much easier to use in most areas, than MFHRIS.

One of the shortcomings of the template approach was that it assumed that the new system would be replacing an effective legacy system, meaning that that the system users would be competent at their jobs, and would only need to focus on using MFHRIS. The experience from the New Zealand Business implementation was that the New Zealand Business management were looking to the implementation of MFHRIS to up skill their employees as well as for them to learn MFHRIS.
The New Zealand experience was that people weren’t doing their jobs as the implementation team were led to expect, and in fact were looking to MFHRIS to address issues within the New Zealand plant. Finance Manager who worked on the New Zealand Business implementation.

One of the project team consultants who had been part of the New Zealand Business project also recognised this aspect of the previous implementation.

Whereas in the past we thought that systems might solve our business issues, we now realise that systems can only support good business practice.

Vicky, change management consultant with the project team.

The implementations of MFHRIS within the broader organisation had been referred to as successful on numerous occasions. This was part of the rationale of the template approach, i.e., using what had worked well previously.

The comments about the New Zealand Business experience seemed at odds with these observations of success, and were raised with one of the corporate IT managers who had overall responsibility for MFHRIS implementation. She related that there were in fact still many problems with the use of MFHRIS in the New Zealand Business, but most were behavioural in that they were to do with problems associated with employees not doing what was required with MFHRIS in their role, and not to do with the technical system per se. She still considered that the implementation had been successful.

This comment, along with that of the study site Logistics Manager, highlight an apparent difference in perspective between the project team and the end customers. If we consider that installation describes those activities necessary to get a new IS up and running, i.e., to achieve sign-off in this case, then to the project team installation success seems to mean the same as implementation success.

From the perspective of the end customers, installation is just the first part of implementation. Complete implementation includes those post-implementation tasks required to ensure that the IS becomes integrated into the day-to-day operations. In this study, it seemed that the site management expected the project team to look after these aspects, and not just facilitate the installation.
The problems associated with the inaccurate employee data that impacted the user analysis should have been avoidable. Previous implementations of other systems had encountered this issue. The data inaccuracy was not a surprise to those within the organisation, to the extent that local departments kept their own records when timely data accuracy was important.

These observations illustrate two facets of this implementation. First, the project team made a number of assumptions about the organisation that were inaccurate, but these assumptions could have been easily verified prior to the implementation through reviewing previous implementation experience, or by consulting the appropriate organisational employees.

Second, the template approach is a valid strategy for conserving organisational resources, but only if the template is based upon successful outcomes in a context that makes them transferable to the next implementation. Without analysis beyond achieving project deliverables in the previous implementation, how can an implementation be judged to have been successful for the organisation? Key learnings are summarised in Table 9.4.

Table 9.4 Pre-implementation key observations

- Numerous pre-implementation activities such as data cleansing are necessary for a successful implementation.
- Identifying key influencers within the organisation (stakeholder analysis) and the potential users (audience analysis) are important tasks in the pre-implementation stage.
- People’s commitment to the project can vary throughout the pre-implementation stage.
- Involving potential users early on (Key User approach) facilitates opportunities to train and engage a wider audience through influence.
- In this study, doubts about the complexity of the IS were raised early on as potential users were exposed to the IS, but were not acted upon.
- The study site management team appeared to be ‘primed’ to be negatively disposed towards the IS and the project team (perhaps by other organisational factors?).
- At the study site, the required training was not satisfactorily attended or supported by the site management.
- The implementation competed for organisational resources and attention with numerous other projects and day-to-day issues.
- The project team’s progress was measured mostly around ‘installation activities’ with little analysis of how the project was going to be received in the longer term.
Referring to Table 9.4, items ‘a’ and ‘b’ were identified as necessary for implementation success, and in line with research question 4, failure to achieve these requirements could contribute to project failure. Item ‘i’ addresses research question 5 and indicates that “success” may in fact be dependent upon the observer’s perspective.

9.4 Implementation: Go Live

For the purpose of describing this implementation phenomenon, the implementation period was chosen to be the first week of July 2007. MFHRIS was activated on Sunday 1st July.

At the study site, the plant-based maintenance users who worked shift work followed a pattern where they would work two night shifts, 6pm until 6am, followed by a day off, followed by two day shifts, 6am until 6pm, followed by 3 days off. This pattern required four separate crews and meant that it would take a week before each of the four crews had experienced MFHRIS.

Most staff users, who worked the normal Monday to Friday week, would experience MFHRIS on the Monday when they started work in the Go Live week. Those who only used the purchasing modules of MFHRIS infrequently might not have the need to use it until some time after MFHRIS was activated. The first week in July covered most users’ first experience of MFHRIS.

9.4.1 Significant events

The implementation period was something of an anti-climax. The MFHRIS modules worked as expected, and there were very few requests from users for assistance. In terms of this study, the main focus was upon the paint ordering problems described later in Section 9.6.2. This was of particular interest given that the project team signed-off that this was a minor issue that had been resolved by July 2nd, and yet was causing the study site significant
problems. The significance of the problem was not widely recognised by the project team until a week later.

One of the roles of the Project Change Agents during this week was to staff drop-in centres for employees to ask questions about MFHRIS. No one came to the drop-in centres at the study site. Following this up later revealed that the study site Key Users had been active throughout the start-up and they had basically provided this role within each of their work areas.

9.4.2 Project team perspective

The project team offered a high level of support to the users during the implementation period. Supporting the project team personnel present at each site was a 24-hour help line, an intranet web site that contained computer based training (CBT) modules for refresher training. The Key Users provided immediate to their colleagues in their respective work areas. An email was sent out from the Project Sponsor early on the morning of July 2\textsuperscript{nd}, before most users had arrived at work and experienced MFHRIS in action. The text is shown in Figure 9.8.

All
MFHRIS has gone live across all sites today!

MFHRIS has replaced the legacy maintenance system and old system versions for Finance, Maintenance, Capital Projects and Supply from today across all Australian Business #2 sites. The legacy systems are now only available in 'read only' access and cannot be used for further processing of data. Only MFHRIS systems can be used from this day forward.

Congratulations to the MFHRIS project team and the many business people who have worked tirelessly over a long period of time to deliver this project successfully, on time and on budget.

This project marks a great milestone in the organisation where we now have the NZ Business, the Australian Businesses #2, Corporate, Logistics and Australian Businesses #1 all on the same platform for running these parts of our business.

I trust and encourage that you will continue to complete any required training (if you haven't already) and will utilise the vast array of support, training and process information that have been put in place to help us transition into this new way of working that will ultimately deliver significant savings for our business.

I ask that you continue to support each other and have patience as we all come to terms with these new systems and processes.

Figure 9.8 Project sponsor email to employees July 2\textsuperscript{nd}
The project team ran a system health check on July 2\textsuperscript{nd} and reported:

\begin{quote}
Overall it has been a smooth first day. Payroll was successfully run and posted into finance. Most support calls raised related to security or printer issues.

The Supply Team has had a prosperous and happy first day. Statistics show excellent results for the Supply Team.

All aspects of the technical infrastructure are running as per normal.

There were some issues with the amount of data being extracted in some interfaces but this should reduce after the initial execution of each interface.
\end{quote}

Project team Health Check, July 2\textsuperscript{nd}.

At the end of the implementation week there were so few issues being raised that the project team began plans to reduce their involvement with the sites and were seeking business sign-off for the project. A second system health check was carried out on July 7\textsuperscript{th} and the following comments were reported:

\begin{quote}
The system is still running smoothly, although with a number of processes still to start. A high priority query regarding mis-mapping of partner vendors is preventing completion of the vendor open invoice load. The finance and conversion teams are working with the purchasing group to resolve this issue.

An issue was experienced with the paint interface and has now been resolved.

All aspects of the technical infrastructure are running as per normal.

Only issue worth mentioning is the failure of the Paint Stock Level interface but this has been resolved. Otherwise all interface programs are working as expected.
\end{quote}

Second project team Health Check, July 7\textsuperscript{th}.

The comments regarding issues with the paint interface being resolved were incorrect. This in fact turned out to be a major issue that took many weeks to resolve, and is more fully described in Section 9.6.2. In summary, by the end of the implementation week, the project team were looking to have the project signed off as having been completed successfully and on time, with only the anticipated minor issues to be expected from a project of this size.

\section*{9.4.3 Users’ perspective}

Reflecting upon the congratulatory email from the Project Sponsor shown in Figure 9.8, Kev, an employee at the study site, commented towards the end of the implementation week:\textsuperscript{84}

\begin{quote}
Someone has sent me an email of congratulations for the MFHRIS, not for us!
\end{quote}

Kev, study site user, July 7\textsuperscript{th}.
Kev’s comment reflected the experience of many of the study site employees in the implementation period. Most employees were trying to do their day-to-day work, and where this involved the use of MFHRIS they were learning how to use it based upon the training they had received, and learning those aspects not covered in the training as they went. Employees were finding that jobs were taking longer in most cases, and in some instances there were problems with the functionality of MFHRIS. These observations at first seem at odds with those of the project team who reported that the site users raised few issues, but, in fact, the employees were finding assistance through the Key Users at the site.

The study site Key Users had been very active from the first day that MFHRIS became active, and had made sure that they were out and about in the workplace fielding questions and demonstrating aspects of MFHRIS. Employees seemed to be more at ease asking questions of their peers, and hence did not make use of the resources provided by the project team. This observation was consistent across all of the sites, and likely underpins the success of the Key User role.

The project team assessed this situation as meaning that there were few issues, and hence they reported, “Most support calls raised related to security or printer issues”. The Key Users could not easily rectify security queries that typically involved logons and printer issues.

9.4.4 Site management perspective

During the implementation week the involvement of the study site management team was minimal. There were no tasks within the implementation that had been assigned to the site management team, and they were happy for the project team to go about the necessary tasks as planned. Bob, the Study Site Manager, enquired regularly how the implementation was proceeding, and was sent updates by email from the project team.

The site management started to raise questions about MFHRIS when, approximately one month after implementation, issues that impacted the site’s maintenance managers started to surface. The end-of-month reports that middle management prepare rely upon information generated from MFHRIS
data. Maintenance managers had issues with paperwork being returned from the accounts department. They had tried to process various goods and services transactions the ‘old way’ and discovered that they could no longer do that. Interestingly they rejected the possibility that lack of their involvement in the training, or reluctance to discuss concerns with the MFHRIS team during the period before implementation, may have contributed to the problems that they were now experiencing.

Very few of the site managers attended any training to get first hand knowledge of what was offered, but there was nevertheless a general view expressed that the training had been ineffective.

Whilst I was stopped from attending training by my boss, most of my people did attend. The training was in my opinion next to useless. It was simply ‘do what you are told on the screen, click this button then click that button’. Very little learning was done or retained.

Site Maintenance Manager.

In a similar vein, the site management were not at this stage users of MFHRIS, but described the complexity of MFHRIS that the site users had been describing.

MFHRIS is very user unfriendly and not logical in any way. Some of my guys are now going back over the training packs and understanding what they were suppose to have learnt.

Site Maintenance Manager.

9.4.5 Participant observations

Most technical aspects of MFHRIS, as expected for a system that was already in operation at two of the organisation’s other sites, presented few problems. Issues that did arise were generally where MFHRIS interfaced with existing systems at the site, e.g., printing of reports and graphical representation onto existing works computers. In these instances, the project team considered that site resources should take care of these activities, but as has been identified, the study site did not provide all of the resources requested.

The aspects that were not planned well, or were poorly executed, caused problems early and some remained unresolved nearly 18 months later. The lack of training at the study site meant that many users were unclear about how to approach certain transactions, or parts of transactions, and from the first few days there were work around solutions put in place in some areas.
An example of a work around solution was in the area of raising purchase orders for contract labour. MFHRIS called for individual orders for contract labour to be raised for each separate job, prior to commencement, so that reconciliation and receipting could be correctly allocated at completion. The transactions were difficult and time consuming. Some employees saved time by getting the supplier to provide the necessary detail in their invoice, and then retrofitting the order information as required.

A check of how this aspect was working at the Australian Business #2 revealed that there were groups still using such work around methods 18 months after implementation. This had not been recognised by the project team previously, but made sense in terms of the template approach used where the methods used in previous implementations had in fact produced similar results in this implementation.

The project team’s comprehensive review and sign-off processes during the implementation week seemed to be unresponsive to the site issues as they were unfolding. Similarly, the local management were not sufficiently involved with the detail of the project to recognise the site issues at this stage, although they became increasingly more aware of them as the site users raised problems with them. Key learnings from the Go Live week are summarised in Table 9.5.

**Table 9.5 Go Live Week key observations**

a. There were few instances of users seeking ‘formal’ assistance during the Go Live week, although the site Key Users received numerous requests for advice from their user peers.
b. The business sponsor quickly congratulated everyone on a successful implementation, even before most users had even used the system for the first time.
c. The management behaviour tacitly indicating implementation success did not mirror the issues that many users were experiencing.
d. The site management team members were not actively involved in the implementation activities, whilst their counterparts at the other sites seemed to be actively engaged.
e. Some problems that arose had been experienced in a similar way in the previous two 'successful' implementations.
f. The project sign off procedure did not seem to take into consideration the users, or the achievement of the organisations objectives.
g. The Go Live week went smoothly and seemed like an anti-climax after all of the pre-implementation efforts.
h. Most employees at the study site did not receive the requisite training
Referring to Table 9.5, items “b”, ‘c’ and ‘f’ lend further support to the assertion in research question six that success depends upon the perspective of the observer. From the perspective of the organisation’s management, success had been achieved even before any level of usage had been demonstrated. This observation also has relevance for research question one.

9.5 Post-implementation

<table>
<thead>
<tr>
<th>Pre-implementation</th>
<th>Go Live Week</th>
<th>Post-implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2007 to June 2007</td>
<td>Week 1 July 2007</td>
<td>Week 2 July 2007 to end 2008 (ongoing)</td>
</tr>
</tbody>
</table>

Observations were formally maintained for some eight months after implementation, although the researcher’s involvement with the project team ended when it was disbanded, essentially at the end of August 2007. Contact with the site users was maintained throughout 2007 and 2008 in order to help resolve ongoing issues with MFHRIS. The issues were essentially around the time required by the maintenance users to use the system as designed. The study site held two workshops in November (2008) to work through ongoing problems with the maintenance side of MFHRIS, and the researcher attended the second session. The outcomes are summarised in Section 9.8.

9.5.1 Significant events

Perhaps the most significant organisational event in the post-adoption phase was the announcement of the impending retirement of the organisation’s CEO, and his replacement at the end of October. The change at the top of the business eventually led to widespread changes throughout the organisation at the end of 2007, but more significantly for MFHRIS implementation, the anticipation of such changes occupied a great deal of the upper and middle managers’ attention throughout this period.

For all staff employees, the July-August period was the time that they went through their annual performance review with their immediate manager, and carried out performance reviews for their direct reports. These reviews led on to salary increases in most cases and so attracted much organisational attention, especially for the HR team. For the finance team, MFHRIS
implementation coincided with the financial end of year, which is one of the busiest times for this group. Both of these activities, the annual performance reviews and the financial end of year, were major distracters to the MFHRIS implementation.

At the study site there were two other IT-enabled IS projects that were being worked on throughout MFHRIS post implementation phase. One of these, a production planning system, was particularly problematic in that the system did not work as required, and did not proceed to implementation during this period. The other, which involved the integration of a satellite site’s systems into the mainstream business also ran into problems with numerous issues around the interfacing of the two systems.

9.5.2 Project team perspective

The project team wound up its activities fairly quickly after Go Live, on the bases that the business signed off on the project, and there were few requests for assistance from the users. Initially the project had planned to provide a help desk for six weeks after Go Live, but the help desk was closed early and from 30th July 2007 onwards, the business IS group and the site co-ordinators and Key Users looked after any queries.

It has been a very successful project all round and I thank you in advance for helping to put the icing on the cake with quality training, documentation and support.

Mack, project team leader.

9.5.3 Users’ perspective

The users’ experience of MFHRIS after Go Live very much depended on what parts of the system they interfaced with, their training and their exposure to the system prior to implementation and the level of support that they had during the post-implementation period. For the HR and finance groups in general there were no significant issues, and MFHRIS was quickly adopted as expected. For the complex area of project planning, once again the users were well prepared and fairly quickly adopted MFHRIS in their day-to-day work. This aspect is more fully described in Section 9.6.3.

Those employees who used the stationery-purchasing module of MFHRIS experienced a number of problems early on. Some of these problems
were quickly solved, whilst some turned out to be characteristics of the system that had to be accepted. The purchasing module story is expanded in Section 9.6.1.

The use of MFHRIS at the study site in the purchasing of paint caused major problems for the users, the paint vendors and the business. The problems had been predicted, and as it turned out had been experienced by the NZ Business, but had not been addressed adequately by the project team. The researcher was asked by the study site manager to facilitate solutions to the paint issues, and this is described in Section 9.6.2.

The Key Users in the maintenance area who had been trained early, and had been involved in helping others at the site, generally coped with using MFHRIS, but struggled with the time that it required. Compared to the outgoing system, MFHRIS required a significantly higher time investment to do things properly.

The general maintenance users who did not have the level of training of the Key Users struggled, and were still struggling some 18 months later. Approximately 12 months after Go Live, the study site employed, on contract, two experienced maintenance engineers familiar with MFHRIS to work with the maintenance users in each department. The contract engineers were asked to demonstrate how to properly use the system, to develop short cuts where possible and to suggest modifications to the system that might help. Despite this, the time requirement continued to be a major issue. Towards the end of 2008 the study site held two MFHRIS maintenance workshops to address ongoing issues for the maintenance users. The outcome of the workshops is further discussed in Section 9.8.

**9.5.4 Site management perspective**

In the first few weeks after implementation, the site management team heard positive reports about the implementation from the project team and were comfortable enough to sign off the project at the end of July 2007. Where there were specific issues that impacted the site operations, particularly those mentioned in the case studies in Section 9.6, the site management team
requested updates as to what the issues were, what was being done to address them, and how the actions were progressing.

The initial problems with paint ordering and stationery purchasing were resolved within the first few months. The problems being experienced by the maintenance users were much more long term.

The site management initially put an update about what was happening with this issue as an agenda item for their monthly review meeting, but eventually decided that it was no longer needed. The maintenance user issues were left to the middle level maintenance managers to resolve, but as described previously, as late as November 2008 they were still unresolved.

### 9.5.5 Post-implementation review

The project team carried out a formal assessment of the project and sign-off from the business was obtained at the end of July 2007, only four weeks after implementation. The review followed the process shown in Figure 9.9.

![Figure 9.9 Project review process](image)

The review required that the project team was able to demonstrate compliance with specific deliverables in the areas of realisation of benefits,
achievement of technical and functional scope, and the delivery of any scope changes that were requested during the implementation process. The review process required sign-off from each separate business unit, and also focussed upon the capital spent throughout the project.

An example of the separate items requiring sign-off is shown in Table 9.6, in this particular example the review area is the realisation of business benefits. In this area, there were twelve items, of which ten were accepted as completed, one accepted conditionally and one deemed not applicable. Overall, there were 120 items requiring review and sign-off at each site, and at the end of the review process 106 had been accepted, with thirteen accepted conditionally and one item not applicable.

Table 9.6 Review sign-off items for realisation of benefits

<table>
<thead>
<tr>
<th>Planned Functional Benefits</th>
<th>Delivered by Project</th>
<th>Business Acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better management of down-day performance through the MFHRIS disciplined approach to planning will improve the visibility of tasks to be completed and the availability of the unit.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>Quality maintenance strategies are critical to delivery of a “fit for purpose” operation. The MFHRIS system ensures that the reasons for the strategy and long-term outcome aims are captured and maintained over time.</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Management of maintenance crews is improved due to the detailed work plans necessary to produce MFHRIS job orders. This detail level will ensure the maintenance crews have a firm schedule to adhere to from the moment they start shift.</td>
<td>Completed</td>
<td>Accept Conditionally</td>
</tr>
<tr>
<td>The ability to access project reporting coupled with the enhanced functionality with financial commitment detail should deliver more timely information to Engineering and Maintenance personnel. Much more immediate feedback on the health of projects should allow better management of those costs.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>Robust identification and approval of work orders over the complete work order life cycle.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>More efficient processing of work orders due to the ability to process multiple work orders as a group.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>Better resource and cost management as the planned cost is developed from data entered into the work order.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>Standardisation of the process for workflow across the business.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>Level of detail delivered in MFHRIS is to maintainable item versus legacy system limited to equipment level.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>MFHRIS is Windows based, therefore much more user friendly.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>Limit orders removing the 1-cent order problems.</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
<tr>
<td>One system to access data from – integrated to the financial and supply systems</td>
<td>Completed</td>
<td>Accepted</td>
</tr>
</tbody>
</table>
Statistics produced by the project team were focussed upon the quality of how the project was run, but not necessarily on the outcomes achieved. An example of this is the statistical evaluation of the training. Each user was asked to fill in an evaluation of the training after each session. The project team reported trainee evaluations “in the 90%’s”, compared to an industry benchmark reported as 80%. No reference for the reported benchmark data could be obtained. The project team evaluation questions, listed in Table 9.7, mostly focussed upon the efficiency of the training process, and the immediate experience of the training, but not on possible outcomes.

Table 9.7 Training evaluation questions

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course was balanced between theory and practice</td>
</tr>
<tr>
<td>The content was relevant to my job function</td>
</tr>
<tr>
<td>The course was well structured</td>
</tr>
<tr>
<td>The course was of the right duration and intensity</td>
</tr>
<tr>
<td>There was enough variety to maintain interest</td>
</tr>
<tr>
<td>The learning objectives were clearly explained</td>
</tr>
<tr>
<td>The trainer demonstrated appropriate process knowledge</td>
</tr>
<tr>
<td>The trainer demonstrated appropriate knowledge of MFHRIS</td>
</tr>
<tr>
<td>The trainer communicated well with the group</td>
</tr>
<tr>
<td>The trainer was enthusiastic and energetic</td>
</tr>
<tr>
<td>The trainer was well prepared</td>
</tr>
<tr>
<td>The training materials and handouts were of a high quality</td>
</tr>
<tr>
<td>The Learning Centre was a useful training and support tool</td>
</tr>
<tr>
<td>The training venue was comfortable for learning</td>
</tr>
<tr>
<td>The training equipment was effective for learning</td>
</tr>
<tr>
<td>The course was effective and achieved its objectives</td>
</tr>
<tr>
<td>The course was worthwhile attending</td>
</tr>
<tr>
<td>The course has adequately prepared me to use this particular functionality</td>
</tr>
</tbody>
</table>

The contract trainers do this on a professional basis and have trained at this organisation twice previously, and so the organisation’s users would be expected to rate the training highly. Studies (Davis, 1986) have shown that if you ask people questions such as, “Will you find the system easy to use when you get back to your workplace?” or “Will using the system that you’ve learned about today be useful in your job?” then their responses will likely correlate with usage when people get back into their workplace.

These items were offered to be included in the evaluation but were rejected on the basis that the project team felt comfortable with what had been used previously. Had the project team used items with better discrimination, then they could possibly have learned from the responses which areas or
groups may have needed further follow-up or assistance in the post-implementation period.

9.5.6 Participant observations

Looking at the implementation outcomes from the project team’s perspective, the project was a success. The project milestones were achieved on time, within budget, and post-implementation support was able to be withdrawn early due to the few requests for assistance from users. MFHRIS was shown to be working as it had been designed.

From the site management’s perspective, the site had participated in the implementation as the organisation had required, and now it was time to get on with the work of manufacturing. There was the ongoing issue of using MFHRIS that was creating more work for the maintenance users, and this was something that needed to be addressed.

The perspective of the users varied. Those in Finance had a new version of a system that they had been using for some time so the implementation came and went without causing much fuss. The situation was similar for the HR people. For those who used the purchasing modules of MFHRIS, in particular with respect to the purchasing of stationery, the reality was that they now had to use a more cumbersome system, which will be described more fully in Section 9.6.1.

The maintenance users inherited a system full of potential, but for the first 18 months at least, they were unable to take advantage of the system potential due to three main factors. First, the system contributed to making their day-to-day work much longer, to the extent that people resorted to using work-around methods in order to get jobs done. Second, because few, if any, of the users had actually completed all of the necessary training they were forced to learn as they went, and by doing so missed out on knowing about many aspects of MFHRIS’ capabilities. Third, the maintenance managers who had responsibility for the maintenance systems and the maintenance users, did not attend their training, and were inadequately prepared to manage MFHRIS.

With respect to training at the study site, a large number of people identified and scheduled for training, both face to face and CBT, did not go
through with their training. There was a marked difference between the poor training attendance at the study site and the Victorian sites, where nearly all users, including those in management positions, completed nearly all of their training. At the study site, only 25% of purchasing users did their required CBT modules, which contributed to some of the issues with receipting.

The one perspective that was difficult to assess was that of the organisation. A large sum of money had been invested in implementing MFHRIS in order to achieve the organisation's goals of “1 Business, 1 System, 1 Way”. In simple terms this had been achieved in that the organisation now had MFHRIS implemented throughout its various businesses, so that the data that cascaded up did so on a common platform. There were indicators that people were not in fact doing things one way, as evidenced by the workarounds and short cuts that some users were resorting to get their work done. Given this observation, it is possible that the data that cascaded up were not in fact as accurate as it might have been if MFHRIS was being used as designed.

The implementation activities at the Victorian and smaller sites, running in parallel to the implementation at the study site, were more straightforward with fewer issues reported than at the study site. The Victorian site had completed most of its maintenance training, at all levels, prior to Go Live. Each of the Victorian site managers had the successful implementation of MFHRIS in their respective areas as a formal job goal. When the project was launched, the Australian Business #1 President, who was also the project sponsor, attended the launch in Victoria to emphasise its importance to the organisation.

Well before the Go Live date, the maintenance employees at the Victorian site were already interfacing MFHRIS with their day-to-day reporting systems so that they could minimise data input time. Anticipating that the goods receipt transactions could be a problem, the Victorian site opted for one central goods receiving area to overcome the potential problem.

In summary, the Victorian site seemed to adopt MFHRIS in principle, which then facilitated the positive behaviours that in turn appeared to give a more successful implementation. The experience of the small sites was similar to that of the Victorian site, in that they appeared to buy in early, and worked
steadily through any issues that arose\textsuperscript{104, 105}. Training was carried out at one site to minimise resources, for example.

*Overall the Small sites have no real issues. They’ve changed a few of their process flows to better suit MFHRIS.*
*Small site Finance Manager.*

*Generally you can find someone who knows when you get stuck*  
*Small site Maintenance Manager.*

Key learnings from the post-implementation period are summarised in Table 9.8. These will be further discussed in Chapter 10.

<table>
<thead>
<tr>
<th>Table 9.8 Post-implementation key observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Post-implementation issues were still being experienced at the study site some 18 months after Go Live.</td>
</tr>
<tr>
<td>b. Soon after Go Live, the organisation’s management moved on to other organisational matters.</td>
</tr>
<tr>
<td>c. The organisation ‘signed off’ that the project had been correctly implemented before any objective analysis had been carried out.</td>
</tr>
<tr>
<td>d. The site management behaved in a way that demonstrated tacit acceptance of the IS as having been successfully implemented.</td>
</tr>
<tr>
<td>e. The project team disbanded and moved on to other assignments five weeks after Go Live, even though numerous implementation problems were still being experienced.</td>
</tr>
<tr>
<td>f. The Key Users maintained their high level of commitment to the IS, and continued to support their work colleagues.</td>
</tr>
<tr>
<td>g. All users struggled with the complexity of the IS and the extended time that it took to carry out transactions compared to the previous system.</td>
</tr>
<tr>
<td>h. Few issues were reported from the finance community where the IS had been an upgrade to a system that they had been using for some time.</td>
</tr>
</tbody>
</table>

Referring to Table 9.8, items ‘b’, ‘c’ and ‘d’ relate to research question six and the notion that observer perspective frames success. Along the same lines, items ‘a’ and ‘g’ address research question one, and indicate that from a management perspective lack of use does not detract from apparent implementation success.

### 9.6 Illustrative vignettes

Three short vignettes are related to illustrate the day-to-day experiences with the implementation at the study site. As with the previous observations,
focus is directed towards observed behaviour and broader organisational issues, rather than just focussing upon the IS directly. Each of these vignettes highlights the sorts of issues that can be encountered within the overall implementation phenomenon, and reminds researchers that there can be differences in context associated with implementation even within the one setting.

9.6.1 Stationery purchasing module

Prior to MFHRIS, the study site had a very effective stationery purchasing system that had been tailored to the site by the stationery vendor. The organisational wide purchasing module that was part of MFHRIS replaced this purchasing system. Control over the spending at the study site through the purchasing system had been historically weak, but over recent time, prior to implementation, had been strengthened by Deb, the site manager’s PA. The project team had not involved any of the site people in the planning for the implementation, and had not identified Deb through the stakeholder analysis as a key contact in this area.

Key Users involved in preliminary training began to express concerns about MFHRIS purchasing module to Deb, who organised a meeting with the key site purchasers and Nick from the project team to find out some information and to list some concerns. The meeting notes are attached as Appendix 9. The site, like many organisations, has a healthy grape vine and information finds its way around very quickly.

_It seems like every issue that someone has spreads through the network and people then take it on as their own._

_Amy, Consultant on another project_

The failure to identify Deb as a key person in the stakeholder analysis was a curious one. A visitor to the NSW site would only need to spend a short time there to realise that Deb was a central figure in many activities, and had the total support of the site manager. The contractor responsible for the implementation of a new travel booking system, for example, told me that she had identified Deb immediately as a key influencer and included her on the tender committee for her project.
The purchasing meeting made three recommendations, the most important of which was to restrict access to MFHRIS purchasing module to those who has access to the current one. The project team agreed to this, and this was communicated to those involved and to the study site manager who accepted the recommendations.

During Go Live it became apparent that restricting purchasing access was actually not possible within MFHRIS purchasing module, despite the inference by the project team. A number of purchasing related problems surfaced during Go Live sufficient to require an intervention by the project team. It was revealed that MFHRIS purchasing module implementation had been ‘templated’ on the one deemed successful within the Australian #2 Business, without checking its suitability for the Australian #1 Business. In fact, the Australian #1 Business had a superior, much more user friendly purchasing system supported by the primary vendor that now had to be abandoned as MFHRIS was mandated as the one to use.

This activity revealed some important learning. First, a lack of end-user involvement early on, especially the failure to identify key players in the organisation, had allowed those at the study site to inherit an inferior system without the possibility of contributing to a better solution, or to be better prepared for what was to come. Second, this highlighted one of the weaknesses in using a template approach, which assumed that what had worked in previous settings would also work at the study site.

9.6.2 Paint ordering

The Australian Business #1 uses large volumes of paint at five of its sites. The NZ Business also uses paint in its operations, and had reportedly converted to ordering paint via MFHRIS about 18 months earlier. Prior to the implementation of MFHRIS each site had evolved its own variation of paint ordering, purchasing and receipting. The timely arrival of paint was important to the flow of production, and as such was monitored by the production units closely and regularly reported to the production planning people through a shared spreadsheet process. There had been accounting problems with the paint ordering system right across the organisation and it was hoped that MFHRIS would fix these problems.
About six weeks prior to Go Live, through conversation with the finance group, a number of potential issues with the ordering of paint using MFHRIS were identified. There also seemed to be a level of confusion about who was doing what with respect to training.

The issues were being left to one of the project team contractors to sort out. Given that this was an area where knowledge of the business and the existing systems seemed important, the potential issues were raised with the project team. The project team did not grasp the potential importance of these issues, and therefore did not treat them as requiring urgent attention. Further communication involving the supply departments at the various sites and the NSW Site manager generated some activity and the business supply group became involved. A degree of confidence was instilled with the knowledge that the NZ Business had been using MFHRIS to order paint for two years.

On the day after Go Live, the project team reported that there had been a minor issue raised concerning paint ordering, but that this had been resolved. During an audit of users on the Thursday of the implementation week, Kev, one of the study site staff who orders paint, identified a number of serious issues that were causing considerable problems.

Kev felt that he had received inadequate training to use MFHRIS and that this was contributing to his inability to use MFHRIS functionality. Paint was arriving before he had generated an order number, which meant that he could not receipt it into the system. MFHRIS did not interface with the production planning spreadsheet in the way that the old system had done. JC, one of Kev’s counterparts at one of the smaller sites, shared Kev’s opinion of the training, considering that it was “poor at best”.

The supply department at the New Zealand Business was contacted to see if there was something that could be learned from their experience. The supply manager responsible for ordering paint at that site described how they had also experienced similar issues, and had developed a work around system that they were in fact still using.

A focus group comprising study site users and project team members was convened in the week after Go Live to identify ongoing issues with paint
ordering, and to suggest possible fixes. By this time, the project team had twice reported through their health checks that the minor issue with paint ordering had been resolved. The minutes of the meeting held on 9th July are included as Appendix 16.

None of the issues raised were insurmountable, and in fact could have been addressed prior to implementation. One of the proposed system fixes would also address the issue within the NZ Business. The researcher was nominated for a number of the corrective actions, as by this time a big picture perspective was what was needed to resolve a number of these issues. It took until 18th October to fix the spreadsheet compatibility issue 98.

9.6.3 Project planning module

The engineering project group were asked to change from their current spreadsheet based system to the project planning modules within MFHRIS, primarily to provide better financial data for the plant accountants. The project group manager assigned one of his team to become involved in the MFHRIS project early on, and to become a Key User for the engineering project group.

A follow up interview with the engineering project group Key User after implementation revealed that there were no major issues that were worrying this group 115. The engineering project group Key User had requested some follow up training in specific areas to address what issues there were. This short vignette shows that within the implementation at the study site there was at least one subset of the overall implementation that appeared to be successful. The summary of this vignette is attached as Appendix 15.

9.7 Post-implementation focus groups: Situation appraisals

<table>
<thead>
<tr>
<th>Pre-implementation</th>
<th>Go Live Week</th>
<th>Post-implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2007 to June 2007</td>
<td>Week 1 July 2007</td>
<td>Week 2 July 2007 to end 2008 (ongoing)</td>
</tr>
</tbody>
</table>

A number of focus group sessions were held in the post-implementation period to follow up on study observations and issues raised within the organisation. These sessions were held in the situation appraisal (Kepner &
Tregoe, 1997) format that was widely used within the organisation at the study site in each case. The main themes are summarised for each of the sessions.

9.7.1 Questions to answer

Following on from observations not yet clarified, and from concerns raised by users during the implementation and post-implementation periods, two specific questions were posed to a number of the site’s maintenance users in the situation appraisals. The items were:

For the maintenance users in the production areas, what specific problems were they experiencing with MFHRIS, and what was the impact of the shortened training?

Having had a period of post-implementation experience, was MFHRIS still considered to be complex and inflexible?

The situation appraisals were conducted in a semi-structured format to allow the maintenance users to raise any new issues that they may have had. Attendance was not compulsory.

9.7.2 Study Site Production Unit 1 Service Shops Users (30/10/2007)

Notes for the situation appraisal are attached as Appendix 12. Many aspects of MFHRIS have been adopted, but there are also parts that are still causing concern.

*If everything lines up work can be done quickly, if not people can go home frustrated at not being able to do their job.*

Over the period since implementation, many users have become familiar with the system, and as with the previous maintenance system they are adapting it to their day-to-day work.\(^{107}\)

*People are starting to pick up the ‘little tricks’ as they become more familiar with the system.*

The users referred to the complexity and inflexibility of MFHRIS when compared to the previous system. It was reported that that even straightforward jobs took a long time. Some users were spending most of their day at a computer terminal inputting to the system.

*There is a combination of ‘familiarity with the system’ issues, which will be reduced over time with instruction and experience, along with the inflexible MFHRIS itself that requires more manual input and time at a computer terminal than the previous system did.*
9.7.3 Study Site Production Unit 1 Maintenance Users (8/11/2007)

The notes from this situation appraisal are included as Appendix 11. This group’s main concern was with the length of time that MFHRIS required to perform the transactions properly. On busy days this was either not possible, or meant that users had to work overtime to get work done. Checking this aspect with Australian Business #2 users confirmed that they had been working considerable amounts of overtime since their MFHRIS implementation\textsuperscript{109}.

There are numerous ‘frustrating roadblocks’ in the system that have led to a number of people spending way too much time at a computer terminal with the MFHRIS.

Those who were able to attend training were pleased with what they were given. In common with the other areas of the study site, now that the users have experienced MFHRIS in their workplace, they would like some specific training in job specific areas. Had all users attended the training that the User Analysis recommended, this extra training may not be necessary.

Even though the training provided was good, it has not produced enough competent users, and further job specific follow-up training is recommended.

A similar purchasing issue to that described with paint ordering, i.e., the time required to get a purchasing order, had been experienced by this group, even though this had been rectified for paint months earlier.

Sometimes it takes four days to get an order number from purchasing.

9.7.4 Study Site Production Unit 2 Maintenance Users (13/11/2007)

Once again the themes of the time required due to poor familiarity with the system, along with the inflexible MFHRIS system itself were raised. Poor response from the purchasing department in Adelaide is also causing frustration and slowing down MFHRIS process flow in a number of instances. According to the users, the old system wasn’t all that bad, and in some ways MFHRIS has been found to be more cumbersome from the plant user’s perspective. The notes are attached as Appendices 13 and 14.

Jim, a study site maintenance engineer, is a long-term employee at the study site, and had been seconded to the project team during the implementation. He was now also a Key User for the Production Unit 2 users. Jim has a good understanding of the intent behind the use of MFHRIS, and also
a good grasp of the day-to-day issues given that a number of users come to him with questions. Jim identified a number of positive aspects of MFHRIS, and also opportunities to gain benefits from features that the users were currently not utilising. He also felt that if users had some understanding of what the organisation was gaining from MFHRIS that it might help them to understand why they were required to do what seemed like extra work.

_We need to provide some business overview to complement the transactional stuff - Jim._

The themes extracted from the post-implementation focus groups are presented in Table 9.9. The behaviour of management, indicating that they had ‘moved on’ as it were from the novelty of MFHRIS, told employees tacitly that they were unlikely to get the assistance they required. It remained to be seen if these issues would eventually impact upon the ability of MFHRIS to deliver for the organisation.

**Table 9.9 Post-implementation focus group themes**

- In general, employees were beginning to adapt to MFHRIS where possible.
- The general lack of training before and during implementation was hampering the adoption of MFHRIS at the study site.
- MFHRIS as a system was complex and time consuming, and not generally perceived as ‘better than’ the legacy system.
- MFHRIS was particularly cumbersome where it interfaced with other systems within the organisation.
- Most users felt that they did not have ongoing support from their management to resolve their issues.

### 9.8 Status at the study site: November 2008

<table>
<thead>
<tr>
<th>Pre-implementation</th>
<th>Go Live Week</th>
<th>Post-implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2007 to June 2007</td>
<td>Week 1 July 2007</td>
<td>Week 2 July 2007 to end 2008 (ongoing)</td>
</tr>
<tr>
<td>Nov 2008</td>
<td></td>
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</table>

During the second half of 2008, approximately eighteen months after MFHRIS implementation within Australian Business #1, the broader organisation held a series of MFHRIS maintenance workshops to address
ongoing issues with MFHRIS across the organisation. Most of the issues were to do with ordering, purchasing and receipting of goods and services.\textsuperscript{112, 119}

One of the sessions was held at the study site in November 2008 and this gave an opportunity to assess where the study site implementation had progressed to eighteen months after implementation.\textsuperscript{118} The main site issues identified are listed in Table 9.10.

\textit{Table 9.10 Site issues with MFHRIS, November 2008}

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase orders not able to be processed due to insufficient information</td>
<td>This is an issue right across the organisation, and is being addressed by getting the purchasing group to define requirements with users</td>
</tr>
<tr>
<td>Purchase orders should not be used to pay vendors</td>
<td>Payment should be made by the purchasing group after they have reconciled goods receipt with purchase order requirements</td>
</tr>
<tr>
<td>Numerous master data errors</td>
<td>There were many instances of master data being set up incorrectly during the pre-implementation activities at each of the sites</td>
</tr>
<tr>
<td>Users not knowing how to correctly do a number of transactions</td>
<td>Attributed to gaps in the training, not just study site, but across the organisation; many new employees have not been trained</td>
</tr>
<tr>
<td>Default settings</td>
<td>When the MFHRIS team were demonstrating the system, it became apparent that there were default values that could be input making the tasks much quicker. None of the users at the session knew of this feature.</td>
</tr>
</tbody>
</table>

Users of MFHRIS right across the organisation were having problems with different facets of the system. Many of the issues were connected with MFHRIS not interfacing easily with other organisational systems, such as those concerned with the payment of vendors.\textsuperscript{99} These types of issues were being addressed by having the users of the interfacing systems working together to come up with the best compromise.

Of particular interest was the progress made by the maintenance users from the Service Shops at the study site. Their progress after four months was described in Section 9.7.2. Another fourteen months on and they had made significant progress in adapting MFHRIS to their day-to-day work. Adapting is a more realistic description than the more frequently used term of adoption in this
area. The users had worked out ways of getting around the system’s perceived weaknesses. A good example is how these users have put ‘dummy templates’ for many of MFHRIS transactions into the system, so that they only have to call them up and change certain details, thereby saving considerable time.

The Service Shops had already organised extra training in the areas where they had felt it was needed, and were now reporting that they had sufficient time to spend on the required computer input. They were aware that their peers across the study site had not yet made the same progress, and felt that the maintenance managers in the other areas needed to take ownership of MFHRIS in order to make similar gains. Purchase orders and goods receipting, like the rest of the organisation, are still problem areas for this group.

It was reported that the Victorian site had also organised for further training in specific areas after implementation, even though their implementation had been reported as fairly trouble free. The consensus of the workshop team, having visited many areas of the organisation, was that until users had the opportunity to use MFHRIS on a day-to-day basis they did not really know what to focus upon.

If you don’t know its there, you can’t use it.

Maintenance user at the workshop.

During the editing of this thesis in February 2009, the study site Finance Manager indicated that the site was still having major issues with the allocation of maintenance costs. He thought that this was directly a result of the site maintenance users not really understanding MFHRIS, and not being able to use it correctly on a day-to-day basis.

9.9 Discussion

Viewing the implementation of MFHRIS within the study organisation reveals that the implementation phenomenon was in fact the aggregation of a number of different activities running coincidentally. Viewed as a system installation, the MFHRIS project could be seen as introducing and installing the IT, demonstrating that it can work, training the potential users to some agreed level and then activating MFHRIS. A fuller view of implementation would include all of the other factors that would ensure the longer-term adoption of the IS and
adapting MFHRIS at a site area level in order to deliver the organisations’ desired benefits.

In this context adoption refers to the user behaviours aimed at trying to take up MFHRIS as it was offered. Adaptation describes how, over time, the users make MFHRIS work for themselves, perhaps modifying the system or exploring features that they had not been shown, and making the system part of how things are done in their workplace.

The observations made during the study indicate that the project team ran a scoped project to install MFHRIS within the organisation with the primary focus of achieving the necessary installation on time and within budget. Installation is used to indicate that the project team ensured that MFHRIS was working, but not necessarily delivering in terms of quality output.

The senior management of the Australian #1 Business, who would be the end customers of the information output from MFHRIS, provided visibility and notional support for the project in the pre-implementation phase, but were not instrumental in the Go Live or post-implementation phases. The site management teams were influential in the ways that they interfaced with the project team, and their behaviour impacted the implementation in all three phases. The impact at the study site was seen to be negative in some instances.

The users of the new system were in many ways less influential to the announced success of the implementation, even though they were the focus of adoption, and essential to the adaptation of MFHRIS. There was no obvious organisational group vested with ensuring the longer-term delivery of outcomes or the optimum use of MFHRIS. To the participant observer, the beginning of successful implementation was seen to occur when local users themselves took ownership of both use and outcome delivery in their areas, but this was not the organisation’s perspective of success.

When the project team and local site management worked together towards the common goal of installation success, such as at the Vic Site where the local management formally shared the Project deliverables through their job goals, the pre-implementation activities such as training were achieved, and the post-implementation experience was positive. Where there was a disconnect between the project team and local site management, as observed at the NSW
Site, the pre-implementation activities did not run smoothly and major problems with the use of MFHRIS were still evident more than twelve months after Go Live.

*Those who treat this implementation as a distraction will be wearing the distraction for the next 18 months.*

*Jim, study site maintenance engineer.*

The DOI phases suggested by Roger (1995) provided a convenient template with which to approach the initial observations. The DOI confirmation phase did not necessarily accommodate the protracted adoption, and then later adaptation phases observed. Smith and Milan’s (2007) CATWOE definitions framed the appropriate perspectives through which to view the implementation phenomenon, and to evaluate implementation success.

In the next chapter the observations and comments from throughout the longitudinal study will be interpreted from the perspective of behaviours. In addition to the research questions proposed, several new questions have presented as a result of the participant observations.

How can the different perspectives of implementation success be accommodated in a conceptual model that seeks to explain that success?

The orientation of the study site management towards the implementation was seen to be negative from early on in the pre-implementation phase. Is the concept of psychological reactance introduced in Section 3.2.6 a feasible explanation for the observed behaviour?
Chapter 10

Interpretation and analysis

“Good God! Did we really send our men through that?”
The man beside him, who had been through the campaign, replied tonelessly,
“IT’s worse further on up”
Attributed to Lt.Gen. Sir Launcelot Kiggell at the Battle for Passchendaele, 1917

10.1 Introduction

The purpose of this chapter is to analyse and interpret the findings of the longitudinal study in order to provide a conceptual understanding of the implementation phenomenon. The understanding has been captured in the conceptual model described in Chapter 11.

The previous work of Jasperson et al. (2005) reviewed in Section 4.3.4 identified the post-adoptive period in an implementation as a potentially rich area for further study. This period had received relatively little focus in previous studies, and Jasperson et al. recommended this stage of implementation as one in particular that management should focus upon. The results of this study support and lend further evidence for the findings of Jasperson et al. with respect to the post-adoptive stage, in particular the need for management focus in this period. The discussion about tacit success in Section 10.4.2 follows on from observations of management behaviour in the post-adoptive stage.

This chapter begins with an interpretation of the context in which the implementation took place by focussing upon organisational factors. This is followed by a discussion of the various perspectives of the implementation that existed within the study time period, and how different notions of implementation success accompanied the different perspectives. Finally, an overview of the implementation leads into the introduction of the conceptual model that will be described more fully in Chapter 11.

10.2 Organisational factors

The quotation at the beginning of the chapter, attributed to Lt. Gen. Kiggell, a staff officer who had taken part in the planning of the 1917 offensive
at Passchendaele in Belgium during WW1 is a vivid illustration of how a plan can fail due to unforeseen local conditions (Taylor, 1966). Months of detailed planning had failed to take into account the rain that turned the battlefield into a field of mud and prevented movement. It was only when Kiggell actually visited the battlefield that the impact of the local conditions on the plan became obvious.

In the field of organisational improvement based upon the methodology of Kaizen, there is a phrase “go to the gemba” which illustrates the need to take into account the local climate when planning changes such as the release of new products (Neel, 1997). Gemba is a Japanese word literally meaning, “real place”, and the notion of “go to the gemba” describes the need to understand the local conditions into which a change is being introduced, through direct observation.

10.2.1 Organisational climate

The need to understanding the organisational climate into which MFHRIS was to be introduced was identified as an important factor in the implementation phenomenon. The Project Team, as highlighted in Section 9.3, failed to take this into account through the use of a pre-determined template approach. This factor was further highlighted by the differing implementation experiences and outcomes at the study site, compared to other sites, during the implementation of the same system by the same project team.

Neel (1997) suggests that often the introduction of a new process into an organisation involves a change to the current way of doing things, and that the chances of introducing the new process into an organisation will be enhanced by the four factors shown in Figure 10.1. The presence of these factors alone would not be sufficient to guarantee a successful change, but the absence of any one would lessen the chances significantly. Importance reflects the need for the managers of the process under change to openly explain and endorse the change.

Motivation suggests that incremental success needs to be communicated to motivate those involved in the process change. Creativity and ownership acknowledges the benefits of having people at all levels of the process involved in the changes, consistent with the rationale behind the Requisite Organisation
(Jaques & Cason, 1994; Jaques, 1998) discussed in Section 3.2.1.1. Visibility suggests that the change process is visibly highlighted through appropriate metrics such as run charts and milestones achieved.

Initially, the organisation highlighted the importance of MFHRIS through the presence of the Business President at the project launch at the Victorian site, although he was unable to attend the equivalent function at the NSW site. In retrospect, the overt support of the organisation’s senior management, whilst initially present, waned throughout the implementation. The project team requested that the study site supply a site coordinator to head the implementation activities, but this role was never formally filled, indicating that the site management considered that the implementation could be handled on a day-to-day basis along with other business activities.

![Diagram](data:image/)

**Figure 10.1** Factors that encourage change based on Neel (1997)

The project leader was replaced prior to the Go Live date in order to fulfil another role within the organisation. Once the Business President announced that the implementation had been a success on the morning of the Go Live
week, it seemed that the organisation’s management moved on. Management behaved as if the implementation was successful, and employees interpreted the tacit behaviour of the senior management in this way. Tacit behaviour and the notion of tacit success will be further explored in Section 10.4.2.

The project team recognised the need for visibility, and frequently updated and circulated information showing the progress of the implementation. The project deliverables and percentage completion chart shown in Figure 9.7 is one example, and the project newsletters as shown in Appendix 17 is another. Unfortunately these visible indicators of progress ended soon after the Go Live period when the project team disbanded, leaving those who were still adopting MFHRIS without any visible measure of their progress in an organisational sense.

One intent of the newsletters was to provide employee motivation through stories of small successes as they occurred up to and throughout the implementation period. For the study site, the success stories often carried mixed messages. Descriptions of the successful training sessions and how many employees had been trained in the use of MFHRIS to date at the Victorian and smaller sites were at odds with the experience of the maintenance employees at the study site. This group had been prevented from taking up all of the training offered, and observed their local managers not attending any training.

One positive motivator that the maintenance employees at the study site had were the Key Users who, introduced in Section 9.3.2, were enthusiastic and active in their respective work areas once back on the job. The Key Users were particularly important in the post implementation adoption and adaptation phases.

Neel’s (1997) idea of creativity and ownership, which describes the notion of grass roots involvement, is relevant to the outcome of the implementation in this study. In each observed instance where employees were actively involved in the implementation process, the results were seen to be positive.
The managers at the Victorian site had aspects of MFHRIS implementation built into their job goals, and behaved as if it was their responsibility to ensure a successful implementation. They were actively involved in the implementation, and were seen by employees at the Victorian site to be positive towards the implementation.

In contrast, the study site management at no stage became actively involved in the implementation, for the most part were content to let the project team function independently, and in some cases acted against the project team needs. Not allowing the maintenance employees to attend the required training is an example of the negative behaviour observed at the study site.

The involvement of employees as Key Users at each of the sites is an example of where the grass roots involvement described by Neel (1997) had positive benefits for the implementation. The Key Users were able to learn about MFHRIS in detail ahead of the Go Live, and this enabled them to suggest ways that the implementation could be improved in their respective work areas.

During and after implementation, the Key Users were visible champions for MFHRIS and played important roles in the adoption of MFHRIS by the local employees, and at the study site were important to the longer-term adaptation of MFHRIS. This adaptation was evident in the eighteen-month review described in Section 9.8.

For those aspects of the implementation where it was observed that there was little involvement, the observed outcomes were less positive. Lack of involvement in the introduction of the purchasing module and the changes to the paint ordering processes caused many problems as described in Sections 9.6.1 and 9.6.2 respectively.

In both instances, involving those employees who would be affected by the changes, in the way that the Key Users were involved would have likely produced a more positive outcome. There were some site differences noted in involvement.

10.2.1.1 Site differences

The project team identified early on that there were differences between the study and Victorian sites in the behaviour of people at those sites that would
likely influence the implementation process. These differences had been observed by other teams involved in other implementations, and by people from outside of the study site in general. The Victorian site appeared to the project team to be more cooperative and open to new ideas, whilst conversely the study site, and in particular the study site management, was closed and protective of their site, and behaved as if new ideas were not welcome. These observations serve as evidence for the influence of the prevailing organisational climate, as the implementation approach, the IS and the nature of the site operations were similar.

Unfortunately, the project team did not build upon the initial observations by developing implementation strategies to suit the current organisational climate at each site; rather, the template approach described in Section 9.3 was used across all sites. In retrospect, it was necessary to modify the overall strategy to accommodate the organisational climate that existed at each of the sites. Where this was done, for example in allowing the finance employees to tailor training and implementation to accommodate MFHRIS as a modification to a system that they knew well, the implementation went smoothly.

The progress of the implementation at the Victorian site demonstrated that it was possible to establish a temporary climate of focus and cooperation that supported MFHRIS implementation. The failure to do this at the study site demonstrated that without a supportive organisational climate, the implementation progress and outcomes could be negatively impacted.

10.2.2 Organisational culture

Some of the behaviours of people within the organisation indicated that there were patterns of behaviour more deeply seated than would be described by organisational climate. The negativity of employees at the study site was seen to be general in focus, i.e., not just towards this implementation, and had existed over a period of years, i.e., not just the influence of a current management group. In terms of OH&S, the organisation had recognised that deeply seated behaviours require years of organisational focus to establish an organisational climate that might eventually result in a culture supportive of excellent safety behaviour.
Once the required behaviours become part of the organisation’s culture, they do not require organisational energy to sustain them. It also follows that if negative behaviours are part of an organisation’s culture, then it will also require sustained organisational energy to change these negative behaviours. For the short duration of MFHRIS implementation, it would not be possible to change the culture, so the project team would need to devise strategies to overcome any perceived negative cultural influence. This did not happen at the study site in this implementation.

The deep-seated resistant behaviour observed at the study site could have been motivated by psychological reactance (see Section 3.2.6). The deep-seated nature of such widespread behaviour indicates that it has likely become a component of the site organisation’s culture, and as such its effects would be seen over time and in connection with many phenomena. Psychological reactance in this context refers to a motivation that may or may not result in negative behaviour such as resistance.

10.2.2.1 Evidence for psychological reactance

This section follows on from the introduction to psychological reactance given in Section 3.2.6, and contains evidence reported at the APS Conference held in Hobart, Australia in 2008 (Matthias & Caputi, 2008).

10.2.2.1.1 Possible sources of reactance from the study observations

Some aspects of MFHRIS implementation directly threatened employees’ perceived freedoms. With respect to the social culture and work within the maintenance group, a maintenance supervisor noted:

The new system requires more manual input and time at a computer terminal than the previous system did, and a component of the shop floor frustration comes from a required level of discipline and accountability ... that we haven’t had before.

Prior to the commencement of the implementation project, the organisation carried out a cultural survey at the study site (Study site confidential document). The survey findings described a communal or family culture, which was well networked, but consisted of fragmented groups working towards a common cause. The social nature of the workplace was emphasised by one employee:
There is no problem during the workday for people to socialize because at the end of the day they are working on building better relationships with the personnel they are interacting with.

It was explained that the previous maintenance system had been used for twenty years, and that a number of maintenance employees felt that their identity and organisational worth was somehow represented in the way that they could use the system to achieve the common goal, which in this situation was their department’s needs. Groups like this had been identified in the cultural survey as fragmented groups. The new system would require more time input from the maintenance workers, and as one of the project team trainers explained, would nullify the shortcuts that the experienced users had developed over many years of using the legacy system:

*The new software requires that every process step be followed, i.e., you can’t miss steps or go through ‘back doors’ as users can with the current system.*

A number of employees commented that the benefits of the new system would not be delivered to their work group, but would be realised at a managerial level only. Somewhat surprisingly, one of the project team’s system architects, after one of the maintenance employees demonstrated the outgoing system’s features, commented,

*It has become apparent that the old system wasn’t all that bad, and in some ways the new system is more cumbersome from the plant user’s perspective.*

Prior to the commencement of the system implementation activities, the maintenance management at the study site had initiated a number reduction project. Reducing employee numbers, or downsizing, was seen as a way of reducing the fixed overhead costs of the business, and hence increasing profit. Part of the rationale for the downsizing was that the maintenance employees had become progressively more efficient at their jobs, and could therefore achieve their objectives with less people. No consideration for the time requirements of the new system had been made, and prior to the implementation of the new system, the maintenance management realised that the new system’s time requirements were at odds with their desire to reduce numbers.
These types of experiences of the new system could be seen as direct motivators of negative behaviours towards the new system. There were also events that occurred within the day-to-day operation of the organisation, not directly associated with aspects of the new system that could also contribute to negative behaviours at this time.

One of the most important players in the site’s social system is the site manager’s personal assistant (PA). One of the PA’s duties is to allocate meeting rooms as needed on a day-to-day basis, and the PA has a large customer base to look after. Early on in the project, the project team ‘block booked’ two of the site’s meeting rooms which they subsequently used only sporadically over the course of about six months. This restricted the PA’s ability to service a number of people from the business, and this situation frustrated a number of employees. This frustration was openly commented on by a number of employees.

10.2.2.1.2 Participant observations of negative behaviour

Some negative behaviour with respect to the new system was expected. Those behaviours due to genuine system problems were seen as legitimate by the project team. At the commencement of the project, some six months prior to Go Live, the project team leader commented that:

*We need to be aware of everyone “who is touched by the system” and be watchful for ripples which result from the implementation.*

Expected negative behaviours that were observed included taking longer than expected to perform system tasks, requiring help to do new tasks, becoming frustrated with the extra effort required to use the new system and making mistakes due to the interactions with the new system. These behaviours were not seen as evidence of a poor implementation. During the post-implementation period, the project team leader remarked that:

*It was expected that there would be some weeks of disruption after Go Live … and compared to other implementations this one has been quite trouble free.*

There were a number of unexpected negative behaviours observed throughout the study, and some negative behaviour directed at the implementation that was thought to be site specific. The confrontational
reception that the project team received from the site management was a difficulty that needed to be overcome but was not totally unexpected. Comparing the study site to the Victorian site during the pre-implementation period, the project leader commented:

(The Victorian site is) already off and running with their site-specific tasks, no doubt it will be a harder slog (in NSW).

The comment was reflecting learnings from previous projects carried out at the NSW site, and was consistent with the organisational climate referred to in the cultural survey. Both the NSW and Victorian sites did similar things with similarly qualified people, but the NSW site was much older than its Victorian counterpart. The system implementation was observed to be much smoother and to plan at the Victorian site than at the NSW site, and some ten months after implementation the NSW site was still struggling to fully implement the new system.

Other negative behaviours observed included preventing employees from attending the necessary training, even though the employees concerned desired to do so. It was also observed that some of the fragmented groups began sub-optimising the new system to suit their local needs, at the expense of the system performance, or as one employee reflected:

My priority overrides your priority.

10.2.2.1.3 Conclusion

Brehm’s (1966) Theory of Psychological Reactance describes how real or perceived threats to an employee’s workplace freedom and control over their day-to-day work can provide motivation to attempt to recover or limit further loss of the threatened freedom and control. Observations from the longitudinal study have confirmed this hypothesis, i.e., some of the organisational behaviours that negatively impacted this implementation were not about aspects of the system per se, but rather the system was the object at which externally motivated behaviour could be directed.

The strongest indication for the influence of psychological reactance as a motivator for negative behaviour directed at the implementation came from the study site’s management group. Unlike their counterparts elsewhere in the
organisation, the study site management team perceived the introduction of MFHRIS by a project team appointed by the organisation as a threat to their autonomy, and behaved in ways that did not enhance the likelihood for implementation success.

In the maintenance area, behaviour that may have resulted from psychological reactance included preventing maintenance employees from attending the training required to make MFHRIS a success. This hypothesis is further supported by the observation that the implementation experience of the same project team, implementing the same system at different sites was different. At the Victorian site there was cooperation and proactive behaviour from the site management and issues such as non-attendance of training did not arise.

An opportunity exists to improve systems implementation by looking for ways to develop a local organisational climate that would support the implementation activities by negating the potential negative influence of cultural factors. Whilst psychological reactance has been suggested as a possible cause for some of the negative behaviours observed in this implementation, it is possible that other organisational factors can influence behaviour directed at IS.

Kling and Iacono (1984) have observed that managers using IS to increase their own organisational power can motivate similar negative behaviours. The managers, like other groups, likely hold different perspectives of the implementation which can affect behaviour.

10.3 Different views of the implementation

It became apparent from interviews and observations during the longitudinal study that participants from the different organisational groups shown in Figure 8.2 viewed the organisational phenomenon differently, supporting the social cognitive perspective described in Section 3.2.5. Differing views were identified at the organisational management, project team, site management and user levels. Finally, there is also the view of the researcher captured in the participant observations. These perspectives were shown conceptually in Figure 9.2.
10.3.1 The organisational perspective

From the perspective of the parent organisation, MFHRIS represented an investment in a system that would support the higher-level strategy of “1 Business, 1 System, 1 Way” described in Section 9.3. Like any other investment, there was a business case associated with the project that evaluated cost versus benefit across the organisation.

Observations from the study showed that in this instance the organisation behaved as if Go Live and the associated sign off of project milestones indicated success, and there was no obvious assessment of whether or not MFHRIS in fact contributed to the higher-level strategy. This will be further discussed in Section 10.4.

10.3.2 The project team perspective

The project team’s perspective was in many ways the most straightforward, and emphasised efficiency as measured in the short term over effectiveness which would require a much longer time frame to assess. The focus was upon installing MFHRIS as an operating system and then moving on. This focus was scoped out in minute detail in terms of milestones and check steps up until implementation, but apart from three weeks of post implementation support, the project team took no visible part in the post-implementation adoption or adaptation activities.

To be fair to the project team, the business, through the presentation made by the Business President at the project kick-off function, had emphasised on time and within budget as the important factors, and the President has acknowledged the project as a success on the morning of July 2nd, before most users had even seen the system in action.

10.3.3 The site management perspective

The study site management team “allowed’ the project team to install MFHRIS at the study site, but did not become involved in the implementation to any great extent. The perspective of the management team indicated that MFHRIS had been imposed upon the site and was distracting them from managing the site operations, which was their primary focus.
In some instances, such as preventing maintenance employees from attending training, the site management actually made the implementation more difficult than it needed to be. The site managers justified this behaviour in that the success of MFHRIS was not of primary importance. This behaviour was at odds with Neel’s (1997) factors that encourage successful change.

10.3.4 The users’ perspective

In general, the potential users and eventual users of MFHRIS at the study site attempted what was asked of them with respect to the implementation of MFHRIS to the best of their ability, and this pattern appeared to have been repeated across the other sites. Differences in the experiences of the users, and the local outcomes obtained, appeared to have more to do with external factors such as site climate, management support, time availability and training than to attributes of the users themselves.

There was an apparent change in the focus of the users towards the implementation as the project moved from pre to post-implementation. In order to classify the changing perspectives, the Leximancer text analysis tool was used to analyse implementation related emails before and after the Go Live week. Concept maps for these analyses are presented for the pre and post-implementation emails in Figures 10.2 and 10.3 respectively.

Figure 10.2 Concept map for pre-implementation emails
The circles on the concept map represent thematic groupings extracted from the email text. The group labels are assigned by the software to represent the concepts included in the group. Extracts from the emails illustrating the concepts that make up these groupings for the pre and post-implementation periods are shown in Tables 10.1 and 10.2 respectively.

**Table 10.1 Extracts from pre-implementation emails**

<table>
<thead>
<tr>
<th>Thematic grouping</th>
<th>Examples of Leximancer extracted phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation</td>
<td>I think that the organisation needs to very quickly take ownership of MFHRIS</td>
</tr>
<tr>
<td></td>
<td>Implementation will have a significant reach across the organisation.</td>
</tr>
<tr>
<td>MFHRIS</td>
<td>Do you know what was done at the senior level before getting MFHRIS approved?</td>
</tr>
<tr>
<td></td>
<td>There are many systems and processes impacted/replaced with MFHRIS and this should form part of our communications.</td>
</tr>
<tr>
<td>Conversion</td>
<td>At the current rate of progress … the conversion will not be completed before the cut-off date.</td>
</tr>
<tr>
<td></td>
<td>100% of the data must be ready for the trial conversion.</td>
</tr>
<tr>
<td>Work</td>
<td>Planner groups have been determined.</td>
</tr>
<tr>
<td></td>
<td>A future conversion activity will be the conversion of work orders.</td>
</tr>
</tbody>
</table>

In the pre-implementation period, there were central themes for the *organisation* and MFHRIS reflecting questions about how would MFHRIS fit into the organisation and how would the organisation benefit from MFHRIS. The *conversion* and *work* themes reflected the way in which the Key Users and employees involved in data transition activities were focussed on the tasks at hand. This builds upon Neel’s (1997) observation that organisational change is positively facilitated through grass roots involvement. The data transition team working extra hours to complete the task overcame the concerns about the data conversion not being 100% completed on time.

The focus of the employees changed in the post-implementation period to that of adoption and adaptation of MFHRIS into the employees' particular work environments. There was less focus upon MFHRIS and the broader organisational deliverables, perhaps reflecting the lack of focus upon these aspects by the senior organisational management.
Referring to Figure 10.3, in the post implementation period, the site users were observed to spend a great deal of extra time trying to get MFHRIS to work in the way they had been told it would work, in particular with respect to order processing captured in the order grouping. Eventually short cuts and adaptive changes began to creep in seemingly when the users perceived that they were not going to get any further formal assistance from the organisation. Process reflected the numerous questions about the MFHRIS process and how it interfaced with other business processes, and the groupings, required and should, captured discussion about the need to now do some things differently.

![Concept Map for Post-Implementation Emails](image)

*Figure 10.3* Concept map for post-implementation emails

There was no compelling evidence that individual factors such as computer self-efficacy or computer skills shortage impacted the implementation. This may have been due to the fact that computers are an integral part of this organisation’s day-to-day work experience, which they have been for more than ten years. It may also be that the widespread use of computers throughout society is reducing the impact of factors that were important in previous eras. In order to tease out such individual effects, the approach of measuring individual attributes quantitatively would be required, but this means reducing the focus to a level below that of the conceptual model.
Employees spent the initial post implementation period, often referred to as the post adoption period, trying to adopt MFHRIS as they had been requested. Following this period, there has been, and as recent as November 2008 still continues to be, a period of adaptation in which employees are trying to make MFHRIS work for them. This adaptation confirms Soffer et al.’s (2005) comments about aligning generic software with business in its own environment.

Having spent considerable time trying to adopt and adapt MFHRIS into the study site’s work, the general consensus of the study site employees was that MFHRIS was a complex system that was not easy to learn and use. There were few benefits that could be described at the site level. There were a few maintenance people who had become proficient in the use of MFHRIS who could see potential benefits for the site in terms of more accurate planning capability and cost reporting in the maintenance areas. According to the review reported in Section 9.8, few of these benefits had been realised eighteen months after implementation at the study site.

Throughout the study a central focus of each of these perspectives discussed was upon success. What would the workplace look like when the implementation was ‘complete’?

---

**Table 10.2 Extracts from post-implementation emails**

<table>
<thead>
<tr>
<th>Thematic grouping</th>
<th>Extracted phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order</td>
<td>The paint orders are coming back from supply far too slowly, or not at all. The person who has been doing the ordering does not have access to the MFHRIS.</td>
</tr>
<tr>
<td>Process</td>
<td>MFHRIS works differently to the old system and requires extra steps to achieve an outcome. I don’t know the progress on this one, although I hear that Kev is spending a lot of time on this one.</td>
</tr>
<tr>
<td>Required</td>
<td>Reflects a number of business data processes that are required by other groups, but which changed when MFHRIS was implemented.</td>
</tr>
<tr>
<td>Should</td>
<td>Reflects a number of recommended changes to enable MFHRIS to do what it “should” do, but was not currently delivering.</td>
</tr>
</tbody>
</table>
10.4 Implementation success

The difficulty in defining and measuring IS implementation success has been discussed in Chapter Five. From the observations made in this study, there were a number of perspectives on what implementation success meant to different people within the organisation. The challenge seems not in identifying which measure is the correct one, but lies in identifying what combination of measures can be used to define an implementation with the greatest chance of succeeding over time. This notion of a multi-dimensioned perspective on success addresses research question six that suggests that success might depend upon the perspective of the observer.

10.4.1 Facets of success

For this study, success to the organisation’s management meant achieving business sign off on time and within budget, and not whether or not MFHRIS would help to achieve the strategic goals. These outcome deliverables would only be obvious after some period of time. Soon after implementation, the business management demonstrated an acceptance of the implementation success of MFHRIS, as shown in Figure 9.8, and demonstrated tacitly that they had accepted the success. This tacit behaviour will be discussed in Section 10.4.2.

The project team measured success by achieving milestones on time and obtaining formal sign off from the business to indicate that they had been achieved. The problems with the paint ordering systems described in Section 9.6.2 highlighted that in some cases sign off was achieved despite obvious problems that took some time and effort after sign off to rectify. Nevertheless, sign off was the measure of success that the project team used.

Observing the day-to-day operations at the study site gave the impression that MFHRIS was a complex system with potential to deliver the desired business outcomes, but that the system had been installed but not fully implemented. Looking at some of this issues facing the users some two months after implementation revealed that there were real problems still to be addressed. Some of these issues are listed in Table 10.3.
The post-implementation issues included aspects of the IS, in particular the time requirements, aspects of the interface with existing systems, and the perceived lack of organisational support for MFHRIS users. At the time these issues existed, both the organisational management and the project team had deemed the implementation a success, and moved on to other priorities.

The tacit behaviour of those in the organisation with widespread influence perhaps could be judged as the ultimate measure of organisational success. If so, it would be unlikely that a quantitative measure would be possible in this circumstance.

Table 10.3 Examples of user issues reported in the first 2 months after implementation

<table>
<thead>
<tr>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>The new software did not interface with a number of site-based reporting programs.</td>
</tr>
<tr>
<td>A number of users had not been adequately trained.</td>
</tr>
<tr>
<td>Authorisations required within the new system followed an HR hierarchy that did not reflect the actual reporting structure of a number of employees.</td>
</tr>
<tr>
<td>Transactions took much longer to complete than was the case with the old system.</td>
</tr>
<tr>
<td>Receipting and close out transactions now had to be done by employees on site whereas previously they had forwarded paperwork to a central resource, and this took more time.</td>
</tr>
<tr>
<td>A number of consumable items had been reclassified as ongoing expenses within the changeover, which now prevented usage reporting at a plant unit level.</td>
</tr>
<tr>
<td>The new system was not capable of providing restricted access to ordering catalogues, meaning that access would have to be manually monitored.</td>
</tr>
<tr>
<td>There was general confusion over where users were to go to for help once the project team support was withdrawn ahead of the planned time.</td>
</tr>
<tr>
<td>Goods being delivered without the corresponding purchase order number, which made receipting a longer manual process.</td>
</tr>
</tbody>
</table>

10.4.2 Tacit success

The interactions between the organisation’s management and employees changed soon after the Go Live date in a way that tacitly indicated that the implementation had been a success, and that it was time for the organisation to move ahead. This observable change in behaviour, not initially announced or stated, has been termed ‘tacit success’.
It was observed that the site employees were primed to observe and react to such tacit behaviour. This priming has been used by the organisation in a positive sense to reinforce its OH&S strategy.

10.4.2.1 Tacit behaviour and organisational leadership

The adjective ‘tacit’ is used literally to mean, “That which is understood or implied without being stated” (Simpson & Weiner, 1989). Within the study of organisations, tacit behaviour has been linked most recently in studies of knowledge management (see for example Alavi & Leidner, 2001).

Tacit knowledge can be thought of as knowledge demonstrated through a person’s behaviour, that is not verbalised, or knowledge that a person may not even be aware of, but which can be inferred from their behaviour (Blackburn, 1994). The inference is that people may behave in a way that indicates that they possess the required knowledge to facilitate that behaviour, even though they may not necessarily describe possessing or acquiring it.

Sternberg and Wagner (1992) studied correlates of management success and found that success could be predicted by the acquisition of informally acquired skills, which correlated with recognition and advancement. These informally acquired skills, termed tacit knowledge, were identified by numerous managers in self-reported responses to the general question of what matters in being successful.

One of the key points in what mattered, was the manager’s ability to determine at any point in time what he or she needed to focus upon in order to survive or advance within an organisation, and it was observed that this knowledge is largely acquired informally, on a day-to-day basis, and rarely verbalised. This behaviour, i.e., the acquisition of decision-making knowledge without formal analysis, was observed within the organisation even though their stated methods involved the use of rational process and analysis.

Further, it was noted that organisation’s employees seemed to be good at picking up the behavioural cues of their managers, and falling into line with how they interpreted this behaviour.

“Anything that interests my boss fascinates me.”
Maintenance employee
The influence of the tacit behaviour of managers within organisations can be profound. Dalmau (1999) describes the “unconscious but nevertheless real” interpersonal transactions that occur within organisations and notes that these behaviours can contain and transmit a large amount of information between people (p.7). Dalmau has analysed the success or failures of managers as they move into new organisations, and in particular has noted the impact of what he calls “implicit unconscious and non-rational transactions” (p.7).

According to Dalmau (1999) employees within an organisation will derive more information from the actual and symbolic behaviour of a new manager, than they will from the manager’s verbal utterances. The organisation’s employees were possibly primed to observe and derive meaning from their manager’s behaviours associated with the new system.

There were numerous observations of the way that tacit organisational behaviours influenced wider organisational behaviours, some trivial and some not so. These observations were told in the form of stories that were interpreted as artefacts of the organisation’s culture. Such stories told to the researcher by employees over the course of this implementation provide rich information made possible by a participant observation approach.

At some time in the organisations past senior male staff wore ties. There was never any stated policy to stop doing so, but apparently a new manager had stopped wearing a tie, and this trend was picked up by employees and is now the norm. In fact, there are still some employees who wear ties, and they are considered as being non conformist.

On a more serious level, the organisation actively uses the notion of tacit behaviour to send positive messages to employees in the area of occupational health and safety. It has been found within the study organisation that positive safety oriented behaviours displayed by managers are noticed and taken up by employees, and conversely, negative safety behaviours dilute the organisations stated safety initiatives.

Positive behaviours include always wearing the required safety clothing, starting meetings with a safety contact, enquiring about employee’s welfare and working conditions and taking the time to check before acting. These
behaviours are not stated by managers, but easily observed by employees. As one employee stated,

Employees don't care of you (their manager) know, but they do know if you care.

Maintenance employee

Research question six asks how implementation success is conceptualised and quantified. In an organisational sense, tacit behaviour may provide a dimension to the definition of success. The emerging conceptual model needs to capture this element if it is appropriate for a particular organisation as a component of organisational climate.

10.4.2.2 Tacit success

Tacit success describes a stage in a system implementation when people within an organisation display behaviours that are consistent with the successful implementation of the information system in question. If the organisation’s senior management tacitly displays positive behaviour towards the implementation, e.g., behaviours indicating the implementation stage to be complete, this can be a powerful organisational message.

Employees are very good at reading the behavioural cues of senior managers and interpreting tacit behaviour, and if organisational leaders send a message through their behaviour that they expect employees to ‘just get on with the new system’ then this message will be picked up. Subtle behavioural cues such as acceptance of the project team recommendations without a formal review, removing the implementation update as a standing item on site management review meetings and, commenting to employees how well the implementation has gone instead of asking if they are having any difficulties were read within the organisation as signs that the management perceived the implementation was successful, and that it was time to move on.

In a situation when a system has been successfully implemented, it is beneficial to have organisational leaders behaving in such a way that employees are motivated to move mentally into the user role rather than remaining in a learning role with respect to the new system. If the system has not been successfully implemented, and in fact users are struggling to deliver what was expected, tacit success can be a negative influence.
When senior business leaders behave in such a way that employees are in no doubt that the business leaders believe that the system is a success, this can prevent further rational analysis from within the organisation, and prevent the focus required to complete the implementation process. Further, the users are now struggling with a ‘successfully implemented’ system, and inferences made about any shortcomings in their job performance may be interpreted as employee issues, and not linked to unresolved system related issues.

There were a number of obvious behaviours of the project team and senior management consistent with their acceptance of implementation success prior to, and within hours of the system going live. The following email message was sent out to all employees via email at approximately 6am on the morning that the business moved onto the new system:

“Congratulations to the project team and the many business people who have worked tirelessly over a long period of time to deliver this project successfully, on time and on budget. This project marks a great milestone in the organisation where we now have all parts of our business running the same system.”

Business Leader

This message in fact reached most employees well before they started using the newly implemented system, but it left them in no doubt what the Senior Manager thought of the implementation. The Project Manager sent a similarly positive message to the project team soon after the first email:

“The fact that we have now gone live and have users working on the new system is a great achievement, which is due to the long hours and dedicated effort that all of you have put into the project. Thank you for your commitment, hard work and positive attitude throughout. You should rightly feel very proud of your achievements.”

Project Manager

The following communication was sent from one of the Site Managers soon after the preceding two messages:

“Congratulations to you and the team on a successful implementation! Well done, it is no doubt a reflection of the great attention to detail you and the team have been delivering. The quality of such work is often the defining factor in such events.”

Site Manager
These communications, from different levels of the organisation’s management, left employees in no doubt that that the new system was seen as a success. Significantly, none of the three business leaders who had sent the messages above were users of the systems in question, although they would receive numerous reports and summaries based upon information from the new system.

One of the most powerful behaviours indicating the tacit success of the new implementation was the way in which managers talked to users of the new system. When a manager made a statement to a user such as, “It looks like the new system is running well …” employees were not inclined to offer a response that indicated a contrary opinion. It appeared that employees felt compelled to answer in a way that supported the manager’s belief that the system was going well.

This behaviour is perhaps an example of motivated responding where employees received unconscious reinforcement from their manager by demonstrating that he or she was correct in their assertion, but the response further reinforced the manager’s belief that all was well. It was also reported that managers did not seek comments on the new system from those employees who would likely ‘gripe’ about it; perhaps the past behaviour of certain employees had conditioned the manager not to seek their opinion.

Indications were that there was no such organisational norm preventing users from reporting issues to members of the project team, including the researcher, who took the time to ask users how they were coping. A number of post-implementation issues were in fact being experienced by users, and were demonstrated and described by them often at their workstations, perhaps in contradiction to the behaviours of some of the management.

Post-implementation issues now became issues to be worked through, given that the new system was being treated as a successful implementation. Speaking to employees at the study soon after implementation revealed numerous issues, and a high level of frustration with the new system. One employee, whose interaction with MFHRIS should have been a minor part of their job reflected:
“Someone sent me an email congratulating everyone on the success of the new system. Not for me.”

There were many comments from employees in the weeks after implementation finding changes in their day-to-day jobs and being unsure of what to do, for example:

“Is the ordering of chemical ABC through the new system now or is this done via a phone call??”
Production employee

Comments such as these were consistent with the organisation being at the start of a learning curve with the new system, and yet there were some behaviours within the organisation that indicated that the implementation had been a success. The effect of this was that post-implementation issues were not highly prioritised, and so took some time to deal with.

The organisation has many issues that senior management deal with on a day-to-day basis, and the observation that they now considered MFHRIS to be a success meant that as an organisational priority to be dealt with it dropped down the priority list. This made it difficult to resource the necessary post-implementation efforts required, so that some eight weeks after implementation there were still numerous problems being experienced.

None of the issues raised by users were deemed fatal to the implementation, but the resources required to address them were prematurely removed. The observation was that the organisation tacitly ‘moved on’ as if the user’s issues were in reality part of the expected adoption phase of this project, when in fact there was still much work to be done.

There were instances of users working around what they perceived to be system problems, and coming up with local fixes such as only running a ‘daily’ summary once a week to make the workload less. This behaviour was considered evidence for users adapting the system to their requirements, rather than strictly adopting the new IS as it was intended.

These local modifications were in opposition to the project aim of having one common suite of systems throughout the organisation, with people doing things one way. Despite these instances, the business signed off against the
criteria “Standardisation of the process for workflow across the business” one month after the Go Live date.

10.4.2.3 Conclusion

The observations of behaviours that indicate the *tacit success* of an information system in an organisation suggest both an opportunity and a potential problem for management. As a means of sending a clear message to the wider organisation that the formal implementation has finished and that employees are expected to adopt the new system, the behaviours of managers are one powerful way of sending this message. Such behaviours are commonly used effectively within the organisation to reinforce safety behaviours. Managers also need to be aware of the negative consequences of such behaviours.

In the post-adoptive period of an implementation, employees will need organisational support to learn the new system and adapt to the changes associated with the new system. It is during this period that the formal support mechanisms associated with the implementation project are likely to be removed.

If the organisational management does not acknowledge and respond to the needs of employees during the post-adoption period, implementation success can be threatened. By demonstrating behaviours consistent with *tacit success*, management can inadvertently send the wrong message to employees and through this tacit behaviour inhibit the adoption process.

For IS researchers looking into implementation outcomes, and for considerations of definitions of success as addressed in research question six, the concept of tacit success is important. It is likely that researchers need to look broadly into organisational behaviours in order to capture this, and possibly other, facets of implementation success.

Months after the Go Live week, many users were still struggling with MFHRIS, even though many parts of the organisation appeared to have moved on. It was not clear to the struggling users whether or not this was the new norm, or were they still moving towards success.
10.4.3 A temporary success or the beginnings of failure?

Silva and Blackhouse (1997) observed that one measure of the effectiveness of a new system was how well the system had integrated and become part of the organisational furniture. It may be that, if after a period of attempted adoption and adaptation, the system does not become part of the furniture, then this could be the start of the failure of the system.

During the review eighteen months after Go Live reported in Section 9.8, it was revealed that some parts of the Australian Business #1 who had implemented MFHRIS before this study, had already replaced some of the maintenance modules with other packages. This seemed to be very much at odds with the organisation’s stated desire to achieve the status of one business, using one system and doing things one way.

It was explained that MFHRIS did not have the functionality required by the engineers who had selected the next “new” system. From the perspective of a participant observer, it appeared that the potential benefits of MFHRIS had not been realised due to the factors discussed previously. The potential of the next “new” system was being compared with the reality of MFHRIS without analysis of why MFHRIS had not delivered its potential gains. Without such analysis, the next system might suffer a similar fate.

10.5 Factors to be explained by a conceptual model

The overall process of implementation could be perceived from one perspective as an introduction of a significant innovation into the organisation leading to major change. This perspective would support the use of Roger’s (1995) DOI model as a suitable template with which to view the implementation, albeit this model does not describe the prolonged stages of adoption and adaptation.

The success of the implementation appeared to depend on factors associated with organisational climate and change, as described by Neel’s (1997) factors that facilitate change within organisations, and the observation of tacit success is a component of this perspective. There was little evidence that individual measures such as computer self-efficacy played important roles in the
overall success of this implementation, but they are likely to be useful in explaining variance in factors such as system usage within the overall implementation phenomenon.

Following on from observations made throughout the longitudinal study, a number of factors considered important for the conceptual model of the implementation of an IS within an organisational context have emerged. These emergent factors are shown in Table 10.4.

Table 10.4 Factors to be included in a conceptual model of IS implementation

<table>
<thead>
<tr>
<th>Factor</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational climate</td>
<td>The organisational climate that prevails within an organisation at the time of the IS implementation produces a set of organisational constraints. The implementation takes place within these constraints.</td>
</tr>
<tr>
<td>The need for guidance</td>
<td>Consistent with Neel's (1997) factors that encourage change within an organisation, there needs to be a consistent source of guidance to ensure that the implementation moves towards the desired outcome.</td>
</tr>
<tr>
<td>Implementation as a multi-faceted phenomenon</td>
<td>Implementation means different things to different groups within the organisation. In particular, the implementation Project Team needs to deliver strategies that will facilitate the required involvement of each of these different organisational groups.</td>
</tr>
<tr>
<td>Multi-dimensional nature of success</td>
<td>Consistent with the notion that implementation is a multi-faceted phenomenon, the concept of success reflects this as a multidimensional measure. In particular, a measure of success should reflect how the IS delivers the required outcomes or ‘fits’ into the organisation.</td>
</tr>
</tbody>
</table>

One aspect that could have made a difference in the implementation outcome at the study site was a level of guidance for the implementation from start until finish. This guidance could have been provided by the business, by the project, by the site management or by an appointed person with organisational knowledge and permission. It is noted that the project team did request such a resource from the study site management, but the person was never appointed.
A necessary attribute for guidance, whether through a group or by an individual, is that the implementation be understood holistically, and it is the intention that the proposed conceptual model to be described in Chapter 11 could provide holistic understanding for those without complete knowledge of the implementation process. The ideal orientation for the person(s) involved in such a guidance activity would be from both the perspective of an organisational practitioner and also from the perspective of one able to integrate the vast body of IS research into the organisational context. A template for this orientation, the scientist-practitioner model, exists within the field of psychology and is discussed in Section 13.4.2.

Organisational climate, and in some instances behaviours driven through organisational culture, will likely dictate the context with which the implementation activities must occur. Whilst it is unlikely that an implementation project team can change organisational culture, they should ensure that they work with the organisation to establish as supportive a climate as possible for the implementation. Preliminary work may need to occur to identify the relevant organisational constraints that apply in a specific instance.

Neel’s (1997) factors of importance, visibility, motivation and involvement apply to the implementation of an IS in the same way that they apply to organisational change in general. The organisation’s management has an important role to play in these factors, especially in emphasising the importance and ensuring that grass roots involvement occurs. These factors highlight the need for the implementation to be guided towards some predetermined place within the organisational context.

Finally, it must be recognised that the implementation of an IS is necessarily a multi-faceted phenomenon, and that there will be different perspectives taken by different groups within an organisation, and that these different perspectives will likely have different measures of what implementation success means.

10.6 Conclusion

The key learnings from this interpretation are summarised in Table 10.5. The implementation phases of installation, adoption and adaptation were seen
as distinct phases. Adaptation resembles Jasperson et al.’s (2005) post-adoption phases in the way that users try to adapt the IS to their specific requirements.

*Table 10.5 Key learnings from the study*

<table>
<thead>
<tr>
<th>Learning</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management novelty</td>
<td>The IS implementation is only 'special' to organisational management for a certain time.</td>
</tr>
<tr>
<td>Adoption</td>
<td>In the early stages of implementation, the organisation needs to focus upon using the new system as presented. The focus is more upon the system than the organisational outcomes in the period of adoption.</td>
</tr>
<tr>
<td>Adaptation</td>
<td>System users will move from adopting the new system, to adapting it to their particular situation. This adaptation may be at odds with the initial organisational vision for the IS. In this stage the focus is more upon the user and organisational outcomes than on the system, and will likely be resourced from within work groups rather than as a planned implementation activity.</td>
</tr>
<tr>
<td>Installation</td>
<td>Unless the implementation project team is made up of potential organisational users, the project team focus will likely be upon installation of the new system, and this installation can fall short of both the adoption and adaptation stages.</td>
</tr>
<tr>
<td>Implementation success</td>
<td>The implementation phenomenon is multi-faceted, and there are differing notions of success depending upon which facet is being considered.</td>
</tr>
<tr>
<td>Organisational climate</td>
<td>Organisational management needs to actively work on establishing a supportive climate for IS implementation. Success has been achieved in the area of OH&amp;S within organisations using this approach.</td>
</tr>
<tr>
<td>Organisational culture</td>
<td>There may be aspects of the organisation’s culture that support or detract from the implementation effort. Whilst it is unlikely that culture can be changed in the short term, awareness of cultural aspects will enable the positive ones to be built upon, and strategies to overcome the negative ones can be put in place.</td>
</tr>
</tbody>
</table>

Note 1: These items are considered a novel contribution to the understanding of IS implementation
These key learnings have been used to formulate a conceptual model for behaviour and implementation success within organisations. Some of the study learnings such as the delineation between adoption and adaptation would likely not have been observed in a shorter duration study. Further learnings may be possible through longer reviews, but this was not possible within the time frame of this study.

The implementation of an IS within an organisational context appears to contain elements of both organisational change and of technology. If this is true in general, then successful implementation needs to cover aspects from both of these perspectives. An implementation driven from an IT perspective will likely fail due to elements of organisational change, and conversely, an implementation without the necessary technical rigour associated with complex IS might fail to deliver the necessary organisational benefits.

User issues could initiate from both of these perspectives. Without organisational support, motivation and context, users may not be in a position to take up the IS, and there were certainly elements of this observed during the implementation at the study site. An IS which is not implemented properly from a technical perspective can fail despite the efforts of the organisational members. Examples of this type of outcome were described by organisational members at the study site for previous IS implementations.

Based upon the narrative of the implementation, and the interpretation offered in this chapter, a conceptual model for behaviour and implementation success has been developed, and is described in Chapter 11. The conceptual model is evaluated in terms of its ability to explain previous studies in the area of IS implementation in Chapter 12.
Chapter 11

The Conceptual Model

Traditional organisational change research has been predominantly concerned with social and human issues. Nevertheless, due to the ever-increasing complexity of organisations and their IT-systems, today good information on the internal structures are indispensable for the required swift changes. Wolff & Frank, 2005.

11.1 Introduction

The purpose of this chapter is to describe a conceptual model for behaviour and implementation success associated with IS within an organisational context. The model is based upon the overall findings from this study, but formulated to be applicable to IS implementation within organisations in general. The applicability of the conceptual model in a general context will be explored in Chapter 12 where the model is evaluated as a tool for practitioners, and is used to frame previous research in the area of IS implementation.

Essentially the conceptual model describes a multi-faceted shape being guided within the constraints of a space towards a pre-determined place within that space which represents organisational fit. These components derive from the elements listed in Table 10.4. A description of the generic stages through which the implementation proceeds, based upon the study outcomes and Roger’s (1995) DOI stages supplements the conceptual model.

The multi-faceted shape represents the implementation phenomena, with the facets indicating perspectives of the implementation. These differing perspectives, described in Section 9.2, include those of the project team, the site management, the organisational management, the users and the participant observer. The notion of a shape indicates that the implementation can be described as an entity in itself, although it will be argued that deep understanding of the implementation requires knowledge of the context within which the implementation occurs. In this conceptualisation, the shape can change according to the organisational context.
Guidance describes how the IS implementation occurs within an organisation according to the organisation’s implementation plan. There will be project specific aspects of the guidance such as milestones and budgets and in a broader context organisational deliverables to be achieved. Guidance also includes the notion of a place in time in that IS implementations are not static phenomena.

The constrained space represents organisation specific context captured in the notion of organisational climate. Organisations, or parts of organisations, are likely to have specific climates within which the new IS must be located. Perhaps there has been a recent history of implementation failure, or the IS might be the first major systems project that the organisation has undertaken. Implementation contractors bring experience from other projects into the organisation, but success will only be achieved within the constraints of this organisation.

The pre-determined place, towards which the implementation is being guided, refers to organisational fit and captures the notion of success or failure. In order for the implementation to be considered successful, it must fulfil predetermined organisational requirements by entering the appropriate organisational “place” within the broader organisational context. This concept is shown diagrammatically in Figure 11.1.

![Diagram showing organisational fit and guidance factors](image)

**Figure 11.1 Conceptual model**

In order to achieve this organisational fit, user behaviours which include elements of adoption, whereby the organisational users adopt the new IS, and also adaptation where the organisational users make the new IS work in their
particular individual contexts (Jasperson et al., 2005), must be realised. Further, achieving organisational fit represents that the IS has been placed in the best possible position to deliver the required organisational benefits, as defined by the various measures of implementation success (Garrity & Saunders, 1998a). The complete implementation process was seen to move through a number of stages.

11.1.1 Stages of the implementation

The implementation of IS into an organisation, like that of an innovation, moves through phases such as those described by Roger’s (1995) DOI model. Organisations themselves are not static, and so the implementation needs to be considered against this changing context, but nevertheless conceptual stages can be identified. Building upon Roger’s (1995) DOI, which provided the initial template for the study’s participant observations, a new set of generic stages for IS implementation within organisations has been proposed. These stages are shown in Figure 11.2.

Figure 11.2 Generic stages for IS implementation within organisations.

In the organisational decision stage the organisation commits to the IS and higher-level planning activities and project related activities such as the formation of project teams occurs. In the employee involvement stage the pre-implementation activities such as training and system testing, which involve the organisational members and potential system users, occur. The implementation stage covers the short period in which the new system becomes operational, but when the support team are still actively assisting users. In the adoption
stage the organisation attempts to use the IS as it has been presented, whilst in the adaptation stage, the organisation makes the IS work for the organisation, often through modifications and local fixes.

11.2 Details of the conceptual model CMISIO

The longitudinal study was interpreted in Chapter 10. The following discussion elaborates on the factors listed in Table 10.4 and forms the detail for the conceptual model shown in Figure 11.1. The acronym CMISIO (Conceptual Model for IS Implementation within Organisations) will be used to refer to the conceptual model proposed.

11.2.1 Organisational constraints

For any deliberate change within an organisation, there will be constraints within which the change must be enacted, and this will also be true for the implementation of IS within an organisation. The overriding constraint is the current organisational climate, best described as ‘the way we do things around here’. Implementation teams must adopt behaviours to enable them to be successful within the prevailing climate, or if possible seek to modify aspects of the climate to suit the implementation strategy.

Has the organisation shown tendencies to be change averse, or have there been numerous recent changes that might have depleted the organisation’s energy for change? Will the local management be supportive of the implementation activities? Are the potential users of the IS competent users of technology, and are they in fact competent in the tasks that the new system will be doing? Does the organisation value efficiency deliverables, e.g., timeliness and cost, over effectiveness deliverables, e.g., delivering the organisations end requirements.

The answers to such questions will help the project team to target the implementation strategy to suit the local context. Effort will be required to guide the implementation throughout the stages of the implementation, bearing in mind that the guidance effort may be required for a much longer time period than previous models would indicate.
11.2.2 Guidance factors

Organisations exist to carry out some defined function or set of functions. The study organisation was a manufacturing organisation, and as such the implementation of the MFHRIS included a set of activities that were outside of the core organisational activities. It is likely that IS implementations will receive organisational focus for only some brief period of time, and so it is important to ensure that the implementation receives, and continues to receive focus and guidance for whatever time it takes to achieve completion of all of the implementation activities.

Neel’s (1997) factors that encourage change offer a working model for the focus that implementation requires in order to be adopted and subsequently for the users to adapt the IS to their needs. It was seen in this study that when these encouragement factors were prematurely withdrawn, before either adoption or adaptation in this case, then the implementation could lose momentum and become a difficult and protracted phenomenon.

Organisational guidance for the duration of the implementation, whether by an individual or though some group charged with such activities, is needed to ensure that the IS will be fully implemented. In the study organisation, the local IS group could have provided such guidance, but the organisation moved the onus for MFHRIS to a corporate function removed from the sites in which the implementation was being enacted, and this proved to be an unsatisfactory working relationship.

11.2.3 Implementation: a multi-faceted phenomenon

The facets of the multi-faceted phenomenon are divided into two groupings. Common facets represent the perspectives of an IS implementation that would likely be present in any implementation within an organisation. Situational facets would be context specific, and not necessarily present in all implementations.

The common facets of the implementation result from the different perspectives of groups likely associated with implementation within a typical organisation. These groups, and hence these perspectives, are likely to be present in most implementations, and are shown in Table 11.1. Each of these
groups were encountered in the study, although the local IS group within the study organisation did not play a key role in the outcome in this instance.

The organisational management perspective should encompass a view of all of the other perspectives, as should the project leader, but there was evidence that this did not necessarily occur in this study. Much later during the study when serious user issues began to be reflected in information errors that did impact upon the management, the user perspective began to get some focus, as observed in the situation appraisal described in Section 9.8.

Table 11.1 Common perspectives on the implementation

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project team</td>
<td>The project team typically looks after the ‘doing’ part of the implementation: testing, training, user support during implementation and forms the bridge between the system vendor and the organisation.</td>
</tr>
<tr>
<td>Organisation</td>
<td>The organisation is investing monetary capital to get a system that will enhance its core operations, typically by providing timely and accurate information. Those who make the decisions may not be system users, and may not be in a position to evaluate ultimate success.</td>
</tr>
<tr>
<td>Local management</td>
<td>The project team will operate within the organisational unit controlled by this group. This group is key in setting the current organisational climate in which the implementation will take place, and as such may be either supportive or detrimental to implementation success. Potential users report to this group.</td>
</tr>
<tr>
<td>Local IS group</td>
<td>Most organisations have an IS group responsible for the day-to-day running of IT enabled systems within the broader organisation. Typically these groups will take ownership of the implementation once it has become an established system.</td>
</tr>
<tr>
<td>Potential users</td>
<td>Those organisational members who will ultimately use the IS, and through their usage deliver the organisational gains. There may be no direct gains for this group, and the IS might actually cost this group in some way.</td>
</tr>
</tbody>
</table>

There may also be situations in smaller enterprises where the organisation and the local management are in fact the same group, as for example in Love, Irani, Standing, Lin and Burn’s (2005) study of small to medium size enterprises. Such a configuration would necessarily lead to a wider perspective, and the geography of smaller sites might mean that management are in a better position, literally, to observe issues that are
impacting on both the system users and the output of the IS. There were few issues from the small sites in this case study.

Complimenting the common perspectives of the implementation phenomenon are the *situational facets*. There will likely be a set of context specific facets, the situational facets, that may apply only to a particular implementation, or to implementations within a certain organisation or type of organisation. Examples from previous studies are used to illustrate these facets, and are summarised in Table 11.2.

*Table 11.2 Examples of situation specific perspectives on the implementation*

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>End customers of the organisation</td>
<td>There have been instances where the introduction of IS within an organisation has negatively impacted the organisation's end customers.</td>
</tr>
<tr>
<td>Suppliers to the organisation</td>
<td>In some circumstances, such as in this study with respect to the paint vendors, where the introduction of IS can negatively impact the ability of the organisation's suppliers to supply the organisation.</td>
</tr>
<tr>
<td>Shareholders</td>
<td>For large organisations, the senior organisation's management answer ultimately to shareholders through the board, and there is not always infinite freedom to persist with problematic systems.</td>
</tr>
<tr>
<td>Unions or 3rd party employee representative organisations</td>
<td>The introduction of IS within organisations can sometimes lead to the reduction of employee numbers if efficiencies are gained through the use of the IS. Where employees are represented by a 3rd party organisation such as a union, there will likely be a different perspective from that group that will need to be considered.</td>
</tr>
</tbody>
</table>

There are situations where the evaluation of these situation specific groups is key to how the organisation perceives the implementation, and to whether or not the implementation is perceived as a success. Myers' (1994) description of the failed centralised payroll system implemented by the New Zealand Education Department tells how the government eventually scrapped the system some six months after implementation due to ongoing problems experienced by the end customers, the teachers. Even though the Education Department’s Director of Management Services maintained that the system per se was not the problem, and that inexperienced staff was the cause of the problems, these other groups made the decision to abort the system.
Lin’s (2008) study of successful virtual communities identified the members’ perspectives of the system’s social factors such as trust and social usefulness were key to system success. This reflects the finding that, in the broader social community into which the system was implemented, satisfaction and a sense of belonging were determinants of loyalty in that particular community.

Hsu and Lu (2004) showed that from the perspective of the members of on-line gaming communities, it was the combination of social influence and flow experience that determined whether or not the members considered a system to be successful. The concept of flow in this context refers to the observation that when members are immersed in the gaming experience, the so-called flow state, their awareness is narrowed to the experience itself.

In summary, in some particular contexts, there are likely to be specific perspectives that can supplement or even dominate other system perspectives. These context specific perspectives need to be considered in the overall implementation strategy, and would contribute to how well the IS achieved ‘fit’ within the organisation. This organisational fit represents implementation success.

11.2.4 Organisational fit: measures of success

In terms of the CMISIO, overall success is predicted to result from guiding the multi-faceted implementation phenomenon into the pre-determined organisational ‘place’ to achieve the necessary organisational fit. The attributes of the pre-determined place, or organisational fit, are the summation of what have been referred to previously as success measures. This directly addresses research question six, and supports the notion that IS success can depend upon the observer’s perspective. This notion of overall success is at odds with studies that focus upon only one facet of success, such as usage frequency.

Overall success then is the result of how well the phenomenon has been guided into this pre-determined place, or, how well the implementation addresses the suite of success measures. One measure of the effectiveness of the system will be how well it has become part of the organisational “furniture”,

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or indeed, a component of ‘how we now do things around here’ (Silva & Blackhouse, 1997).

The concept of success is seen to be very much one of perspective. Similarly, the notion of implementation failure may also be one of perspective. It may be that from one perspective the implementation has not achieved organisational fit, for example, the struggling maintenance users, but from another has satisfied the requirements for a particular definition of fit, for example, consolidated maintenance costs for the finance team.

The multi-dimensional nature of IS success measures was introduced in Section 5.3.1 with Garrity and Saunders’ (1998a) IS success measures listed in Table 5.1. Following on from this study, in addition to Garrity and Saunders’ three levels of success, i.e., firm or organisational, function or process and lastly individual (user) levels, the levels of project team and local management can now be added. These success measures, the dimensions of organisational fit, are listed in Table 11.3.

Table 11.3 Measures of success

<table>
<thead>
<tr>
<th>Measure</th>
<th>Possible dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational</td>
<td>Market share, profit, ROI</td>
</tr>
<tr>
<td></td>
<td>Increased revenue</td>
</tr>
<tr>
<td></td>
<td>Efficiency relative to competitors</td>
</tr>
<tr>
<td></td>
<td>Realisation of higher-level strategy</td>
</tr>
<tr>
<td>Process</td>
<td>Operating efficiency</td>
</tr>
<tr>
<td></td>
<td>Reduced cycle times</td>
</tr>
<tr>
<td></td>
<td>Reduced costs</td>
</tr>
<tr>
<td></td>
<td>Integrated processes</td>
</tr>
<tr>
<td>Individual</td>
<td>User satisfaction</td>
</tr>
<tr>
<td></td>
<td>Utility of the system on the job</td>
</tr>
<tr>
<td>Project team</td>
<td>Milestones met</td>
</tr>
<tr>
<td></td>
<td>Within budget</td>
</tr>
<tr>
<td></td>
<td>Implementation date achieved</td>
</tr>
<tr>
<td>Local management</td>
<td>Minimised disruption to operations</td>
</tr>
<tr>
<td></td>
<td>System integrated into day-to-day operations</td>
</tr>
</tbody>
</table>

Note 1: after Garrity & Saunders, 1998a.  
Note 2: study derived.
In this study, from both the organisational and project team perspectives the implementation was deemed to be successful, albeit with little evidence of objective evaluation at the organisational level. From the individual and local management perspectives, the implementation was seen to be unsatisfactory in that it presented usage difficulties for the maintenance users, and disrupted the day-to-day operations that were controlled by the local management team.

11.2.5 Sub-components of the CMISIO model

The components of the CMISIO have been conceptualised to subsume a number of sub-components and behaviours that were encountered in the longitudinal study, or have been described by previous researchers. These sub-components are shown in Table 11.4. The choice of the groupings has been made primarily to separate, where possible, organisation general factors from IS implementation specific factors. Following this logic, the components of organisational constraints, guidance factors and organisational fit could reasonably be expected to be important in introducing any significant change into an organisation.

Similarly, the varied organisational perspectives of the implementation would likely be seen for many organisational phenomena. There were no major reasons seen in this study why IS implementation should not be considered as major organisational change.

11.3 Limitations of the proposed model

In common with findings from longitudinal studies of a qualitative design, the model described in this chapter has been influenced strongly by observations from one implementation within one part of a larger organisation. The observations necessarily reflect the orientation of the researcher despite best efforts to describe the phenomenon as it occurs.

It was anticipated that behavioural models of both individual and group behaviour, and in particular the individual differences of the users described in Chapter 3, would be significant factors in explaining the IS implementation outcome. The CMISIO emphasises the role of organisational dynamics as
strong indicators of implementation outcome over and above the individual differences of the organisational members.

Table 11.4 Sub-components of the CMISIO

<table>
<thead>
<tr>
<th>Component</th>
<th>Sub-component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational constraints</td>
<td>Climate and culture</td>
</tr>
<tr>
<td></td>
<td>Management support</td>
</tr>
<tr>
<td></td>
<td>Existing systems and user ability</td>
</tr>
<tr>
<td></td>
<td>Change management capability</td>
</tr>
<tr>
<td></td>
<td>IS strategy</td>
</tr>
<tr>
<td>Guidance factors</td>
<td>Project champion</td>
</tr>
<tr>
<td></td>
<td>IS plan</td>
</tr>
<tr>
<td></td>
<td>Factors that encourage change</td>
</tr>
<tr>
<td></td>
<td>• Importance</td>
</tr>
<tr>
<td></td>
<td>• Visibility</td>
</tr>
<tr>
<td></td>
<td>• Motivation</td>
</tr>
<tr>
<td></td>
<td>• Creativity &amp; ownership</td>
</tr>
<tr>
<td>Implementation phenomenon</td>
<td>The project:</td>
</tr>
<tr>
<td></td>
<td>• Project team</td>
</tr>
<tr>
<td></td>
<td>• Budget</td>
</tr>
<tr>
<td></td>
<td>• Timings</td>
</tr>
<tr>
<td></td>
<td>• Training</td>
</tr>
<tr>
<td></td>
<td>• Communication</td>
</tr>
<tr>
<td>View of the researcher</td>
<td></td>
</tr>
<tr>
<td>Organisational view</td>
<td></td>
</tr>
<tr>
<td>Local management view</td>
<td></td>
</tr>
<tr>
<td>Local IS group view</td>
<td></td>
</tr>
<tr>
<td>Users</td>
<td></td>
</tr>
<tr>
<td>Situation specific facets</td>
<td></td>
</tr>
<tr>
<td>Organisational fit</td>
<td>How the new IS integrates with existing systems</td>
</tr>
<tr>
<td></td>
<td>Adoption</td>
</tr>
<tr>
<td></td>
<td>Adaptation</td>
</tr>
<tr>
<td>Measures of success</td>
<td>• Organisational</td>
</tr>
<tr>
<td></td>
<td>• Process</td>
</tr>
<tr>
<td></td>
<td>• Individual</td>
</tr>
<tr>
<td></td>
<td>• Project team</td>
</tr>
<tr>
<td></td>
<td>• Local management</td>
</tr>
</tbody>
</table>

The CMISIO was developed as a conceptual model at the level of explanation in line with the classification of IS theory outlined in Section 5.4 (Gregor, 2006). In order to present theory capable of making predictions with testable propositions, it is likely necessary to reduce the complexity of the
dependent variable from the CMISIO’s broad focus of behaviour and implementation success to a subset of the outcome such as usage frequency. Focussing down to this level is an area where individual difference studies are likely to be helpful, for example in explaining the variance in usage frequency of a system by individuals within a department.

The CMISIO is presented as a conceptual model for both researchers and practitioners. At this stage there is not a level of detail such that causal links can be verified to the extent that will lead to testable hypotheses. Further work is required to verify the model as a useful general model for IS implementation within organisations. Whilst causal links are not verified, there are some likely linkages to be explored.

The CMISIO guidance factors need to be focussed on moving the implementation towards a successful conclusion through the climate described by the organisational constraints. Each significant group within the organisation will be represented by a facet of the implementation phenomenon. Unique to the CMISIO model, some of the implementation facets will represent groups not directly associated with the IS under study. The facets of the implementation in a particular context will dictate the combination of measures that make up the multi-dimensional measure of success. Success can include factors such as tacit success behaviour that can be observed, but not easily quantified.

**11.4 Conclusions**

A conceptual model with which to understand behaviour and implementation success associated with IS in an organisational context, the CMISIO, has been developed. The intent of the CMISIO is for both research and practice, and it is not meant to be just a theoretical model.

The essential elements of the model, i.e., *organisational constraints*, *guidance factors*, the *multi-faceted implementation phenomenon* and success through *organisational placement* have been derived from observations made during a longitudinal study of an IS implementation in an Australian manufacturing organisation. Along with the essential elements, an indicative sequence of stages comprising *organisational decision*, *employee involvement*, *implementation*, *adoption* and *adaptation* has been proposed.
The CMISIO and the associated indicative stages should be of practical use in a number of ways. For practitioners working with IS in organisations, the CMISIO and the associated indicative stages will provide a roadmap when beginning to focus on IS within the broader organisational context. In particular, it is possible that implementation project teams that focus upon carrying out an efficient and effective IS installation may do so in such a way that will not lead to a successful implementation in the long run. The important stages of adoption and adaptation can take place after the project scope has ended.

For organisations, there is a need to understand that successful IS implementation involves more than can be delivered by a project team in an organisational context. Neel’s (1997) factors that encourage change should be adopted by organisational management for IS implementation in the same way that they might be for any other significant organisational change. This supports the study organisation’s experience with OH&S systems, and relates to both Jaques’ (1998) notion of a supportive organisational structure, and to Reason’s (2000) description of reliable organisations.

Reason’s (2000) concept of reliable organisations discussed in Section 4.2.3 described how errors encountered in the safety systems within such organisations were attributed to “broader, organisational, system-related issues” (p. 768) rather than people issues. This learning fits the observations made in this study, and forms a component of the requirement for organisations to support system implementations at an organisational level.

According to the CMISIO, there will be a set of organisational constraints within which the implementation will proceed. These constraints are described by the operating organisational climate, and influenced by the underlying organisational culture. A climate survey prior to the project commencement is recommended to define these constraints. Management working with the project team needs to ensure a supportive climate for the implementation in situations where the climate is found to be initially unsupportive.

Implementation takes time, and the project needs to be resourced through the Go Live, adoption and adaptation phases. Whilst it may be impractical to keep a dedicated project team in place for the months or even
years required, the organisation needs to be mindful of the needs of the IS users throughout this period.

Guidance, in various forms such as senior management sponsorship, project leader, local Key Users and ongoing support is needed to steer the implementation towards the intended organisational fit. The notion of organisational fit captures the measures of success, and where possible, these measures should be articulated in a way that they can be reported at the appropriate time. Measurement allows feedback so that guidance can be focussed where necessary, especially during the post- adoption period, when the project team likely withdraws.

Finally, the model highlights that implementation is a multi-faceted phenomenon, and that numerous perspectives are to be expected, and are seen to be valid from the position of various organisational observers. Implementation from both the practitioner and research perspective requires an appreciation of these various facets.

The model’s validity will be explored in Chapter 12 by revisiting previous work in the area of IS implementation and addressing questions raised in those studies through the perspective of the CMISIO. Utility will be established if the CMISIO provides guidance for both practitioners in the field of IS implementation, for organisations considering IS investment and for researchers working with IS within organisations. Following this analysis, the study research questions are addressed in light of the longitudinal study outcomes, and through reference to the CMISIO model in Chapter 13.
Chapter 12

The conceptual model as explanation

A conceptual model describes essential features of a phenomenon and identifies the principle processes taking place.
ZAMG, 2008.

12.1 Introduction

In Chapter 11 a conceptual model was outlined to describe the implementation of IS within an organisational context. In order to demonstrate the utility of the conceptual model, previous studies addressing aspects of IS implementation and outcome, in particular within an organisational context, will be revisited and reinterpreted through the perspective of this model. The purpose of this chapter is to report on these reinterpretations.

The CMISIO, as described in Chapter 11, subsumes a number of factors addressed separately in previous studies and suggests that overall implementation outcome is a result of the sum of these factors. Examples of the factors subsumed include Ngai et al.’s (2008) critical success factors, Jasperson et al.’s (2005) post adoptive behaviours, explanations of system usage frequency such as Davis’ (1986) TAM, and widely reported elements of organisational climate and culture. These studies have been selected on the basis that they are widely cited, and that they capture the breadth of factors that have been included in previous studies.

Some of the study research questions arose from unresolved findings and research challenges posed by previous researchers, in particular the recent studies of Venkatesh et al. (2003) and Jasperson et al. (2005) who looked at user acceptance and post-adoptive behaviour respectively. Aspects of these studies will be analysed through the perspective of the CMISIO.

12.2 Implementation success and failure

The CMISIO describes implementation success as the aggregate of a number of ‘successes’ drawn from perspectives that exist with a particular organisation at a particular point in time. For success, the aggregate of
measures will describe a system that fits with the organisation and, as described by Silva and Blackhouse (1997), has become part of the organisational furniture. A system that does not achieve organisational fit will eventually fail either through lack of use or through replacement by another system. Considered in this way, organisational fit would be necessary for implementation success, but as has been discussed previously, failure to provide long-term organisational support for adaptation as the organisational context changes could still lead to implementation failure.

The CMISIO identifies the need to support an IS organisationally throughout the life of the system. One of the reasons given by the organisation in this study for the need to replace the legacy systems was that vendors no longer supported them. A similar situation for organisational support is suggested.

Failure can result from obvious causes such as the wrong choice of a system or the failure to carry out designated implementation tasks correctly as described in Section 5.3. Sometimes the chosen IS simply cannot do what it was purported to do. Such cause and effect types of implementation failures should be readily recognised through post-implementation reviews, or in the case of major failures through post-mortem analysis.

The more subtle type of failure predicted by the CMISIO relates to an eventual lack of organisational fit, where, despite the attempts of organisational members to adopt and adapt the new IS, the effort is deemed to be more than the organisational benefit. This realisation may take months or years, and the desire to look for new systems by groups within an organisation can be a clue to the failure occurring. This failure through eventual lack of organisational fit is a contribution to the IS research area. A number of studies related to the success and failure of IS within organisations are now considered from the perspective of the conceptual model.

12.2.1 Critical success factors

Ngai et al. (2008) reviewed IS studies across ten different countries and regions to identify the factors considered critical for the adoption of ERP. Eighteen main factors were identified as critical, with top management support
and training and education the most frequently cited factors. The factors are listed in Table 12.1 and grouped according to the CMISIO components.

*Table 12.1 Success factors* \(^{\text{Note 1}}\) and CMISIO components

<table>
<thead>
<tr>
<th>CMISIO component</th>
<th>Critical success factor (^{\text{Note 1}})</th>
</tr>
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<tbody>
<tr>
<td>Organisational constraints</td>
<td>Appropriate business and legacy systems</td>
</tr>
<tr>
<td>“Climate &amp; Culture”</td>
<td>Business process reengineering</td>
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<td></td>
<td>Change management culture and programme</td>
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<td></td>
<td>Top management support</td>
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<td></td>
<td>Organisational characteristics</td>
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<td>National culture</td>
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<td></td>
<td>ERP strategy and implementation strategy</td>
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<tr>
<td>Guidance factors</td>
<td>Business plan/vision/goals/justification</td>
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<td></td>
<td>Project champion</td>
</tr>
<tr>
<td>Implementation phenomenon</td>
<td>Communication (^{\text{Note 3}})</td>
</tr>
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<td></td>
<td>ERP teamwork &amp; composition (^{\text{Note 3}})</td>
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<td></td>
<td>Project management (^{\text{Note 3}})</td>
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<tr>
<td></td>
<td>Software/system (^{\text{Note 2}})</td>
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<td></td>
<td>Data management (^{\text{Note 2}})</td>
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<td></td>
<td>ERP vendor (^{\text{Note 2}})</td>
</tr>
<tr>
<td>Organisational fit</td>
<td>Monitoring and evaluation of performance</td>
</tr>
<tr>
<td></td>
<td>Fit between ERP and business/process</td>
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<td></td>
<td>Country related functional requirement</td>
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\(^{\text{Note 1}}\): After Ngai, Law & Wat (2008)  
\(^{\text{Note 2}}\): about the IS  
\(^{\text{Note 3}}\): about the project

Consistent with the findings of the present study, individual difference factors of the users was not in the list, although training and education as components of the project implementation was mentioned. Factors classified as facets of the implementation fell into two groups, those about the IS, and those concerning the implementation project. In terms of guidance, it was suggested that the project champion should be “a high-level executive sponsor who has the power to champion the project throughout the organisation” (Ngai et al., 2008, p. 555). The study organisation started out with such a champion, but this role ceased almost at the Go Live stage. Overall, there was considerable agreement between Ngai et al.’s (2008) factors and the CMISIO.
Jasperson et al. (2005) observed that most models of IS implementation lacked adequate coverage of the post-adoptive stage. The CMISIO captures post-adoPTION through the adaptation stage and through evaluating organisational fit over time.

12.2.2 Conceptualisation of post-adoptive behaviours

Jasperson et al. (2005) developed a research model to bring together existing knowledge about behaviour associated with post-adoptive IS use and to direct future research towards factors likely to influence users to adopt and adapt the IS. Their focus in adoption was the belief that the act of extending the functionality built into applications was an indicator of implementation success. The extension of functionality was seen as a voluntary behaviour even within mandated environments. This work was introduced in Section 4.3.4, with their research model shown in Figure 4.5.

In Jasperson et al.’s (2005) model, the work systems component referred to as the Organisational Action Model corresponds to the organisational constraints in the CMISIO. This component represents “the context within which organisational members perform their assigned work” (Jasperson et al., 2005, p. 535). The Individual Cognition Model represents the factors that would lead an individual to make decisions such as adopt, discontinue or to expand their use of the new system. Jasperson et al. (2005) argued that post-adoptive behaviour would become habitualised unless some form of intervention prevents the habitualisation, and presumably these habitualised behaviours could be either supportive of or detrimental to the implementation outcome.

Jasperson et al. (2005) suggest that during the post-adoptive period managers and other organisational leaders need to encourage systems use through the adoption of positive post-adoptive behaviours visible to the new users. Examples of this visible behaviour could include public demonstration of how the system outcomes were benefiting the organisation. This study has confirmed, albeit through the negative, the power of negative and tacit behaviours upon the implementation outcomes.

Consistent with the findings presented in Chapter 9, Jasperson et al. (2005) note that the majority of the post-adoptive life cycle is “without
management attention and direction” (p. 548) and recommend that focus be
given to the post-adoptive period in implementation. Further work is needed to
determine if the hypothesised adoption of features maps onto those activities
seen as adaptation behaviours in this study. Both Jasperson et al,’s (2005)
concept of adoption and the CMISIO concept of adaptation are seen to help
integrate a new system into a better organisational fit.

It has been hypothesised that organisational fit represents the facets of
implementation success, and that the CMISIO captures the organisational and
behavioural elements that will make success more likely. Will absence of the
CMISIO factors predict implementation failure?

12.2.3 IT project failure

Nelson (2007) examined the outcomes of 99 failed IT project reviews
carried out in 74 organisations over a seven-year period. From the top ten
ranking of mistake categories, measured in terms of frequency associated with
a failure, five were to do with how well the implementation project was run and
the suitability of the chosen system, i.e., poor estimation, insufficient risk
management, insufficient planning, quality problems and poor requirements
determination.

Poor estimation, insufficient risk management and insufficient planning
factors shown in Table 12.1. These factors would be represented by a sub
component of the guidance factors described by the CMISIO, i.e., IS Plan.

The other five factors were people related, and correspond with
components of the CMISIO organisational constraints and facets of the
identified stakeholder management, team issues, ineffective sponsorship,
inattention to politics (organisational climate) and lack of user involvement as
the main people related factors associated with failure.

There does appear to be some overlap between factors considered
critical for IS success, and those factors correlated with IS failure. For example,
top management support has been seen to be critical for IS success (Ngai et
al., 2008) whilst ineffective sponsorship was seen to be associated with IT
failures (Nelson, 2007). This prompts consideration of a question posed by Fowler and Horan (2007), i.e., are IS success and IS failure in fact opposite ends of a continuum, and how do their findings relate to the CMISIO predictions?

12.2.4 Are success and failure related?

Fowler and Horan (2007) examined factors associated with both the success and failure of IS through literature survey methodology. They found that four factors identified in the literature as being contributors to failure were also found to be critical to the success of such systems. The four consistent factors were effectiveness of project management, top management commitment, project team skills and user acceptance. Two other factors, lack of user involvement and poor training were identified as factors involved in failure, whilst enlisting external contractors and project team commitment were seen to contribute to implementation success.

The four success factors identified by Fowler and Horan (2007) have also been identified in the study and included as components of the CMISIO model. Five of Fowler and Horan’s factors, i.e., effectiveness of project management, project team skills, enlisting external contractors, project team commitment and poor training, identified as components of the project activities, are represented by a facet of the CMISIO implementation phenomenon. The other factors, i.e., lack of user involvement, user acceptance and top management commitment are components of, or result from, the implementation climate within the CMISIO organisational constraints.

The CMISIO shows that the concept of success is itself multi-faceted, and means different things to different groups within the organisation. Further, overall success represented by organisational fit is a long-term outcome that relies on more factors than have been described by Fowler and Horan (2007). Fowler and Horan’s factors mostly address the short-term notion of success that most closely resembles that of the project team in this study.

The CMISIO explains implementation success as an eventual outcome that results after the successful aggregation of the facets of the implementation phenomenon. An IS may exist within an organisational context for years without
ever finally achieving this overall success referred to as organisational fit. Failure, as described in Section 5.5, is seen as the abandonment of the implementation due to one or more factors before the organisational fit has been achieved. Seen in this way, an implementation that exceeds budget and overruns milestones, yet eventually achieves organisational fit can still be considered a success.

Some previous studies (Davis, 1986; Venkatesh et al., 2003) have examined use as an indicator of implementation success. It has yet to be demonstrated that factors that encourage use are actually linked to the implementation outcome. The CMISIO predicts that outcome may not be obvious for years, rather than months, and few studies, if any, have taken such a long-term focus upon the implementation phenomenon.

12.3 Use and success

Since the introduction of the TAM (Davis, 1986), there have been numerous studies that have built upon this model to explain variance in the usage of IT-enabled IS in both study and field settings. Whilst the dependent variable in such studies has been labelled with such terms as user acceptance (Venkatesh et al., 2003), in practice many studies measure usage frequency, often through self-report measures, and it is this that the quantitative models explain. Straub, Limayem and Karahanna-Evaristo (1995) argued that objective measures of use, such as computer-generated actual usage, were more appropriate for IS research. They found that using objective use measures in the TAM (Davis, 1986) showed weaker links than when the usual self-report measures of use were used.

One of the unanswered questions then has been how, if at all, understanding the variance in self-reported usage contributes to knowledge about the success or failure of IS implementation. Venkatesh et al. (2003) also questioned whether successful IS adoption, indicated by self-reported usage, could be linked to success from the organisation’s perspective.

According to the CMISIO, usage variance and adoption effort after the Go Live period are expected stages in the overall process of implementation.
There is nothing per se about these factors that will confirm or deny ultimate or long-term success from an organisational perspective.

The study in this thesis showed that despite some 18 months of adoption and then adaptation effort by the maintenance users at the study site, MFHRIS is still not delivering the maintenance deliverables. In fact, in other areas of this organisation where MFHRIS has been used for much longer, it has been reported that alternative systems are already being phased in, perhaps signalling organisational failure for MFHRIS in the maintenance area.

If we define user acceptance, not by usage frequency, but by an acknowledgement that the IS has now become “the way that we now do things around here”, an indicator of organisational fit, then this would be a more definitive indicator of organisational success. This concept is similar to the study organisation’s desire to establish better OH&S performance through establishing a supportive climate for safety behaviours, in the hope that such behaviour will become accepted by the users (employees).

Whilst use per se in an organisational environment does not indicate organisational success for the IS in question, non-use, below the required level, would be more likely to indicate failure. If potential users do not go through the stages of adoption and adaptation then it is unlikely that IS could attain organisational fit and deliver the organisation’s anticipated results.

Non-use indicating potential failure is closer to the experience of IT-enabled systems in non-mandated settings where lack of expected uptake can indicate failure. In this particular instance, considering usage frequency, it appears that success and failure are not either ends of a continuum. Burton-Jones and Gallivan (2007) have looked at aspects of system usage in this light.

12.3.1 Commentary on system usage

Burton-Jones and Gallivan (2007) suggest research that only focuses upon one element of system use, when in fact there are multi levels of use, can be problematic. An example cited in their commentary was the evaluation of a discussion database within an organisation. Self-report surveys indicated success due to increased usage frequency by individuals. Group level usage, and the emergence of communities considered a requirement of success, did
not increase, and by this criterion the discussion database was a failure. In this example individual use increased, but the reason that the discussion database was implemented was not achieved.

Consistent with this argument, the CMISIO model considers success through the aggregation of success measures from the various facets of the implementation phenomenon. Also, the determination of overall success through organisational fit requires the consideration of these multiple perspectives. In agreement with Burton-Jones and Gallivan (2007), the CMISIO suggests that focussing upon only one measure of system usage can lead to an incorrect or incomplete understanding of factors that contribute to overall success.

Venkatesh et al.’s (2003) UTAUT study raised questions addressed in this study. The UTAUT will now be revisited from the CMISIO perspective.

12.3.2 The UTAUT model

Venkatesh et al.’s (2003) UTAUT focuses on the initial stages of IS uptake, where there is a minimum usage level needed to allow both adoption and the beginnings of adaptation behaviours. Without some level of early usage, it would be difficult to imagine the longer-term success of a new system, so in this way, the usage described by the UTAUT is one necessary component of longer-term success.

The users observed in this thesis, especially the Key Users, spent a great deal of time trying to adopt the MFHRIS but this usage could not overcome inherent weaknesses with the system or make up for the lack of organisational support. In this example, initial usage was not seen to be sufficient for longer-term success.

Whilst the UTAUT model is claimed to be able to account for 70% of the variation in usage by individuals, Venkatesh et al. (2003) have commented on a number of potential weaknesses with their study. First, the authors state, “little to no research has addressed the link between user acceptance and individual or organisational usage outcomes” (p. 470). As explained in the introduction to Section 12.3, the CMISIO model would indicate that there is no definitive link
between usage and implementation success, albeit that usage increases the likelihood of organisational fit.

Further, other facets of usage behaviour such as usage quality, rather than just usage frequency, might better lead to organisational fit. The results of this study indicate that even 18 months after Go Live, users were complaining about how long they had to spend using MFHRIS, and this prevented them from doing their job.

In a previous study of the use of a safety reporting system within this organisation (Matthias, 2005) specific elements of usage quality, i.e., transaction timeliness, closeout and completeness, used as the dependent variable in Davis’ (1986) TAM were found to better explained outcomes than usage frequency alone. It was also seen that unless users used the safety reporting system for a time above what was considered a ‘minimum’ amount, the TAM had little explanatory power for usage variance (Matthias, 2005). It was only after the minimum usage threshold was achieved that the TAM was able to explain a modest amount of the variance in usage behaviour. This implies that variance in usage below some required threshold is better described by other factors.

Venkatesh et al. (2003) also state, “future research should study the degree to which systems perceived as successful from an IT adoption perspective are considered a success from an organisational perspective” (p. 470). The CMISIO would indicate that adoption is a necessary step in the implementation process, but unless adoption leads to longer-term organisational fit then it does not per se indicate implementation success.

Organisational climate, and some elements of the organisation’s culture were seen to be important factors in determining the implementation outcome. These findings are consistent with those from previous studies (Lin, 2008; Ke & Wei, 2008; Leidner & Kayworth, 2006).

12.4 Climate and culture

The longitudinal study indicated that the overt and tacit behaviour of senior management and its subsequent interpretation by the organisation’s
employees was important in setting a supportive climate for IS implementation. This outcome was also predicted by Jasperson et al. (2005). The supportive climate would be supplemented by guidance through Neel’s (1997) factors that support change within organisation, i.e., importance, visibility, motivation and creativity and ownership.

Other researchers in this area have emphasised the importance of a supportive organisational climate during the implementation of IS. Yen, Li and Niehoff (2008) have described how organisational citizenship behaviours working through both integration climate and effective project management positively influenced IS success. D’Amato and Zijlstra (2008) showed that organisational citizenship behaviour mediated the relationship between psychological climate and self-efficacy as antecedents with work outcomes that included quality of performance with hospital workers.

D’Amato and Zijlstra (2008)’s use of psychological climate refers to an individual’s mindset and core values that are reflected in behaviours. Organisational citizenship behaviour refers to the extent to which organisational members comply with what the organisation expects of them. It would be expected that in order to persist with the adoption of a difficult IS that a high degree of citizenship behaviour would be required.

The behaviours of the study site Key Users reflected a high degree of organisational citizenship. The Key Users had the benefit of reinforced importance through their selection as Key Users, they were involved early on in the implementation, the implementation was highly visible through their involvement and they were motivated through the constant feedback from the project team and in their work places. The group of Key Users was important to the study site from Go Live onwards, as they in turn provided guidance for their local work groups. This guidance also helped to provide a supportive climate. Such organisation wide influence suggests that there may be an optimum ‘type’ of organisation to support IS implementation.

12.4.1 Revisiting reliable organisations

The CMISIO model proposes a supportive climate for IS similar to Reason’s (2000) reliable organisation that supports the adoption of excellent
OH&S practice. Highly reliable organisations can reconfigure themselves to suit local circumstances. Whilst in the routine mode they are controlled by the site management, in the instance of IS implementation this control would yield to that of the project team. The management of the study site did not do this, possibly due to motivation from psychological reactance to the loss of control.

Highly reliable organisations are preoccupied with the possibility of failure. It was observed that the study organisation did not respond to the possibility of failure in a number of instances such as with paint ordering and purchasing both before Go Live, and even after Go Live when the users were reporting ongoing problems.

Finally, reliable organisations learn from ‘accidents’ and use the learnings to make their systems more resilient. There was evidence in this study that shortcomings from previous implementations were not used to enhance the implementation process, and there was evidence that past mistakes were actually repeated by incorporating bad practice into the template approach used.

12.5 Individual differences

In the formative stages of this research, it was thought that the variance in IS related behaviour brought about through individual differences may help to explain some of the variance observed in implementation outcomes. 'Individual differences' is an approach where phenomena are examined through ways in which individuals may be shown to differ (Reber & Reber, 2001). The differences could be, for example, in computer self-efficacy as described in Section 3.2.3.3.

The rationale was that organisations are made up of people working both individually and in cooperation, and that the implementation of a new IS might be one area where individual differences could be influential. In retrospect, it is more likely that the individual differences are absorbed into variations within the overriding organisational climate.

Individual differences of organisational members, such as those described by the personality theorists covered in Chapter 3, do not figure as
major components of the CMISIO model. It is suggested from previous studies (e.g., Neufeld & Fang, 2005) that individual differences likely explain the variance observed between individuals in subsets of the broader behaviours observed in this study.

In their study of telecommuter productivity, Neufeld and Fang (2005) found that whilst demographic factors such as family status or gender were associated with outcomes such as satisfaction, group factors appeared to be more important determinants of productivity per se. Group factors likely relate to the organisational climate covered by the CMISIO model’s organisational constraints.

Observing the organisational members in their day-to-day work and participating in the project allowed the impact of individual differences to be seen in an organisational context. People reacted differently to the same event or issue, and employees in equivalent roles perceived the implementation of MFHRIS in different ways.

The study indicated that individual differences were doing little more than producing a variance in behaviours that were being driven by broader organisational factors such as climate and culture. This is consistent with the use of individual differences in previous studies, i.e., to explain variance in some aspect of IS-related behaviour within a larger context. One factor that did influence the implementation outcome was the level of organisational guidance provided.

12.6 CMISIO Concept of Guidance

The CMISIO model highlights the role of organisational guidance, whether through individual or distributed control, in the implementation process. Guidance captures the notion that there needs to be explicit effort focussed by the organisation onto all phases of the implementation process. Hakkinen and Hilmola (2008) examined the phase immediately after implementation and related overall implementation success to how well momentum could be maintained in problematic stages, as discussed in Section 6.4. Guidance captures this perspective, i.e., maintaining momentum to prevent problems from escalating.
Guidance is necessary to orchestrate the implementation actions, and to overcome obstacles. This is similar to actions taken in a reliable organisation (Reason, 2000) that moves out of control mode. Most studies that summarise the factors important for IS implementation success include guidance factors in some form. Walsham (1993) refers to guidance in the notion of the “leadership style” of the IS implementers “who may be senior management or members of the IS project team or both” (p.227).

Fowler and Horan (2007) identified effective project management as an important success factor in IS implementation. Similarly, Ngai et al. (2008) identified the project champion as a critical success factor in their literature review. Neel (1997) recognised the need to emphasise the importance of change through high-level endorsement. This study and the resulting CMISIO has confirmed this view, and shown that for IS implementation the need for guidance can continue long after the new IS is up and running.

The study organisation had implemented a similar system to MFHRIS in the late 1990’s, throughout its Asian businesses. The system is still running successfully. When asked to describe the important factors in the success of that system, the senior management told how they still have a senior member of the management team championing and providing necessary support for the system, even ten years after it was implemented. Even after this time period, there is still a requirement to adapt the system to the changing business.

The study organisation’s Asian Business management team described the IS in this example as successful and fitting where the Asian Business was during implementation, but with the ability to adapt to the changes over a long time frame. The long-term support required confirms the CMISIO stage of adaptation linked to a ‘years’ time frame.

12.7 Organisational fit and stages of the implementation

The proposed stages of the CMISIO have been described in Section 11.1.1. It is conceptualised that the stages of implementation move the IS into an optimum organisational fit.
12.7.1 Organisational fit

Goodhue and Thompson (1995) examined factors that relate IT use and task performance and found that in order for the IT to have a positive impact upon task performance, the IT must be utilised to some minimum extent and the IT must also be a good fit with the tasks that it supports. Goodhue (1988) considered fit at a general level of task performance and observed that IS has a positive impact upon performance if there is correspondence between the users’ requirements and the functionality of the IS.

Another aspect of organisational fit is more about key organisational players than elements of the IS or its use. Cooper and Zmud (1990) looked at implementation from the perspective of technological diffusion, and their study found that organisational politics were extremely important factors in the explanation how the acceptance of IT spreads throughout an organisation. In line with Dalmau’s (1999) observations of organisational behaviours, Cooper and Zmud noted that organisational behaviours that appeared to be more about self interest than about the IT in question could determine the organisational outcomes for the IT in question.

Whatever the combination of factors in a particular scenario, for an IS to move through implementation and achieve organisational success, the IS must achieve a degree of fit with the organisation. Cooper and Zmud (1990) recommended longitudinal studies to examine the interactions between individual, organisational and technological factors, especially if they are to account for “the fit between the technology being examined and the work context within which the technology is being introduced” (p. 137). The use of the term “fit” within the CMISIO is along these lines.

12.8 Conclusions

The CMISIO model describes the implementation of IS in an organisational context. Comparison with previous research studies of IS in organisational contexts has shown the model to be valid in its broad coherence with those studies. The CMISIO model describes the life cycle of the implementation phenomenon from conception through Go Live into the adoption and later adaptation stages.
Recent studies such as that of Jasperson et al. (2005) have suggested that behaviour in the post-adoptive stage could be critical to implementation success. The CMISIO model confirms this observation, and building on the observations made in the longitudinal study has extended the view of implementation success through the post-adoptive stage to describe the longer-term contribution of adaptation leading to organisational fit.

Jasperson et al.’s (2005) description of feature uptake as a measure of success describes a similar stage to that of adaptation observed in the longitudinal study and included in the CMISIO model. The adaptation process likely includes elements of feature uptake as well as system modifications, short cuts and local improvements.

The CMISIO model has two primary aims. One aim is to provide a practical overview for those charged with IS implementation in an organisational setting. Another aim is to provide a high-level perspective for researchers so that they can focus the research effort, and to identify boundaries within which quantitative models would be valid.

For practitioners, the CMISIO model provides a broad perspective for the implementation of IS in an organisational setting. Even though an experienced project team carried out the implementation of MFHRIS in the study organisation, the implementation would have been enhanced through referral to the CMISIO model and acknowledgement of the need to deal with the local organisational constraints manifest through the current climate at each site.

The project team failed to take steps to understand and work around the constraints of the local climate, and as such did not form a cohesive front with the site management. Project support ceased within three weeks of the Go Live week, and insufficient support was provided throughout the adoption and adaptation stages.

The organisation accepted a narrow set of ‘success’ measures based upon the project team’s deliverables. This allowed the organisation to consider the implementation to be a success at a stage when success could not be determined. This in turn promoted tacit behaviours from the senior management.
that negatively impacted the ability of users to obtain support in the post-adoption period.

The organisation did not appoint a champion at the study site who would have provided necessary guidance through the Go Live period and beyond. Each of these issues could have been avoided through consideration of the CMISIO components prior to commencement of the project.

Positive elements brought to the project by the project team practitioners were seen to be powerful and long lasting. The appointment of the Key Users, an initiative of the project team, fulfilled many of the requirements of the local guidance factors that are required to support change within organisations. There are learnings for the research community by observing the ways that practitioners approach IS implementation.

For the research community the CMISIO model provides a practical perspective on implementation within organisations that will allow those perhaps not familiar with day-to-day organisational life to target their research efforts in fruitful areas. This is particularly important when considering how to incorporate research findings into practice, and allowing practice to influence research efforts. This question will be addressed in detail in Chapter 13.

An important learning for the research community is in the area of implementation success. The CMISIO describes success through organisational fit involving post-adoption behaviour that includes adaptation. Implementation issues might not become resolved until many months or even years after Go Live. This finding also illustrates the strength of longer-term qualitative studies to guide more focussed quantitative studies.

Chapter 13 addresses the research questions posed in Chapter 1 in light of the study findings, and addresses implications of the study findings for both research and practice. Finally study limitations and opportunities for further research are discussed.
Chapter 13

Conclusions and implications for further studies

“… the business objectives are sometimes not even reached a year after implementation”.

*Berchet & Habchi, 2005, p.590.*

13.1 Introduction

This study was based upon questions raised by previous researchers about the relevance of findings concerning the implementation of IS within organisations, and specifically questions raised by Venkatesh et al. (2003) and Jasperson et al. (2005). These questions included concerns about implementation success and failure, the boundaries that delineate the usefulness of quantitatively derived models of IS use and the influencing role of the organisation within which the IS would be implemented.

A review of prior research in this area identified the need for a conceptual model to assist in addressing the sorts of questions that IS researchers were asking about research findings. These questions were restated in the form of this study’s research questions that are formally addressed in Section 13.2. A conceptual model, the CMISIO, has been presented and discussed in Chapters 11 and 12.

Implications for IS theory are discussed in Section 13.3. Gregor’s (2006) review of the structural nature of theory in the IS discipline, discussed in Section 5.4, is used to frame this discussion. Study findings that may be of particular interest to organisations, practitioners and researchers are discussed in section 13.4. The idea of adopting psychology’s scientist-practitioner model is presented as an opportunity for both IS research and practice.

The primary methodology, participant observation, was selected on the basis that it presented the best opportunity to describe the phenomenon of IS implementation within an organisation by placing the least numbers of methodological restrictions upon the observations. The validity of the participant
observations were triangulated through reference to subject matter experts, one-on-one interviews, small group discussions in the form of situation appraisal, analysis of implementation related documents and Leximancer analysis of selected emails.

Whilst the study attempted to describe the implementation phenomenon as it occurred as a ‘raw’ phenomenon to then theorise about, in practice it is difficult to be entirely neutral in describing a phenomenon in this way. Participant observation suited the longitudinal nature of the study, and the desire to get inside the organisation to experience the implementation as it happened. Aspects of the method are discussed in Section 13.5.

This chapter concludes with discussion of the study limitations and opportunities for further research that might follow from this work. In particular, the adaptation phase of implementation, which has similarities with Jasperson et al.’s (2005) uptake of IS features, is worthy of closer observation.

13.1.1 Significant findings

Jasperson et al. (2005) suggested that implementation success would be improved if people expand their usage of a new system. This observation was confirmed in this study. Jasperson et al. imagined that the expanded use would take the form of exploring and adopting optional features of the MFHRIS. This study suggested that adapting the IS to specific local requirements in a given workplace setting was another facet of the expanded use, leading also to an increased likelihood of long-term success.

The expanded use was captured in the CMISIO stages of adoption and adaptation. Jasperson et al. (2005) had commented that, “most (ERP) life cycle models lack an explicit post-adoption stage” (p.526) and the study confirmed the importance of both Jasperson et al.’s adoption stage, and the CMISIO adaptation stage.

The need to define and understand the current organisational climate and to plan the project within the constraints of the climate was seen as an important element of implementation success. Project managers should not assume that an approach deemed successful in one organisational context might be necessarily successful in another.
The implementation phenomenon was seen to be a multi-faceted one, with differing perspectives depending upon the observer’s position within the organisation or within the implementation. Each of these facets carried a separate notion of what success meant, with ultimate success indicated when the IS had achieved the required level of organisational fit.

Evidence was presented to support the notion of psychological reactance motivating behaviour that might lessen the likelihood of IS implementation success. This is important as psychological reactance can be generated elsewhere in the organisation, and then motivate behaviour directed against the IS being implemented. The negative behaviour can be generated by factors that are not in fact related to the IS. Unless IS practitioners take steps to be aware of the climate into which the IS is being implemented, they may miss opportunities to adopt strategies to mitigate the impact such organisationally generated behaviours against the IS.

In order to facilitate closer relationships between IS research and practice, the scientist-practitioner model, to be discussed in this chapter, has been offered as a consideration for the IS community. It is an orientation particularly suited to a changing area such as that of IS within organisations.

13.2 Conclusions about the research questions

Prior to the commencement of this study, as a result of reviewing relevant literature in the area of IS implementation, the research problem and a number of specific research questions were proposed in Section 1.6. The studies of Venkatesh et al. (2003) and Jasperson et al. (2005) were prominent in generating these questions. Two more specific questions followed on from the participant observations described in Chapter 9 concerning the CMISIO model developed and the relevance of Brehm’s (1966) theory of psychological reactance as an explanation of observed behaviours. Each of these questions will be addressed in this section.

13.2.1 Research questions answered.

1. Are commonly used dependent variables such as ‘use’ related to implementation outcome?
Commonly used study variables such as use, often measured as self-report usage frequency, are not reliable indicators of implementation success. For any IS within an organisational setting there will be a minimum amount of use, whether through data input or analysis, below which the IS can not deliver the organisation’s requirements. It does not follow from this that increased use per se would increase the likelihood of overall systems success.

In the study, the finance group looked to MFHRIS as an enhancement of the previous version of the IS, and success to them included decreased use of the IS brought about by improved system efficiency in the new version. For the maintenance community, using MFHRIS required much more time than the outgoing system and this was seen as a major problem as it prevented the maintenance workers from doing their main job. These observations support the assertion of Jasperson et al. (2005) that usage frequency alone might not be a suitable indicator of implementation success.

Certain usage patterns such as the adoption of features (Jasperson et al., 2005) or systems adaptation after adoption as seen in this study were seen to be consistent with increased likelihood of success. Given that the implementation phenomenon can be seen as a multi-faceted one, commonly used study variables such as use relate more to the facet from within which the variable was selected. Success depends on many facets, so it is unlikely that any chosen study variable on its own could predict implementation success.

2. Will the effort put into understanding factors that contribute to increased usage from an IS user perspective help to predict ways to increase success in IS implementation?

The observations discussed in the answer to the first question would support the inference that use per se is not indicative of implementation success. It follows then that factors that contribute to increased usage may not necessarily help to predict ways to increase success in IS implementation.

People in an organisation work within complex social and technical systems. Any effort to understand the factors within those systems that contribute to increased usage, even though the increased usage per se does not necessarily indicate a better chance of success, will be useful. Such effort will likely give information about the current organisational climate, will expose
evidence of the underlying organisational culture and should highlight any obvious impediments to use of the system in question.

From the perspective of the CMISIO model, the effort put into understanding factors that contribute to increased usage such as a supportive organisational climate or focussed guidance effort should identify important information about the organisational constraints and guidance factors specific to the organisational context being addressed. Having this information will be useful in predicting ways to increase the likelihood of implementation success.

3. What is the context within which models of systems related behaviour are applicable and useful?

Models of system related behaviour are applicable and useful within the broader understanding of the implementation as shown in the CMISIO model. Models such as Venkatesh et al.’s (2003) UTAUT are useful in understanding influences upon individuals’ attitudes towards the use of a new IS, but within the context of implementation within an organisation, such understanding necessarily becomes of second order importance.

It is incumbent upon the researchers who develop such models to define the parameters within which their models are both valid and salient. It would appear that there is no broad, general context to support models of systems related behaviour. Such models necessarily must be located within the wider phenomenon of implementation as described by a conceptual model such as the CMISIO.

4. Why do projects fail? It would seem that the answer to this question depends on the perspective of the observer, and their definition of success.

There are many reasons why IS implementation projects can fail. It would appear that none are linked to any IS specific mystique that requires special knowledge outside of an understanding of what it takes to introduce new processes into organisations.

IS projects can fail in the project phase due to poor execution in many areas. These would include failing to select the correct IS to match the organisation’s requirements, underestimating the resource or time requirements, insufficient training or failing to identify the organisation’s target audience.
IS projects can fail in an organisational sense by not understanding the local climate and ignoring the influence of aspects of the organisational culture. Like any organisational change there are factors that increase the likelihood of success and these should be built in to the implementation, i.e., importance through high level endorsement, motivation through success stories, creativity and ownership through grass roots involvement and visibility through suitable metrics (Neel, 1997).

Projects can fail by not providing the necessary resources; often after the project team has disbanded or moved on, to support the CMISIO phases of adoption and adaptation. The process of adaptation can take months or years. This type of failure can lead to ultimate failure if the users cannot work with the system, or modify the system to do achieve the necessary outcomes, and it is at this point that users look for alternative systems or alternative ways of achieving what the system was meant to achieve.

5. Why are organisations continuing to invest in expensive IS, given the reported poor track record of system implementation over a number of years? Is it that the measures of success often studied are not consistent with what organisations are really experiencing?

Organisations invest in IS for numerous reasons, such as to improve their day-to-day operations and/or to reduce their operating costs. In this study, the organisation believed that by adopting one system and one way of doing things across the organisation, that there would be benefits to the financial bottom line through the efficiencies gained.

No definite assessment of bottom line gains was made within the study time period. The organisation announced the project as a success on the first day of implementation and moved on. Tacit behaviour of the management (see Section 10.4.2) supported that announcement. It was not until months later that the site management became aware of the numerous problems that the MFHRIS had brought to their site. Eighteen months after the implementation, see Section 9.8, there were numerous serious issues to be addressed. There were signs, see Section 10.4.3, that the organisation was already moving towards the replacement for MFHRIS, without really understanding what it was about MFHRIS that had ‘failed’.
Why are organisations like the study organisation continuing to invest in expensive IS? It would appear that those organisations that get the right IS implemented properly are able to demonstrate some improvement in performance or to command a level of competitive advantage that other organisations aspire to.

If this is true, then this observation suggests an important question. Does properly implemented IS help organisations become better organisations, or do good organisations successfully implement IS because they are good? The work of Reason (2000) suggests that highly reliable organisations are good at safety because they are good at a systems approach. If this follows on to IS in general, then it may be that successful implementation and successful organisations go hand in hand, and that the same organisational behaviours that enable an organisation to be successful, also support IS implementation.

6. ‘IS success’ is not a concept that has been defined in a way that is widely accepted. How is IS success conceptualised, can it be quantified or is it dependent on the observer’s perspective?

It would appear that like the phenomenon of implementation, implementation outcome depends very much on the perspective of the viewer, and it then follows that success is also a multi-faceted concept. The study has suggested at least the five levels of success shown in Table 11.3, i.e., organisation, process, individual, project team and local management. There may in fact be others depending on the situation.

7. Study aim: A conceptual model to describe organisational factors that influence the implementation of IS within organisations.

The CMISIO described in Chapters 11 and 12 has been proposed to describe the organisational factors that influence the implementation of IS within organisations. Further evaluation, to be discussed in Section 13.7, will be required to demonstrate the model’s reliability and utility.

From Chapter 9: How can the different perspectives of implementation success be accommodated in a conceptual model that seeks to explain that success?

The different perspectives of implementation success have been represented as facets of a multi-faceted implementation phenomenon. Some facets or perspectives, see Table 11.1, are likely to be common to
implementations, whilst others are likely to be situation or context specific, see for example, Table 11.2.

From Chapter 9: The orientation of the study site management towards the implementation was seen to be negative from early on in the pre-implementation phase. Is the concept of psychological reactance introduced in Section 3.2.6 a feasible explanation for the observed behaviour?

It has been argued in Section 10.2.2.1 that in this study some of the behaviour observed to be of a negative nature towards the project was likely motivated by psychological reactance. This is an important learning for those involved in similar projects, and requires effort to understand the local climate and underlying culture so that steps can be taken to work around such negative motivation.

13.3 Implications for theory

Gregor (2006) describes how the discipline of IS research is involved with subject matter that can be considered to lie at the intersection of attributes of the IT as physical objects with aspects of human behaviour. Research in this area likely draws upon theory from a number of disciplines including natural and social sciences. This study has attempted to clarify the phenomenon that lies at this intersection, in order to help define this subject matter, and to place the phenomenon of implementation within the broader organisational context.

Consistent with Gregor’s (2006) observation that research can be classified by the nature of the research problem formulated and the research questions asked (see Section 5.2.3), this study is best classified as one of explanation. The intent of explanatory level theory is to promote greater levels of understanding within the area of study of the phenomenon upon which the research focussed.

The CMISIO model, offered at the level of explanation (Gregor, 2006), is primarily intended to define what the IS implementation phenomenon is, and to address questions relating to how, why, when and where. Whilst the CMISIO was aimed at providing understanding through interpretation (Braa & Vidgen, 1999), it can serve as a framework to help define the utility and validity of activities concerned with prediction through reduction. In this way, the CMISIO
provides a link between a model as theory and the requirement for a model with utility for practitioners.

An important contribution of the CMISIO to IS theory is that researchers should not take for granted that explanation of the variance in one facet of the implementation, e.g., usage, can by itself be offered as a way to improve the likelihood of implementation success. A conceptual understanding of the implementation phenomenon is required to put such explanatory models into perspective. Further, there are factors that contribute to implementation success that may not be directly associated with the users or the IS in question.

13.4 Implications for policy and practice

This study indicates that the implementation of IS into an organisation needs to be considered as a significant organisational change, and not as a phenomenon that can be considered outside of the context within which it occurs. Further, the timeframe for IS implementation and eventual confirmation of success likely takes much longer than the focus of many previous studies. These observations have implications for organisations, project teams and researchers within the area of IS.

13.4.1 Implications for Organisations

From an organisational perspective, the implementation of IT-enabled IS involves people, both as enablers of the organisational change, and as the recipients and users of the IS. Gasser’s (1986) observation that computers present people with low-level day-to-day issues was confirmed in this study, and these day-to-day issues become more difficult to deal with when connected to the implementation of IS.

It would appear that most organisations entrust the implementation of the IS to those with expertise in either the IS or the IT that enables it. The project team at the study site, mostly from an IS/IT background, did take steps to consider the people aspects of the implementation. It was felt that the project team did not gather enough detailed knowledge of the local climate, or prepare themselves for a long enough timeframe, to complete all of the necessary implementation steps required to ensure success from the organisation’s
perspective. The CMISIO model’s stages of adoption and adaptation in particular require sustained organisational support if the new IS is to ultimately deliver what the organisation required.

Reflecting upon the discussion of research question 5, in line with Reason’s (2000) notion of reliable organisations, it may be that there is an optimum organisational orientation to support IS implementation. Such an orientation would include an appreciation of the many roles and perspectives that exist within an organisation, the leadership required from organisational management throughout the implementation and the necessary commitment for the life of the system in question. It was observed in this study that even when the senior management decided that the implementation had been successful, and tacitly behaved as if it was successful, the lack of support in the adoption and adaptation phases was moving the implementation away from achieving the apparent success.

13.4.2 Implications for IS project managers

An important implication for IS project managers from this study is that IS success is in fact a multi-faceted phenomenon that can take years to fully realise. The achievement of overall success requires strategies that take into account different organisational stakeholders with differing organisational perspectives.

IS project managers need to work within the constraints of the local organisational climate, and be aware of aspects of the organisational culture that might impact upon the project. Organisational culture was seen to be a stable influence, and unless someone is prepared and able to understand the organisation’s culture, then setting out to change it would be difficult. In the case where the organisation’s culture is supportive of innovation, then steps should be taken to harness, rather than change, such a culture. At best, the project leader could look to foster an organisational climate that supports what is required at a point in time.

Despite previous research that has suggested that the implementation process is likely to be longer than has been popularly conceptualised (Berchet & Habchi, 2005), IS implementation projects are still focussed upon the
installation of the IS, and not on long-term success. The important stages of adoption and adaptation that follow on from the IS installation phase are seen to be important to the long-term success of IS within organisations. Many IS implementation projects do not include these phases in the project scope.

Further, it is possible that in not providing organisational support in the adoption and adaptation phases, organisations are actually initiating the eventual failure of the IS in question. Observations from this study of a new maintenance system emerging would support this assertion, although this requires further examination. It has been observed that when systems go beyond vendor support, i.e., the IT component can no longer be updated or modified by the vendor, that they are likely to be replaced or phased out. Perhaps a similar phenomenon occurs with organisational support around the adaptation activities of update and modification.

Given that IS project managers are likely to be more experienced in IS implementation than the wider organisational management, it should be incumbent upon IS project managers to make the broader business aware of the life cycle and long term requirements of implementation. After all, Whilst the project might be deemed to have been a success after sign-off of the project deliverables, as in this study, this did not necessarily imply that the delivery of the required business outcomes would follow.

This study in fact highlighted how the tacit behaviour of organisational management around the project specific success hampered the level of ongoing support needed to assist the users through the adoption and adaptation stages of implementation. A method to ensure that IS project managers are equipped to provide the lead role in this area is discussed in the next section.

13.4.3 Implications for IS researchers – the Scientist-Practitioner model

Chiasson and Davidson (2005) studied IS related journal articles over an eight year period and observed that industry received little attention from IS researchers, given the narrow range of industries examined. They also noted a lack of consideration of the practical relevance of industry and organisations in theory development. Experience gained from this thesis suggests that having a research orientation, and being aware of recent findings in the area of IS
research, equips the practitioner involved in the implementation of IS in the field to become usefully involved in the process.

From another perspective, observations made during this study suggest that experienced practitioners involved in the day-to-day implementation of IS are unaware of, and do not in general follow, the outcomes of the numerous IS research studies that are carried out in this area. There seems to be a gap between the researchers looking at IS on the one hand and practitioners implementing IS within organisations on the other. The scientist-practitioner model (Belar & Perry, 1992) is suggested as one way of addressing this gap.

Scientist-practitioners in the field of psychology are trained in both research and practical techniques. They are encouraged and supported in their practical endeavours to reflect a research orientation, and to reflect a practical relevance in their research endeavours (Belar & Perry, 1992). Perhaps IS practitioners, trained and supported in the style of psychology’s scientist-practitioner model, would produce more effective and consistent IS outcomes, and be ideally placed to play an important role in the integration of research and practice in the area of IS.

In simplistic terms, the scientist-practitioner model describes an approach to science-based research and practice (Belar & Perry, 1992) where each 'informs' the other in an iterative way. The scientist-practitioner model is not about summing the parts and it is not meant to be a midpoint between science and practice, but emphasises the integration of science-based research and day-to-day practice whereby each informs the other through involvement.

The overall aim is to produce valid and useful outcomes. The basis of this approach is the belief that there must be an integration of research and practice in order to maintain relevance in a discipline that is seen as dynamic and ever changing.

In the discipline of IS research there is a perceived need from the research community to find new ways to make research more relevant to those who are involved in the day-to-day implementation of the systems studied. The scientist-practitioner model, from an IS discipline perspective, suggests that IS practitioners should seek to understand current research and seek to apply it in
practice, to conduct their practice whilst thinking like an IS researcher, and to be actually involved in doing IS research. This approach offers opportunities to bring the benefits of IS research back into the organisations at which the research was originally focussed.

13.4.3.1 The scientist-practitioner model and psychological research

The scientist-practitioner model, sometimes used synonymously with ‘manual-based treatment’ (Wilson, 1996), has been used as a framework for training programs used in clinical psychology since the 1950’s (Belar & Perry, 1992) and has now been extended to other areas of professional or practicing psychology. Most importantly, the scientist-practitioner approach suits a discipline in which the knowledge base and practical challenges are in a state of constant change. The changing nature of the subject matter in the discipline of psychology is similar to the trend within the IS world. The IT that supports the systems studied is rapidly and constantly changing, as are the organisations that deploy these systems.

A scientist-practitioner can be supported through formal links between research enterprises and industry. Along these lines, in the field of organic chemistry, the formation of such links has provided learning opportunities for those in the early stages of their careers and opportunities for established chemists to participate in current research initiatives (Cawley, Besley, George & Hibbert, 2007).

13.4.3.2 The scientist-practitioner model and IS research

The scientist-practitioner framework could be a suitable one to support IS research. Formal qualifications for IS and IT practitioners are provided by most universities and technical colleges. IT qualifications often include specialist areas such as Mechatronics, Internet Technology and Health Informatics. It is common for students to become vocationally focussed in the qualifications that they attempt, and not to progress through a research orientation into the workforce. Currently, the IS/IT qualified practitioner who becomes involved in IS project work is likely to differ from their scientist-practitioner psychologist counterpart in terms of two main aspects.
First, practising psychologists are typically involved in the assessment and reporting of outcomes. Even with the reported poor track record of IS implementations, it is unusual for the IS implementers themselves to report such information.

Schulte (2004), for example, reviewing 20 years of IT project experience reflected that it is standard practice for the project manager to conduct a post-implementation review, but that in his experience the frequency of such reviews was very low. Reasons cited include people moving on to the next assignment and consultants moving out to their next project.

Second, scientist-practitioner psychologists are often actively involved in ongoing research activities such as the clinical trials of new treatments. It is unusual for IS practitioners to be actively involved in the sorts of research carried out within the IS research discipline. Within organisations many of those involved in IS implementation project teams typically come from diverse backgrounds. Many hold no formal IT or IS qualification, and have moved into the IT or IS areas from other disciplines, and it may be that they are not equipped to participate in or to benefit from IS research.

13.4.3.3 Supporting observations

The MFHRIS implementation was carried out by a project team comprising the organisation’s employees along with IS subject matter experts on a contract basis. An early observation was that many of the IS practitioners did not hold formal qualifications in IS or IT related fields, but had developed experience through involvement in numerous previous projects in other organisations.

Awareness of the discipline of IS was not high, e.g., one of the training consultants asked whether or not there were any people from the university active in researching IS. What was obvious though, was the high level of interest in IS research once people were made aware of numerous studies that had been done, or were being done at present, including the authors’ study.

Participating in the implementation whilst carrying out this study provided benefits for both the research and for the researcher as an employee of the organisation. For the research, access to employees from all levels of the
organisation as well as direct experience of the day-to-day context within which the implementation occurred provided a rich insight into the phenomenon of IS implementation. The longitudinal observation provided a detailed description of the implementation as a phenomenon for further study, and against which models of systems related behaviours could be assessed.

Conducting research as an employee working within the IS discipline, having timely access to the body of IS knowledge and current research, and possessing the skills and opportunity to utilise this in the day-to-day work of implementation proved to be worthwhile. The practical aspects help to improve the research skills.

What also emerged from the study was the importance of “being in the situation” and how this facilitated an understanding of different perspectives. Warren (1998) states, “When reality, that is, the reality of the situation, becomes clearer … the individual emergences from ignorance and powerlessness to awareness and a sense of efficacy” (p.137). Practice, within a situation, and thought are interlinked. Moreover, understanding (knowledge) that comes from doing is powerful and liberating. The IS discipline is ideally placed then to embrace this notion of “understanding by doing” or praxis, the Aristotelian notion that highlights practice as a type of knowledge.

13.4.3.4 Issues with the scientist-practitioner model and IS research

For psychologists, manual-based treatments, facilitated by the scientist-practitioner approach, offer advantages over purely practice-based approaches in that they can be empirically validated, standardised and more easily disseminated to other practitioners (Wilson, 1996). In the area of clinical psychology, the branch of psychology where therapists operate, there is still considerable resistance to a manual-based approach based upon a number of criticisms. Two are of direct relevance to IS researchers.

First, some therapists claim that the prescriptive nature of the scientist-practitioner approach undermines a therapist’s clinical artistry. This claim reflects the commonly held belief that experience will improve practitioners’ performance, and that prescription hinders the benefits of the experiential process.
Empirical studies do not support this concern. Garb (1989) found no evidence that on-the-job experience altered the validity of judgements in mental health fields, but found limited support for the value of training. Similarly, the same study found that experienced clinicians were no more accurate in assessing personality than less experienced ones.

In practice, many IS practitioners do not hold formal qualifications in IS or IT related areas. It is anticipated that a similar set of concerns about experience versus formal qualification would arise from the suggestion that qualified IS practitioners might have something extra to offer in the practice of IS. Observations from practicing psychology where formal, degree based qualifications have become the norm, would indicate that we could expect a transition period within which experience of IS in the field was recognised, and where formal qualifications would become the requirement for new people entering the area of IS employment.

Second, still considering elements of resistance to the idea of a scientist-practitioner approach, it is argued that often the research samples chosen by psychologists for laboratory based studies differ significantly from the patients that therapists treat in practice. It is suggested that such research-based findings cannot be generalised to real life situations. For those in the discipline of IS research, we need to consider how useful and valid to real organisations are the models that we develop, if not developed using real populations. This consideration might focus researchers upon real organisations, which could ultimately provide the motivation for organisations to want to take up the outcomes of the IS research.

13.4.3.5 Conclusions about the scientist-practitioner model for IS research

Psychology’s scientist-practitioner approach has much to offer to the discipline of IS research in terms of making research more relevant to practice. For the research enterprise, scientist-practitioners would have ready access to, and a deeper understanding of, the organisations within which the implementation phenomena occur. Organisations that choose to support IS scientist-practitioners would have the benefit of employees who are current in their systems knowledge and practiced in the methods needed to understand
existing phenomena and to explore emerging facets of IS. It is recommended that:

- IS researchers look to conduct their research within the settings where the research has practical relevance,
- IS research findings are made available to IS practitioners,
- IS practitioners become involved in the research enterprise as a means of generating improvement to both the research and to practice, and
- Qualifications for IS/IT practitioners involve some level of research methodology and experience.

### 13.5 Comments on the study methodology

Conducting this research as a participant observer had a number of benefits. Numerous activities and exchanges that occurred over the implementation would not have been possible to access after the event, and some were important in terms of understanding the outcomes. Being a member of the project team and therefore part of the organisation gave a level of tacit permission to ask people about what happened and why they thought that it had happened. It was always possible to go back and ask clarifying questions when there seemed to be ambiguous observations.

A significant advantage of participant observation comes from “being in the moment” where, for example, on an extremely hot day in a busy factory it is easy to understand how people could become frustrated with events that in another context might be overlooked or readily accepted. The notion of ‘levels’ within an organisation takes on new relevance when it is possible to actually experience an implementation from the different levels and to get some idea of what aspects of implementation success mean to people at different levels.

Perhaps one of the most important benefits was the opportunity to record an accurate sequence of events. Judging possible causal links becomes clearer with the knowledge of what preceded what within the implementation.

Being both the researcher and a member of the implementation team provided a number of situations where care had to be taken. First and foremost it was essential to act ethically so as to preserve the rights of the people being observed. There were times when going through the formality of explaining the research and obtaining written consent for interviews possibly impacted upon
the information obtained, although most of the people contacted expressed more interest than apprehension.

There were some situations when actions taken actually changed the outcome being observed, e.g., notifying the management in a particular area that training was falling behind schedule. The experience confirmed Braa and Vidgen’s (1999) assertion that regardless of the research method chosen, i.e., interpretation, reduction or intervention, all three dynamics co-exist to certain extents in practice when researching within the organisation. The possibility of an opportunity to approach a subsequent implementation within this organisation through a formal action research design will be explored.

13.6 Limitations

This study was carried out longitudinally within one organisation, primarily focussing upon the implementation of a single IS. Whilst attempts were made to validate observations and inferences through discussion and situation appraisals, there remains the limitation that the findings were based largely upon this one study. Participant observation, within the methodological limits discussed in section 7.3.2, is ideally suited to capture incidents and histories associated with a phenomenon, and these aspects largely guided the CMISIO developed. It was argued in Chapter 12 that the CMISIO generally fits with previous research findings, but this needs to be established through further case studies with different organisations and different IS.

Whilst effort was made throughout this study to appreciate the many diverse organisational and research perspectives, the participant observations were necessarily those of the researcher. The requirement for reliability requires that other researchers using the same methodology would make the same observations, even if the observations were interpreted differently. Where possible the observations were captured without interpretation, but as has been discussed previously, it is not possible to ensure that all observations are entirely free from observer values and bias.

13.7 Recommendations for further research
The longitudinal study has captured the phenomenon of an IS implementation within an organisation, and the essential stages of the implementation have been described in the CMISIO model. A number of aspects of both the longitudinal study and the CMISIO model require further research.

Primarily, there is a requirement to establish the validity of the CMISIO in a broader context with different IS and different organisations. The CMISIO predicts that aspects of a particular IS form only one component of the implementation outcome, and so factors such as organisational constraints and guidance factors should enhance different IS within the same setting. Similarly, one IS implemented in the same way within different organisational constraints should show different outcomes.

Further, case studies are required to show the utility of the CMISIO for both researchers and practitioners in organisational settings. One way forward would be to involve IS practitioners in research endeavours that explore the CMISIO within the organisations in which they operate, so that the research outcomes could be put into practice.

The observation of behaviours that impact upon the implementation, but which may be organisationally motivated and not associated with the IS, needs further exploration. This finding, if supported, is important as it suggests that the prediction of implementation outcome requires an understanding of the broader context within which the implementation occurs. This would suggest that research about the outcome of IS implementation could not be carried out wholly away from the context in which it occurs. Some of these contextual behaviours have been hypothesised to be associated with psychological reactance, but this remains to be proven.

The notion of a supportive organisational climate for IS implementation, along the lines of Reason’s (2000) reliable organisation in the context of safety behaviours, can be further explored. Such a supportive organisational climate would be of practical significance to organisations and enterprises and would offer a way to better predict implementation outcomes.
The notion of organisational culture influencing the behaviours of people within the organisation, specifically around IS implementation, remains enigmatic. Does culture modify and support organisational climate, or does organisational culture work through a collective unconscious along the lines of Jung’s (1969) perspective?

13.8 Conclusions

The CMISIO has been proposed as a conceptual model to assist practitioners and to guide researchers in the area of IS implementation within organisations. The model incorporates several key components, i.e., the multi-faceted implementation phenomenon reflecting varying perspectives, guidance through the organisation’s specific plan within which the project team plays a key role, a constrained space brought about by the organisational climate and elements of the organisation’s culture and success represented by organisational fit.

Building upon Jasperson et al.’s (2005) findings, the CMISIO stages include both adoption and adaptation stages, and unlike many previous studies, the CMISIO suggests that overall success might take many months, if not years, to confirm. The CMISIO adaptation likely covers part of what Jasperson et al. referred to as post-adoption. Lack of organisational support within the adoption and adaptation stages can lead to eventual failure if the IS.

Participant observation has been found to be a useful research technique to observe the implementation phenomenon within organisations. Many of the behaviours that can influence implementation success have origins away from the IS in question, and are acted out by people other than system users. Participant observation is a useful method to capture these other behaviours. The longitudinal timeframe of eighteen months was necessary to observe the behaviours discussed, and these behaviours may have been missed in previous, shorter duration studies.

Finally, psychology’s scientist-practitioner model has been identified as a way of bridging a gap between researchers looking at IS on the one hand and practitioners implementing IS within organisations on the other. Whilst there are some issues with this model, its introduction could help address the ongoing
issues with IS implementation that were part of the rationale of this and other similar studies.
References


effects of integration climate and project management. *Information and Management, 45*, 394-402.


Appendix 1

Longitudinal events log

A.1 Introduction

The implementation of MFHRIS was focussed towards a Go Live date of Monday July 2nd 2007. This date was selected to coincide with the financial end of year reporting as it was judged that this was the best time to modify the financial version of the legacy IS as part of the overall project. A dedicated Project Team comprising employees from within the organisation and subject matter experts and experienced trainers on contract came together in early January 2007 to commence the pre-implementation activities. The researcher joined this team as a change agent primarily involved in communications and training scheduling amongst other tasks. This log captures the day-to-day events during the study period.
## Appendix 1: Longitudinal events log

### January 2007 to February 2008

<table>
<thead>
<tr>
<th>Ref</th>
<th>Who, where and when</th>
<th>Comments noted</th>
<th>My notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>119</td>
<td>8/2/08 Meeting held with maintenance and reliability managers to discuss concerns over the time required to service MFHRIS.</td>
<td>Since MFHRIS was implemented in July 2007 we have been working through various problems with the day-to-day use of the system. A number of things have been sorted out and peoples’ general skill level is improving with use. One manager raised the concern that some of our maintenance people are spending significant amounts of time at computer terminals interacting with the MFHRIS system and that this is reducing the amount of time spent around the equipment. We are still suffering from a general lack of detailed MFHRIS skills within the maintenance community, although a few of our people are becoming quite proficient as they learn. One aspect of MFHRIS which consumes time is the number of transactions associated with purchasing goods and services. This was largely handled by the purchasing department previously, but is now a major time component of our maintenance people.</td>
<td>In doing MFHRIS, they are not doing their job.</td>
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<td>118</td>
<td>7/2/08 Maintenance managers requesting a discussion re the time required interfacing with MFHRIS.</td>
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<tr>
<td>117</td>
<td>23/1</td>
<td>Comments from another project team, “Here’s your budget, now make it fit”.</td>
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<tr>
<td>116</td>
<td>17/1</td>
<td>My thoughts</td>
<td></td>
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<tr>
<td>115</td>
<td>6/12 SA with project engineer re MFHRIS projects modules</td>
<td>Overall, the MFHRIS projects system is not causing too much grief. In part, this is because most users only access limited parts of the total system, for example, to obtain project numbers to enable project related costs to be charged to the job that they’re looking after. Another factor is that, compared to the day-to-day use of MFHRIS by the plant maintenance people, the project user doesn’t have the pressure of time and things like the allocation of down day labour costs to worry about. It appears that the MFHRIS system has much more to offer in terms of cost and resource analysis than we’re currently using, and hopefully down the track we can utilise these aspects. Once again, the key users are providing timely and useful assistance to users, and directing the requests that they cannot address to the right people. Now that we know what we need to know, a round of remedial training would be recommended.</td>
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<tr>
<td>114</td>
<td>6/12</td>
<td>Is the desire to link MFHRIS with Event an example of the uptake of features or confirming a system that needs help?</td>
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<tr>
<td>113</td>
<td>28/11 OH&amp;S managers</td>
<td>5 year strategic OH&amp;S plan. Felt leadership the key. Need a consistent set of operating principles. Look at culture from a practical sense. Culture of mindfulness.</td>
<td>Compare OH&amp;S systems with IS systems</td>
</tr>
<tr>
<td>112</td>
<td>23/11 Maintenance employee</td>
<td>Frustration with printing out too much paper, the requirement for different isolations for different disciplines.</td>
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<tr>
<td>111</td>
<td>13/11 SA with plant maintenance employees</td>
<td>Once again the themes of time required due to poor familiarity with the system, along with the inflexible MFHRIS system itself were raised. Poor response from purchasing department is causing frustration and slowing down the MFHRIS process flow in a number of instances. It has become apparent that the old system wasn’t all that bad, and in some ways MFHRIS is more cumbersome from the plant user’s perspective.</td>
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<td>110</td>
<td>13/11 SA with Jim re MFHRIS maintenance and purchasing modules</td>
<td>Jim has a good understanding of the intent behind the use of MFHRIS, and also a good grasp of the day-to-day issues given that a number of us come to him with questions. There are opportunities to gain benefits from MFHRIS features that we are currently not utilising. Issues include the need to fix some of the model service specs, set up mass service entries for the likes of</td>
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<td>Date</td>
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<td>Details</td>
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<tr>
<td>29/10</td>
<td>8/11</td>
<td>SA with 9 maintenance employees from Production Unit 1</td>
<td>The Production Unit 1 Maintenance Group is still on a learning curve with MFHRIS, especially given that there have only been two maintenance shut days since GoLive. There are numerous ‘frustrating roadblocks’ in the system that have led to a number of people spending way too much time at a computer terminal with MFHRIS. Even though the training provided was good, it has not produced enough competent users, and further job specific follow-up training is recommended. In many ways the MFHRIS system is inflexible, especially compared to the previous system, and it appears that local users are required to spend a considerable more time with MFHRIS than people may have imagined.</td>
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<tr>
<td>29/10</td>
<td>My thoughts</td>
<td>Need to distinguish between (1) develop the system and install, (2) install a system with no prior history to draw upon and (3) install a system with previous experience relying upon a “template”. Implementation or installation?</td>
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<td>29/10</td>
<td>30/10</td>
<td>SA study site maintenance</td>
<td>Minuted and attached. Shops and Services, like most of us study site, are still on a learning curve with MFHRIS. There is a combination of ‘familiarity with the system’ issues, which will be reduced over time with instruction and experience, along with the inflexible MFHRIS system itself which requires more manual input and time at a computer terminal than the previous system did.</td>
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<tr>
<td>29/10</td>
<td>22/10</td>
<td>Consultant</td>
<td>Intro to new expense management system.</td>
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<tr>
<td>29/10</td>
<td>Small site Maintenance manager</td>
<td>Generally you can find someone who knows when you get stuck.</td>
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<tr>
<td>25/10</td>
<td>Bob’s PA</td>
<td></td>
<td>HR module is an excellent system. The MFHRIS doesn’t seem to be anywhere near as easy to use or as useful as the previous system was.</td>
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<tr>
<td>25/10</td>
<td>25/10</td>
<td>Conversation with an IS Business Analyst about another new system</td>
<td>The other new system developers had a very clear algorithm, their mathematical model to explain scheduling, but the IT package was not written by computer savvy people. They ended up with software that was extremely inefficient in terms of computer resources. His perspective re MFHRIS: “When is someone going to realise that the emperor isn’t wearing any clothes? What is it about this MFHRIS thing? They seem to have mesmerised everyone.”</td>
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<td>24/10</td>
<td>24/10</td>
<td>IT employee</td>
<td>A much bigger previous project had everything, why didn’t it fly?</td>
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<tr>
<td>19/10</td>
<td>My thoughts</td>
<td></td>
<td>Models such as the TAM predict the behaviour of an individual user. Success depends upon many users’ behaviour exceeding some critical mass.</td>
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<tr>
<td>18/10</td>
<td>Maintenance employee</td>
<td>The main problems since implementation have been associated with goods receipting and payments. One supplier has received money from us but doesn’t know what it is for. Australian Business #2 were not really impacted because they were buffered by a third party to some extent. Some people have reported problems that seemingly have fixed themselves. “What did you do? I don’t know”. We’ve upset many of our suppliers.</td>
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<td>18/10</td>
<td>Logistics employee</td>
<td>The report into MFHRIS is now up and running!</td>
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<tr>
<td>18/10</td>
<td>Maintenance employee</td>
<td>System seems OK. It only takes 21 minutes to create an order. Its harder to locate unfamiliar parts compared to the previous maintenance system. Payments to vendors and suppliers are slower than in the past, sometimes taking more than 120 days.</td>
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<td>17/10 James</td>
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<td>Still problems with the paperwork that accompanies incoming goods. Some customers are getting what they need from the MFHRIS paperwork; it’s a learning curve for them too. Australian Business #2 is still using workarounds 2 years after implementation. Supply department stopped processing paperwork 6 weeks too early, which caused study site many issues. There were some issues with the roll shop people but they tried to get back to an activity-based system like the previous maintenance system. “The roll shop got the system that they and the accountants were prepared to accept”.</td>
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<td>Date</td>
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<td>95</td>
<td>23/8 Major situation appraisal of purchasing with the input of 30 employees from across a number of business functions.</td>
<td>I believe that there was a major weakness in the MFHRIS implementation approach that has contributed to many of the issues that we’re dealing with today. The “template” approach where the implementation followed the steps that had been used “successfully” twice before, in Australian Business #2 and NZ Business, had two major flaws (not considered major flaws by the MFHRIS team). First, the study site is different enough from the previous operations to have warranted at least a pre-implementation study prior to the rollout. This is best illustrated by the issues with paint ordering where MFHRIS was substituted for only part of the existing system, and serious issues arose from where the old wasn’t compatible with the new, e.g., the EUC report. I believe that the MFHRIS team should have stayed with this issue until paint ordering was flowing smoothly, not until the MFHRIS part had been demonstrated to work to specification. Second, it would appear that the MFHRIS team didn’t learn from either the Australian Business #2 and NZ Business implementations, such that they could avoid making the same mistakes again (there were many lessons learned from the previous implementations at Australian Business #2 and NZ Business that were part of the Study organisation implementation). The combined supply – MFHRIS team didn’t have a working knowledge of the study site, and hence implemented the new system with incorrect assumptions. Study site doesn’t have a goods receipt store like other sites. We used a stationery provider system, and hence the change to ordering stationary through MFHRIS was a backwards step as we no longer have tight control over spending, and our common items aren’t considered common items under MFHRIS. NZ Business moved away from the MFHRIS implementation for ordering paint, which raised orders via supply department, but we implemented the original system only to move to creating our own requisitions after a month of problems. It was expected that there would be some weeks of disruption following GoLive, and the MFHRIS team consider that, compared to other IS implementations; this one has been quite trouble free. With respect to training, and training evaluation, there is also, I believe, a flaw in the evaluation. The implementation review reports trainee evaluations in the 90%’s, where the industry benchmark is reported as 80%. Our evaluation focused upon the efficiency of the training process, and the immediate experience of training. The trainers do this for a living and have done so for this organisation twice previously, and people likely responded to the polished presentation. Studies (Davis, 1986) have shown that if you ask people items such as, “Will you find the system easy to use when you get back to your workplace?” or “Will using the MFHRIS system that you’ve learned about today be useful in your job?” then their responses will actually correlate with usage when people get back into their workplace. Had we used items with better discrimination, then we could possibly have learned from the responses which areas or groups may have needed further follow-up. The point with respect to training at the study site that is perhaps more salient, is the large number of people identified and scheduled for training, both face to face and computer based, who did not go through with their training. There is a marked difference between training attendance at the study site and Vic sites. For example, only about 25% of purchasing users have done their required CBT modules, which is likely to explain a large number of the issues with receipting. This review caused quite a discussion within the company by those who perceived that they were being criticised. Unfortunately the discussion seemed to be more about the notion of criticism, than about the content of the appraisal. The comments in red are those added by the MFHRIS management.</td>
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<td>94</td>
<td>22/8 Spent 2 weeks (prior to 6 weeks away from study site) on another project. [RTW 16/10]</td>
<td>Compared to MFHRIS this project was very much an ‘in-house’ exercise. See accompanying documentation.</td>
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<td>93</td>
<td>13/8 Training session organised by supply</td>
<td>Supply team had mistakenly not included many of the study site items into the MFHRIS catalogue as they picked their top 100 on the basis of volume and frequency, and the study site transactions were very much outnumbered by the other ones. Study site had a very good purchasing system, and the new purchasing system was less flexible and more time consuming for the study site users. “Stationery provider’s previous system was a brilliant system because it was made by the stationary company.” When Australian Business #2 changed over to MFHRIS “it was a nightmare”. There are MFHRIS bugs in the system linked to certain key user accounts. “I would have thought that MFHRIS would have talked to Australian Business #2 to not repeat the mistakes they made with them – or at least have talked with stationery provider”. So how do we predict usage when the employees have to order their supplies, but obviously both PU and PEOU will be negatively impacted? Predict high levels of reactance. It appears that the MFHRIS team did not consult with many (any?) suppliers who lie...</td>
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<td><strong>92</strong></td>
<td>Discussion with Production unit 2 manager re the absence of study site people from training, 8/8/07</td>
<td>Manager saw a number of problems with the MFHRIS implementation. He saw that there was a communication disconnect between the Project Team and integration at a site level. This included a great deal of inflexibility on what was being offered. Resources were not properly identified and there didn’t seem to be much thought as to who needs what. The project arrived very quickly at the management level, and the MFHRIS team didn’t do the ‘up front’ stuff. The training was not targeted to the needs of the business, for example, see the issues around the supply of paint. The MFHRIS team didn’t get to the right level of ownership, they didn’t do the whole job. <strong>The MFHRIS team didn’t understand the context within which they were working.</strong> The MFHRIS team needs to provide a flexible training approach from here on in.</td>
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<td><strong>91</strong></td>
<td>My thoughts - 8/8</td>
<td>Along the lines of tacit success, is implementation failure what happens when those in control consider that the effort required to support the system no longer justifies the perceived benefits, from their perspective?</td>
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<td><strong>90</strong></td>
<td>Mack – 6/8</td>
<td>Email re the high number of queries from study site re purchasing issues.</td>
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<td><strong>89</strong></td>
<td>Study site IS Manager – 6/8</td>
<td>At the IS morning phone hook up, it was observed that MFHRIS at Vic site is going smoothly, whilst at the NSW sites, specifically the study site, there still seems to be issues. Attributed to a lack of training stemming from lack of management support. At Vic site, training in MFHRIS was made part of the management’s STI (bonus). At NSW site, there were times when MFHRIS was identified as the cause for day-to-day issues. For example, at the June OH&amp;S meeting, it was mentioned that some managers were spending “10 days away from their jobs due to training”. In fact, at this point in time, only 1 manager had spent 1 day in training; the rest had not even been put onto the schedule for training. The “10 days” was repeated a few times subsequently; the power of negative filters!</td>
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<td><strong>88</strong></td>
<td>Corporate IT manager 3/8</td>
<td>Discussion re the follow-up study for the ARC grant. Happy for us to do a preliminary study of study site re the current perceptions of the possibility of introducing MFHRIS Event module. Contact NZ site finance manager to conduct a follow-up survey. They have something like 60 (?) outstanding MFHRIS issues, of which only 4 seem to be system related, i.e., the rest are people related.</td>
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<td><strong>87</strong></td>
<td>Production unit 2 maintenance – 2/8</td>
<td>Maintenance managers had issues with paperwork being returned from accounts. They had tried to process various goods and services the ‘old way’ and discovered that they could no longer do that. Interestingly they rejected the possibilities that lack of their involvement and training, or willingness to discuss concerns with the MFHRIS team may have contributed.</td>
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<td><strong>86</strong></td>
<td>9/7 SA held with study site 1 employees and MFHRIS staff re the problems being experienced with purchasing since Go-live</td>
<td>The format of the meeting was to ask the attendees for any current issues associated with the small site and study site paint lines, in particular with respect to: - Ordering paint - Paint stocks - Scheduling the lines - Paint companies The intent was to list the issues, clarify and separate as needed by group discussion, prioritise and decide how to progress. A responsible person was assigned to those issues that required action. Full notes available.</td>
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<td><strong>85</strong></td>
<td>6/7 My Thoughts</td>
<td>Downloaded PCPACK software</td>
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<td>77</td>
<td>My questions – 18/6</td>
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<tr>
<td>Potential problems table (?)</td>
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<tr>
<td>Organisation perceives the need for an IS: Was there really a need, at this time?</td>
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<td>The IS is selected: cost/benefit is the choice the right one for the whole organisation?</td>
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<tr>
<td>Deployment: Training, rollout, cut over, support</td>
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| 78 | My thoughts – 18/6 |
|---------------------------------|
| Tacit Law: arises by operation of the law, rather than through direct expression, i.e., the way we do things around here. Tacit approval, tacit success? |
| John Sherwood’s dance |

| 79 | The paint issue – 19/6 |
|---------------------------------|
| Around about 4 weeks ago, I became aware that there was a high level of uncertainty around who should be trained and in what, with respect to the ordering of coating metals and paint. These are huge accounts probably in excess of $250K per annum. The details were being left to contractors to sort out and I raised this with the project leads. Am told that this is now under control. |

| 80 | Corporate IT manager – 20/6 |
|---------------------------------|
| Issues re project support at GoLive. |
| There will be 4 to 6 weeks post-GoLive support offered for the Study organisation (turned out to be just over 3 weeks). |
| The role of IT within businesses is changing; it’s now an embedded necessary function. |
| MFHRIS incident – it used to work; now it doesn’t. |
| Project – lots of change requests put together. |

| 81 | Leximancer course 21/6 |
|---------------------------------|
| Training course at UTS. |

| 82 | Recorded interview with study site maintenance people – 29/6, Friday before GoLive. |
|---------------------------------|
| Only recurring maintenance within the old maintenance system. |
| Anticipate anywhere from comfort to mild panic. |
| 1 to 2 weeks confusion is OK. |
| Old maintenance system works on dumb terminals; some operators are still quite PC illiterate. |
| Compared to the old maintenance system, the MFHRIS can do more and its elements are well integrated. |
| For the data team, they worked mostly in Excel. They were thrown in at the deep end, but the experience was most worthwhile. They felt that the people in the plant who run it day to day should have been in their shoes. |
| In their work, they came across some equipment that had likely never been maintained. |

| 83 | 2/7 GoLive |
|---------------------------------|
| The system became operational over the weekend, and there was very little evidence that anything had changed. |
| Most issues raised seemed to be about passwords and logging on, or similar access issues. |
| “Health Check” - System still running smoothly, although with a number of processes still to start. 1 high priority QSM regarding miss-mapping of partner vendors is preventing completion of the vendor open invoice load. The finance and conversion teams are working with the contractor to resolve this issue. The Project Team reported that an issue was experienced with the paint interface and has now been resolved. |

| 84 | 5/7 Kev’s paint problems. |
|---------------------------------|
| Kev works on the study site paint line, and helps to order their paint. When I called in to see him he told me that, “someone has sent me email of congratulations for MFHRIS, not for us!” He was having a number of issues ordering paint, including, being left out of the project consideration, not knowing how to use the MFHRIS functionality, paint arriving before he had an order number. The issues were covered in a separate SA. |
| His counterpart at one of the smaller sites, JC, said that his training was poor at best. |

The conceptual model will seek to explain IS-related behaviour; I also need to explain how the behaviours relate to IS implementation success or failure.
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<tr>
<th>Appendix 1: Longitudinal events log</th>
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<td><strong>76</strong></td>
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<td>Appendix 1: Longitudinal events log</td>
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<tr>
<th>Event ID</th>
<th>Description</th>
<th>Details</th>
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<tr>
<td>57</td>
<td>Mack, Vicky &amp; team PA ‘team huddle’ on the afternoon of 27/4.</td>
<td>Once again, bums on seats. Myself and one of the study site HR trainers to walk around the various managers and get people to commit to training places. Whilst agreeing that training places need to be filled, and that advance warning for participants is necessary, there were several occasions when the critical thing was that the project didn’t want the business saying at some later date that there was not sufficient notice given for training, and that this disrupted the business.</td>
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<td>56</td>
<td>Weekly transition team meeting, 27/4. NSW and Vic Project Team Members via phone hook up.</td>
<td>This was a very short meeting basically around the theme of assuring ‘bums on seats’ during the training. A very informal handover of a formal process, and now I was responsible for the sign off.</td>
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<td>55</td>
<td>Myself, Bob, the site manager, Mack (by phone) in Bob’s conference room, 26/4/07.</td>
<td>The study site had not provided a person to fulfil the role of ‘business to MFHRIS’ coordinator, so one of the key actions involving sign off to accept the systems has not been done. Bob and Mack asked me to coordinate sign off of the interim procedures to be used for engineering and maintenance. A very informal handover of a formal process, and now I was responsible for the sign off.</td>
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<td>54</td>
<td>Weekly transition team meeting, 20/4. NSW and Vic Project Team Members via phone hook up.</td>
<td>Small sites to be engaged via a net meeting this afternoon. Need to find out where potential users are up to (not actioned). It was commented that we shouldn’t get people off night shift onto training the next day. Training will commence on Monday 21st May, there is no training planned for the Friday of that week as it will be used as a review day. The weekly meeting, which began as a ‘fun’, well-planned event has become rather hectic. There is no longer the ‘mandatory’ safety contact at the beginning, and some of the conversation is sharp and unfriendly at best. The polycom which has been labelled ‘do not remove from this room’ has been removed and a lesser equivalent substituted.</td>
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<td>53</td>
<td>Meeting with people from the study site who order things: they will move to the MFHRIS.</td>
<td>Main concerns were broader access to catalogues and goods receipts. General consensus achieved, need to give clear expectations and review regularly.</td>
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<tr>
<td>52</td>
<td>Meeting between Project Team and study site representatives to discuss deployment, 16/4.</td>
<td>Mack gave a presentation, and Jim filled in the detail. Sticking point was the need for 2 more resources, i.e., engineering and maintenance deployment people for the study site. Various emails had gone back and forwards (see MFHRIS kept emails). Apparently 2 people had been indicated to fill these roles in 11/06, but they didn’t come. This wasn’t communicated to anyone, and now the Project Team expects the study site to supply the people. Project asked that old orders be closed off. Apparently this isn’t mandatory, but if not this will mean a lot of work for the team translating the data. It will be interesting to see what happens given that the effort to close out will need to come from within the study site, but the impact will be on the project team.</td>
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<td>51</td>
<td>Phone conversation with maintenance employee at Vic site.</td>
<td>Vic site initially wanted to use the events system for everything, but couldn’t come up with a universal format. It was then mandated that MFHRIS would be the maintenance system, so they went that way. In order to make life easier, they have opted to use a daily information dump from MFHRIS into event for their review meetings. This is analogous to a story told about Production Unit 2. In about 1998 – 2000 (?) when the request was for the maintenance people to bring the blue cards to the morning meeting – another aspect of reactance?</td>
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<td>300</td>
<td>6/01/2010</td>
<td>Discussion with small site management team, Goods ordering and goods receipt still a bit of a mystery. This small site not 100% sure of what they currently do. Vic site has opted for a situation where everything will go through their stores for goods receipt, meaning few people will use the MFHRIS.</td>
</tr>
<tr>
<td>48</td>
<td>Project team update</td>
<td>Training to commence 18/5, post go-live training will continue until 10/8. Everyone needs to be loaded into training by 7/5. Initially most people trained will come from the key user group.</td>
</tr>
<tr>
<td>47</td>
<td>Mack meeting with logistics 4/4</td>
<td>Logistics approach was 'we won’t use it if it doesn’t suit us'. According to Mack, this is a result of not doing a pre-feasibility study to identify these sorts of concerns and obtain buy-in. Even though Study organisation signed up for a template implementation, there is significant creep around the scope in the maintenance area. Is this a result of reactance generated through the loss of perceived freedom, or just failure to do the required tasks at the front end?</td>
</tr>
<tr>
<td>46</td>
<td>Training room 4, first hands on training.</td>
<td>System is not intuitive to navigate. Doesn’t ‘feel’ like a Windows application.</td>
</tr>
<tr>
<td>45</td>
<td>Weekly transition team meeting, 23/3. NSW and Vic Project Team Members via phone hook up.</td>
<td>What’s happening with project Lagoon, another parallel project that is consuming resources? Learning centre spends $5K per month to lease the server. Communications between geographically separated people is an issue for this sort of project. Audience analysis remains the highest priority. [The audience analysis that I prepared earlier, but was rejected would have helped out here.]</td>
</tr>
<tr>
<td>44</td>
<td>20/3 Meeting with study site maintenance staff to discuss user security profiles in MSS conference room</td>
<td>Production unit 2 intend not to use MFHRIS as their notification tool as planned, they will only use the M2 notification if they need to order parts. They will continue to use the event system, which is a home grown one. Currently there are times when even breakdowns only find there way into the events system, they aren’t entered into outgoing maintenance system either. There was some confusion about what will happen in the period some weeks before go-live when ‘interim procedures’ are in place. One supervisor seemed concerned about the potential ‘industrial implications’ of trying to get people to use the new system.</td>
</tr>
<tr>
<td>43</td>
<td>16/3 No weekly meeting</td>
<td>Key people were committed to other meetings. The is a noticeable change in the attitude towards team stuff, as if that can be ignored when people are busy?</td>
</tr>
<tr>
<td>42</td>
<td>15/3 Interview with Travel system consultant, Commercial Bldg, also taped as CO_2.</td>
<td>She has been implementing the change from Amex to CWT travel, as a consultant. Travelling road show to talk to the key users at each site. Amex had targeted the ‘top-end’ users, which made her job a little more difficult. There seemed to be an opinion that different equated to worse. The project used an intranet site and published user guides, but they seem to have been generally ignored. It was noticed that the study organisation seemed to be in a constant state of change. The CWT (travel) system speed has been very slow since implementation (see interview). Web training has been instigated since implementation to capture those users who had missed out. Fast-adopters have now turned out to be the most critical; symbolic adoption?</td>
</tr>
<tr>
<td>41</td>
<td>13/3 Maintenance key users 2nd training session in the Springhill MTC</td>
<td>The turn out (19 attendees) and level of energy was pleasing. Most comments were directed at trying to understand and anticipate working with the MFHRIS system. The types of questions were targeted towards getting MFHRIS to do their jobs, i.e. job first, MFHRIS as a support tool.</td>
</tr>
<tr>
<td>40</td>
<td>10/3 My observations (whilst recovering from 2 hours of)</td>
<td>I am interested in all the behaviours in, on or around the IS implementation: what are they? Refer paper discussing key players in IS implementations.</td>
</tr>
<tr>
<td></td>
<td>Weekly transition team meeting, 9/3. NSW and Vic Project Team Members via phone hook up.</td>
<td>Another system being introduced into Study organisation, has ‘blundered’ into this MFHRIS; it may have to wait until after MFHRIS go-live. A demonstration of the outgoing maintenance system was given, as none of us were actually users. The general opinion was that the outgoing system was actually quite a sophisticated system with much of the functionality of MFHRIS, whereas people had previously thought of it as being quite Spartan.</td>
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</tr>
<tr>
<td>38</td>
<td>MFHRIS bldg., software supplier representative</td>
<td>General discussion about IS implementation and causes of failure; refer previous study on what works.</td>
</tr>
<tr>
<td>37</td>
<td>My thoughts</td>
<td>Orlikowski &amp; Robey (1991, p.144) reflect upon • inattention to questions of causal agency • over-reliance on variance models in theory, and • failure to distinguish amongst individuals, groups and organisations as levels of analysis They mention ‘emergent’ rather than ‘deterministic’ models of causal change.</td>
</tr>
<tr>
<td>36</td>
<td>Net meeting with the small sites key user group.</td>
<td>Emphasised the view that change management and timely communication was critical. In the new supplier relationship management modules procurement was by shopping carts. Part of the presentation was the assumption by the MFHRIS team that we were not going to train people how to do their job, this was a given. For example, we assume that people are competent computer users, and the group agreed that this was a fair assumption.</td>
</tr>
<tr>
<td>35</td>
<td>Maintenance key users training session in the NSW site main training centre.</td>
<td>With what the attendees had seen so far, there was discussion of how the old system allowed the more straightforward tasks to be done more easily than what MFHRIS was offering, but there was acknowledgement that in the long run, MFHRIS had a lot to offer to the broader business. There were some –ve comments about what might occur around breakdowns. The belief was that MFHRIS’s requirement for approval before proceeding with urgent work could delay jobs. The main area of concern was the acquisition of spares. Currently the maintenance people can ring a central resource to get spares sent out immediately, whereas MFHRIS requires notification and authorisation/approval.</td>
</tr>
<tr>
<td>34</td>
<td>Catch up with Vicky.</td>
<td>Contact key users via NSW site reporting tree. NSW site sessions for maintenance users will commence next week. Need to pick up on key production people who have been missed to date, such as the production clerks.</td>
</tr>
<tr>
<td>33</td>
<td>Weekly transition team meeting, 2/3. NSW and Vic Project Team Members via phone hook up.</td>
<td>Need to pick up maintenance people who run small projects (an engineering function) through the old systems. TWNW discontinued a/c possible information overload. Vic maintenance introductory training sessions are going well, only 1 negative person. Vic Key user training is commencing. Compare the MFHRIS project with the non-prime conversion for NSW site. Vic management is now expressing concern over the tight training schedule which is 6 weeks pre go-live and 4 weeks after go-live.</td>
</tr>
<tr>
<td>32</td>
<td>HR trainer at NSW site.</td>
<td>The old version of the MFHRIS, currently used to capture safety training information, will not be used for the MFHRIS training. In the Australian Business #2, where the MFHRIS had been implemented 18 months ago, there are still groups of people who are using the old systems. When eventually they are required to change over to MFHRIS, there will be 2 years or so of data that will not have been translated.</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
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<tr>
<td>31</td>
<td>27/2 Northern businesses key users session</td>
<td>Issues were captured on the flip charts. The PowerPoint presentation was also recorded.</td>
</tr>
<tr>
<td>30</td>
<td>26/2 Catch-up with Vicky</td>
<td>Which key stakeholders have been left out? Need to start TWNW list (this week, next week). Feedback sheets will come out of the key user situation appraisal, and will generate the initial frequently asked questions. It turns out that the NSW site research had not been included. This was eventually not used.</td>
</tr>
<tr>
<td>29</td>
<td>24/2 My thoughts</td>
<td>Considering the notion of implementation success vs failure, is there an opportunity to bring in KT’s problem analysis approach? The notion of a meta-model to locate reactance now seems to be an important one. In the model, there could be a systems related strand as well as a behavioural one. ** Refer to Wixom &amp; Todd, 2005 article. - not competing models, but steps in a causal chain/causal environment, absolute usage and use relative to opportunity, this is good but is still ‘use’.</td>
</tr>
<tr>
<td>28</td>
<td>Weekly transition team meeting, 23/2, NSW and Vic Project Team Members via phone hook up.</td>
<td>There are some NSW site employees who are apparently not keen to travel a short distance for the key user session next week. The second key user session at Vic went OK, but there were fewer people present. It was reported that the key user response was excellent, although there also seems to be some confusion about the meaning of key user. People’s job descriptions don’t necessarily give a true account of what they actually do. For the previous implementation, only about 70% of the users were trained. By comparison, for this implementation there will be more users who will need to be trained in how to raise a task list pre go-live. At the NZ site, there was a requirement to maintain extra support for over 12 months after go-live due to there being insufficient time up front to evaluate their ‘as is’ situation. I asked if we could include some items about people’s attitude towards MFHRIS, rather than just the training, in the post training evaluation, but there was reluctance to change what they has used before. This was an interesting discussion, but I didn’t get the feeling that the difference between people’s attitudes towards MFHRIS, and their acceptance of MFHRIS training was understood.</td>
</tr>
<tr>
<td>27</td>
<td>My reviewing of the power point slides prepared for the key user sessions, 21/7.</td>
<td>Slide 6 contained MFHRIS specific terms such as ‘SLISCP’ which will need to be explained to the audience. Slide 7 was a summary of the production units affected by the MFHRIS implementation, but was clearly out of date. SLISCP was an accounting term that was not known to the transition team, clarified by financial staff. A good example of why having employees as part of the transition team is a good idea.</td>
</tr>
<tr>
<td>26</td>
<td>Supply department manager, 19/2/07</td>
<td>Project needs to capture everyone who requisitions through the old systems. Nobody in supply currently uses the old systems, they had converted to the MFHRIS during the previous implementations. What about people from the NSW site canteen and the works nurses? Do they use the old systems and have they been contacted? Currently vendors have to reference their catalogue numbers to multiple organisational reference numbers. MFHRIS punch out process is based on the check out – trolley analogy. Is this suitable for plant based maintenance people? Even at this stage of the transition, there are potential people being identified. The potential issues with purchasing have not been flagged to date (?).</td>
</tr>
<tr>
<td>25</td>
<td>Vicky &amp; Mack, 19/2</td>
<td>In terms of the template approach, if you the systems being replaced, you will be trained in the replacement system. But some production supervisors want their people to become front end users, i.e., to use MFHRIS where in the past they had not used a system, but had reported verbally to someone else. “You can continue to phone whoever you used to phone, so long as they have been trained”. The initial implementation is just to get the core system in place. Expectation more than the project has allowed for I suspect.</td>
</tr>
</tbody>
</table>
| 24    | Marg, 19/2/07 Follow up to TR 1 | Marg had been thinking about some of the things that we had discussed previously, and had three observations to offer. Thinking about the concept of management buy-in to the project, and the need for ongoing commitment, there appears to be at
### Appendix 1: Longitudinal events log

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>303</td>
<td>this early stage a definite difference between Vic and NSW, where the Vic people are more visible in their support of the MFHRIS activities. Will this be reflected in the nature of the end result when we compare the 2 sites? Reflecting on the discussion we had about the processes of change and grief, where the person reacts to something of value lost, does this become part of the person’s behaviour over time? Is it only a short time phenomenon? Is it related to the exposure and level of emotional buy-in to the system being replaced? How much emotional energy has been invested in the legacy maintenance system at the 2 sites? How does the background/experience of the management team at the NSW site and the users compare to their counterparts at the Vic site with respect to this project? Observation (Marg): the NSW site focus is more on action, than on systems. Could it be that the NSW site does not have a collective vision of what the proposed MFHRIS system can do for the business? If we look at project success as defined by “achieving the desired outcomes”, then in light of the above possibilities, could their be people who’s desired outcome is the status quo?</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Production Unit 2 manager, 16/2</td>
<td>I caught up with him after the site manager’s meeting. He agreed to let me give him and his direct reports an introduction to the MFHRIS project at their next (20/2) team meeting.</td>
</tr>
<tr>
<td>22</td>
<td>NSW site manager’s monthly meeting, 16/2</td>
<td>I had spoken at the previous meeting to give NSW site manager’s direct reports an update on the MFHRIS project, but there was no request to do so at this meeting, and the MFHRIS was not mentioned or discussed even though I was there?</td>
</tr>
<tr>
<td>21</td>
<td>Interview with Corporate IS manager 16/2 BL_1</td>
<td>She now works at a corporate level but has worked throughout many areas of the business. She agreed to talk again when the implementation date was closer.</td>
</tr>
<tr>
<td>20</td>
<td>Weekly transition team meeting, 16/2</td>
<td>Ready to go with day in the life analyses, i.e., which roles actually carry out which functions? Web page previewed. The focus on the production users will be to train them in raising an issue. Currently this is done through their supervisor who enters the issue into the events system. Do we have enough $ to provide MFHRIS logons for that many users? This was not in the original scope. Re-iterated that we are ‘dumping’ a template onto Study organisation, which collectively exhibits risk-averse behaviour. NSW site will need to change their processes to match the template, albeit the changes are not anticipated to be major. The meeting was noticeably more business like and focussed on the implementation process than previous weeks.</td>
</tr>
<tr>
<td>19</td>
<td>Marg, 13/2/07 Notes to accompany the taped interview TR_1</td>
<td>The following prompts were used in this interview: Thoughts about training: what works, what doesn’t. Do you change your training approach depending on the audience? How do you know if the training is effective? If you were to audit a user, what would you look for to measure how well they were going? Have you had an experience when you were asked to present training to a hostile audience? What did you do? For systems such as MFHRIS, is there a ‘best way’ to train, or is it a combination of things? You mentioned that the concept of ‘people resistant to change’ might not be accurate, and that perhaps its more the point that people fear what they don’t know. I’d like to ask about this. I’m interested in any thoughts that you may have about why people in groups behave differently than they might do alone. We’ve even seen situations where within this organisation the behaviours can be different plant to plant. Following on from the interview Marg related a story about a previous client who had gone through a problematic implementation. They attributed the problems to issues with the material master data. They failed to realise that these issues had been caused by a couple of key people who wouldn’t ‘let go’ and subsequently they had another similar problem with a subsequent implementation.</td>
</tr>
<tr>
<td>No.</td>
<td>Date</td>
<td>Event</td>
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</tr>
<tr>
<td>18</td>
<td>9/2/2010</td>
<td>Weekly transition team meeting, NSW and Vic Project Team Members via phone hook up.</td>
</tr>
<tr>
<td>17</td>
<td>7/2/07</td>
<td>MM thoughts</td>
</tr>
<tr>
<td>16</td>
<td>6/2/07</td>
<td>MM thoughts</td>
</tr>
<tr>
<td>15</td>
<td>2/2/2007</td>
<td>Weekly transition team meeting, NSW and Vic site members of the Project Team via phone hook up.</td>
</tr>
<tr>
<td>14</td>
<td>1/2/07</td>
<td>My thoughts after the discussion,</td>
</tr>
<tr>
<td>13</td>
<td>1/Feb.</td>
<td>Vicky, Jim and Nick,</td>
</tr>
<tr>
<td>12</td>
<td>31/1</td>
<td>Production Unit 1 supervisor,</td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>Event Description</td>
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</tr>
<tr>
<td>11</td>
<td>Vicky, 29/1</td>
<td>The go-live date is not the end of the project, it’s just a stage in a longer process. The project offers businesses a chance to reorganise how the work is done.</td>
</tr>
<tr>
<td>10</td>
<td>Vicky, 24/1</td>
<td>The training for the MFHRIS system is specified, but in our experience you end up teaching people how to do the actual job that the business thinks that they are doing.</td>
</tr>
<tr>
<td>9</td>
<td>MFHRIS opening session “Launch” for the northern business.</td>
<td>Template approach to minimise scope changes. MFHRIS for engineering projects is new, hasn’t been used within the study organisation previously, unlike the other modules. Will deliver significant dollars, especially as the current maintenance and finance modules are no longer supported. NSW site did not claim any business benefit, “Changing how people use the system, not the system itself that delivers the benefit”. Anticipate 1250 users along with 100 corporate/logistics users in an associated project. Legacy systems will not be decommissioned, but no historical data will be uploaded into the new system. Key messages sent out in Dec ’06 were not widely recalled. Conversion team stressed the importance of data conversion. Plan – analyse – design – build – test – deploy. Testing is the key risk reducer. Data conversion is the critical path of any systems implementation. There will be disruption to the business no doubt, we need to minimise this. Releases are often made after go-live to capture any good ideas. 1020 project deliverables, each of which need to be signed off. Organisation President, and project champion, not available. Few business managers attend. Project team confident, they’ve done it before.</td>
</tr>
<tr>
<td>8</td>
<td>Weekly transition team meeting. Attendees included Mack, Marg, Vicky along with Project Team members from both NSW and Vic.</td>
<td>Project reporting to be via Sharepoint, a new software. User analysis is on the way, a critical tool in this exercise. Maintenance people involved and pro-active at Vic site, need a similar role and energy at the NSW (study) site. Good feel to the team at this stage. Already concerns about the level of involvement at the NSW site; this was flagged by a number of people already.</td>
</tr>
<tr>
<td>7</td>
<td>Mack, 18/1/07</td>
<td>Mack attended the NSW (study) site management meeting to give them an update on the project.</td>
</tr>
<tr>
<td>6</td>
<td>Small site manager, 17/1/07 He is the operations manager at a Qld site. Telephone conversation.</td>
<td>The Qld small site uses an “off the shelf” maintenance system called MEX, they would like to change to MFHRIS. He has heard whispers about MFHRIS, but nothing in detail. The Qld small site will change to MFHRIS, but only for finance and purchasing.</td>
</tr>
<tr>
<td>5</td>
<td>Mack, 15/01/07</td>
<td>Response to question about using PPA within the business setting</td>
</tr>
<tr>
<td>4</td>
<td>Mack, 10/01/07</td>
<td>The MFHRIS project’s budget and timelines are based upon the original stated assumptions signed off at the organisational</td>
</tr>
</tbody>
</table>

**Appendix 1: Longitudinal events log**
<table>
<thead>
<tr>
<th>General conversation</th>
<th>level. If the current situation around implementation changes there is no provision to accommodate this in the project scope. in the project timelines.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Finance employee, 10/01/07 General conversation</td>
<td>Some of the finance implementation team, including this employee, have been told that they will likely be redundant after the 6-month implementation. One of the current systems used for profitability analysis will no longer be supported by the current vendor so if he leaves there will be nobody who can fix issues that arise. This employee considered that the finance group is in disarray as their business head has left, and there are a number of people changes happening at present. According to him, a colleague from HR told him that moral is at a very low level within finance at present.</td>
</tr>
<tr>
<td>2 Finance manager, 10/01/07 General conversation</td>
<td>This is his 3rd consecutive implementation within the study organisation; he came to this project from a finance background. Communicating to plant personnel via email was not at all useful or effective (“as useful as tits on a bull”), and Ken’s opinion was that the team had to get out into the user’s world and communicate directly. People using that current systems that MFHRIS will replace are not using it correctly and there is no provision for this within the implementation schedule. According to Ken this was a major issue in the NZ MFHRIS implementation, which he considered to be poorly executed. The current implementation will adopt a template approach which essentially means that a model developed in another part of the business which has been considered acceptable will be installed over the current business’s systems ‘as is’. The current business will need to adapt to any differences or shortcomings of the new system. This approach assumes that people within the business are doing their jobs as ‘the system’ expects and that MFHRIS will replace the expected old with the template new. The NZ experience was that people weren’t doing their jobs as the implementation team were led to expect, and in fact were looking to MFHRIS to address issues within the NZ plant. Ken anticipates negative reaction from the maintenance people at the study site who have been using the existing system for quite a while, and with the knowledge that there are things in Legacy Maintenance System that MFHRIS won’t do.</td>
</tr>
<tr>
<td>1 Marg, 10/01/07 General conversation</td>
<td>People in general are not resistant to change in the context of IS, but they fear and react to the unknown. People in groups tend to behave differently to how they might as individuals in an organisational context. Group behaviours can be business or even site specific.</td>
</tr>
</tbody>
</table>
Appendix 2.

Faculty of Health & Behavioural Science

Post-adoptive user behaviour in IT-enabled work systems

Consent Form

I have been given information about this study titled *Post-adoptive user behaviour in IT-enabled work systems*.

I understand that my participation in this research is voluntary, and that my participation takes the form of one of the following:

(i) Completing an anonymous survey,
(ii) Taking part in a recorded group discussion,
(iii) Taking part in a recorded one on one interview with the researcher.

I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my work or employment status in any way.

If I have any enquiries about the research, I can contact Associate Professor Rohan Jayasuriya (ph: 02 42213344) or Dr. Peter Caputi (ph: 02 42213717) at the University of Wollongong or if I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Complaints Officer, Human Research Ethics Committee, University of Wollongong on 02 42214457.

By signing below I am indicating my consent to participate in the research entitled "Post-adoptive user behaviour in IT-enabled work systems", conducted by Michael Matthias, as it has been described to me in the information. I understand that the summary data collected from my participation may be used for publication in peer-reviewed journals and I consent for it to be used in that manner. It will not be possible to identify individuals from the data or findings contained in any journal article.

The report provided to the study organisation will contain only the results of summary data. It will not be possible to identify individuals from the data or findings presented in the final report.

Signed

Date

.......................... .................................................. ......./ ........./ .........

Name (please print)

.......................... ..............................................
Appendix 3 Focus group information sheet

University of Wollongong
Faculty of Health & Behavioural Science

Post-adoptive user behaviour in IT-enabled work systems

Study Information for Focus Group Participants

The study organisation along with the University of Wollongong (UOW) has been given a grant by the Australian Research Council (ARC) to study how IT-enabled work systems such as one of the study organisation’s safety reporting systems are implemented. We are particularly interested in people’s use of IT-enabled systems once they are up and running (post-adoptive use) and how this relates to whether or not the system is considered a success, with a view to doing things better in the future if possible. Michael Matthias is the primary researcher for this study.

This part of the study, which you are being asked to take part in, is a group discussion aimed at getting yours and a number of other people’s opinions on topics related to the use of IT-enabled systems. Topics put forward for discussion will include, for example:

Describe your experiences with the training that preceded the introduction of the system in your workplace.

Has the introduction of the system changed in any way your day-to-day work?

Following on from this part of the study, we will look to build a model to explain the post-adoptive behaviour that we are studying. Participation in this research is voluntary. If you choose not to participate, neither the study organisation nor the UOW will be informed of that decision, nor will there be any negative consequences associated with a decision not to participate. The interviews will be recorded and then transcribed for further analysis in such a way that no individual will be identified. All information will be confidential.

The findings of this research will be presented in summary reports that will be available to the study organisation. These reports will contain only the results of summary data. It will not be possible to identify individuals from the data or from findings presented in the review reports.

If you have any inquiries about the research, you can contact the UOW supervisors: Associate Professor Rohan Jayasuriya (ph: 02 42213344) or Dr Peter Caputi (ph: 02 42213717). Any issues or concerns regarding the study should be raised with the UOW Ethics Officer (02 42214457).

Peter Caputi
University of Wollongong

Michael Matthias
Appendix 4 Interview information sheet

University of Wollongong

Faculty of Health & Behavioural Science

Post-adoptive user behaviour in IT-enabled work systems

Study Information for Interview Participants

The study organisation along with the University of Wollongong (UOW) has been given a grant by the Australian Research Council (ARC) to study how IT-enabled work systems such as safety reporting systems, are implemented. We are particularly interested in people’s use of IT-enabled systems once they are up and running (post-adoptive use) and how this relates to whether or not the system is considered a success, with a view to doing things better in the future if possible. Michael Matthias is the primary researcher for this study.

The first part of the study, which you are being asked to take part in, involves a number of one-on-one interviews with employees from different functions such as finance and maintenance, and from different levels within the study organisation. The purpose of the interview is to obtain individual perspectives about the use of information systems. We are interested in what works, what could be done better, and how the use of information systems fit into day-to-day work life. Topics for discussion could include, for example:

- Has the experience with the introduction and use of the new system been a positive one?
- Did the introduction of the new system achieve its objectives? Were any of the expected benefits quantifiable?

Following on from this part of the study, we will look to build a model to explain the post-adoptive behaviour that we are studying. Participation in this research is voluntary. If you choose not to participate, neither the study organisation nor the UOW will be informed of that decision, nor will there be any negative consequences associated with a decision not to participate. The interviews will be recorded and then transcribed for further analysis in such a way that no individual will be identified. All information will be confidential.

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Peter Caputi
University of Wollongong

Michael Matthias
Appendix 5. Interview 1.

Person(s) interviewed: Project Team Transition Leader

Date & Place: 10/01/07 Transition team room

Interview subject: General induction

The following points were discussed:

1. Several documents outlining the project were received:
   - Orientation checklist
   - Welcome to the program
   - Project transition role descriptions
   - Project scope definition
   - Project overview

   These documents carry a great deal of detail about such things as the project intent, milestones, and deliverables etc. but mainly from the perspective of the implementing team.

2. The project is being delivered using a template approach, which infers that

   “As the system to be implemented is a template solution there should be minimal technical change required. However, it is broadly understood there will be business process change impacts across key areas of the organisation. Not only will users have to continue their ‘business as usual’ operations whilst undergoing this transition, they will also have to take on new ways of working. Add to this the numerous changes that have affected the businesses to date there will be a comprehensive change program to undertake”.

3. As part of the Project implementation we will be trialling new knowledge sharing software from Microsoft called ‘Sharepoint’.

4. Part of the task is to manage the business’s expectations around the MFHRIS.

5. The Vic Site is already ‘off and running’ with their site-specific tasks, no doubt it will be a harder slog at the NSW Site (the study site).
Appendix 6. Interview 2.

**Person interviewed:** Project Transition Team member: Vicky  **Code:** INT_2

**Date & Place:** 10/01/07 in Conference Room

**Interview subject:** Change management role

The following points were discussed:

1. Vicky has been working in the area of change management around systems since about 2000, and in particular focussing upon the behavioural change needed to accompany the implementation of new computer based information systems.

2. Key elements for a successful implementation mentioned (though not elaborated at this stage) were:
   - At the core of a successful implementation, is a process called user (or audience) analysis.
   - Change and communications strategy that leads to a communications plan.
   - Overall implementation strategy.

3. We need to be aware of everyone “who is touched by the system” and be watchful for ripples which result from the implementation.

4. There will no doubt be some downside to the implementation, and the rule of thumb is “give people the bad news early”. For example, the new software requires that every process step be followed, i.e., you can’t miss steps or go through ‘back doors’ as users can with the current system. Further, the system logs everything that a user does against his or her name so there is visibility to the system owners.

5. One of the reported benefits of the stakeholder analysis process is that it alerts the current system owners to problems which they can address and in doing so “clean up the system” on the way.

6. Typically there would be a series of regular communications with everybody concerned throughout the project.

7. The audience analysis is a key tool for assisting in a successful implementation; it seeks to get from the end customers what are their particular requirements, and identifies the names and roles of the key people in the implementation process. Audience analysis drives the impact analysis, which is based upon spending a day in the life of system users.
   The audience analysis and impact analysis combine to help generate a training schedule.

8. Systems like MFHRIS are “hot on security”, and experience in previous implementations highlighted a need to be watchful for people trying to get into areas that they can’t. Not sure how this compares with the legacy maintenance system security.

9. Are there likely to be industrial issues at the NSW Site I? Will people expect to get paid for doing things differently or using new systems? Vicky anticipated, from what she had been told, that the NSW Site I would be a harder sell than the Vic Site.

10. Previous IS implementations within this organisation have highlighted 3 key areas for concern:
    - Data cleansing and preparation required for transitioning to the new system. The MFHRIS, for example, requires that every transaction have a functional location.
    - Master data. The MFHRIS requires its base data to be correct and not to be changed as all the connected businesses have access to the same database.
    - Security

11. The overall approach: flag things early and get it out there!
Appendix 7. Interview 3.

Person(s) interviewed: NSW Site Production Manager 1.

Date & Place: 5/2/07 in Production Manager 1’s Office at the NSW Site

Interview subject: Introduction and identification of key users

The following points were discussed:

1. I went through the intent to talk with NSW Site Production Manager’s key reports to identify their key users; he was OK with this approach. He identified the maintenance manager, as probably the main person to talk to. Mgr was also OK with the ‘day in the life of’ approach for the shift and day worker teams.

2. Mgr hoped that the new system would be able to reflect the plant equipment down to the lowest maintainable item, i.e., what’s sinking all our dollars. Note: this area has traditionally had big maintenance overruns.

3. The MFHRIS implementation begs the question, “What do we want our maintainers to do”? There might be better ideas in other departments, so we should compare and adopt the best.

4. Mgr questioned whether or not what we’re planning to do with the MFHRIS implementation could be widened to move towards a more holistic view of maintenance. The training should not just be how to operate the keyboard differently.

   Maintenance could well be the key to future operations, as we cannot afford to continue with the level of equipment reliability that we currently have. This seems to be a result of the way that we focus in a reactive way, and do not truly act proactively. The diagram above was offered as a way of explaining Mgr’s thoughts.

   Any system, such as MFHRIS, needs to support the information needs at each stage of the maintenance process. The outgoing system, combined with our current operating paradigm, doesn’t do this. It is hoped that MFHRIS can deliver a complete and integrated view of the information.

   ‘See’ is the pivotal behaviour in the cycle described, and involves people actually looking at how the key parts of the manufacturing equipment are working at any time, and therefore we can know with some level of assurance how they will be working in the future. This complete view of how the equipment is working represents a new way of thinking for us.

   ‘Do’ involves capturing accurate and timely information into the system. Often this information lies outside of traditional areas where, for example, a contractor servicing spares off site may have an important part of the story.

5. Hopes that another planning system being introduced in Australian Business #2 will be part of the package. [Note: what is this?]

6. Mgr is less concerned with signing off on dollar approvals as compared to signing off on the hierarchy of those who assure the condition of the plant. Most reporting that we have is focussed on ‘what happened’, and we should be
Appendix 7. Interview 3.

actually talking about levels of assurance. Plant reports should be about critical pieces of equipment, i.e., reporting the critical variables.

   coil preparation
   process leveller
   welder - centring - equipment defect report, e.g., oil leak
   welding
   shearing

The ‘true equipment defects’ such as the oil leak are key to the person who has accountability for the plant. This level of knowledge, which comes from inspectors, operators and contractors, provides the person accountable for the reliability with a greater chance to make a difference.
Appendix 8. Interview 4.

Person(s) interviewed: NSW Site I, Production Manager 2 

Date & Place: 8/08/07 in Production Manager 2’s Office at study site (duration: 30 min)

Interview subject: Reflections on MFHRIS to date

The interview took place about five weeks after MFHRIS GoLive. There were still a number of issues within Sam’s department associated with MFHRIS at this time. Three questions were presented for discussion:

1. From your perspective, what would make MFHRIS a success?

2. What are your observations of MFHRIS to date?

3. What would you like to see from the MFHRIS team for your department (MPF) from here on?

There seemed to be a huge disconnect between the project at the project management level with the business at the integration level. For example, whilst the MFHRIS team offered a comprehensive suite of training courses, they were highly inflexible in how it was to be delivered, such that in this department they were not able to make best use of it. Part of the issue was that there were a number of parallel things happening at the study site which required the involvement of the same key people in his team, for example, an audit of his safety systems, and that he had prioritised other requirements ahead of MFHRIS.

[At the Vic site, the MFHRIS training had been prioritised by including it in the senior manager’s job goals].

Mgr 2 also had a belief that MFHRIS had come upon the study site abruptly, i.e., whatever fanfare had preceded MFHRIS at the organisational level, did not filter through to the study site until it was well past the consultation stage.

It appeared that the MFHRIS team didn’t do the up front things that you would normally do when engaging a business unit to make a significant change.

[This corresponds to my observation that whilst the ‘template approach’ looked to have enabled the team to cut many corners in the overall implementation process, it prevented them from engaging the diverse business groups in a consultative way].
Appendix 9: Purchasing pre-implementation

Notes from the meeting held 18/4/07 to discuss the MFHRIS purchasing module.

Present: Eight employees including Deb (the study site manager’s personal Assistant), Nick (a Project Team member), and the Researcher.

The meeting was called to address two main worries that had been mentioned about the change from the current purchasing methods to the MFHRIS purchasing module.

Firstly, the group was concerned about what extra work might be required in the closing off of receipted goods. Secondly, there appeared to be the opportunity for MFHRIS approved users to have access to ordering things from vendor catalogues which they currently didn’t have access to, and this might lead to extra expense.

Background:

After the implementation of MFHRIS, purchases can be made through either the MFHRIS purchasing module, or through the MFHRIS maintenance work order system.

When an order is released through the MFHRIS maintenance work order system any associated purchase requisition will then automatically go to an approver. Stock items will be receipted via the central store. An order for non-stock items can be receipted (closed off) through the MFHRIS maintenance work order system by the person who raised it, or it can be done via the supply department if the paperwork is forwarded to them. There will be auto goods receipt available for the main contract suppliers, as is currently the case.

When an order is raised through the MFHRIS purchasing module it will be automatically released if under $1,000, and will become a purchase order on the vendor. Orders $1000 and over need to be approved by the purchaser’s 1-up manager. Receipt for these goods will be as above, i.e., there will be some designated as auto goods receipt, the paperwork can be sent to the supply department or the purchaser can close out the purchase by receipting the goods in the MFHRIS purchasing module.

The following points were discussed:

1. Goods receipting within the MFHRIS, will not be as restrictive as we first thought as there will be a function, similar to what we currently have, whereby contract suppliers can be set up with an auto goods receipt function. This should account for the majority of “every day” purchases.

2. The different departments at Springhill operate slightly differently with respect to purchasing under the current systems, but all have controlled spending by limiting access. The MFHRIS purchasing module users will be able to see and order from more catalogues than they currently can.

3. Whilst some supplies such as clothing and stationery are purchased typically by a person in a day shift role, the shift crews typically order their crew consumables. At the Production Unit 2 ordering for the shift crews is done through the D/S role, but production support do their own ordering.

Shift maintenance crews do their own ordering.

4. We need to be aware that in some areas of the plant such as the pack line the crews have undertaken ordering as part of their agreed roles/models.

5. The production Unit 1 clerk contacts some suppliers by phone to coordinate resin deliveries. Is it anticipated that this will continue?

   Action: Researcher* to find out

What about chromate, zinc and aluminium?

   Action: Researcher* to find out
Appendix 9: Purchasing pre-implementation

6. Need to make sure that the canteen and medical centre are covered off.
   Action: Researcher* to chase up with supply team

Recommendations:

Introduce the MFHRIS purchasing module purchasing as planned, with the following:

1. Restrict the number of MFHRIS purchasing module purchasers, ideally to mirror what we currently have.

2. Review purchase activities within departments (weekly?) and across the plant (3-monthly). One of the benefits of MFHRIS purchasing module is that we will be able to run reviews by user, and users are linked to their orders.

3. Introduce MFHRIS purchasing module purchasers to the MFHRIS purchasing system with clear instructions as to the intended use, the review process and to the NSW site expectations.

* The Researcher acting in the project role.
Appendix 10: Situation appraisal: purchasing post-implementation.

SITUATION APPRAISAL:

Concern: MFHRIS Purchasing

Notes prepared: 16th August 2007

Michael Matthias
**Written Input received from:**

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<tr>
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<td>anon MFHRIS team</td>
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<td>anon Supply Chain</td>
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<td>anon Finance</td>
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Comments:

I believe that there was a major weakness in the MFHRIS implementation approach that has contributed to many of the issues that we’re dealing with today. The “template” approach where the implementation followed the steps that had been used “successfully” twice before, in the Australian Business #2 and the New Zealand Business, had two major flaws.

First, the study site is different enough from the previous operations to have warranted at least a pre-implementation study prior to the rollout. This is best illustrated by the issues with paint ordering where MFHRIS was substituted for only part of the existing system, and serious issues arose from where the old wasn’t compatible with the new. I believe that the MFHRIS team should have stayed with this issue until paint ordering was flowing smoothly, not until the MFHRIS part had been demonstrated to work to specification.

Second, it would appear that the MFHRIS team didn’t learn from either the Australian Business #2 and the New Zealand Business implementations, such that they could avoid making the same mistakes again. The combined supply – MFHRIS team didn’t have a working knowledge of the study site, and hence implemented the new system with incorrect assumptions. The study site doesn’t have a goods receipt store like the Australian Business #2 and the New Zealand Business and the Victorian site. We used a site tailored system, and hence the change to ordering stationary through MFHRIS is a backwards step as we no longer have tight control over spending, and our common items aren’t considered common items under MFHRIS. The New Zealand Business moved away from the MFHRIS implementation for ordering paint, which raised orders via Adelaide, but we implemented the original system only to move to creating our own requisitions after a month of problems.

With respect to training, and training evaluation, there is also, I believe, a flaw in the evaluation. The implementation review reports trainee evaluations in the 90%’s, where the industry benchmark is reported as 80%. Our evaluation focused upon the efficiency of the training process, and the immediate experience of training. The trainers do this for a living and
have done so for this organisation twice previously, and people likely responded to the polished presentation.

Studies (Davis, 1986) have shown that if you ask people items such as, “Will you find the system easy to use when you get back to your workplace?” or “Will using the MFHRIS system that you’ve learned about today be useful in your job?” then their responses will actually correlate with usage when people get back into their workplace. Had we used items with better discrimination, then we could possibly have learned from the responses which areas or groups may have needed further follow-up.
<table>
<thead>
<tr>
<th><strong>List Concerns</strong></th>
<th><strong>Separate/Clarify</strong></th>
<th><strong>S</strong></th>
<th><strong>U</strong></th>
<th><strong>G</strong></th>
<th><strong>Plan Next Steps</strong></th>
<th><strong>Who</strong></th>
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<tbody>
<tr>
<td>Paint ordering</td>
<td>Time delay from when plant enters paint order details, to when PO number is received from supply</td>
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<td>OK, users now use the ‘create requisition screen’ to generate their own PO numbers</td>
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<td></td>
<td>Paint delivered without PO numbers, can’t be receipted</td>
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<td>OK, as above</td>
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<td>Reconciling use versus receipts</td>
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<td>OK, as above</td>
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<td>Multiple PO numbers on the one order</td>
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<td>OK, as above ** check this</td>
<td>MM</td>
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<tr>
<td>Ordering report</td>
<td>The MFHRIS implementation didn’t pick up the use of this by the schedulers, and hence the ordering report still subtracted use, but didn’t accumulate deliveries.</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>IS group modifying report so that it can work again, in effect, drawing the required data from MFHRIS</td>
<td>LF &amp; CSC</td>
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<tr>
<td>Time required to do the new MFHRIS entry functions</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>One of the costs of MFHRIS? Monitor</td>
<td>MM</td>
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<tr>
<td>Payment for suppliers</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>Not sure where this is up to, need to check with supply. We had asked for some supply and supplier sessions to capture their concerns.</td>
<td>PT</td>
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<tr>
<td>Reporting the use of consumables</td>
<td>Some consumables, such as paint line pretreatment, changed from being ‘stocked items’ to ‘ongoing expenses’, which are averaged out over the year’s usage.</td>
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<td>How can we report our monthly per tonne usage? Need to check with KJ as to where this is.</td>
<td>MM</td>
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<td>The use of the purchasing module in general</td>
<td>Some users still require training</td>
<td>L</td>
<td>M</td>
<td>L</td>
<td>Identify people who require more training and notify MFHRIS via our ERP coordinators.</td>
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<td>General access to the purchasing module.</td>
<td>Our intent was to restrict access to things like stationary, but once people have access to one part, they have access to all catalogues. There are approximately 190 users who have access.</td>
<td>M-H</td>
<td>L</td>
<td>M</td>
<td>This is a feature of the new system. Need to monitor and review usage closely, which is facilitated by MFHRIS. Ask ST how best to do this.</td>
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<td>Sign off.</td>
<td>Intent is that anything over $1,000 requires authorization from your 1-up supervisor, but you can have multiple lines of $900 for example without authorization. But, all restricted items require authorization, for example a different toner cartridge.</td>
<td>M</td>
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Creating orders in MFHRIS that replace the previous non-goods and field release orders, essentially under the banner of standing orders.

| Restricted items | Supply set up the list of ‘punch out’ items from annual usage, but the volume from Australian Business #2 meant that many study site items weren’t included. Consequently, people have had to raise special orders for items such as printer toner. | M | M | L | Supply is adding our items onto the list. MFHRIS didn’t appreciate that we used a tailored systems, and we now know that it was a much easier to use, more efficient, and manageable system than what we’ve now got. | TR |
| Goods receipting | Confusion over exactly how this will now happen | M | M | L | Session to be held on Monday 20/8 with MFHRIS team to resolve or identify what concerns we still have. | MM |
### Suppliers not being paid:
1. This impacts them, and
2. We lose our pay early discount

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<tr>
<th>M</th>
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<tr>
<td>Supply needs to own this, as the confusion means that paperwork can go back and forwards between the study site and supply.</td>
<td>RM</td>
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### Time impact on those in each department who are trying to resolve this.

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<td>Hopefully can be addressed via Monday’s session.</td>
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### PO creation for the maintenance people

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<td>Still some system related bugs.</td>
<td>JM</td>
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### General lack of certainty around the MFHRIS implementation

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<td>There are many examples of where questions are answered, but then a different answer is obtained by asking someone else.</td>
<td>Not sure how to resolve this, other than to define and agree upon how the study site will use MFHRIS?</td>
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Situation Appraisal -- Notes and Actions from ICP Meeting 16/8/07

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<th>ITEM</th>
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Reference

Situation Appraisal re the day-to-day use of MFHRIS by the Maintenance Group at Study Site Production Unit 1.

Present:
9 maintenance users & Michael Matthias

Summary:
The Study Site Production Unit 1 Maintenance Group is still on a learning curve with MFHRIS, especially given that there have only been two planned maintenance down days since Go-Live. There are numerous ‘frustrating roadblocks’ in the system that have led to a number of people spending way too much time at a computer terminal with MFHRIS. Even though the training provided was good, it has not produced enough competent users, and further job specific follow-up training is recommended. In many ways the MFHRIS system is inflexible, especially compared to the old system, and it appears that local users are required to spend a considerable more time with MFHRIS than people may have imagined.

Main Issues:
- Functional locations (FLOCS). Now that MFHRIS is being used there is a need to expand the functional locations down to a lower level to pick up equipment in more detail. Can this be done from within the Study Site Production Unit 1? Currently they have a local contact, but he is on shift and therefore not readily contactable on a day-to-day basis.
- The front end of the process, raising a notification, is generally going OK. There was some energy for the proposal to develop the functionality within the Event system to allow certain events to generate a notification from within Event.
- Similar to the issue raised previously, the requirement to estimate the value of work on a purchase order (PO) is causing problems with invoicing when the invoice comes in higher than the initial estimate. Once this occurs, the only option is to contact the supply department and get the amount changed on the PO to allow receipting. Sometimes the invoice information such as time and hours for contract labour comes in some time later, which means that the maintenance people can’t close out their jobs in a timely fashion.
- Once again, consistent to the issue raised previously, the study site maintenance group got in early, well before MFHRIS GoLive, and sent a large number of orders to the purchasing department to be closed out under the old system as they were requested to do. Many of these were returned to the study site after GoLive, i.e., purchasing had not done the close out, and this meant that the study site people had to go into MFHRIS to deal with these past orders. This is one of the causes of the delayed payment for our maintenance providers.
- There are issues with Terms of Payment details on a number of the service specifications that still need to be corrected. Supply should be responsible (?) for the service specifications.
- Multiple vendor listings within MFHRIS. Apparently we should email purchasing when this occurs.
- Sometimes it takes four days to get an order number from purchasing. It seems that purchasing reply on a just in time fashion according to when the work is scheduled, but the Maintenance people would like a prompt response.
- Similarly, parts ordered from the Distribution Centre also seem to arrive on a just in time fashion, not when first requested. This means that they can’t be checked before a job for example.
- Sometimes it isn’t obvious which screen fields have to be filled in. It would be beneficial to have an experienced user spend some time around the Study Site Production Unit 1 to demonstrate the easy way of doing the routine inputs until people come up to speed.
- It would be better if we could close off the multiple operations of a work order as they occurred, like we were able to in the old system.
• Standard jobs in the old system allowed for comments, such as safe working procedures, to be updated across a number of jobs. In MFHRIS, because these are linked to FLOCS, if we update one aspect, we then have to go through and find the other FLOCS similarly impacted. One way around this would be to link several FLOCS to a PDF file in Documentum, which can then be updated.

• Certain stock codes and material numbers have disappeared, and parts now appear in the bill of materials as non-stocked items.

• Multiple work orders, even if only minor, which call upon one provider each generate separate purchase orders which have to be reconciled and closed out. Purchasing still collates these for the Australian Business #2 users and raises just one umbrella PO to cover a number of work orders. Can we have that functionality? Apparently not and this will be changed over at Australian Business #2 also, some time in the future. Can we consider frequent providers as internal providers? Apparently not according to finance.

• Given the time and complexity of closing out orders, some people continue to book onto open orders.

• It would be great if we could get someone to help out at the Study Site Production Unit 1 with cataloguing of items.

• How do we check in MFHRIS to see if a particular provider has been paid for a particular job?

• There is a large job now required to review the overall maintenance plan, but only coordinators have system access.

• How do we use the condition monitoring functions within MFHRIS?

Recommendation:

• Complete situation appraisals with other plant groups, and collate to generate a site list – researcher to complete.

• Engage MFHRIS team with respect to follow-up training and experienced users as mentors. Are there generic tips and tricks that we can get access to from across the organisation now that the study site users are up and running?

• Can we get some help for the Key Users in the short term while they address a number of local issues?
Situation Appraisal re the day-to-day use of MFHRIS by the Shops and Services Group.

Present:
Shops and Services & Michael Matthias

Summary:
Shops and Services, like most of the study and smaller sites, are still on a learning curve with MFHRIS. There is a combination of ‘familiarity with the system’ issues, which will be reduced over time with instruction and experience, along with the inflexible MFHRIS itself which requires more manual input and time at a computer terminal than the previous system did.

Main Issues:

- Notifications: fairly straightforward; most users can easily find their way around a do what is needed.
- Overall the system is great for cost analysis once you know where to look. Convenient and timely.
- The requirement to estimate the value of work on a purchase order (PO) is causing problems with invoicing when the invoice comes in higher than the initial estimate. Once this occurs, the only option is to contact the purchasing department and get the amount changed on the PO to allow receipting. Sometimes the invoice information such as time and hours for contract labour comes in some time later, which means that the maintenance people can’t close out their jobs in a timely fashion. One work around is to over estimate the cost of the work, e.g., if you think that it might cost $1,000, then put $3,000 so that the actual will be less than the estimate.
- The study site Maintenance group got in early well before MFHRIS GoLive, and sent a large number of orders to the purchasing department to be closed out under the old system as they were requested to do. Many of these were returned to the study site after GoLive, i.e., the purchasing department had not done the close out, and this meant that the study site people had to go into MFHRIS to deal with these past orders. This is one of the causes of the delayed payment for our maintenance providers.
- Each maintenance schedule, even if only for a routine inspection over at Stainless, will necessitate the creation of a work orders and its associated purchase order. The purchasing department still collates these for the Australian Business #2 users and raises just one umbrella PO to cover a number of work orders. Can we have that functionality? Apparently not and this will be changed over at Australian Business #2 also, some time in the future.
- MFHRIS requires a high level of maintenance personnel involvement throughout the process compared with the old system where there was mainly a requirement for involvement at the tail end for invoicing and cost review, not in the paperwork flow.
- Given peoples’ lack of experience with the system, if everything lines up work can be done quickly, if not people can go home frustrated at not being able to do their job. When someone asks a non-standard question, people are generally not familiar enough to be able to answer such questions.
- People are starting to pick up the ‘little tricks’ as they become more familiar with the system.
- Need another Key User.
- The shops people have started to manually print out hard copies of confirmations and purchase order numbers as a reference just in case something goes wrong.
- Maintenance planners can spend 30 hours or so a week at a computer doing what is required in MFHRIS.
- There is a daily requirement for users to log on and release a swag of purchase requisitions. Some purchase requisitions for people and situations that aren’t familiar may sit unreleased, and hence the jobs are bogged down.
• MFHRIS purchasing, if not used often, can be very difficult to navigate.

Recommendation: Obtain comments from other shops employees. Complete situation appraisals with other plant groups, and collate to generate a site list.
Situation Appraisal re the day-to-day use of MFHRIS by the Maintenance Group at Study Site Production Unit 2.

Present:
Maintenance Users & Michael Matthias

Summary:
Once again the themes of time required due to poor familiarity with the system, along with the inflexible MFHRIS system itself were raised. Poor response from the purchasing department in Adelaide is causing frustration and slowing down the MFHRIS process flow in a number of instances. It has become apparent that the old system wasn’t all that bad, and in some ways MFHRIS is more cumbersome from the plant user’s perspective.

Main Issues:
- The inflexibility of the MFHRIS system can be seen in interactions with the Distribution Centre (DC) in the ordering of parts and spares. An example was discussed where 10 parts were ordered, but there were only 9 in stock, so none were sent until the full order could be delivered. If the reorder point happens to be below the 9 in stock, then the system can stall until someone manually intervenes. In this instance a phone call to the DC cleared up the problem.
- Once again, parts ordered don’t come early to allow for inspection prior to their use date, so people are now putting earlier dates onto the job information. There may be (?) a way in MFHRIS to advise that early delivery of parts is appropriate, and this is one of the areas where people are learning as they go.
- Multiple purchase orders (PO) from the one supplier associated with various aspects of one job are time consuming to process, and can be difficult for the service provider to work with. Australian Business #2 has had a working relationship with the purchasing department where they consolidate the multiple orders into one PO, but we are unable to use this system. Reportedly this option will be removed over at Australian Business # also in the future.
- Tracking deliveries has become difficult, as there are a number of suppliers who send parts in with only the name of the person who ordered it through 1SAP. The person on the delivery label could be a purchasing officer from purchasing in Adelaide for example.
- Ordering supplies through manufacturing orders is much more complex than through purchasing. MFHRIS doesn’t easily show you what’s available and in this respect the old system was much more user friendly. Some people are still going into the old system to locate the part they require, and then converting it into the equivalent MFHRIS number.
- It would be helpful if the users could sit down with someone and say, “We used to do this particular thing in the old system, what’s the best way to do this in MFHRIS?”
- A list of all the MFHRIS transaction codes and their meaning would be helpful.
- Some of the specific standard jobs have not yet been set up.
- Work that could take 5 minutes in the old system, maybe up to 30 minutes if you needed to search around for info, can now take 4 hours in MFHRIS.
- Raising work orders is going well generally, apart from the time factor.
- When maintenance orders are printed out there are numerous extra pages that print out each time. Can this be amended? As an example a short job was printed out which was 7 pages long, 4 of those pages were not useful.
- Some tradesmen have yet to get into MFHRIS and rely on others to do their ordering for them.
- The purchasing people are often slow to respond to requests for help or order amendments, and we wondered if they were having similar problems with MFHRIS familiarity.
- Approval levels should be reviewed and it may be appropriate to allow approving to be more widely distributed.
• In the training it was explained that it would be very easy to attach a variety of documentation to the work orders, e.g., safety instructions, drawings, procedures. It turns out that in order to attach documentation, it needs to be controlled via the document control system and then attached as a PDF.

• Flocs have a mechanical orientation, and could use some revision from an electrical perspective.

Recommendation:
• Obtain further comments from other users. Complete situation appraisals with other plant groups, and collate to generate a site list.
Situation Appraisal re the day-to-day use of MFHRIS by the Maintenance Group at Study Site Production Unit 2, part 2.

Present:
Jim, a study site maintenance engineer, & Michael Matthias

Summary:
Jim has a good understanding of the intent behind the use of MFHRIS, and also a good grasp of the day-to-day issues given that a number of users come to him with questions. There are opportunities to gain benefits from MFHRIS features that we are currently not utilising. Issues include the need to fix some of the model service specs, set up mass service entries for contractors, and to improve upon a less than helpful working relationship that we currently have with the purchasing department.

Main Issues:
- Some of the frustrations in terms of timely response to requests from plant personnel are because Jim, who has his day-to-day job to do, and other Key Users have had trouble keeping up with the large number of requests over the implementation period. An example was the large package (~1,000) of changes to Flocs from the Production Unit 1 area that required some weeks to clear. Jim explained that we have to be very careful changing master data as the impact can be widespread.
- People have mentioned problems with goods receipting and the close out of multiple purchase orders right across the study site. The instruction from the top is that we will not allow the purchasing department to receipt, as they have done for other parts of the business, and that the person who receives the goods or services will be required to carry out the receipt transaction. Where there are many transactions, such as for labour on a down day, this can get very complex, so we are looking at the use of mass service entry sheets for these type of instances. Apparently we have set up some contractors already and are looking to include others. Mass service entries can be uploaded into MFHRIS as they contain the work and purchase order info. Multiple POs can relate to the way in which the service master has been set up initially.
- It would appear that the whole issue of multiple POs and receipts is really annoying suppliers. What is it actually costing them and us? What are we paying the purchasing department - $100 per transaction has been quoted?
- Jim suggested that a component of the shop floor frustration comes from a required level of discipline and accountability in ordering and receipting that we haven’t had before.
- It is difficult to search for work orders around a particular work centre, which is an issue for the Shops and Services people.
- The detailed planner function doesn’t work as intended, and that is something that would have been evident over at Australian Business #2 since they went on to MFHRIS. Not sure why it was never raised or addressed. There needs to be a “master” detailed planner function for circumstances where there are multiple jobs on a work order.
- There are a number of positives that have become evident since Go Live:
  - Flocs have contributed to an increased visibility of our equipment hierarchy throughout the maintenance system.
  - There are likely to be efficiency opportunities through the clever use of MFHRIS’s maintenance planning.
  - Purchasing orders that have been set up, e.g., for the ordering of some supplies, are working extremely well and receipting takes only minutes to process.
  - A higher visibility of maintenance and purchasing related information.
  - Navigation within MFHRIS via the drop down menus, once you know your way around the system, is a real bonus.
• There are still issues with the purchasing department. It would appear that the staff that we deal with are largely untrained in MFHRIS functionality, and inexperienced in our part of the business. For some reason we still get POs amended back to a $1 value as an example. Previously we knew whom to call, but now someone who has been nominated to be responsible for a certain group of vendors services us, and they seem reluctant to get back in touch with us where there are problems or where they’re not sure what to do.
• In general the purchasing approvals based upon the old HR hierarchy don’t make sense to people out on the plant.
• How do we set up standing orders on the bigger suppliers?
• How do we capture items that we hadn’t thought about in the preliminary planning, that we now have to pay for?

Recommendations:
• Fix up the incorrect model service specs.
• Provide some business overview to complement the transactional stuff.
• We are probably now ready for some more detailed training in certain specific areas of MFHRIS, particularly purchasing.
• Need a better working relationship with the purchasing department.
Situation Appraisal re the use of MFHRIS for Engineering Projects.

Present:
Engineering Project Group Key User  Michael Matthias

Summary:
Overall, the MFHRIS projects system is not causing too much grief. In part, this is because most users only access limited parts of the total system, for example, to obtain project numbers to enable project related costs to be charged to the job that they’re looking after. Another factor is that, compared to the day-to-day use of MFHRIS by the plant maintenance people, the project user doesn’t have the pressure of time and things like the allocation of down day labour costs to worry about. It appears that the MFHRIS system has much more to offer in terms of cost and resource analysis than we’re currently using, and hopefully down the track we can utilise these aspects. Once again, Key Users are providing timely and useful assistance to users, and directing the requests that they cannot address to the right people. Now that we know what we need to know, a round of remedial training would be recommended.

Main Issues:
• This group had been users of the finance system a few years ago, and compared to that system, the move to MFHRIS was seen as a positive step. For those who had been legacy system users at the study site, it could be seen why some felt that they had taken a backwards step.
• Most users of the project systems within MFHRIS only access the front end to obtain the required project numbers and this is quite straightforward.
• Once within the system, assigning internal resources to jobs is difficult. Access is in some ways restrictive and cumbersome. If the main focus is upon control, then this system would probably make sense, but in achieving the control the user has inherited an unfriendly system. Using MFHRIS probably adds an extra hour a week for each project.
• Password protocol is difficult. Instead of accessing the organisation logon security, MFHRIS has its own passwords, and so does the purchasing module, and for infrequent users this is causing problems.
• One within the system, the MFHRIS projects modules allow a proficient user to do much more than they could do with the old system, especially for big capital jobs. Within the old system you never actually knew in real time what costs you had accumulated for example, where in MFHRIS you can access reports when required.
• Can MFHRIS produce the equivalent of the monthly report’s ‘S’ curve? Would be really useful if it could, as this is currently outsourced.
• It would appear that we are now paying extra administration costs ($40K - $100K?) to support the MFHRIS package.
• The backup that we’re getting from the other Key Users is excellent. Users who are proficient with the system are passing on their expertise to others also.
• More training would have been useful for those who were migrated from across the works as things had been added and modified. One problem with the training that we did get which is now becoming obvious is that we weren’t told ‘why’ certain things have to be done in the way that we are currently doing them. A refresher training course would make sense now as we are in a position, for example, to understand short cuts offered, as they didn’t have relevance in the original training sessions. We also got a number of functions that were explained in detail as to how to do things, but not necessarily by whom and when. We received a fair proportion of training in areas that we’re unlikely to ever need to use.

Recommendations:
Appendix 15: engineering project group Key User

- Provide some business context for the functions that we’re asked to use.
- Re-visit training in those areas where people are struggling.
- Look for a cost saving by getting MFHRIS to output the ‘S’ curve monthly reports.
Minutes for situation appraisal held 9/7/07 to discuss “Issues associated with paint ordering since the MFHRIS Go Live on 2/7/07”.

Present: 14 Study and Small site Users and Project Team members

The format of the meeting was to ask the attendees for any current issues associated with the use of MFHRIS at the study and small sites, in particular with respect to:

- Ordering paint
- Paint stocks
- Scheduling the lines
- Paint companies

The intent was to list the issues, clarify and separate as needed by group discussion, prioritise and decide how to progress. A responsible person was assigned to those issues that required action.

The following issues were discussed; some were as questions that we answered during the meeting:

1. **Response from the purchasing department about the purchase order (PO) numbers being issued too slowly.**

   This was experienced by both the study site and small sites. In the previous paint ordering process, there was a standing order with the paint companies, and the item order number was generated in real time, and sent to the paint companies with the order. The paint orders are generally delivered within 24 hours, and the delivery paperwork had the order number, which allowed the paint to be receipted. The MFHRIS PO number is generated in by the purchasing department after the site raises the order, and the turnaround had been very slow, even up to 3 days.

   **Actions:** 1. Project Team to raise a change request to progress the “create requisition screen” that will enable direct ordering of paint from each site (already done); 2. researcher to review PO turnaround in the interim.

2. **Paint being delivered without corresponding PO number.**

   This was a result of item 1, i.e., the paint was being delivered prior to purchasing generating the PO number. The impact of this was that the delivered paint could not be receipted into the system in a timely fashion, but indications are that purchasing is getting on top of this one, see above action 2.

3. **Paint orders generated with multiple PO numbers, i.e., one per colour.**

   Instead of matching up one number per delivery, the matching would have to be per line item, and, for example, one order could have 20 colours, hence 20 lines. Our advice from one of the paint suppliers was that their system couldn’t handle this format. For the study and smaller sites this represents a considerable increase in the time taken to process each set of receipt paperwork.

   **Action:** Project Team to progress a fix that’s in the pipeline

4. **Schedulers could not depend upon the spreadsheet being up to date.**

   Prior to the MFHRIS Go Live the paint line schedulers had an accurate picture of what paint they had available to use through the spreadsheet report, which essentially summarised the receipts against usage on a daily (?) basis. Given the problems encountered with the PO numbers from purchasing, any receipted quantities were absent or delayed, hence the errors in the reported quantities of paint.

   *Without going into the spreadsheet report in detail, as part of the MFHRIS project the following changes were proposed:*
   - Modify spreadsheet to no longer deliver reports directly to the paint suppliers
   - Data to be sent to the MFHRIS application
APPENDIX 16: SITUATION APPRAISAL: STUDY SITE ISSUES CONCERNED WITH PAINT ORDERING 9/7

- Modify spreadsheet to export data to MFHRIS to meet the requirements of the MFHRIS conversion team for paint ordering
- Replace the paint stock control system with a MFHRIS solution
- MFHRIS would still send paint details to the mainframe so that key reports can still be run

The schedulers require both running total of paint stocks, and through their forecasts input to predicted usage that the paint suppliers rely on. Some further changes are required the spreadsheet/MFHRIS interface.

Actions: 1. Project Team to assist sites with ‘spreadsheets’ in the interim.

5. The MFHRIS summary screens report paint numbers, not the paint names.

This made dealing with the summary information more difficult as the people involved were used to the paint names, especially for the frequently used/high volume colours.

6. Opportunity to enter paint requests “on-line”.

Given the changes to the system and the capability of the MFHRIS software, JC from one of the small sites raised the possibility that the paint requests could be raised by the production teams to replenish their usage.

7. Both Kev and JC are currently spending an inordinate amount of time dealing with paint ordering and receipting, and other day-to-day work that is part of their jobs is not being addressed.

Talk with the paint line management to assist getting over the immediate hump of work.

Action: Researcher to facilitate

8. How do we receipt and monitor pre-treatment chemicals?

Chemical such as paint line pre-treatments are now no longer a “stocked item”, but because of their non-varying usage have been counted as an ongoing expense.

9. Following on from 8, how will we now be able to report monthly per tonne usages?

Not sure of what’s involved with this item, need more data.

Actions: 1. Researcher to go through the report with the site people

10. Can we send orders via email, rather than by fax?

Yes, this just requires a change to the vendor masters.

Action: Project Team to progress.

11. How will we know if an order is blocked?

This should be an infrequent occurrence, but the person raising can go into MFHRIS and check the status. For now, it would be best if we could get purchasing to advise us of any blocked paint orders.

Action: Project Team to advise purchasing to let sites know of any blocked paint orders in the short term.

12. There are other users, i.e., our backups, who require training.

They should have been identified by the sites during the audience analysis.
Action: Researcher to liaise with the sites, and request further training from the MFHRIS team.

13. It would be good to get the date of manufacture for paint at the time that we receipt it.

Perhaps this is something that we can get the paint manufacturers to put onto their delivery paperwork, and we can enter it as part of the receipting process.

*Action: Project Team to raise with the suppliers.*

14. What capabilities do the paint companies have to interface with the new system?

It was decided to offer the paint companies a Q&A session about changes to our paint ordering systems at which we could explore their issues and capabilities.

*Action: Project Team to organise.*

15. What will be the process for bulk primer and backer?

Standing order? Need more data.

*Action: Researcher to find out what is proposed*
Key Messages from the Australian Business #1 MFHRIS Project December 2006

Australian Business #1 – Key Messages

ONE BUSINESS

......Using ONE SYSTEM

... Doing things ONE WAY...

What is the MFHRIS Programme?
MFHRIS is the name given to the organisation’s implementation of the new SAP based IS. The strategy is to use the current implementation as a “template” to replace legacy systems and provide process and data integration in the capability areas of Finance, HR, Supply, Engineering, and Maintenance. Current target business units are the NZ, Australian #1 and #2 businesses, Corporate Head Office and Logistics.

What organisational business units are already on the MFHRIS?
The NZ Business went live with the MFHRIS in July 2005 and Australian Business #2 went live in March 2006. The current plan is for Australian Business #1 to go live with the MFHRIS in July 2007.

When will the Australian Business #1 MFHRIS Project commence?
Some business readiness work has already commenced to prepare for converting data from the old systems to the MFHRIS systems and to scope the technical requirements for the various interfaces required between MFHRIS and other systems. There will be a short break over the Christmas period, with the Execution phase of the project picking up again in January 2007.

Who is the Sponsor of the MFHRIS Project?
The Australian Business #1 President is the Executive Sponsor for the project. The Australian Business #1 Management Team (AMT), together with additional key stakeholders, form the Project Steering Committee. The Business Owner of the project is the VP Finance Australian Business #1, and the Business Project Manager for the project is BPM.

Who will be affected by the Australian Business #1 MFHRIS project?
The MFHRIS implementation will affect anyone who currently uses Australian Business #1’s Maintenance, Finance, HR or Supply systems. The level of usage of these systems will determine the extent to which individuals will be affected.

What’s in it for us?
There will be some significant benefits to the business with Australian Business #1 coming onto the MFHRIS, including the replacement of unsupported legacy systems, integration of data between the functional areas of Finance, HR, Supply, Maintenance and Engineering, and reducing the total cost of ownership by having most of our Australian and NZ businesses on the same system and infrastructure. There will also be a significant business transition effort to provide you with the necessary skills and knowledge for using the new systems and processes, including the MFHRIS Learning Centre where you will be able to access MFHRIS training and support material during the project and on the job.

What do I need to do about it?
Most employees will not need to do anything at this stage, as training will not formally commence until mid May 2007. However, there are many people already involved in the project and this involvement will increase from January onwards to ensure Australian Business #1’s requirements are addressed. Over the coming months project communication activities will intensify and more detailed information will be provided to Managers and Supervisors as appropriate.

When will training commence?
The formal instructor led training component for the Australian Business #1 MFHRIS Project will be conducted over a three-month period commencing mid May through to mid August 2007. However, there is
also a self-paced, online training component, where you will be required to complete some pre-requisite computer based training (CBT) on the MFHRIS Learning Centre prior to attending instructor led training.

**How much training is expected?**
At this stage of the project we don’t know precisely how much training or what particular courses each individual user will require. However, by the end of March when the training needs assessment has been completed we will be developing and communicating the training schedule.

**WHO CAN I DIRECT ANY QUESTIONS TO?**
E-mail to – Business.project.manager@studyorganisation.com