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Management of open information
technology and systems (ITS)
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perspectival model for information
systems management

Deborah J. Bunker-Murray
University of Wollongong

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**MANAGEMENT OF OPEN INFORMATION TECHNOLOGY AND SYSTEMS
(ITS) ARCHITECTURES IN THE AUSTRALIAN FEDERAL GOVERNMENT**

Development of a Perspectival Model for Information Systems Management.

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

DOCTOR OF PHILOSOPHY

From

UNIVERSITY OF WOLLONGONG

VOLUME I

by

DEBORAH J. BUNKER-MURRAY, BA 1980, MCom (Hons) 1991, UNSW

SCHOOL OF ECONOMICS AND INFORMATION SYSTEMS

2004

CERTIFICATION

I, Deborah J. Bunker-Murray, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Economics and Information Systems, 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 institution.

Deborah J. Bunker-Murray

22 June 2004

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For Bill...

*...and also for Eric (my father), Jim, Peg, Len and Rosemary who I will see once more at
the end of a greater journey.*

ABSTRACT

This thesis looks at the limitations of current ITS management objective (normative) theory and develops a new Perspectival ITS Management Model so as to supplement this theory and overcome some of its limitations. The proposed Perspectival ITS Management Model is an approach to reconciliation/integration of object/subject from a phenomenological viewpoint. The development of the Perspectival ITS Management Model has been heavily influenced by the work of John Haynes (2001a).

In order to investigate the applicability of the Perspectival ITS Management Model a constructionist epistemological stance is taken in the thesis, which describes an overview of current objective ITS management theory, that is analysed and focussed through a normative ITS Management Model (developed by the candidate in the early stages of the thesis). The thesis goes on to develop the objective theoretical view of the management of open systems architectures and uses this to investigate the subjective case study accounts of the management of open systems architectures from 1993–1996 in the Australian federal government. These cases are used to highlight how the Perspectival ITS Management Model can be utilised to enhance, extend and transform our understanding of ITS Management in ways that the current body of theory does not.

A postscript has also been developed to illustrate how the Perspectival ITS Management Model can also be applied to the ITS management landscape (whole-of-government ITS outsourcing) of the Australian federal government (1996 – 2001) after the initial open systems case study period (1993-1996).

INDEX WORDS: ITS Management, ITS Architecture, Perspectival Thinking, Phenomenology, Australian federal government.

PUBLICATIONS RELATING TO THIS THESIS

- Bunker, D.J. & Winley, G.K. (1993) "Position statement: management of open systems architectures", IFIP, Conference on Diffusion, Transfer and Implementation of Information Technology, Champion, Pennsylvania, October 10-13.
- Fowler, P. (Scribe & Ed), Bihari, T., Bunker, D., Chung, W., Damsgaard, J., Glasson, B., Lien, L. (Facilitator), McOwen, P., Montealegre, R., Radic, Z. & Varner, M. (1993) "Working session 1: Critical issues in first to third world transfer of software and information technology", IFIP, Conference on Diffusion, Transfer and Implementation of Information Technology, Champion, Pennsylvania, October 10-13.
- Bunker, D.J. (1994) "Research in progress: management of open systems architectures - a case study", Australian Unix and Open Systems User Group, Annual Conference, Melbourne, September 6-9: 145-155.
- Bunker, D.J. (1995) "Management of open systems architectures - an Australian government perspective", Australian Unix and Open Systems User Group, Annual Conference, Sydney, September 19-21: 10-15.
- Bunker, D.J. & Winley, G.K. (1995) "Management of Open Architectures" Association for Information Systems Proceedings of the First Americas Conference on Information Systems August 25-27 1995 Pittsburgh, Pennsylvania USA: 378-380.
- Bunker, D.J. & Dean, R.G.. (1996) "Toward an Information Systems Paradigmatic Framework", Association for Information Systems Proceedings of the Americas Conference on Information Systems, Phoenix, Arizona, August: 596-598.
- Bunker, D.J., Larsen, T. & Vlissidis, P. (1997) "Technology transfer: does the context of the creation of IS technology inhibit its transfer? An international perspective", IFIP TC8 WG8.6 International Working Conference on Diffusion, Adoption and Implementation of Information Technology, 25th-27th June, 1997, Ambleside, Cumbria, UK: 375-376.
- Bunker, D.J. & Dean, R.G. (1998) "Information Technology and Systems (IT&S) As Tools: the Cultural Context of Tool Creation and Use and Its Effect on the Technology Transfer Process", the electronic journal Philosophical and Conceptual Foundations of Information Systems, <http://www.cba.uh.edu/~parks/fis/bunker.htm>
- Bunker, D.J. (1998) "Information Technology and Systems (IT&S) As Tools: Cultural Bias and the Implications for International Technology Transfer (ITT) ?" Proceedings of the Association of Information Systems Conference, Baltimore, August: 818-820.
- Bunker, D.J. (1998) "A Philosophy of Information Technology and Systems (IT&S) as Tools: Tool Development Context, Associated Skills and the Global Technology Transfer (GTT) Process" in MIS-shaped or misshaped ? Emerging issues in the new global arena. Proceedings of IFIP WG8.7 Working Conference, Helsinki, Finland: 199-214.
- Bunker, D.J. (2000) "Comments on the "information" concept in FRISCO compared to empirical studies of information in decision making", ISCO-4 (IFIP8.1) Proceedings, Information Systems Concepts: An integrated discipline emerging, Lorentz Center, Leiden, The Netherlands, 20-22 September: 295-297.
- Bunker, D.J. (2000) "Enterprise Resource Planning (ERP) System Tools: The Context of their Creation and Use Within the Technology Transfer Process" in Proceedings of the Americas Conference on Information Systems AMCIS 2000, (ed H.Michael Chung) August 10-13, Long Beach California: 1533-1536.
- Bunker, D.J. (2001) "A Philosophy of Information Technology and Systems (IT & S) as Tools: Tool Development Context, Associated Skills and the Global Technical Transfer (GTT) Process", Information Systems Frontiers 3:2: 185-197.
- Bunker, D.J., Wilson, D. & Elliot, S. (eds) (2002) The Adoption and Diffusion of IT in an Environment of Critical Change Proceedings of IFIP WC8.6, Sydney, Australia, August 1-3.

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"...the successful management of IT isn't going to look like the current theory"
Philip Yetton (1993) – pg 13.

CHAPTER 1 – THESIS OVERVIEW, RESEARCH PROBLEM AND QUESTIONS

1.1 Introduction

This chapter discusses the current information systems and technology (ITS) management context that is the motivation for thesis. It then outlines the research questions stemming from this ITS management context as well as describing the overall thesis structure and flow throughout the rest of the chapters.

TERMINOLOGY USED THROUGHOUT THIS THESIS

Before the research problem is framed in the next section of this chapter it is critical to clarify how terminology is utilised within this thesis. The epistemological view of this thesis is one of a constructionist-interpretive paradigm of understanding. This epistemological view is particularly important when acknowledging the fundamental premise of the reconciliation/integration of object/subject. When objectivism is discussed within the bounds of this thesis, it is used as a way of focussing on the normative views, theories and approaches of ITS management that are underpinned by mostly positivist research approaches and methods. The definition and discussion of subjective perspectives within the thesis, however requires more anti – positivist

and relativistic approaches and understanding as well as the methods to adequately describe them. It is on this definitional basis that the research problem and questions are now discussed.

1.2 Current Management Context and Research Questions

We all work and interact within and between organisations. From the largest profit-driven bureaucracy to the smallest one-person company, we cannot escape the impact of managers and the way that they manage. Management is an issue of concern to all of us and we have seen that management theory has evolved over the years, from "structural change by edict" through to the "industrial democracy model of change" and then on to the flat structures and employee "empowerment" which we see in its many forms today (Dunphy 1996, Earl & Sampler 1998). Throughout these changes to organisational structures, management theory and approaches, the impact of information technology (IT) can be clearly observed (Handy 1993).

From the time of the first computer we have seen the development, growth and application of ITS from support for basic financial system functions (as the development of information systems had initially been within the corporate, financial or technical areas of organisations). ITS is now being used for sophisticated applications such as intelligent networking within and between organisations, and support and replacement of some expert decision makers and knowledge workers within the organisation (Alter 1996, Ciborra 2000).

The management approaches to ITS design and use have also changed over the years. Fully functional ITS department/s were created to handle the ever-increasing list of core organisational computerised applications and systems. What we have witnessed over time is the formation of the specialised information systems department which provides a range of diverse applications to a multitude of organisational users. With the miniaturisation and modularity of computer hardware and components we have also seen the advent of end user driven, designed and managed ITS workgroups, incorporating the more simple and flexible ITS design and development tools and techniques as well as utilising the advice of ITS specialists within the organisation (Martin et al. 1994, Plant 2000).

Changing organisational structures and cultures have also contributed significantly to changes in ITS management and development and vice versa. We have seen some departure from the "steady-state" or role culture that utilises routine or repetitive forms of information, to more entrepreneurial or power and task cultures, for whom information is a dynamic resource (Handy 1993, Hofstede 1990 & 1998), when the situation within the organisation has required this.

It is now difficult for the users of ITS to control the development and operation of their systems in the way that specialists within the organisation once did. The technology used to deliver information has become increasingly complex and simple

at the same time. The need for analysis-based instead of transaction-based systems has increased (Clark 1992, Plant 2000).

This has, in turn, intensified the need to consciously choose centralised ITS or decentralised ITS development and management (Edwards et al. 1989), and the subsequent desire for an organic versus a mechanistic organisation structure to facilitate this process (Galbraith 1973, Handy 1993, McKenney et al. 1997). The expertise to understand and control this technology is either held centrally in the ITS department, uncontrolled and difficult to get to in the hands of users or a combination of both.

End user systems (EUS), fourth generation languages (4GL) and graphical user interfaces (GUI) and more open and flexible architectures and infrastructures have been used to limited effect to rectify this situation (Hollis 1993, Plant 2000), so who should control and be held accountable for management of ITS within the organisation and what do we know about the process of ITS management within the organisation?

General systems theory describes systems characteristics and behaviour given certain conditions. Open systems have been well defined and described within this body of knowledge (Bertalanffy 1950, Angyal 1941, Sommerhof 1969, Emery & Trist 1965, Ackoff & Emery 1972). Information systems are complex systems which co-exist and interact with other systems within their environment (Handy 1993, Plant 2000). Many

researchers have developed approaches to managing and planning ITS resources for information system success. These methods have been expressed in the many Strategic Information Systems Planning (SISP) methodologies (Galliers & Baker 1994, Galliers 1999).

More recently, however, architectural design approaches and processes have been applied to the management of system resources. This has been seen as an important breakthrough and as a mechanism used to facilitate the integration of information technology with other organisational systems (Martin et al. 1994, Synnott 1985, Devlin & Murphy 1988, Plant 2000).

More recent developments within IT/IS management theory has seen the expression of ITS architecture and infrastructure with the implementation of smaller and more flexible and varied ITS components and their platforms (Weill & Clair 1994, Stevenson 1995, Plant 2000).

IT infrastructure is distinguished from other ITS activities by the fact that it changes gradually. Because the infrastructure supports multiple types of uses and is expensive to develop, it usually changes only incrementally over time. If viewed once every seven to ten years, however, the changes in many firms' ITS infrastructures can appear quite revolutionary (Davenport & Linder, 1994).

The large and long term nature of ITS infrastructure often results in these investments being made in anticipation of business developments. The return on infrastructure investment, (business results) are difficult to predict or track directly. ITS infrastructure investments also typically do not necessarily provide direct business performance benefits (Parker et al. 1988). The benefits are realised by business systems connected to and enabled by the infrastructure. In the case of enabling infrastructure, however, the future flexibility provided by ITS infrastructure can provide direct benefits by enabling economical or rapid implementation of other systems (Ratchukool 1997).

From 1988 to 1991 the DMR Group Australia completed a study of **Strategies for Open Systems in Australia**. The study indicated that with the development and implementation of open systems architectures, practitioners had seen their usual management approaches to ITS fail. Planning cycles seemed to have shortened radically; technology seemed to have become more strategic in its application; ITS skill sets (both managerial and technical) were based on broader knowledge of technology; and ITS portfolio development was much less stable. This trend has continued to the present day as we have seen open systems architecture paving the way for the implementation of smaller components and more flexible and varied ITS infrastructures (technologies and platforms-Plant 2000).

Open systems architectures (and the technology and organisational dynamics which influence them), destabilise ITS platforms and make traditional approaches to

managing systems ineffective (DMR Group Australia 1991, Tapscott & Caston 1993, AGGOS 1993, Zampetakis 1993, Bunker 1998a & 2001, Plant 2000).

Smaller and more flexible architectures generally relate to better technology absorption (via user-driven management) but lesser overall management control and greater ITS and organisational complexity. Subsequently, core ITS systems need to be managed more intensely and with better control than the more loose end user (EUC) driven systems. Smaller, more flexible architectures generally mean less ITS stability and less relevance of positivistic and normative ITS management approaches for the organization (Hackney et al. 2000).

It can be argued that ITS management theory has never addressed the issue of ITS management dynamics effectively (Hackney et al. 2000). Older more proprietary ITS has represented a snapshot of an organisation at a point in time but we now see that organisations are no longer able to take part in more lengthy and dynamic ITS decision making due to the changing nature of systems architecture and EUC.

With these smaller and more modular information systems technologies we have seen the advent of inter-organisational systems (Plant 2000, Galliers 1999). It is now evident that external competitive pressures can guide an organisation just as critically as internal business drivers. The impact of greater inter-organisational connectivity may indeed exacerbate this problem further. This thesis seeks to address the

limitations of the normative and positivistic approaches to ITS management by developing a more relativistic and constructionist approach (see figure 6.2).

This is expressed by the research problem and the research questions under investigation.

RESEARCH PROBLEM

ITS management is a complex issue which organisations have grappled with as ITS has become more strategic and less operational in nature. New directions in systems architecture such as open systems, have magnified this complexity and the subjective nature of ITS management i.e. each organisation represents a different ITS management context. Approaches to ITS management to date, however, have been predominately objective in character and positivist in orientation. A more subjective perspective (with a relativist orientation) may be helpful in providing a better understanding of the ITS management process, thus ensuring more successful management, planning and control of ITS for individual organisations.

Research Question 1

Do existing objective ITS management models, theories and approaches, adequately reflect an understanding of the ITS management process?

Research Question 2

Do complex organisational environments and the effects of systems architecture implementations magnify (in subjective and relativistic ways) the limitations of the objective ITS management models, theories and approaches?

Research Question 3

Should the objective ITS management model be modified to incorporate a more subjective perspective of how to manage ITS? Would this modification enhance our understanding of ITS management?

The following sections of this chapter briefly describe an overview of subsequent chapters and their interrelationships.

1.3 The Research Problem (chapter 1)

The research problem was to address the three research questions (outlined previously) by investigating the objective approach to the management of open systems architecture boundary context issues using the Galliers & Sutherland (1991) Revised Stage Theory Approach (7 S's - strategy, structure, systems, staff, style, skills and superordinate goals) as well as the proposed open systems architecture models of the day, and compare this to the subjective accounts of the approach to management

of open systems architectures in the Australian Federal Government from 1993 - 1996. This is done in order to understand how the ITS and open systems architecture management processes relate to individual cases, thus, allowing us a more relativistic view of these processes.

Addressing these research questions was deemed to be important as the current objective (positivistic and normative) models had some shortcomings in terms of their ability to handle the dynamic nature of the process of ITS management.

1.4 Literature Review: An Objective ITS Management Model (chapter 2)

This chapter reviews objective Information Technology and Systems (ITS) management and planning theory literature with particular emphasis on the management of the ITS function within the large organisation. As a result of this review the candidate developed an ITS Management Model (see figure 2.1) which was produced and published in the earlier stages of this thesis work (Bunker 1994). This chapter then focuses on a number of ITS Management areas, which are argued to be context dependent, through the work of Galliers & Sutherland (1991). These management areas form the focus of the research approach, which is expanded in more detail in chapter 3, through the development of a research design outlining an approach to the investigation of open systems architecture management within the Australian federal government.

After the discussion of this analysis the chapter highlights general conclusions about the nature of objective theory of ITS management and further areas of inquiry. These are expressed in the outline of the *research problem* and the 3 *research questions* (see section 1.2 of this chapter) to be pursued within the research approach, design and data collection methods pertaining to the thesis.

1.5 Research Design for Data Collection and Analysis (chapter 3)

This chapter describes the research design and justifies this thesis' central research problem (see section 1.2 of this chapter)

It then describes the research design used to investigate the objective management approach for open systems architectures within the Australian federal government as well as the subjective views of open systems architecture management, by conducting federal government organisational case studies. Within this chapter the general epistemology adopted for the research study, research method, research output and related issues, such as the development of the semi-structured case interview instrument (see appendix A) are discussed.

An holistic research framework, was developed by the candidate and utilised to conduct this thesis investigation. It has incorporated objective and subjective

investigative elements, which run in parallel to each other throughout the research stages. The overall framework is summarised by figure 3.1. This framework also indicates the relationship between chapters within the thesis.

1.6 Background to the Objective Theory of the Management of Open ITS Architectures as it Applies to the Australian Federal Government (chapter 4)

This chapter outlines and highlights objective open systems architectures and the related ITS management issues from 1993-1996. This normative definition of open systems architectures underpins the content and structure of the case-based survey instrument (see appendix A) used to gather subjective accounts of open systems architecture management in the Australian federal government (see appendices B, C & D).

This chapter ends with the presentation of statistical data that was published on the use of open systems architectures within the Australian federal government (from 1995-1997) thus providing the context and background for the case study subjective accounts (presented in chapter 5).

1.7 Data Analysis: Australian Federal Government Case Interpretations of Management of Open ITS Architectures from a Subjective Perspective (chapter 5)

This chapter outlines the hermeneutic interpretation of subjective case study accounts from 6 Australian federal government organisations. These subjective case study accounts were documented as a direct result of the administration of a semi-structured interview instrument (see appendix A) as well as the gathering of other organisational artefacts (reports and diagrams) and secondary subjective account materials (media reports and general Federal government reports). These case study texts were then hermeneutically analysed to reveal contextual factors (both obvious and emerging) that influence the management of open systems architectures within these case organisations.

These factors and their influence reveal subjective meaning of the management of ITS for these organisations and this chapter then argues that this meaning highlights the limitations of the objective views of open systems architecture management. A tool based model of the IS discipline (developed and adapted by the candidate) is then used to explain how to more effectively view and reveal meaning of both objective and subjective elements of open systems architecture management.

1.8 Discussion and Conclusion (chapter 6)

This chapter restates the research questions, problem and approach addressed by this thesis. It then goes on to discuss the importance of phenomenological views regarding the reconciliation/integration of object/subject with regard to the current limitations of objective ITS management theory. The chapter then proposes a Perspectival ITS Management Model (figure 6.2), which has been developed by the candidate, and based on the work of Haynes (2001a) that addresses the issues surrounding the major research findings.

1.9 POSTSCRIPT: Australian Federal Government Management of ITS (Outsourcing 1996-2001 - chapter 7)

While this thesis primarily concerns itself with open systems architecture management from 1993-1996 it is prudent to include a brief chapter on Australian federal government management of ITS *post* open systems, in order to illustrate the usefulness of the proposed Perspectival ITS Management Model (figure 6.2).

Federal government policy on ITS management changed drastically after the election of a new political party in 1996. The new administration implemented an outsourcing policy for ITS. This chapter explains objective ITS outsourcing theory from a general and then specific Australian federal government perspective. It then goes on to look at subjective accounts of the whole-of-government outsourcing initiative and how

these varied in assumptions made regarding **technological skill sets, outcomes, conceptual expression, building techniques and cultural context** which were embedded in objective theory. It is explained how these variations in assumptions affected the outcome of this initiative. The chapter then suggests how the **Perspectival ITS Management Model** (see figure 6.2) developed by the candidate, may have assisted in transforming the outcome of the whole-of-government ITS outsourcing initiative. This may have been achieved by taking a non-reductionist view of ITS outsourcing in order to reconcile/integrate object/subject and develop a different way of understanding ITS outsourcing, use of ITS by government organisations and government ITS policy making.

1.10 Summary of Research Findings, Contributions, Limitations and Opportunities (chapter 8)

This chapter deals with the findings of and contributions made by the thesis as well as the limitations of the research outcomes and further research that has been motivated by the results of this study.

CHAPTER 2 – LITERATURE REVIEW: An Objective ITS Management Model

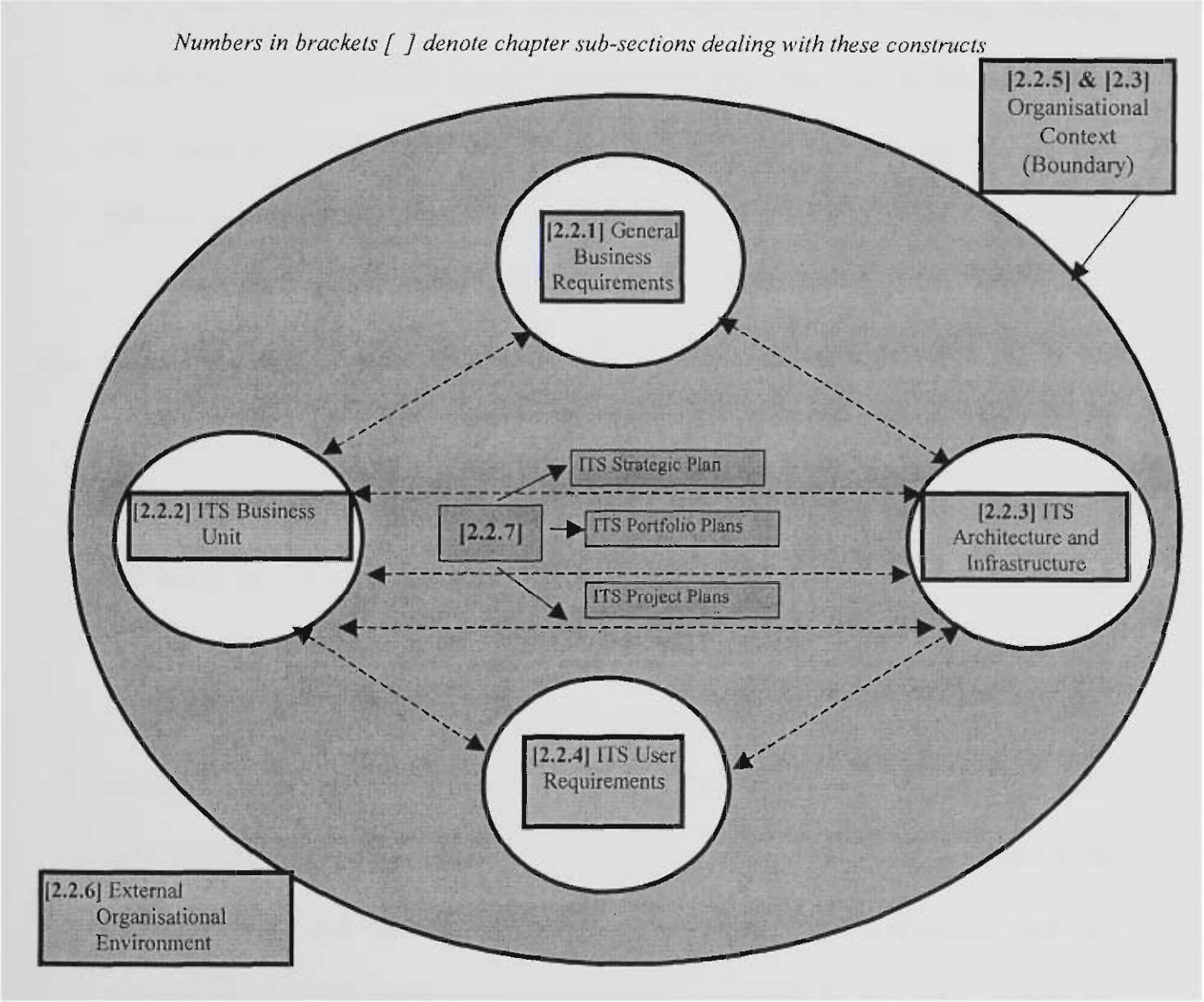
Chapter Overview

This chapter reviews objective Information Technology and Systems (ITS) management and planning theory literature with particular emphasis on the management of the ITS function within the large organisation. As a result of this review an ITS Management Model (see figure 2.1) was produced and published by the candidate in the earlier stages of this thesis (Bunker 1994). This chapter then focuses on a number of ITS Management areas, which are argued to be context dependent, through the work of Galliers & Sutherland (1991). These management areas form the focus of the research approach, which is expanded in more detail in chapter 3, through the development of a research design outlining an approach to the investigation of open systems architecture management within the Australian federal government.

The first section of the literature survey outlined within this chapter, has been organised around the seven components of the candidate's ITS Management Model (see figure 2.1) which include: the organisation's general business requirements (outlined in section 2.2.1 of this chapter), its ITS business unit requirements (outlined in section 2.2.2 of this chapter) and ITS architecture and infrastructure requirements (outlined in section 2.2.3 of this chapter). User requirements of ITS (outlined in section 2.2.4 of this chapter), the organisational boundary context (outlined in section

2.2.5 of this chapter) and its effect on ITS management as well as the external organisational environment (outlined in section 2.2.6 of this chapter) and its effect on ITS management and ITS planning cycles (outlined in section 2.2.7 of this chapter), which have been the subject of much of the research to date and have also been included. Other researchers such as Leavitt (1965), Scott-Morton (1991), Earl (1993), Rockart et al. (1996), Earl & Sampler (1998) and Galliers (1999) have modelled these constructs in similar ways.

Figure 2.1 - ITS MANAGEMENT MODEL (modified from Bunker 1994 – pg 152)



In section 2.3 of the chapter the ITS Management Model has been supplemented by the work of Galliers & Sutherland (1991) in their revised Stages of Growth Model (see table 2.5) which extends the ITS Management Model through the organisational contextual factors outlined in section 2.2.5 of the chapter.

After the discussion of this analysis the chapter highlights general conclusions about the nature of objective theory of ITS management and further areas of inquiry. These are expressed in the outline of the *research problem* and the 3 *research questions* to be pursued within the research approach, design and data collection methods pertaining to the thesis. This research problem was also influenced by the researcher's own practical knowledge of the ITS management field (derived from 13 years of industry experience).

2.1 Introduction

The ITS Management Model (figure 2.1) presented here provides the key to viewing and using the literature in a cohesive and meaningful way. Gorry & Scott-Morton (1989) were amongst the first researchers to highlight that a lack of an ITS management framework or model meant creating unnecessary expense and wasted effort for an organisation. The lack of framework meant that an organisation could only address individual ITS crises without having a total ITS context in which to do so. The expense and wasted effort not only included the cost of computer hardware and software but also systems and programming personnel. As the cost of technology

drops and the cost of trained and competent personnel rises this places a limitation on the number of systems that can be effectively developed, so that good resource allocation and management of ITS becomes critical.

Stevenson (1995) developed a model of Enterprise Architecture which is greatly influenced by organisational context (culture, structure, business processes) and includes aspects other than ITS. These include areas such as business planning (organisational goals, visions, strategies and governance principles); business operations (business terms, organisational structures, processes and data); aspects of automation (application systems and databases) and enabling technology infrastructure. Issues such as intellectual capital, organisational learning, strategic planning, organisational design, competitive advantage, mass customisation, business process engineering and systems delivery all require an enterprise architecture model so that they are included in the total organisational view. Stevenson's model encompasses the constructs of business architecture, data architecture, applications architecture and technical architecture and substantiates the view expressed in the ITS Management Model (see Figure 2.1), however, it does not attempt to elaborate on the interaction between the various parts of the model as expressed in the planning cycles. This chapter attempts to explain the complexity of those interactions in detail.

This chapter presents the rationale behind the objective ITS Management Model (figure 2.1) by expanding and reviewing seven ITS management topics in subsequent chapter sub-sections. It is important, (within the focus of this research) to understand

the history and incremental construction of the normative theory associated with ITS management models and frameworks. Each of the chapter sub-sections explores these ideas in turn to illustrate how they combine to form the ITS Management Model (figure 2.1)

The numbers beside each of the model sub-headings correspond to the chapter sub-section description of the ITS Management Model (figure 2.1).

Derivation of an Organisation's General Business Requirements [chapter sub-section 2.2.1] describes the approaches used within large organisations to set the mission, goals, objectives and critical success (strategic) factors that are crucial to an organisation's direction and success in the marketplace. Tactical and operational considerations are also described and the use of ITS for competitive advantage is related to these approaches. The general business unit requirements have a direct influence on the ITS business unit (sub-section 2.2.2) and the ITS architecture and infrastructure (sub-section 2.2.3).

Derivation of an Organisation's ITS Business Unit Requirements [chapter sub-section 2.2.2] describes the approaches used within a large organisation to align the ITS functional strategic business unit with the more encompassing general business requirements (sub-section 2.2.1). Strategic, tactical and operational issues and supporting systems can be mapped from the general business requirements to the ITS business unit through strategic information systems planning approaches (sub-section

2.2.7) and these can be directly linked to current hardware, software, communications and management configurations (ITS architecture and infrastructure – sub-section 2.2.3). This process forms a key link between the business and the ITS function within the large organisation as it forms a key bridge between the general business requirement (sub-section 2.2.1) and the ITS user requirements (sub-section 2.2.4). This is achieved by facilitating involvement of lower level staff in the higher level IT planning processes to ensure that their day-to-day business processing ITS requirements are met within the overall ITS direction.

ITS Architecture and Infrastructure Requirements [chapter sub-section 2.2.3] addresses the various current and future hardware, software, communications and management requirements of an organisation's ITS architecture and infrastructure. The architecture and infrastructure requirements represent an objective which the organisation attempts to achieve through the ITS portfolio or architectural and infrastructural planning processes (sub-section 2.2.7). The ITS architecture and infrastructure also forms a key bridge between the general business unit requirements (sub-section 2.2.1) and the ITS user requirements (sub-section 2.2.4) as it becomes a concrete translation of the business requirements into ITS that affect staff in their performance of day-to-day business processes.

The ITS User Requirements [chapter sub-section 2.2.4] focuses on the 'micro' version of the general business requirements. ITS user requirements get to the heart of the day-to-day issues that confront the organisation in its use of ITS and how it

supports business processes at the lower levels of the organisation. How individuals relate to the technology via dialogue interfaces, the types of basic functionality staff require of their systems and how staff communicate via the organisation's communication and ITS infrastructure with other staff and customers, are typical areas of inquiry. The ITS user requirements relate to the ITS business unit (sub-section 2.2.2) and the overall ITS architecture and infrastructure (sub-section 2.2.3) in order to be consistent with the general direction of the organisation i.e. the general business requirements (sub-section 2.2.1). This is generally done via the organisation's ITS project planning processes (sub-section 2.2.7).

The Organisational Context (Boundary) and Its Effect on ITS Management [chapter sub-section 2.2.5] addresses organisational culture, structures, change and business process re-engineering effects as well as the way that ITS managers and general management communicate. It is these contextual factors that constrain all elements of the ITS Management Model (figure 2.1) by providing the backdrop to the ITS planning decision processes.

The External Environment to the Organisation and Its Effect on ITS Requirements [chapter sub-section 2.2.6] highlights those issues in the environment external to the organisation which effect the decisions made by organisations about the way in which they will use ITS. Such issues include: government and industry policy, ITS standards, special interest groups, customer behaviour and supplier relationships.

ITS Planning Cycles in a Typical Organisation [chapter sub-section 2.2.7] tie together all aspects of ITS management and planning within an organisation (sub-sections 2.2.1–2.2.6). This section of the literature review analyses issues which discuss strategic information systems management and planning. It also highlights the types of planning, profile, skills, education and access to information that the ITS manager should have, in order to create and implement strategies and plans that will effectively achieve the objectives for a successful ITS architecture and infrastructure. The issues most highly ranked by ITS managers (priority concerns) for effective ITS management, as well as those issues which are important to non-ITS executive managers, are also highlighted and discussed due to their influence on the management approach used for ITS planning.

The ITS Management Model (figure 2.1) is presented and explained based on these seven literature review topics. The Galliers & Sutherland (1991) revised Stages of Growth model (see section 2.3) is then used to frame research questions about organisational boundary context issues. These issues form the basis of this thesis as they affect, and are affected by, the ITS Planning Cycles and all other aspects of the ITS Management Model. It is also argued that contextual issues surrounding the objective implementation and subsequent management of an ITS architecture, are in evidence and should be well understood by an organisation in order to effectively implement and manage ITS in a subjective sense. This raises the philosophical question of how to deal with the integration/reconciliation of object and subject in the

investigation of ITS management issues (Hegel 1977, Husserl 1965, Heidegger 1976, Crotty 1998, Klein & Myers 1999, Ciborra 1997).

2.2 Literature Discussion Using the ITS Management Model (figure 2.1) as a Framework

ITS management and planning does not occur in a vacuum. The many facets of an organisation such as structure, culture, resource availability, competitive strategy and communications, have a symbiotic relationship with the ITS management process and its application (Cash et al. 1988, Hirschheim et al. 1988, Morieux & Sutherland 1988, Scott-Morton, M. (ed) 1991, Yetton 1993, Handy 1993, Premkumar & King 1994, Stevenson 1995, Kling & Tillquist 1997).

Relationships are evident between the formulation of the general business requirements, the ITS business unit, the ITS architecture and infrastructure and ITS users via the ITS planning cycles. These relationships are in turn constrained and influenced by (and constrain and influence) the organisational boundary context and external environmental factors. Premkumar & King (1994) state that “organisational support mechanisms, top management and user involvement, the resources devoted to planning, the organisation’s size and management styles have been found to influence IS planning” – pg 76. These factors are complex in nature and present us with a picture of a “multivariate organisation”. Contingency theory underpins much of the literature referred to in this thesis (Lawrence & Lorsch 1967) and promotes the idea

that there is no universal approach to managing, planning and co-ordinating the many aspects of the organisational ITS environment. Ciborra & Hanseth (1998) and Ciborra (2000) have recently reflected these ideas in their work on IT infrastructure and knowledge and how these are influenced by individual organisational context.

The related literature is now presented around the seven topics that were previously described which form the components and the relationships between components in the proposed ITS Management Model (figure 2.1).

2.2.1 Derivation of an Organisation's General Business Requirements

Firstly let us consider the concept of a *business strategy and the way that it links to ITS strategy*. Organisational management and strategic planning theory has gained in popularity in the last twenty years, as evidenced by its initially sporadic application to corporate environments in the early '80s, and then blanket application in the mid '80's. Porter (1980) became a popular prophet of the need to plan strategically for business. He was instrumental in the development of the idea that a corporate strategy allows an organisation to focus on what it wants to produce and by focusing on the marketplace it wishes to serve it conserves energy and resources to do what it does best. Overall, these ideas allow for better management and application of the organisation's resources in order to produce goods and services for the marketplace.

General business requirements, at the strategic level, need to be clearly articulated and followed in order for the business to operate successfully and competitively (Anthony 1965, Jackson 1986, Premkumar & King 1994). The strategic requirements of the business reflect the mission, goals, objectives and critical success factors (CSFs long term) of the organisation. These requirements are derived from senior management and the business plans of the organisation. ITS strategic management and planning is only useful if it is driven by the organisational planning process and its competitive business strategies. ITS plans should have a thematic basis linked directly to the business rather than be plans in their own right (King 1978, Jackson 1986, Porter 1980, McKenny & McFarlan 1982, Tavakolian 1989, Galliers & Sutherland 1991, Earl 1992, Lederer & Sethi 1992).

The tactical requirements of the business reflect the organisational structures, personnel selection and motivation, procedure and policy settings (medium term) of the organisation. The operational requirements are indicative of the day-to-day monitoring, fault detection, staff co-ordination and transaction processing (short-term) issues that should be tracked and responded to. All of these requirements should be met if the business operation is to be successful and competitive in overall business strategy Jackson (1986). There are different types of management levels that should be planned for in the traditional management triangle as espoused by Anthony (1965) (Jackson 1986). These levels address the strategic, tactical and operational management focus of an organisation. Planning at higher levels within the organisation should be driven by the analysis of CSFs, which the organisation should

guarantee to be successful in order to survive. This has been expressed in the research, as a preoccupation of management with the alignment of ITS strategy with that of the organisation (Martin 1982, Ball & Harris 1982, Earl 1983, Dickson et al. 1984, Hartog & Herbert 1986, Brancheau & Wetherbe 1987, Galliers & Sutherland 1991 Brancheau et al. 1996, Luftman et al. 1999, Hackney et al. 2000). General business requirements are, however, heavily influenced by the environment external to the organisation and the effect that this has on the organisational boundary context. They in turn, can affect the organisational boundary context and the environment in which the organisation operates. For example, we only need look at the affect that the strategic direction of Microsoft or Coca Cola has on its environment (Kling & Tillquist 1997).

Some researchers would say that contextual issues provide a somewhat chaotic approach to ITS management and planning and that many of our rational assumptions such as the existence of business strategy and its alignment with ITS strategy are built on somewhat “shaky ground” (Hackney et al. 2000, Flynn & Goleniewska 1993).

Stemming from all of these views we recognise the need to highlight that all planning (including ITS planning) must operate on multiple levels, with regard to organisational context, if it is to be successful and effective. Davis & Olson (1985) and Jackson (1986) indicate the planning issues at each level. As the decisions become more short-term or operational in nature, management has less time to manoeuvre. If the strategic direction of the company is well identified and articulated,

more short-term operational decisions are easier to make, as they stay within the strategic framework. Strategic planning methodologies can be based on identifying CSFs at the start of the organisational planning process (Jenster 1987, Shank et al. 1985). An organisation identifies objectives that are critical to business success. They then base their strategies (and monitoring and control of these strategies) on the critical objectives. CSFs are tactical in nature (related to tactical planning initiatives) so the strategic direction of the business is not necessarily impacted by a change of CSFs. They do, however directly impact organisational operations.

ITS are critical organisational resources that are distributed and squabbled over Boynton & Zmud (1987). There is a problem with the development of the ITS planning agenda within organisations (which is constrained and limited by the ITS planning process behaviour). This behaviour has a reciprocal impact on the effectiveness of the ITS plan, as a change in organisational circumstances (boundary context or environment) e.g. new CEO, may impact the behaviour of the ITS planning participants in the way that they vie for ITS resources.

Issues and problems, which surround the organisational strategic planning process include: planning staff high-jacking the process, strategic planning methodologies which dominate the staff; and planning approaches and planning systems designed to diminish the executives' decision making (Wilson 1994). The planning focus may also 'excite' issues such as mergers, acquisitions and divestitures at the expense of the core business, while planning processes may fail to produce true strategic choices

(satisficing) rather than a true analysis of the strategic options. Planning processes may also neglect cultural and organisational requirements and single point forecasting may be inadequate in an era of restructuring and uncertainty. Wilson's (1994) study of 50 corporations regarding major changes to their strategic planning, found that that organisational strategic planning was moving away from being a planning, staff driven, analytical, heavily documented strategy development exercise and moving towards an executive driven, balanced (qualitative and quantitative based measures) strategy implementation exercise.

It was found that this new approach was being driven from within the business units rather than at the corporate level. Business units were taking a more holistic approach and were considering external and internal cultural and organisational contextual influences as well as the consideration of a range of options. They were also incorporating a multiple methodological approach in linking strategy to implementation. It would seem that organisational factors that support multiple methods planning, are important in the success or failure of implementing strategy (Conner et al. 1987).

When strategy is not properly matched with organisational culture then the organisation will exhibit stress and strategic impact will be minimal (Gunsteren (1987). It is recommended that changes to strategy are easier to facilitate than changes to organisational culture and that these should be made if the dissonance between culture and strategy becomes too great.

Consequently we see the importance of the link between general business strategy and ITS business unit strategy and the effect organisational boundary context has on this relationship.

The second area to be addressed is that of the *ITS strategy and its link to business strategy (or ITS for competitive advantage)*. The issue of the competitive strategy of an organisation being linked to its ITS strategy is taken up by Tavakolian (1989) when he found that an organisation with a more conservative competitive strategy would have a tendency to centralise its ITS department. If the organisation was competitively aggressive then it would tend to decentralise its ITS management.

The ITS strategic plan may also have a direct effect on the corporate strategic plan, thus, effectively reversing the link between the two (Cash et al. 1988, King 1988). ITS use for competitive advantage indicates how the ITS strategic direction can greatly influence the corporate strategy, and how this necessitates the need to have ITS literate people working both within the ITS function and outside of it, in order to understand the technological and business issues. This relationship, therefore, is not only one-way but also reciprocal in nature.

The history of ITS use and the orientation towards its competitive uses, as per Porter's (1985) five forces of competition model, is outlined by Somogyi & Galliers (1987). ITS can be used to: build barriers against new entrants; change the basis for

competition; change the balance of power in supplier relationships; tie in customers; raise switching costs and create new products and services. There are obvious implications of utilising ITS for these purposes and the resultant requirement to link the business strategy with the ITS strategy. Business process analysis should be conducted resulting in the development of the information architecture, which in turn maps into the existing ITS business unit requirements as strategic, tactical and operational plans are formulated (Premkumar & King 1994). Most of the conceptual research on ITS planning is based on the top-down approach so the organisation's strategic business unit requirements are critical to effective ITS planning (Premkumar & King 1994, Vitale et al. 1986). Other approaches have also been investigated, however, they are less formal and reliant on a thematic approach to ITS management (Earl 1992). These approaches focus on business-led; method-driven; administrative; technological; and organisational issues and are discussed in greater detail later in this chapter.

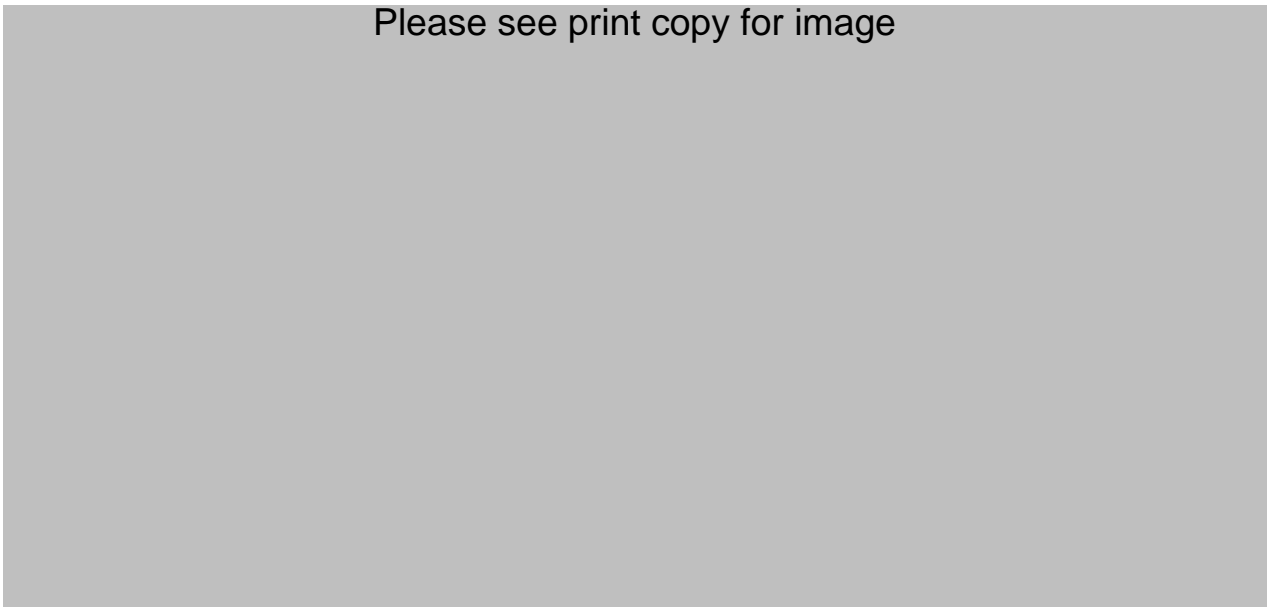
Organisational participants at all levels also have a role to play in the formulation of the various ITS plans within the organisation as they grapple with the systems that they require to do their work (Gorry & Scott Morton 1989, McLean et al. 1993, Alter 1996, Plant 2000). The influence of user requirements on ITS systems plays an important role in ITS planning and implementation. ITS strategic planning cannot be done in isolation. There are many complex interdependencies in the organisational planning process and these do not just occur within the ITS management function. These are discussed later in this chapter.

2.2.2 Derivation of an Organisation’s ITS Business Unit Requirements

ITS business unit requirements need to be clearly articulated and followed within the organisation (Jackson 1986, Gorry & Scott Morton 1989, Earl 1989, Gao & Oppelland 1994, Premkumar & King 1994, Plant 2000). Adequate planning and control mechanisms also need to exist at the strategic, tactical and operational levels of an organisation, in order for the ITS department to operate successfully.

A table of MIS planning task levels and the related literature for each level (see table 2.1) has been developed (Gao & Oppelland 1994).

**Table 2.1 – Basic Tasks at Different Levels of MIS Planning
- from Gao & Oppelland (1994) – pg 287**



Three levels of MIS planning have been related to the ITS business unit requirements as: information strategy planning (strategic); information architecture planning (tactical) and project planning (operational). Several critical issues emerge from this analysis.

Strategic objectives encompass the use of ITS to support the business mission, goals, objectives and CSFs. The type of ITS architecture that the organisation would have to support and invest in, such as large transaction processing architectures in the case of the finance industry, or the agile client/server architectures which link to other organisations' systems in the case of e-commerce retailers, would be a typical example of an organisational mission.

Tactical objectives encompass the existing ITS environment, available technologies and current resources. For example, the long-term goals and short - term objectives of a finance organisation might encompass various expansion strategies, in terms of organisation and market size while an e-commerce retailer may look to ways of better linking players in the supply chain. Consequently the organisation will need to be cognisant of the constraints or opportunities that ITS architectural decisions might present in terms of impact on these goals.

Operational objectives encompass systems requirements, support requirements, implementation and review plans. For example the CSFs relating to goals and objectives might necessitate certain types of systems being designed, created and

implemented which may mean a substantial commitment of organisational resources over a long period. If these resources are committed then the organisation may not have room to move in the event of a change in the organisational boundary context or environment. It has been suggested that the integration of IS objectives with organisational goals for the development of an organization-wide information architecture will meet current and projected information needs (Fink 1994).

While there has been a conceptual link between the general business plans and the ITS business unit plans, this link is weak in practical terms (Premkumar & King 1994, Hackney et al. 2000). As a result various support mechanisms have been developed to foster this link such as steering committees or the active participation of the ITS manager in the business strategy planning process (Earl 1989). On the other hand the formulation of the business strategy and the ITS strategy are generally undertaken in isolation from one another due to differences in planning outlooks, processes and styles between general business and ITS managers (Galliers 1991). General business managers tend to see the long-term horizon of the organisation while ITS managers tend to have an operational focus due to the critical nature of systems and the fact that the business relies on them for day-to-day operation.

Researchers agree (Earl 1992, Galliers & Baker 1994, Premkumar & King 1994, Hackney et al. 2000) that in order for strategic information systems planning to be effective and the ITS business unit requirements to be successfully articulated from general business unit requirements, a number of approaches should be used. What the

approach should be differs from study to study, and this issue will be discussed later in this chapter. The quality of the planning process greatly contributes to the outcome of the ITS area's contribution to the overall organisational performance, and failure to carry out adequate planning can result in lost opportunities and wasted resources (Lederer & Sethi 1992).

2.2.3 ITS Architecture and Infrastructure Requirements

Architectural design approaches and processes have also been applied to the management of ITS resources. This has been seen as an important breakthrough and as a mechanism used to facilitate the integration of information technology with other organisational systems (Synnott 1985, Devlin & Murphy 1988, Earl 1989 Martin et al. 1994, Premkumar & King 1994, Stevenson 1995). Recent ITS management theory indicates that ITS architecture and infrastructure is comprised of smaller and more flexible and varied ITS components and their platforms (Weill & Clair 1994, Plant 2000).

Martin et al. (1994) defines an ITS architecture as

"A written expression of the desired future for information uses and management in an organisation that creates the context within which people can make consistent decisions" – pg 404.

This statement encompasses such topics as: *values* (the beliefs that guide IT decision making); *hardware*, (system technology components and their location, for example work station definition, node location and operating systems support); and *data*

(ownership and sharing, stewardship, security and ease of access). Other topics covered include: *network* (access, application location, service range, protocols); *applications*, (for example who are the assumed customers and process or data driven applications) and the *management system* (ITS roles, funding, planning and control). El-Imad & Tang (2001) identify similar areas in their discussion of the management of enterprise information systems. Gao & Oppelland (1994) also equate tactical mid-term planning approaches with ITS architecture.

Broadbent & Weill (1997) have defined an ITS infrastructure as

“...the shared foundation of IT capability for building business applications and is usually managed by the information systems (IS) group. At the base of the IT pyramid are the components, such as computer and communications technologies, that are largely commodities and readily available in the marketplace...The second layer comprises a set of shared services such as management of large-scale data processing, provision of electronic data interchange (EDI) capability, or management of firm-wide databases. People with knowledge, skills, and experience bind the commodity components into reliable, shared IT infrastructure services. The business applications, such as order entry, bank account opening, sales analysis, and purchasing systems, that actually perform the business processes utilise the shared infrastructure services” – pp 78-79.

Figure 2.2 in this chapter illustrates the logic behind this argument. Duncan (1995) defines ITS infrastructure

“as a set of shared, tangible, IT resources that provide a foundation to enable present and future business applications” – pp 39-40.

Primary, tangible resources include aspects such as: platform technology; network and telecommunication technologies; key data; and core data-processing applications (Duncan 1995). ITS architecture and infrastructure is defined in much the same terms except that ITS infrastructure development is distinguished from other ITS activities by the fact that it changes gradually and, therefore, is stable over time, making it more long term in nature and more strategic in planning requirements (Martin et al. 1994, Duncan 1995). Because the infrastructure supports multiple types of uses and is expensive to develop, it usually changes incrementally and very slowly. If viewed once every seven to ten years, however, the changes in many firms' ITS infrastructures can appear quite revolutionary (Davenport & Linder, 1994).

A model of the structure of an ITS infrastructure has been developed and is presented as figure 2.2 (Weill et al. 1996).

Figure 2.2 – The Elements of IT Infrastructure – from Weill et al. 1996 – pg 6

Please see print copy for image

Infrastructures are often only equated with costs, as the benefits they derive tend to be associated with the applications that run across them (Weill et al. 1996). The large and long-term nature of ITS infrastructure often results in these investments being made in anticipation of business developments. The return on infrastructure investments, in terms of the business results, is difficult to directly predict or track. ITS infrastructure investments also typically, do not necessarily provide direct business performance benefits (Parker et al. 1988). The benefits are realized by business systems connected to and enabled by the infrastructure. In the case of enabling infrastructure, however, the future flexibility provided by ITS infrastructure

can provide direct benefits by enabling economical or rapid implementation of other systems (Ratchukool 1997, Rosenthal 1994). Due to this fact, infrastructure is often a key resource in developing and maintaining long term competitive advantage.

There are four views of the ITS infrastructure (Weill et al. 1996). These are: none (where the business unit independence is forgoing economies of scale); utility (where cost savings are achieved via economies of scale); dependent (where business benefits are developed for the current life of the architecture strategy) and enabling (where current and future flexibility becomes in-built). Each of these views is shaped by a meta-construct that is derived from four sub-constructs. These include: infrastructure justification (cost saving and flexibility) and firm-wide infrastructure investment (percentage of revenue, percentage of total ITS investment), or average change in firm-wide ITS infrastructure as a percentage of total investment in ITS. Infrastructure and architectural responsibility (centralised or decentralised) and extent of the firm-wide infrastructure (number of services and reach and range of services) are also part of this meta-construct. One view is expected to dominate an organisation's direction but all views are affected by an organisation's boundary context. Context is defined as a firm's strategy (flexibility, changing products, business unit synergy and extent of ITS integration), industry type, stability and size (in terms of revenue). The view of the ITS infrastructure is more enabling where: an organisation is in an information intensive industry; where there is synergy between business units; in smaller firms; and where ITS and the business planning processes are better integrated. Management implications include: the need for senior management to be part of the decision

process based on the company's strategic objectives and their industry; the different views have significantly different management objectives, investment levels and benefits; and the view would be dependent on the strategic context of the firm. Firms which take the enabling perspective on ITS infrastructure, invest in a more centrally provided firm-wide infrastructure that is planned by a combination of the corporate ITS group in consultation with business units which, set architectural standards. Findings indicate that this can be politically difficult due to contextual differences across organizations (Weill et al. 1996).

There is a link between the effort to encourage synergy between business units and consideration given to investment in IT infrastructure and its range and reach within the organisation (Broadbent et al. 1996). Business unit synergy (and what drives it) seems to be the key for understanding the firm wide ITS infrastructure. Issues such as greater integration of information and ITS needs in the strategy formulation process may indicate that ITS considerations for strategic choices encourage investment in ITS infrastructures. Different strategic issues might lead to more consideration of the outcomes of the use of ITS and therefore more extensive ITS infrastructure. An approach has been developed to business-driven ITS infrastructure by utilising short statements on a company's business situation (maxims) to identify which ITS infrastructure best suits them (Broadbent & Weill 1997). Firms need to: consider their strategic context (business demands, roles and relationships); articulate business maxims (firm's competitive stance, extent of co-ordination across units, implications for information and ITS management); identify ITS maxims (role of ITS and level of

investment) and then clarify their view of the ITS infrastructure (none, utility, dependent, enabling). Barriers to the expression of these maxims include problems with expression and implementation due to lack of understanding and communication by senior managers of the firm's strategic intent and cultural issues such as politics, reward systems and lack of ITS leadership. Infrastructures should support the business processes, be developed incrementally, and be driven both by technology and business initiatives (Davenport & Linder 1994). Thus there is a link between, organisational boundary context, general business requirements, ITS business unit requirements and ITS architecture and infrastructure.

Economic issues surrounding ITS infrastructure development are considered by Monk (1993) in terms of international environmental issues. Findings indicate that academics and practitioners should focus on issues of national and international infrastructural significance in areas of economic policy and practice in the wider environment of ITS infrastructure. This highlights the need for development of ITS management theory in the inter-organisational areas of technology introduction, transfer and diffusion (Lien 1993, Bunker 1998b & 2001, Robinson 1988). Literature on culture and economic systems has been combined to specify the integrative devices required for organisations to adapt, survive and renew in an increasingly complex and competitive business environment (Acar & Winfrey 1994). Proprietary architectural control, by individual organisations or by third party vendors, has broader implications for organisational structure. Architectural competition is giving rise to a new form of business organisation (Alberthal 1993, Steinbrenner 1994) that

is impacted by the wider environmental factors that have a direct influence on ITS architecture and infrastructure. For example, the impact of Microsoft Windows on the global economy is manifest in e-commerce development and the resulting law suit with the US government. Is it possible for an architecture to dominate business in a global sense ?

2.2.4 The User Requirements of ITS

User requirements need to be clearly articulated and fulfilled in order for the effective and efficient use of ITS to perform organisational roles and tasks. These requirements are derived through the multitude of systems development methodologies that have been created (Alloway & Quillard 1983, Davis & Olson 1985, Davis 1989, McLean et al. 1993, Alter 1996, Ciborra 1997 & 2000).

Typical users' requirements of corporate systems functionality include: transaction definition (transaction frequency, required integrity, volume, required response time); interfaces (screen designs in graphics or text, feedback and assistance, error control, validation, workstation design, mouse, keyboard, touch screens, voice synthesis) and dialogues (known command languages, menus, forms, icons, graphs, colour). These corporate systems are typically controlled by the ITS function, however, End User Computing (EUC) is another part of the ITS architecture and infrastructure, over which the end user has more direct control and influence (Davis 1989, Alter 1996, Ciborra 1997). The types of end user issues, which concern managers and their staff

within the organisation have been analysed and 74 firms were surveyed on many issues including end user critical success factors (McLean et al. 1993). Results are included as table 2.2.

Table 2.2 – Key Issues of EUC (N =74) – from McLean et al. 1993 – pg 86

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It is interesting to note that this type of survey is more inclined to be carried out looking at more general and corporate ITS CSFs and so information of this nature gives us a different perspective on the importance of various ITS issues within the organisation. As we can see from Table 2.2 there are issues, which are considered important organisational CSFs that also appear to be important at the end user level. Adequate support for users is high on a list that otherwise reflects many corporate factors. End user computing is changing in terms of the nature of applications and now includes transaction processing systems, manufacturing systems, expert systems and ITS development for local, corporate-wide and inter-organisational systems.

It appears that end user and corporate ITS activities are converging along the continuum of task and problem structure and are therefore creating much more pressure and influence on the design, creation, use and management of the ITS architecture and infrastructure. This is particularly the case when we witness the effects of e-commerce (Plant 2000). Thus we see an influence of end user requirements over the ITS business unit requirements and the ITS architecture and infrastructure requirements. As McLean et al. (1993) state,

“...it remains the responsibility of end users to advance the business and information needs of their respective functional domains. Notwithstanding, it remains the responsibility of IS professionals to advance the organisation wide viewpoint, and to provide the technical expertise required, for the effective and integrated management of the information assets of their respective organisations”
pg 91.

Strategic information systems can be developed as the result of “grass roots tinkering” as new ideas “bubble up” from the bottom of the organisation (Ciborra 1997). It is important that IT is used to harness the core competencies of the company to create new information and business knowledge. End users have the experience and knowledge to provide new insights into what might work strategically for their organisation in the use of ITS. This approach complements the more formal top down methods of ITS planning and development. A more holistic view of end user influence is emerging as an important area and it has a direct role to play in the ITS Management Model (figure 2.1).

2.2.5 The Organisational Context (Boundary) and Its Effect on ITS Management

The organisational boundary is a complex interaction of culture, structure and change processes. The boundary state of an organisation has self-regulating properties, that is to say the, rules, beliefs and structures that mediate between the ends of the organisation and its external environment (Emery & Trist 1965). These beliefs, rules and structures hold the organisation together as an operating unit. Formalised organisational structures, operating procedures and organisational myths are all examples of boundary properties (Emery & Trist 1965, Schein 1984).

There is a need to account for the complexities of different organisational cultures, goals, personal and groups styles in order to create, implement and manage effective and useful ITS within an organisation (Gorry & Scott Morton 1989). There are cultural and structural aspects of an organisation which affect the planning process within the organisation and the role and function of the ITS department. The failure to differentiate between organisational cultures and workflows (“steady-state” and “policy and innovation”), has led to frustration and disappointment within organisations, due to vast amounts of money being wasted on unused computer facilities, with the result of highly sophisticated but unwanted information analysis (Handy 1993).

We should also remember that the ITS of an organisation and their management have a reciprocal effect on the organisational boundary context of the organisation (Kling & Tillquist 1997, Ciborra 1997, Morieux & Sutherland 1988, Avgerou 2001, Baskerville & Smithson 1995). Consider the impact of a new ITS architecture on the structure of an organisation. Many organisations during the 1990's have "downsized" or "right sized" as a result of the implementation of a new ITS architecture or infrastructure.

There are many views of what constitutes an organisational culture such as symbolic interpretation of an organisation or the values, norms and beliefs that underpin an organisation's culture. There is also a more holistic approach to cultural definition, which encompasses both of these definitions and many other factors including social, political, technical and historical perspectives.

Culture can be

"...a particularistic system of symbols shaped by ambient society and the organisation's history, leadership and contingencies, differentially shared, used and modified by actors in the course of acting and making sense out of organisational events" (Allaire & Firsirotu 1984 - pg 216).

Symbolism manifests itself in the indication of an individual or groups' status or position in the organisation. Technical expertise is often a symbol of ITS status. This has been generally reflected in the level of ITS professionals' salaries and with the advent of the new 'high performance' IT organisation (Willcocks 1996).

There is determinism in technological change processes and the interrelationship between technology and the social system of an organisation (Berg 1985). The symbolic meaning of the technology often affects its introduction. There is a technoculture at play within an organisation, which affects the organisation's ability to deal with and absorb technology. It is expressed in the symbolic representation of technology by that organisation.

Implicit and explicit underlying assumptions of staff members within organisations may affect overall organisational culture and beliefs systems. (Schein 1986). This may have a “knock on” effect on strategy, integration of new technologies, conflicts, communications and socialisation within the organisation. Many types of organisational cultures are manifested through organisational structures (Handy 1993). Bureaucratic hierarchies often produce role-based organisations whereas matrix style relationships are more likely to produce task-based organisations. The inference here is that ITS culture, structure and function can also be an expression of overall organisational culture rather than just an expression of the ITS management's or general management's will.

The holistic approach encompasses both previous views of culture (Sorge 1982, Pettigrew 1988, Alvesson 1985 and Hofstede 1990 & 1998). Shared values, beliefs and norms may be projected and these may be expressed through symbolism and organisational structure and behaviour.

Cultural paradigms can be expressed in a number of ways and different assumptions and values underpin various cultures (Kluckhohn & Strodtbeck 1961, Hofstede 1980 & 1998, Schein 1984). Assumptions of cultural paradigms are an: organisation's relationship to its environment; nature of reality and truth; nature of human nature; nature of human activity; and the nature of human relationships (Schein 1984). These assumptions represent the philosophical position of a particular culture such as the example of the differences in values between some Eastern and Western cultures: Western cultures are oriented towards mastery of nature; are based on individualistic competitive relationships; are future-oriented involving a linear, monochronic concept of time. They also view space and resources as infinite; assume that human nature is neutral and ultimately perfectible; and base reality or ultimate truth on science and pragmatism. Eastern cultures are passively oriented towards nature; seek to harmonise with nature and with each other; view the group as more important than the individual; and are present or past oriented. They also see time as polychronic and cyclical; view space and resources as very limited; assume that nature is bad but improvable; and see reality as based more on revealed truth than on empirical experimentation.

National cultures have also been defined by the following dimensional values: large versus small power distances; strong versus weak uncertainty avoidance; individualism versus collectivism; masculinity versus femininity; long versus short-term orientation (Hofstede 1980 & 1998). Given, that these examples indicate

distinctly different philosophical positions in these particular extremes of culture, then the skills required to design, make, understand, use and manage ITS, would also be significantly different from one type of culture to another. All of these organisational cultural factors can relate to the ITS function and, therefore, may provide an indication as to what may unconsciously affect the function and role of ITS within an organisation.

Much of the research literature deals with organisational structure and work-unit groups and how these affect business processes within organisations. In order to understand ITS management in relation to other areas within the organisation it is reasonable to assume that we should understand the impact of organisational structure on the role of ITS and resultant business processes within organisations.

"The keys thus lie in the organisational realm, beyond the conventional confines of system development methodology. And the implication, therefore, is that most MIS research is too narrowly focused at present to answer its own basic questions" (Swanson 1987 – pg 182).

Research has highlighted how and why organisations structure themselves to produce certain business outcomes (Lawrence & Lorsch 1967, Khandwalla 1977, Galbraith 1973, Perrow 1979, Mintzberg 1979, Handy 1993, Yan & Louis 1999).

Different organisational variables and uncertainty effects mean that structures and sub-structures are created within an organisation, to assist in coping with management uncertainty (Mintzberg 1979, Khandwalla 1977 Galbraith 1973). There is difficulty

associated with determining the most appropriate organisational structure given various organisational circumstances (Khandawalla 1977, Galbraith 1973, Hunt 1972, Perrow 1979, Lawrence & Lorsch 1967, Handy 1993, Avgerou 2001). There is an ongoing debate that moves in many directions and is dependent on the organisation's reason for existence, the type of ITS architecture and infrastructure involved and the cultural factors at work.

Technology affects the formality of organisation structures (Handy 1993, Avergou 2001, Mintzberg 1979). Rigid technology application produces formal organisational structures. The more technically sophisticated ITS becomes within the organisation, the more likely ITS liaison roles (e.g. business analysts) will be developed to cope with this fact (Mintzberg 1979).

Many researchers discuss organisational features in regards to organisational and work-unit flexibility (Hunt 1972, Galbraith 1973, Khandwalla 1977, Mintzberg 1979, Perrow 1979, Handy 1993, Yan & Louis 1999). Organic organisations tend to cope more effectively with dynamic and changeable markets and technologies and mechanistic organisations tend to cope more effectively in more stable environments (Galbraith 1973). This line of argument is supported by the tendency of organisations that employ custom technology to be more informal and organic than those employing off-the-shelf-systems (Khandwalla 1977, Alter 1996). More rigid process technology is linked to more rigid functional workers within the organisation, whereas the knowledge workers (or the more flexible organic organisational groups) are more

likely to use decision support or knowledge based ITS to perform their tasks (Alter 1996).

The introduction of an ITS within an organisation influences major changes to many areas which include: use and purpose of organisational hierarchies; redefinition of organisational communication; and task performance and structure. These changes affect the information processing capability and structure of the organization as well as nature of incentives, work roles, management techniques and the working flexibility of the organization (Foster & Flynn 1984, Morieux & Sutherland 1988, Yan & Louis 1999). An organisation may not, however, be the total product of technology effect, rather it may be organic in nature utilising available appropriate technology (Perrow 1979). Organisational change, and its implications for ITS management and planning, is a critical factor in this argument.

This can be illustrated by the phenomenon of Business Process Engineering (BPR) which is not recent in its origins. As early as 1977, Khandwalla observed that organisational workflows and the ITS applied to them, affected an organisation's structure. The organisational structure then had a reciprocal affect on the way ITS were perceived, implemented and used as well as affecting the role and management of the ITS function.

Motivation plays an important role in this view. Rather than assuming that people, like machines, can be programmed, a fresh focus is needed. There also needs to be

promotion of a process-oriented view rather than a content oriented view allowing change management as a process to become institutionalised. Organisational structure design and control is used to facilitate socio-technical systems within the organisation and we should understand technology at the strategic level within the organisation so as to successfully implement it (Eason 1988). This understanding reinforces the link between organisational boundary context factors and the organisational and ITS business unit strategy.

BPR can be used to assist an organisation to become more effective and efficient (Barrett 1994). Defining the ITS vision via the general business unit requirements is an important activity for successful BPR, and a four phase, structured approach to process visualisation has also been developed (Barrett 1994). This method attempts to align and unify the re-engineering process behind a business and ITS vision and mission. Bashein et al. (1994) look at similar issues when they outline the organisational conditions that managers need to meet in order for business process reengineering to succeed.

Technology controls the work processes, organisational structures and environment through its design (Hunt 1972, Leavitt 1978, Handy 1993, Bunker 1998a & 2001). This affects organisational flexibility as rigid technology architectures and infrastructures can make an organisation ill equipped to react quickly to a competitive and changing environment. It is important, therefore, for ITS managers to have knowledge of this fact and its consequences for organisational flexibility.

Human rationality affects the ability of the manager to make decisions based on information. There is only so much information a manager can absorb; therefore, information flows should be controlled (Khandwalla 1977). The computer has the least impact on top management's ability to make use of quantifiable data. The real effect is at the operating levels of management (Alter 1996). This has implications for executive management's expectations of ITS in the organisation. Today's executive manager may be using technology as a support mechanism for decision making processes but organisational decision making at the strategic level is a complex activity and therefore ITS resistant (Courtney 2001). Failure of Executive Information Systems (EIS) to make an impact at this level is testimony to this fact.

Understanding the complexity of the decision making process and use of information technology in that process can in turn affect the way an executive manager perceives the importance and use of ITS across the organisation. It is one thing to say that ITS is a strategic enabler but an entirely different thing to enact decisions to ensure that it is. Consequently BPR is only as useful as a manager's understanding of ITS and their affect on the organisation.

2.2.6 The External Environment to the Organisation and Its Effect on ITS Requirements

General systems theory describes systems characteristics and behaviour given certain conditions. Open Systems have been well defined and described within this body of knowledge (Bertalanffy 1950, Angyal 1941, Sommerhof 1969, Emery & Trist 1965, Ackoff & Emery 1972). Information systems are complex systems that exist and interact with other systems within their environment (Handy 1993).

This environment is defined as that which is external to the living organism (or self ordering system). In this case, the self ordering system is represented by the organisation which may exchange materials with the environment continuously building up and breaking down its components (Von Bertalanffy 1950). This external environment plays an influential part in how organisations implement and manage their general business requirements, ITS business unit requirements, ITS end user requirements ITS architecture and infrastructure. The approach to ITS planning chosen by the organisation is also directly affected.

The general business requirements are affected most directly at the strategy level. An organisation will develop business strategy as a result of how it sees its mission being influenced by environmental factors. Changes to markets, industry operations,

information technologies, government legislation and social pressures are all influential in the way that an organisation will frame its strategic business direction. Globalisation of the world economy is an example of how environment plays a direct part in business strategy formulation, with many businesses raising capital, developing marketplaces and strategic alliances and building ITS architectures on a global scale (Hackney et al. 2000, Plant 2000).

Influences evident at a strategic business level filter down to the tactical and operational levels of the business. The example of the deregulation of the Australian banking sector is indicative of an environmental effect at the strategic level. Changes to Australian government legislation from 1983 had the direct effect of allowing individual banks to change their strategic direction. This was achieved by raising vast amounts of capital offshore, setting variable interest rates that directly reflected the cost of this capital and the ability to rationalise the industry through mergers and with acquisition of other financial institutions both locally and globally. More international players were also able to enter the marketplace forcing a spirit of competitiveness that had not been seen prior to these changes.

Changes such as these also affect the ITS strategic direction, and in the banking industry, as a result of deregulation and changes in technology, we see the move from large proprietary, centralised mainframe architectures to more distributed, open, smaller and more flexible client server arrangements. This highlights a new emergent form of organisation that encompasses learning, collaboration and empowerment in

the effective use of ITS infrastructures in a complex and dynamic environment (Plant 2000). This view illuminates the interaction between today's complex environment and the way that an organisation views the attributes of its emergent boundary context (culture, structure and change objectives).

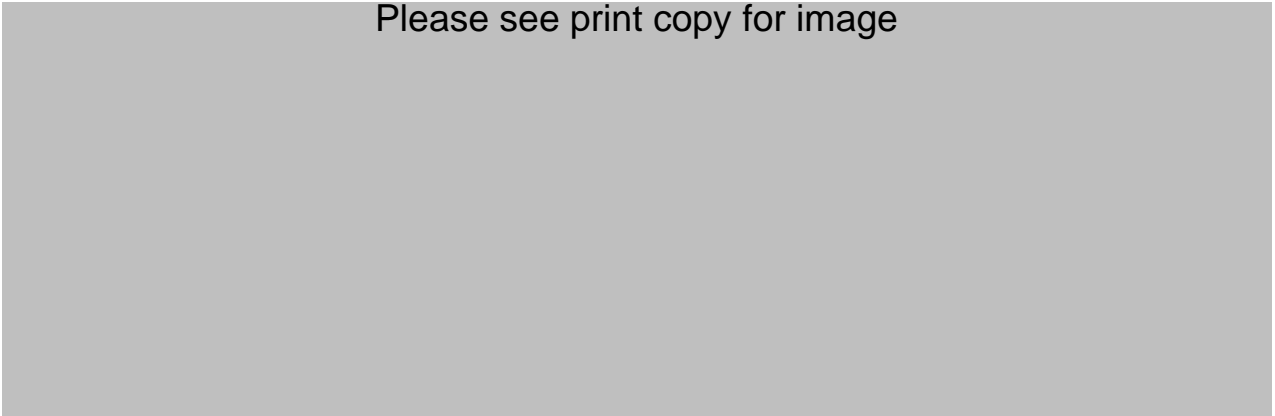
Environmental issues also have an impact on ITS management (Hackney et al. 2000). Characteristics such as flexibility/capability of rivals, first mover effects, patents/trade secrets, government legislation and monopolies all affect the ITS management approach of an organisation.

2.2.7 ITS Planning Cycles in a Typical Organisation

ITS planning cycles are used for long (strategic), medium (portfolio or architecture) and short term (project) ITS management, implementation and use (Gao & Oppelland 1994). A table describing these three levels, the various stakeholders and the research that underpins these ideas (see table 2.3) has been developed (Gao & Oppelland 1994). These three levels of planning link the ITS business unit, to the general business requirements, the ITS user requirements and the ITS architecture and infrastructure (Cash et al. 1988, Sprague & McNurlin 1986, Bunker 1994).

**Table 2.3 – Possible Stakeholders in MIS Planning within an Organisation
– from Gao & Oppelland (1994) - pg 288**

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Different approaches to the ITS planning process (see table 2.1) have also been highlighted (Gao & Oppelland 1994). Such approaches as; Gibson & Nolan's (1974) Stages of Growth; Rockart's (1979) Critical Success Factors; Hirschheim et al. (1988) evolutionary model and Galliers & Sutherland (1991) revised stage theory approach can also be added to this table.

ITS management and planning encompasses ideas that deal with ITS interaction with the organisational strategic and shorter-term planning processes (Jackson 1986, Davis & Olson 1985, Earl 1987, Ein-Dor & Segev 1978, King 1988, Lederer & Mendelow 1986, Premkumar & King 1994, Lederer & Sethi 1992). Most of the literature has dealt with the evolutionary nature of ITS and how it is planned for, implemented and used. Later research has dealt with those aspects of management that need to be focussed on in order to more effectively manage ITS. Management and planning literature deals with controlling the organisational environment, and as a result, information systems management and planning literature attempts to anticipate the

impact of each stage in the evolution of a technology and its management within the organisation.

In 1983, Pyburn explained that planning was an attempt to deal with current decisions and their future effect. This is still true today and supports the use of planning cycles to move from the current ITS business unit requirements to the future ITS architecture and infrastructure.

ITS academics and practitioners have attempted to develop and link ITS management theory and organisational strategic planning theory (Ein-Dor & Segev 1978, King 1978, Pyburn 1983, Premkumar & King 1994, Gao & Oppelland 1994). Strategic Information Systems Planning (SISP) theory developed and gained momentum more in the mid 1990s. Pyburn's research was a very important first step in looking at ITS strategy implementation (HOW) issues rather than the normal descriptions of strategic planning processes (WHAT). His approach looked at useful ways an organisation could actually use planning tools instead of just talking about them.

The need to plan was highlighted by the development of a focus on organisational objectives in a strategic context. (Jackson 1986 adapted from Synnott & Gruber 1981). This was designed to offset uncertainty and change and to develop an economic approach to ITS planning by eliminating haphazard approaches and snap judgements and to facilitate control by providing a basis for performance. Many ways that the ITS planning process could be visualised from the top down were outlined

(Jackson 1986). This involved a process bringing corporate focus and information resource management together in the corporate plan through the use of such integration methodologies as critical success factor, whereby project risk could be derived, and suitable projects initiated.

The types of strategic information systems planning methodologies and their strengths, weaknesses and applicability to the organisational planning process were also analysed (Lederer & Mendelow 1986, Lederer & Sethi 1988). The IT plan was also linked with the organisational strategic plan, and it was concluded that IT planners should be made aware of strategic organisational plans, but also that it was just as beneficial for the organisational strategic planners to understand IT concepts and associated problems (Hufnagel 1987). This ensures that an overall plan is formulated which considers environmental, organisational, business, user and technological impacts.

There are many types of ITS planning dealt with in the literature. The early ITS planning literature approaches planning through Gibson & Nolan's (1974) four-stage model, (later changed to six stages). ITS planning was explained within this model by indicating that the organisation was dependent on ITS stages of development. It was then illustrated that the planning function could be used to move the management and development of information systems from stage to stage.

Gibson and Nolan's (1974) model has attracted criticism over the years (King & Kraemer 1984, Drury 1983, Benbasat et al. 1984, Earl 1989, Galliers & Sutherland 1991, Damsgaard & Scheepers 2000) due to problems associated with the evolutionary nature of the model. The model tended to ignore the basic characteristics of organisations such as their cyclic behaviour, political nature and reactive behavioural characteristics as well as different levels of maturity; early economic successes mistaken for organisational maturity; and the differences in structure of some organisations. The model also lacked the ability to predict organisational activities and was not generalisable to all organisational types.

An evolutionary approach to ITS planning and development may partially satisfy our understanding of the ITS function, however, we must also take account of cyclic, de-evolutionary or linear processes that effect the planning and development of ITS. Gibson & Nolan's (1974) model is still extremely relevant to the theory of ITS (Galliers 1991) and we should view their model in terms of its application to understanding the technological maturity of an organisation or part thereof. This would prove to be more useful than the definitive model of change which Gibson and Nolan proposed. There is wide acceptance that Gibson and Nolan's model could serve better to modelling the evolution of a single technology implementation in an organisation or organisations rather than be used to represent an all encompassing view of technology implementation (Jackson 1986, McFarlan & McKenny 1983(a), Earl 1989).

The Galliers & Sutherland (1991) model is based on a similar approach to that proposed by McKenny & McFarlan (1982) where they have modelled a learning curve for various ITS technologies within the organisation. This learning curve is accelerated by internal ITS business process pressures. As a result of this development, the Gibson & Nolan (1974) model may more appropriately approximate an iterating (rather than evolutionary) process of individual technology lifecycles, rather than the entire ITS infrastructure and architecture development within an organisation.

Various systems planning scenarios which highlight the strategic impact of current applications as well as the strategic impact of planned applications have been assessed (McFarlan & McKenny 1983a). When an organisation is located at a particular ITS development stage, we can see how this will influence the type of ITS planning for that organisation.

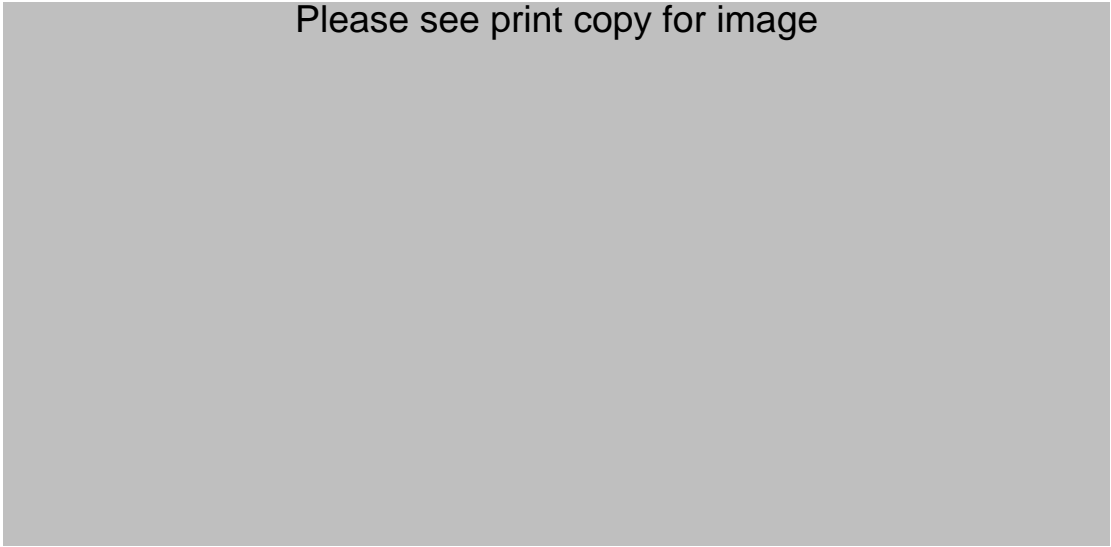
A core group of researchers have strongly influenced the direction of ITS planning theory in large organisations (Earl 1983, 1989, 1993, Galliers 1991, Galliers & Sutherland 1991, Galliers & Baker 1994). Many research projects have been conducted using their theories as a basis for directing the planning process and in assessing the need for strategic ITS planning within an organisation. The approaches developed by Gibson & Nolan (1974), McFarlan & McKenny (1983b) are also insightful and useful.

It is acknowledged that an organisation may have many requirements over time and due to this fact there is no one correct approach to ITS strategic planning (Earl 1989). Management usually needs to link the ITS objectives with the business objectives and consequently requires that ITS planning be done by individuals with a range of organisational, ITS and user skills. Galliers (1987a, 1991) then adds an early “ad hoc” stage to the planning process and an extra factor concerning the area of planning focus. These additions take the organisation through three distinct phases of ITS department, organisation wide and then environmental focus as part of its ITS planning process. This substantiates the effect of environment on each of the areas within the proposed ITS Management Model (see figure 2.1).

Hirschheim et al. (1988) build on Nolan’s Stage Theory model by analysing staged management of the ITS functions in a number of UK organisations. Their model incorporates three stages: delivery; reorientation and reorganisation (see figure 2.3).

Progression through each of these stages is a function of the increase in the time the ITS function has existed within the organisation (maturity) and the education levels of the ITS staff. The initial phase (delivery) is less strategically aligned and integrated with the rest of the organisation than the final phase (reorganisation).

Figure 2.3 – The New Age – from Hirschheim et al. (1988) – pg 79



These three phases are elaborated using six key factors (see figure 2.4). This study highlights some interesting organisational patterns for the management of ITS.

Figure 2.4 – Managing the New Age – from Hirschheim et al. (1988) – pg 79



Strategic planning phases are linked with organisational value systems, competitive strategy, management control, IT/IS application, decision making style and the management and structure of the ITS function (Bhabuta's 1988). Bhabuta does not intend for an organisation to go through each phase. The process of strategic planning is blurred with some organisations having some attributes in different phases.

The candidate (Bunker et al. 1992) explored the background and role of the ITS function within two Australian (financial & legal) organisations as the basis of a Master of Commerce (Honours) thesis at UNSW. The study followed the original structure of the Hirschheim et al. (1988) study but also attempted to validate the ITS function by studying the end users of the systems and asking their opinions about the ITS function in the management and delivery of the systems. The study attempted to highlight organisational structural and cultural issues that affected the perceptions of ITS staff and the user population. Findings from this study had more in common with Bhabuta (1988) and studies such as Jackson (1986) and McFarlan & McKenny (1983b) rather than with the Hirschheim et al. (1988) findings. Organisations may be in many stages of management and use of ITS, which may relate directly to the technology rather than to the ITS unit as an entity. Both the organisations studied by Bunker et al. (1992) inhabited the reorientation/reorganisation phase of the Hirschheim et al. (1988) model, however, they both also had elements of the delivery phase within their ITS functions, especially in the application of new technologies. Another interesting factor to emerge from this study was that the perception the ITS

function had of itself in the financial institution did not match the perception of its end users.

Earl (1993) studied the strategic information systems planning experience in 27 companies, interviewing not only ITS managers but also general managers and line managers. It was found that these companies were using five strategic information systems planning approaches described as: business-led; method-driven; administrative; technological; and organisational. Earl (1993) discovered that there were three conditions necessary for successful strategic information systems planning. These were: the method used; the process employed; and who was involved (line managers, users, IS staff) in terms of ownership, education, awareness and organisational context. Success factors included; top management involvement and support; the availability of a business strategy; the need to study the business and get that right before making technological decisions; and good ITS management. Table 2.4 represents Earl's summary of the five approaches taken by the companies.

Table 2.4 – Five Approaches Summarised – from Earl (1993) - pg 12

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The conclusion reached within this study is that strategic information systems planning is a multi-dimensional construct (SISP method, process and implementation) which has a multi-stakeholder perspective (ITS, general and line management) and suggests that studies of ITS management can be enriched by looking outside the ITS department. Earl also suggests that the assumption that formal strategic information systems planning methods are used to link the business process to the planning process should be challenged and that issues relating to the strategic planning process need to be studied further while paying attention to implementation issues. Suggestions to practitioners include the advice that a strategic information system planning requires a holistic or independent view of methods, processes and implementation strategies. If any factor is neglected then the plan may fail. Strategic information systems planning needs a multiple management approach that generates

ideas but also ensures ownership of processes and outcomes. With these suggestions in mind, it would appear that the organisational approach is most effective, but that the multi-dimensional view of strategic information systems planning approaches can provide a diagnostic tool for evaluation of organisational efforts and experience in this area. The choice of an appropriate strategic information systems planning approach is critical to a successful planning outcome (Galliers 1991). Approaches should be continuous instead of cyclic or one-off and should be measured against outcomes. Regular executive workshops and briefings could play a part in this ongoing issue. As a result of this approach Galliers & Sutherland (1991) developed a contingency framework for choosing an appropriate strategic information systems planning method based on stakeholder motivations (see figure 2.5).

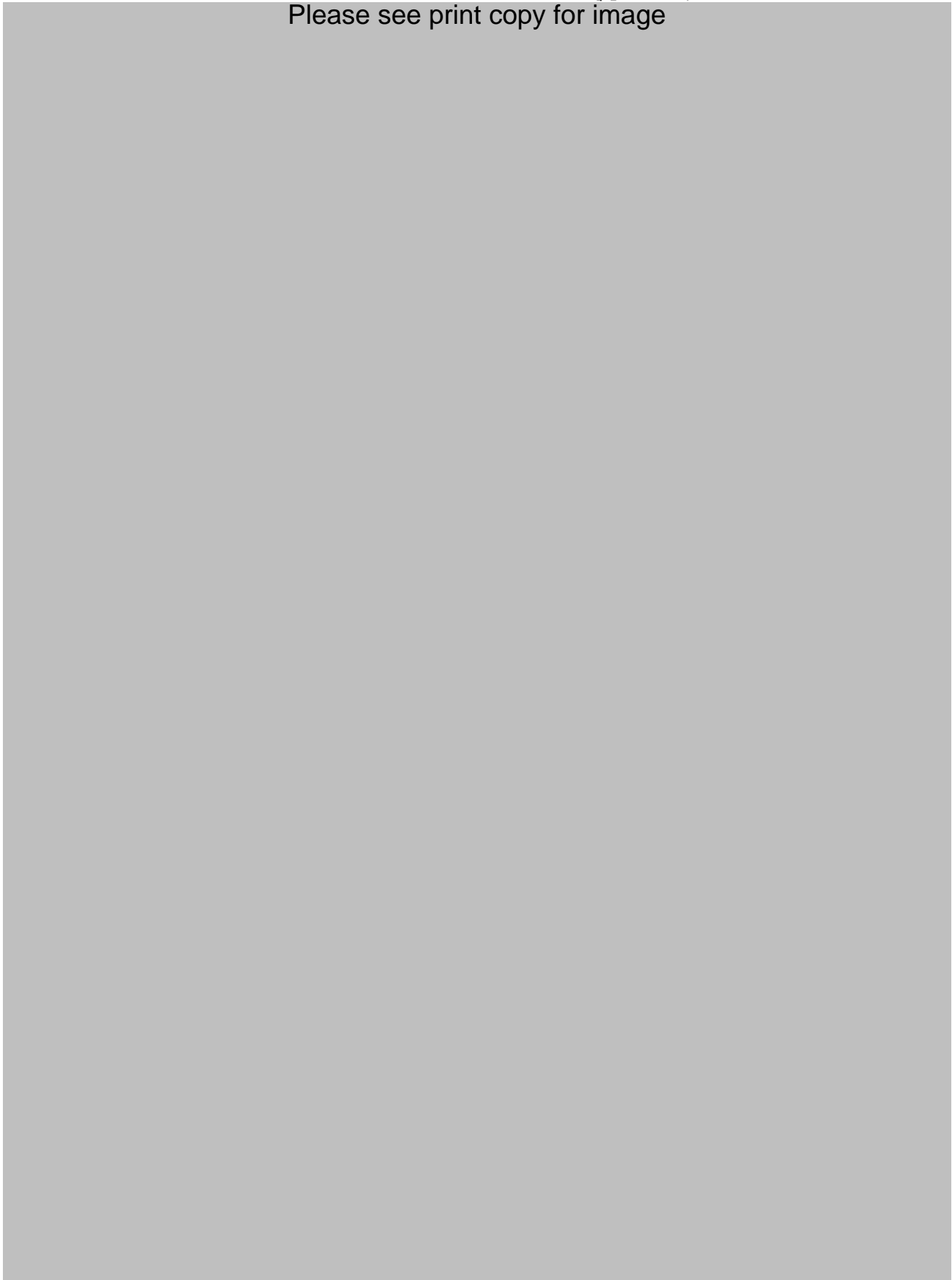
Figure 2.5 – A Contingency Framework for Choosing and Appropriate SISP Approach Based on Stakeholder Motivations (amended from Galliers 1987f, p 344) – reproduced from Galliers (1991) - pg 63

ISP Orientation Motivation	IT	Organisation	Environment
Efficiency, cost reduction	XX	XX	X
Effectiveness	X	XXX	XX
Improved products/services	X	XX	XXX
Applications portfolio	X	XXX	XX
IT acquisitions	XXX	X	X
IT architecture	XXX	X	X
Competitive advantage	X	XX	XXX
Improved m'ment/IS relations	X	XX	XX
Resourcing decisions	XX	XX	X
Human resource considerations	X	XX	X
Database architecture	XXX	XX	X
Note: SISP orientation relates to the type of SISP approach being considered, i.e. whether the focus is on the technology itself (isolated), or on matters internal to the organization (reactive), or on the business environment (proactive)	X – minor XX – reasonable XXX – major		

Galliers & Sutherland (1991) bring together the various disparate key elements of the major planning models in a 'Revised Stages of Growth' model. They utilised the seven 'S' approach used by McKinsey and Company (developed by Pascale & Athos 1981) in their management consultancy. These seven areas covered by the approach are: strategy; structure; systems; staff; style; skills; and superordinate goals. They then considered each of these seven areas across the six stages of ITS growth based on Earl's and their own (1989) studies (see table 2.5).

Table 2.5 – A revised “stages of growth” model – (Sutherland & Galliers, 1989, p23 reproduced in Galliers, 1991, pp 61-62)

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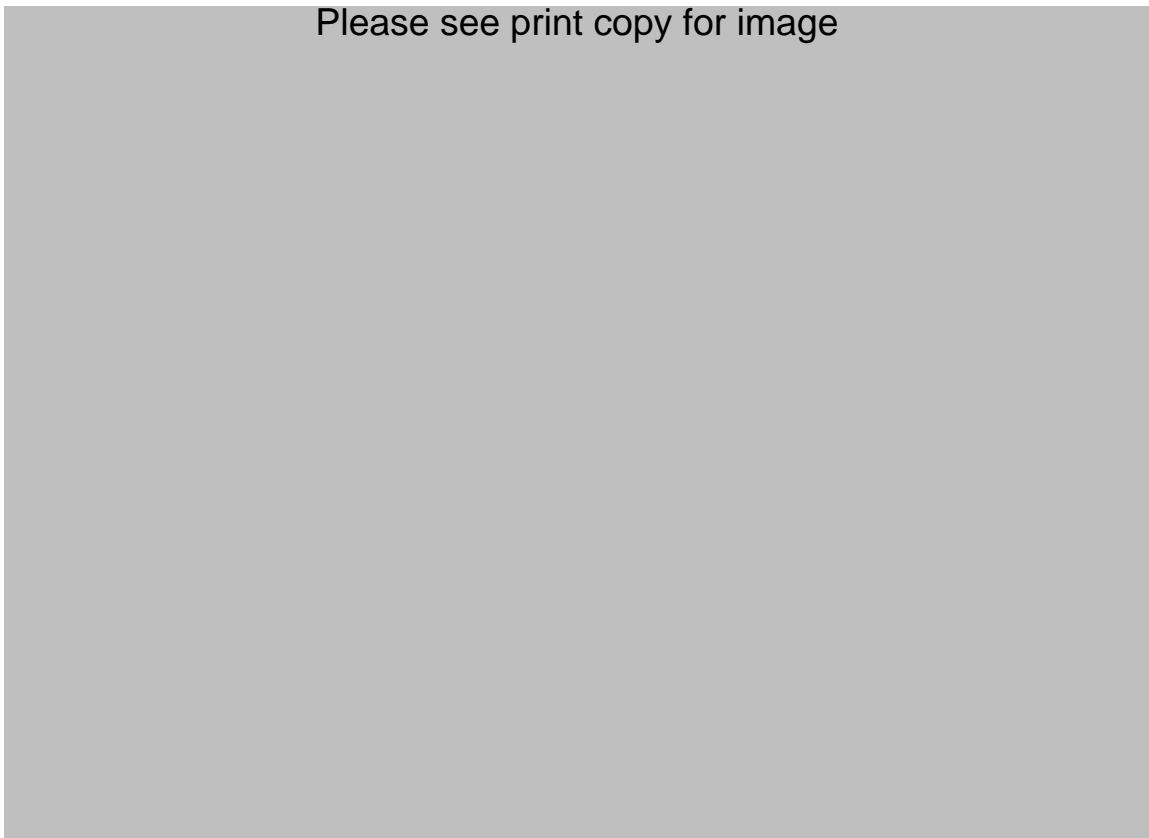
Key findings from this study indicated that organisations can be in different phases of the model at the same time and that elements of early phases of the model must be addressed before later stages can be undertaken successfully. Organisations who have large systems backlogs and maintenance loads are unlikely to progress past stage 2 in the development of their strategic systems without further development in skill levels and planning approaches. Findings also highlighted that experienced IT managers working in 'young' organisations can skip earlier phases of the model providing they follow the correct procedures and that positive aspects of the model are not thrown away as an organisation moves through the latter phases of the model. An organisation should consolidate their efforts to be successful up to a certain phase before moving to the next phase and movement towards more mature phases is not necessarily automatic as sometimes personnel and management attitudes change and so organisations can move backward.

A number of organisations implementing strategic information systems planning approaches, were also studied by Lederer & Sethi (1992). They noted that there are significant problems for organisations attempting to complete implementing strategic information systems planning tasks with effective outcomes. Strategic IS planners were not satisfied with the various methods of implementing the strategic information systems planning process, as they require resources. Most managers find that it is difficult to obtain management commitment and there is always further effort required by the organisation after implementing the strategic information systems

plan so that it can be effectively executed. If this effort is not forthcoming then the execution of the plan may fail. These managers then go on to make the comment that implementing a strategic information systems planning effort is like other organisational planning efforts, in that it most importantly requires the involvement of top management and business planners to be successful.

In order to better understand the context of ITS planning and management research findings, an analysis of organisational and environmental factors and their effect on ITS management and planning is required. It is suggested that a contingency-theoretic research model that links organisational characteristics to ITS planning systems characteristics is effective (Premkumar & King 1994 - see Figure 2.6).

Figure 2.6 – Research Model – from Premkumar & King (1994) – pg 81



The quality of the ITS planning process is articulated as a series of activities taking inputs from business plans, external sources and ITS users and transforming them into ITS plans. This construct is operationalised by a detailed analysis of the three major planning areas which encompass: internal factors (strengths and weaknesses of IS, and analysis of business processes, user requirements, information architectures and telecommunications); external factors (business opportunities and threats in relation to IS, opportunities for strategic IS and linking business plans to IS); and technology (assessment of technology trends and the impact on the firm, assessment of hardware/software market and analysis of hardware/software requirements). The process was also evaluated for levels of plan integration, evaluation of multiple approaches and resource constraints. The planning effectiveness construct is operationalised as a set of three IS planning objectives which are: better integration of business goals and strategies with IS plans; greater exploitation of IS opportunities for strategic advantage; and better planning and control of hardware and software resources.

The results of this study indicate that planning quality and planning effectiveness are valid and useful measures of planning success. Out of the eight organisational factors considered the most critical were: resources provided for IS planning; the quality of implementation mechanisms; the future impact of IS; the quality of facilitation mechanisms and the quality of strategic business planning. Suggested areas for further research included: quality of planning process; and effectiveness within industry (to

highlight the differences in deployment of IS between firms in the same industry and factors influencing them); other strategies used with IS to achieve the firm's business objectives; planning climate; organisational form; prior experience with IS planning; and stakeholder relations.

This analysis also builds on issues that Earl (1983) began to explore. Organisational factors should also be studied and analysed if ITS planning research models are to be generalised to all types of organisations given the number of environmental variables across multiple organisations. There are many organisational factors which affect ITS planning. Organisational attributes such as: the status of the ITS manager; how close the general management team's style is to the ITS management team's style; the corporate culture; and that the size and complexity of the organisation will influence how ITS staff will plan for their activities within the organisation. If the plan is not consistent with the organisation's values, assumptions and beliefs, then it is bound to fail. This indicates the need for a close fit between organisational boundary context and ITS planning objectives.

Consideration of complexity of organisational and environmental context as well as that of the planning process itself should be highlighted as one of the greatest challenges that ITS planners face (Hackney et al. 2000, Peters et al. 2002).

In summary, an organisation (or part thereof), goes through various stages of development (termed maturity by many researchers), and depending on which stage

the organisational technology and its management are at, will reflect the use and planning cycle of technological application (Jackson 1986, McFarlan & McKenny 1983a, Galliers & Baker 1994). Information technology must be managed in the same way as any other resource in the organisation (Handy 1993, Adams 1972). An organisational top down view of ITS planning may be more useful than an ITS outward view, however, planning that is organised around business themes seems to be the most effective (Jackson 1986, Ein-Dor & Segev 1978, King 1988, Earl 1989 & 1992). There is also the challenge of complexity to consider when developing ITS plans and ongoing management approaches (Hackney et al. 2000, Peters et al. 2002).

2.3 The Objective ITS Management Model and Its Relationship to the Galliers and Sutherland (1991) Revised Stages of Growth Model

The ITS Management Model which was developed from the work of the candidate and is explained in the previous sections of this chapter, is an objective model for investigating ITS management approaches. The model illustrates the relationships among: general business requirements; the ITS business unit; the ITS architecture and infrastructure; ITS users; via the ITS planning cycles. These relationships are in turn constrained and influenced by organisational boundary context and external environmental factors (see figure 2.1). In arguing a case for the ITS Management Model an holistic view of ITS management is put forward which highlights how different elements within the model have influence on, and interact with each other.

As the model was being constructed, however, it became apparent that understanding factors relating to the context in which ITS were placed and used, and this context's effect on the elements within the ITS Management Model, were very important. The Galliers & Sutherland (1991) Revised Stages of Growth approach to ITS planning, was seen as a way of addressing this area of concern as it targets specific areas of contextual organisational impact that affect all elements of ITS management. Strategy, organisation structure, the systems architecture and infrastructure, the ITS management style, the staff and their skill levels and the superordinate goals or priority concerns of the organisation all form part of their approach. These are important issues which relate to organisational context (Damsgaard & Scheepers 2000) and which impact the ITS planning cycles and, thus, affect all areas of the ITS Management Model (figure 2.1).

This chapter will now deal with each of these issues, within the literature in turn, as a background to chapter 3, which explains how the Galliers & Sutherland (1991) model is used as a framework for case study investigation (in chapter 8).

Strategy – Strategy is a “plan or course of action leading the allocation of a firm's scarce resources, over time to reach identified goals” (Galliers & Sutherland 1991 – pg 99). This idea is reflected in the ITS Management Model (figure 2.1) and through the literature which is focussed around the idea of general business requirements as discussed in the earlier section of this chapter.

Organisational Structure – This is the “characterisation of the organisation chart” (Galliers & Sutherland 1991 – pg 99) and the ITS Management Model (figure 2.1) reflects this as well in the literature which is focussed around the definition and discussion of the organisational boundary context outlined in the earlier section of this chapter.

Systems Architecture and Infrastructure – This is defined as “the procedural reports and routine processes such as meeting formats” (Galliers & Sutherland 1991– pg 99) which support and enhance organisational activities. Through their Revised Stages of Growth Model they also extend this idea to encompass hardware, software, data communications and associated technologies and their configuration within the organisation. This has been discussed at some length in the area of the literature that is focussed around the ITS Management Model (figure 2.1) discussing ITS architecture and infrastructure management in an earlier section of this chapter.

IT Management Style – This is defined this as the “characterisation of how key managers behave in achieving the organisation’s goals; and also the cultural style of the organisation” (Galliers & Sutherland 1991 – pg 99). Other researchers have also highlighted characteristic styles, roles and activities of managers (Champy 1995, Denison et al. 1995).

The partnering relationship between the ITS and line managers is becoming a crucial part of ITS management (Brown et al. 1996). This relationship reflects some of the

changes in the nature of the ITS organisation and this organisation's need to forge new relationships with line managers, vendors consultants and others in order to optimise ITS utilisation and align it to the business strategy. A model of ITS leadership roles, is proposed, which bring together such factors as leadership types, focus and business climate as well as the ITS executives need to manage the ITS architecture in either an effective or efficient way (see exhibit 2.1).

Exhibit 2.1 – A Model of IS Leadership Roles – from Brown et al. (1996) – pg 15


Please see print copy for image

Source: E.R. McLean and S.J. Smits, "The IS Leader as "Innovator"", *Proceedings of the Twenty-Fifth Hawaii International Conference on Systems Sciences IV* (January 1993), pp 352 - 358

Four forms of ITS partnering based on these roles are also proposed (see exhibit 2.2).

Exhibit 2.2 – Four Forms of IS Partnering – from Brown et al. (1996) – pg 16

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Each of the four roles is essential to an organisation, however, organisational context such as: structure, culture, reward systems, business unit autonomy and climate of co-operation, can effect the ability to gain benefits from these roles. ITS re-engineering and change can also place pressures on the effectiveness of partnering approaches as well as other organisational ITS roles including, end users, outsourcers and divisional computing staff. ITS managers need to have both technical and interpersonal skills and qualities such as communication and negotiation skills, the ability to tolerate ambiguity as well as broad management skills.

The planning process can be resource intensive, especially if it becomes involved with detailed processes. Managers should be aware of the point that planning no longer represents a benefit but becomes a burdensome cost. The amount of money that should be devoted to planning is very much in question (Cash et al. 1988). ITS managers need to: improve ITS project prioritisation techniques; improve ITS project

benefit prediction techniques; improve communication with top general management; derive and apply good planning methodologies and employment of "buffering techniques" to shield ITS from the internal and external environments (Lederer & Mendelow 1986).

The literature in this area indicates that a program of effective education and a more business like approach by ITS management towards the end user, would go a long way to smooth the process of ITS management and planning, as well as co-operation from the rest of the organisation in systems design and implementation (Sethi et al. 1985, Earl 1989, Hackney et al. 2000).

Partnering managers at top levels of the organisation is also critical (Lederer & Mendelow 1987, Feeney et al. 1992, Khandelwal 2001, Ward & Peppard 1996). CEOs and CIOs need to share the same vision of ITS. CEOs in particular need to feel that their CIOs are honest, sincere and open, have a business perspective and the ability to explain contextual factors such as the availability of technology in plain English. The new breed of CIO needs to be able to forge relationships in the organisation through communication, motivation, leadership and political tact. They should also be up to date with ITS and its significance to the business. In summary, they need to be change oriented and team players as well as having an understanding and appreciation of the wider business issues, just as CEOs need to appreciate and understand ITS efforts (Khandelwal 2001, Ward & Peppard 1996, Feeney et al. 1992). Perhaps the ITS manager's ability, to influence the role of the ITS area or the

strategic aims of the organisation, may be impacted by organisational context factors such as the availability of skilled ITS managers. Even if the contextual influences are recognised by the manager, Conner et al. (1987) suggest in their banking study that

"Though many bank executives recognise the importance of the alignment between decisions and culture, they often lack the skills necessary to achieve it" pg 16.

Over the years management techniques have treated technology in different ways (Leavitt 1978, Mintzberg 1979). Scientific management for instance, isolated people into parts of processes, and made them more effective workers in this way. Mass production became the manifestation of this management approach. There were shortcomings of scientific management, however, as the lack of consideration for the "human factor" had a de-humanising effect on the workplace (Leavitt 1978). This de-humanisation of the workplace led to the emergence of participative management processes in an attempt to re-engage the worker. This process, however, saw the battle lines drawn between workers and the management over the need for a mechanism by which the management could control workers.

As management science in the form of information technology, re-emerged, we saw the elimination of many de-humanising, repetitive jobs for workers and the enslavement of management to their need for information to ensure that they could maintain a competitive stance (Alter 1996). In many ways there was a return to a mechanised form of scientific management and the old work ways of process orientation. Each of these ways of managing has associated costs and benefits,

therefore, technology needs to be applied by management as another way of doing work, but not the only way. ITS managers and academics, should also realise this and promote the use of technology in the best possible (and most cost effective) way for the organisation.

It is suggested that the level of ITS planner's role expands when the ITS top executive reports to the highest levels of the organisation (Ranghunathan & Ranghunathan 1993). By implication, the status of ITS as a strategic enabler within the organisation, also increases and takes on a more managerial orientation. If the ITS manager reports at lower levels the ITS planner and plans take on a more technical orientation. This same managerial problem might also be argued in the case of the ITS manager and his role within the organisation.

Managers are the major decision-makers within their organisations; these decisions can be strategic in nature or more day-to-day operational decisions (Handy 1993). These managers are invested with the authority that allows them to shape the organisation and its structure by offering incentives, as well as influencing organisational members with a plan of action (Frank et al. 1996).

If a manager wants to be more entrepreneurial in his decision role then he must have the skills to: translate an idea into corporate strategy; determine the market and associated risks; translate strategy into more operational procedures, and recognise the need for a rethink if the idea proves to be unworkable. If this managerial role is

coupled with the use of ITS problems can arise. Due to the intractable nature of the technology (ie not easily modified and changed) the manager is faced with the need to change the decision or direction but the accompanying ITS may not be so easily altered to suit the new direction.

Managers must also be good at guiding others, delegating, obtaining and distributing resources and facilitating the implementation of their decisions by inspiring and motivating their employees in all aspects of organisational life. In order to be effective, managers must: know what to do and how to do it; understand why they are doing it; want to do it; have the resources for doing their work, and believe that they have the leadership to do it (Frank et al. 1996).

ITS managers must be competent in these areas as, very often they are responsible for the enactment of the critical strategic, tactical and operational decisions, which are taken from all over the organisation. They must communicate effectively with their staff, manage and motivate them and provide the tools to enact the organisations decisions and accompanying processes. ITS managers must also empower their staff to make the smaller systems decisions that will ultimately underpin the larger organisational ones. Organisational readiness for ITS is one of the problems that managers need to look to in order to be successful ITS planners (Galliers 1991). Skills, human resources and management practices are often overlooked and ITS management frameworks can assist in the identification of organisational strengths and weaknesses in the area. Management commitment to ITS and involvement in the

SISP process is another area where there can be a shortfall in skills due to concentration on technology rather than business and organisational issues.

Staff and Skill Levels – These are the “demographic’ description of important personnel categories within the firm (i.e. engineers, entrepreneurs, MBAs etc). ‘Staff’ is not meant in line terms. Skills are defined as the “distinctive capabilities of key personnel or the firm as a whole” (Galliers & Sutherland 1991 - pg 99). Most organisations are broken up into distinct skill areas and levels. The most obvious skill areas are those of managers and their generalist or specialist staff.

Instead of the logical demise of the ITS function, that was expected as a result of out-sourcing and business ownership, there has been an emergence of a ‘high performance’ ITS function (Willcocks 1996). Thus the ITS function is being shaped by forces which include: the challenge of the economic recession (pressures to cost cut and represent value); the pursuit of a core competency and activity approach to operation (that which is not necessary should be minimised, eliminated or out-sourced); ITS out-sourcing potential and business reliance on ITS. A view is then developed of a high performance ITS function that has four fundamental tasks within the organisation (figure 2.7).

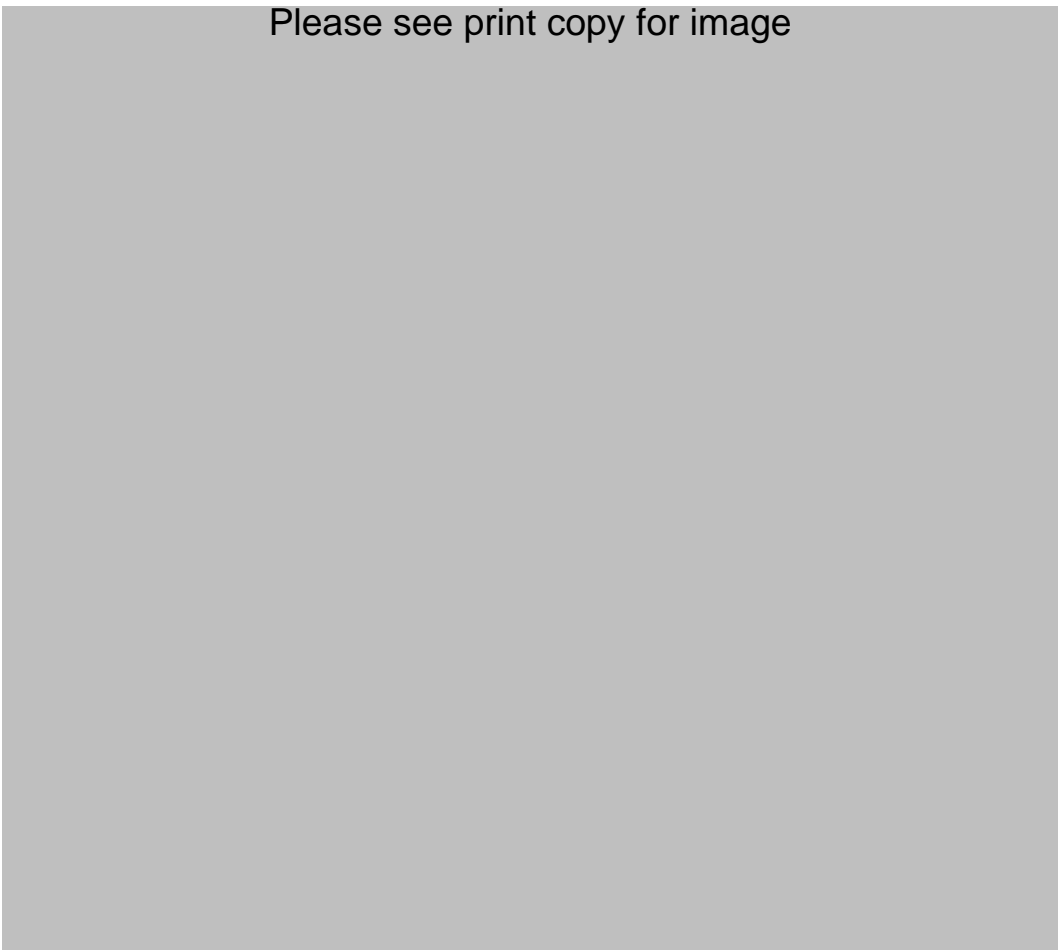
Figure 2.7 – Four ‘Faces’, or Tasks, of the Emerging IS Function
– from Willcocks (1996) – pg 6

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The emerging ITS function is focussed on the business information systems strategy, information technology strategy, information management strategy (governance) and the ITS market sourcing strategy (supply). Profiles have been developed for nine capabilities for the ITS function (Willcocks 1996 - see Figure 2.8).

Figure 2.8 – Nine Capabilities For The IS Function – from Willcocks (1996) pg 7

BUSINESS



These capabilities become more or less important for an organisation depending on a number of contingent factors. The organisational structure, mission and nature of activity (business context) and the maturity of ITS exploitation and outsourcing (ITS context) guide the need for such capabilities. There are also four key human resource developments which also play a part in the high performance ITS organisation (Willcocks 1996). These are: greater emphasis on business skills and business

orientation within nearly all the roles (except the technical ones); increased requirement for 'soft' skills across all of the roles (except contract monitor); all roles call for high performance indicators (fewer personnel of greater quality); and specific sets of skills, attributes and drivers are required for each role (excluding high performance in one role from high performance in another. All of these factors have implications for staffing, personnel and the development of careers. Inhibitors of the high performance ITS organisation include: dissonance between the human resource policy of the organisation and the external labour markets; and a role view of project management as a specialised function. This model assumes a project task way of operation and location factors, as the model assumes that various roles can be located around the organisation where they are required, rather than within the same location.

How administrative units affected workflow was also explored over twenty years ago (Khandwalla 1977). Work unit power was directly related to how strategic its location was within the work flow of organisation.

For ITS to be in a strategic position within the organisation then the following points must apply to its use: non-substitutability of ITS skills by other areas of the organisation; work-flow pervasiveness of ITS in order for the organisation to function; work-flow immediacy and the impact on the speed and intensity of the business process; and ITS as a means of coping with organisational and environmental uncertainty.

Organisational Development (OD) methods have been used in the management of the ITS function (Loftin & Moosbrucker 1982). These reflect planned and systematic procedures that can assist in altering patterns of behaviour within organisations (diagnosis and feedback). Benefits of using these OD methods have included: devaluing of the ITS technical image in favour of a more relationship and business oriented image; making ITS professionals into change agents who could assess the impact of technological change on organisations; evaluation of non-technical opportunities by which ITS can improve end-users effectiveness; and supportive and constructive interactions with user groups and focus of attention on issues outside ITS (such as decision making processes, information sharing and personal reward systems).

Superordinate Goals, Priority Concerns and Key IT Issues - Many researchers have subsequently built upon these ideas, especially in the area of critical success factor (CSF) research which relates to the CSFs that the business needs to monitor via its information systems and technologies, so that we see the treatment of ITS management and planning as a subset of an organisation's mission goals and objectives (Jackson 1986, Earl 1987).

ITS managers and executives had changing views over the years, in regard to the importance they have attached to planning. This is best viewed by the ongoing discussion within the research base, on the assigned importance of critical success factors (CSFs), by Western organisations within their information systems planning

process (Martin 1982, Ball & Harris 1982, Earl 1983, Dickson et al. 1984, Hartog & Herbert 1986 Brancheau & Wetherbe 1987, Pervan 1993 & 1996, Brancheau et al. 1996, Gottschalk 2000). This debate highlights the relationship between the setting and monitoring of the general business requirements and the ITS business unit requirements.

Over the period of time in which these researchers have dealt with CSFs, we see that issues and their ranking of importance have changed, but the following factors are common to most research; aligning IS with the business; management of IT resources and hardware and software development; IS planning; management of end user systems; measuring and improving IT effectiveness and productivity; recruiting and training in the use of technology (both IT and non-IT staff); management of data; impact and management of telecommunications; IS security and control; building responsive hardware and software architectures; Business Process Re-engineering (BPR); management of distributed systems; and managing disparate technologies. Australian managers tend to concur with this list of concerns and issues, however, a study done by practitioners for practitioners (Philipson 1996) lists some interesting 'organisational' issues in managers' minds. These are (in order of importance): keeping up with technological changes; costs and value for money; aligning IS with the business; business and personal development; training and staffing; satisfying user demands; rate of change; dealing with senior management; and a variety of technology choices and planning issues. It is interesting to note that change management issues are upper-most in the minds of these managers.

Much of the early research supported an image of an introverted ITS profession with little concern for issues outside of its function (Martin 1982). Whilst CSFs were regarded as important to ITS management (and planning) for feedback and monitoring purposes, the ITS function may not have been able to control many critical areas outside of their direct influence e.g. corporate strategic direction.

It is also interesting to note that these 'typical' priority concerns and key issues are somewhat different for countries outside of the more affluent, developed, Western economies (Dexter et al. 1993 (Estonia), Deans et al. 1991 (US Multinationals), Dekleva & Zupancic 1996 (Slovenia), Palvia & Palvia 1992 (India), Wrycza & Plata-Przechlewski 1994 (Poland), Kim & Kim 1995 (South Korea), Harrison & Farn 1990 (China), Sixth Annual Survey of IS Management Issues 1993 (Europe)).

These studies generally listed a subset of the Western priority concerns and key issues but they also had some quite different additional ones to add (NB not all countries listed all factors).

Issues such as: organisational problems (culture, style, language); telecommunications infrastructure; national ISO compatible ITS standards; use of modern tools for ITS development; equipment selection availability (limited quality products and services); stability and constraints of national regulations; effect of political climate and stability; legal protection; export restrictions; currency restrictions and exchange rate

volatility; loss of management authority; loss of employment; global systems (international MIS planning); alliances and linkages with Western organisations; legislating software copyright; affordability of hardware and software; loss of ITS skills to foreign countries; learning to conduct ITS business in other countries; vendor support in foreign subsidiaries; trans-border dataflow restrictions; legal restrictions on hardware and software acquisition and obtaining access to ITS knowledge and advice, were all important within these studies. As we can see from this list, the priorities and concerns of ITS managers and executives around the world can be quite different. Many of the organisational context and environmental factors that we take for granted in Western organisations may be somewhat different in other parts of the world.

In fact, Palvia et al. (2002), in their meta analysis of global ITS key issues, provide strong evidence for the four way classification of developed, newly industrialized, developing and underdeveloped countries and the differences in key issues across each.

CSFs have been used to link ITS operational factors and what the organisation expects of the ITS function (Earl 1983) by having those areas outside of the ITS function choose and evaluate ITS CSFs. Behavioural factors also influence the function and role of ITS within the organisation. These have an impact on ITS in terms of job design, work practices, social behaviour and the relationship of the organisation with ITS department and are generally highlighted by the users of ITS rather than the managers of the ITS function.

"There must be greater attention to, and explication of, behavioural factors. This is not only required to satisfy social goals, but in the long run is likely to assist the pursuit of economic and technological goals" (Earl 1983 – pg 210).

There are five significant areas that mostly look outward from ITS and these should be considered within the organisational context for relevance to ITS management and planning. They are: information technology (IT) as a competitive weapon/barrier; IT as a business bias (dominating the organisation); creative fusion to exploit IT (business and ITS synergies); politics and ethics of technology (global networks and e-commerce); and dependence of functional strategy on IT.

In a more focussed study, Clark (1992) describes the six issues that were important to ITS executives that dominated discussions with them. These were: the evolution of the IS structure; end user computing management; IS planning and the link between the IS and the business functions; measurement of the effectiveness of the IS infrastructure; the management of outside services; and the technology development process. The resultant research agenda, which stems from this analysis is outlined in table 2.6.

Table 2.6 – Research Agenda – from Clark (1992) – pg 49 .

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ITS predictions for the next decade have also been made in the areas of: technology; architectures and standards; services; economics; applications and change management (Benjamin & Blunt 1992). These predictions are contained in table 2.7.

Table 2.7 – The predictions for the next decade
– from Benjamin & Blunt (1992) – pg 55
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Earl (1992) says,

“...in many businesses in (1992), IT is undergoing heavy scrutiny and sometimes radical surgery. IT budgets are being capped or pruned. Headcounts in the IT function are under attack, often for the first time. IT and an examination of the IS departments are being rationalised or sold off. IT operations and development are being out-sourced. IT directors are being replaced. These are not just reactions to recessionary pressures or changing economics of technology. Chief executives are tiring of IT rhetoric and hype; many of them feel it has been oversold and under-delivered” – pg 76.

There has also been research which highlights the concerns of chief executives with putting ITS back into the business (Earl 1992) and this is represented by figure 2.9.

Figure 2.9 – Putting business back into IT – from Earl (1992) – pg 79

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Galliers (1991) looks at barriers to successful ITS strategy (amended from Wilson (1989)) and compares them to strategic information systems planning success factors (amended from Galliers, 1987b, p.249). This process highlights what are key considerations for strategic information systems planning. These include: attitude, commitment and involvement of management (debating of process and outcomes of SISP to overcome politics of the planning process as well as management education); current ITS status of the company (technology, organisation of the ITS function and available SISP skills); the ability to assess SISP outcomes and processes and the link between the business strategy and the ITS strategy. Gottschalk (2000) highlights the weaknesses of these key issues and priority concerns studies highlighting the lack of theoretical framework, selection procedures and the fact that most studies ask for a rating rather than a ranking of issues.

2.4 Conclusion and Areas of Inquiry

ITS management and planning is becoming more complex and multi-faceted as organisations use ITS in a more pervasive way to deliver strategic, tactical and operational advantages and efficiencies, within a multitude of organisational contexts. Somogyi & Galliers (1987) state that

“It is evident that activity in the information systems field will continue in many directions at once, driven by fashion and market forces, by organisational need and technical opportunity. However, it appears that the application of information technology is at the threshold of a new era, opening up new opportunities by using

the technology strategically for the benefit of organisations and businesses” – pg 27.

This multi-context and subjective nature of this activity can place limitations on traditional normative approaches to ITS management and planning. The ITS Management Model (see figure 2.1) and the Galliers & Sutherland (1991) Revised Stages of Growth Model (see table 2.5) form the basis of the *research problem* and *research questions* that highlight these limitations, are listed at the conclusion of this chapter and which are answered within this thesis. Chapter 3 outlines the objective research approach which discusses typical issues confronted by an organisation managing open systems architectures as well as the specific questions that were asked of managers at the research sites (Australian federal government organisations) to establish the subjective approaches and specific organisational contexts in which the open systems architectures were managed.

Many researchers have attempted to predict the direction ITS management and planning will take. For example, planning as a management issue relates directly to the planning section of the ITS Management Model (figure 2.1). There are many pressures for an ITS manager to cope with which include: aligning ITS investments with the business; management doubt about real benefits; the complexity of controlling resources over multi-year projects; and establishment of certainty of direction. Competitive advantage through ITS; methodologies for ITS planning (which are politicised and commercialised) as well as recommendations and priorities


which are not supported by the business are also real concerns (Brancheau & Wetherbe 1987, Earl 1992).

A theme based approach has been developed as a result of these planning issues (Earl 1992) where; no ITS strategic planning is done at all (integrated into the normal strategic plan which includes an analysis of ITS opportunities and implications); long range planning of any sort is counter-cultural (to include discussion of ITS in the decision processes of any sort); and there is the use of task forces (who every few years do business rethinking exercises which incorporate ITS issues as a matter of course). All of these approaches are theme based rather than outlining detailed ITS strategic plans. Over the years management is then able to report on the progress of such themes thus simplifying the view of the ITS strategy.

ITS management approaches are predicated on the objective view of an organisation towards the particular ITS in question. As we have seen in the literature however, contextual or subjective aspects (both organisational and environmental) play an extremely important role in the management of an ITS. Hackney et al. (2000) clearly show how context impacts the tangible and intangible effects of ITS on sustainable competitive advantage.

Figure 2.10 -IS Complexity Framework- Hackney et al. (2000) – pg 16

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How does specific subjective organisational context affect the management of open systems architecture management in Australian government organisations? The ITS Management Model (figure 2.1) outlines objective ITS management wisdom but is this relevant for Australian government departments implementing their chosen ITS architectures and infrastructures? How does the objective management approach

differ from subjective accounts? Can the object be integrated/reconciled with the subject in the theme and effective management of ITS architectures ?

In 1987 Michael Earl highlighted problems and issues within ITS management which included the need for more flexible, business-oriented, organisationally focused and eclectic approaches and perspectives of a multi-disciplinary and interdisciplinary nature. He stated that research strategies should include interpretive casework, longitudinal investigations and change process and would take some time to develop. This opinion is as relevant to the field of ITS management in 2004 as it was back in 1987. Earl's more recent work in 1996 and 1998 lends ongoing support to this view (Earl 1996, Earl & Sampler 1998).

In many companies information systems strategy can be arrived in a more informal and creative way and therefore the prevalent style of ITS strategy must be considered in any given context (Galliers 1991). In order to contextualise these types of organisational issues some researchers have and are attempting to legitimise more qualitative and organisationally driven ITS management research projects (Myers 1997, Walsham 1993, Davies & Myers 1994, Baskerville et al. 1997, Ciborra 1997, Braa & Vidgen 1999).

The analysis of the literature and the production of an objective model of ITS Management (figure 2.1) leaves us with a specific research problem as well as a number of related research questions to ponder.

RESEARCH PROBLEM

ITS management is a complex issue which organisations have grappled with as ITS has become more strategic and less operational in nature. New directions in systems architecture such as open systems, have magnified this complexity and the subjective nature of ITS management i.e. each organisation represents a different ITS management context. Approaches to ITS management to date, however, have been predominately objective in character and positivist in orientation. A more subjective perspective (with a relativist orientation) may be helpful in providing a better understanding of the ITS management process, thus ensuring more successful management, planning and control of ITS for individual organisations.

Research Question 1

Do existing objective ITS management models, theories and approaches, adequately reflect an understanding of the ITS management process?

Research Question 2

Do complex organisational environments and the effects of systems architecture implementations magnify (in subjective and relativistic ways) the limitations of the objective ITS management models, theories and approaches?

Research Question 3

Should the objective ITS management model be modified to incorporate a more subjective perspective of how to manage ITS? Would this modification enhance our understanding of ITS management?

The research problem and subsequent research questions indicate a need for the integration/reconciliation of the objectivist views of ITS management theory and the subjectivist nature of ITS management practice.

Integration/reconciliation of object and subject is not meant in the reductionist sense. Useful reductionist views to object/subject integration/reconciliation of ITS management and development, are evident in recently emerging philosophical approaches, that build on Churchman's Inquiring Systems approach (Churchman 1971). This calls on the philosophies of Leibniz, Locke, Kant, Hegel and Singer for the development of an incremental and interlocking view of systems which allows for ill-structured or "wicked" problem solution in dynamic organisational environments

(Kienholtz 2000, Bennet-Thatcher & Srite 2000, Chae & Courtney 2000, Courtney 2001, Juniper & Metcalf 2001, Guo & Hall 2001, Elgarah et al. 2001).

What is meant within this thesis, is that object and subject should be integrated/reconciled in a transformatory approach. This is best captured by Haynes' (2001a) Perspectival Thinking Approach.

“Notice that if we accept the view of a series of models more closely approximating varieties of all phenomena in the natural world, then this view should also include *our thinking*. This is because our thinking also constitutes phenomena none of which captures the whole picture.” – pg 36.

Haynes (2001a) description of “*Our thinking...*” highlights the influence of our values and context which requires careful consideration (Schein 1984). Values and context were discussed in detail in section 2.2 of this thesis and are again discussed at length in chapter 5. We must also note that the integration/reconciliation of the object and the subject is also greatly influenced by time and context (Haynes 2001a) and that both of these issues are handled within the technology transfer literature to great effect (also discussed in chapter 5).

Haynes (2001a) discusses the argument for reconciliation and/or integration of the subject/object in the anti-reductionist sense in his ideas relating to perspectival thinking and the learning culture within organisations.

“Clearly, for an organization, action based on reconciliation of perspectives will be more fruitful than action based on an absence of reconciliation...The action which can follow the perspectival reconciliation is now informed by that interpretation – this is the *effect upon the future*” – pg 33.

In order to further develop this line of argument in a meaningful, anti-reductionist manner, the theories which underpin constructionism, and in particular, phenomenology are very useful. In fact, Courtney & Porra (2000) state that

“...hermeneutics and phenomenology may serve to inform IS research to help develop a better understanding of information technology in a broader context. Work by Bunker (1998; forthcoming) and Haynes (1997) is representative of this role for philosophy in IS research” – pg 1460.

The constructionist view of the world encapsulates both the ideas of the object and subjective world and their interaction.

“From the constructionist viewpoint, therefore, meaning (or truth) cannot be described simply as ‘objective’. By the same token, it cannot be described simply as ‘subjective’...According to constructionism, we do not create meaning. We construct meaning. We have something to work with. What we have to work with is the world and the objects in the world” (Crotty 1998 – pp 43-44).

In order to develop a new model which better reflects this transformatory approach, this thesis addresses the ITS management research problem and questions by

analysing, interpreting and discussing objective views of open systems architecture management from a combination of accepted theory and Australian federal government management policy (see chapter 4). The thesis then interprets 6 case studies in Australian federal government organisations as subjective accounts of open systems architecture management in order to develop a model, which incorporates more subjective perspectives of ITS management for consideration (in chapters 5 and 6). Galliers' & Sutherland's (1991) contextual issues (or the seven Ss as they call them), outlined in this chapter, have formed the focus of linking the objective and subjective elements of the thesis investigation. Chapter 3 will now detail the research design for data collection and analysis as well as the questions asked of these case study organisations.

CHAPTER 3 - RESEARCH DESIGN FOR DATA COLLECTION AND ANALYSIS

Chapter Overview

This chapter describes the research design and justifies this thesis' central research problem. The central research problem is as follows:

ITS management is a complex issue which organisations have grappled with as ITS has become more strategic and less operational in nature. New directions in systems architecture such as open systems, have magnified this complexity and the subjective nature of ITS management i.e. each organisation represents a different ITS management context. Approaches to ITS management to date, however, have been predominately objective in character and positivist in orientation. A more subjective perspective (with a relativist orientation) may be helpful in providing a better understanding of the ITS management process, thus ensuring more successful management, planning and control of ITS for individual organisations.

This chapter addresses the research design used to investigate the objective management approach for open systems architectures within the Australian federal government sector as well as the subjective views of open systems architecture management by conducting Federal government organisational case studies. Within this chapter the general epistemology adopted for the research study, research method,

research output and related issues, such as the development of the semi-structured case interview instrument (see appendix A) are discussed.

The chapter illuminates each of these areas in the following sections:

3.1 Introduction - Research Framework

3.2 Epistemology

3.3 Research Investigation and Resulting Research Problem, Question and Approaches

3.4 Research Methods – Including Steps for Data Collection and Analysis

3.5 Research Instrument

3.6 Justification of Research Sites

3.7 Research Stages

3.8 Reconciliation of Object and Subject

3.9 Challenging Methodological Issues

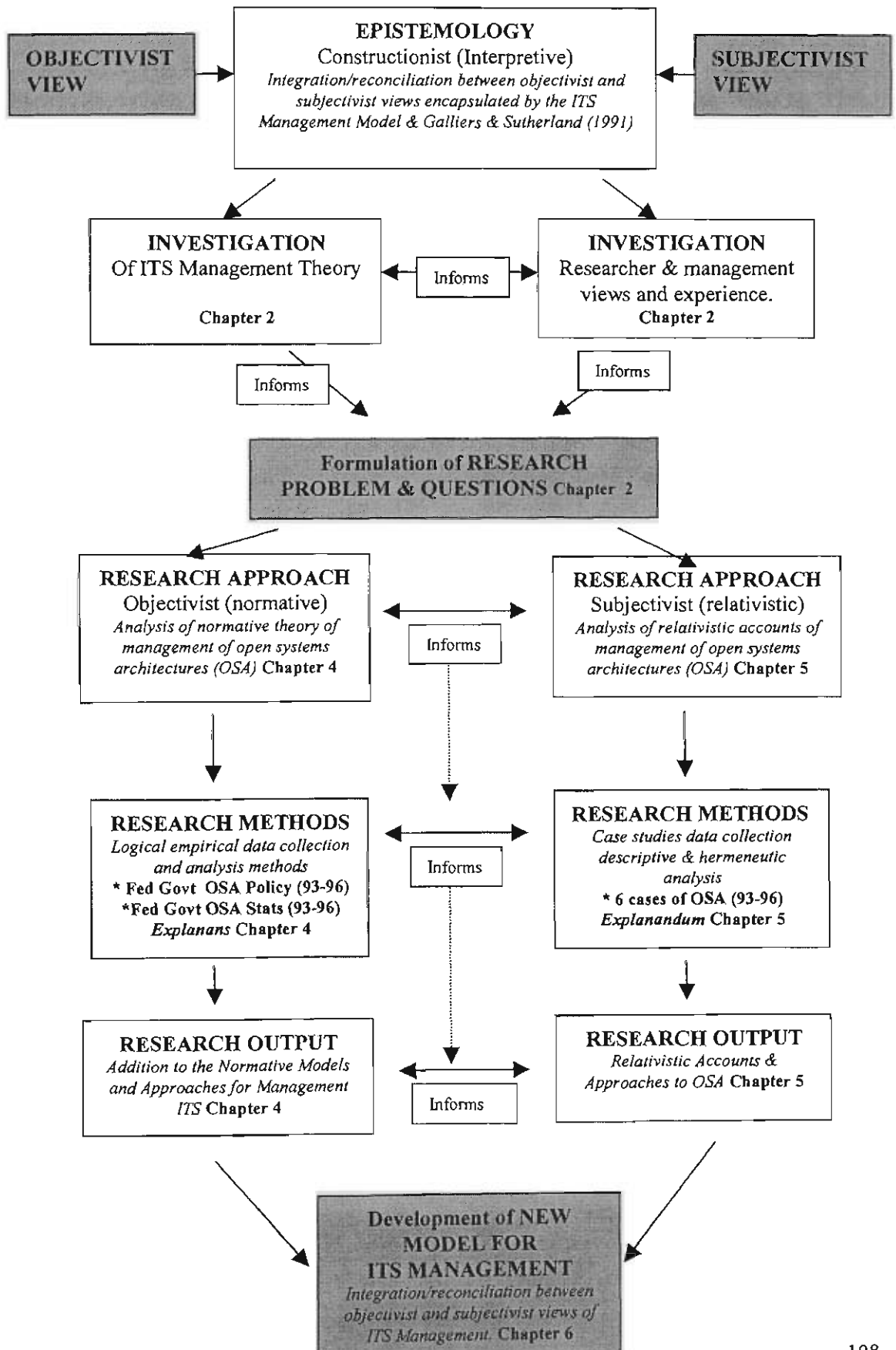
3.10 Conclusions

The next section explains the research framework, which was developed by the candidate and utilised to conduct this thesis investigation.

3.1 Introduction – Research Framework

An holistic framework was developed to incorporate objective and subjective investigative elements, which run in parallel to each other throughout the research stages. The overall framework is summarised by figure 3.1. This framework also indicates the relationship between chapters within the thesis.

Figure 3.1 – Research Framework for Data Collection and Analysis



A **Chapter 7** *postscript* will then analyse objectivist and subjectivist material (normative theory, federal government outsourcing policy, published case study accounts) that analyses approaches to, and accounts of, federal government outsourcing from 1997 – 2002 by way of illustration of the proposed Perspectival ITS Management Model (figure 6.2). This has been done as a “proof of concept” of the model to the events that occurred subsequent to the open systems case study period investigated by this thesis.

3.2 Epistemology

This study was motivated by the need to investigate knowledge about the current objective views of ITS management and their effectiveness in ITS management from a subjective perspective. The researcher was investigating this proposition from a constructionist epistemological viewpoint. Constructionism by its assumptions necessitates the overall use of an interpretive (phenomenological) approach to the integration/reconciliation of object and subject (Crotty 1998, Myers 1997, Galliers 1992). This in turn, necessitates a research approach that can encapsulate “methodological pluralism” (Kuhn 1970, Mingers 1997, Hirschheim 1992) as objectivism (normative) views of ITS management are underpinned by mostly positivist research approaches and methods whilst subjective perspectives require

more anti-positivist (relativistic) approaches and methods to adequately describe them.

The nature of knowledge from an epistemological standpoint is also very contentious

“since man cannot transcend his language and cultural system, he cannot obtain any absolute viewpoint...Knowledge is a matter of societal (or group) acceptance” (Hirschheim 1992 – pg 29).

This argument is ideally framed within the literature which describes technology transfer and diffusion issues within the ITS area.

Technology Transfer Literature

If we are to understand the assumptions on which technology transfer, diffusion and implementation are based it is critical to understand the philosophy of the literature in this area. Robinson (1988) broadly defines technology as being licensed or documented artefacts (equipment, software and conceptual models and tools) and the skills and ability to successfully use them. “Licensed and documented artefacts” are those which are created within a specific context and which the creator of those artefacts can then transfer and diffuse (for a price) within new and sometimes radically different contexts. In the case of this thesis the technology of open systems architecture (objective) and its implementation and management within the Australian

federal government (subjective) is under scrutiny. The process of technology transfer has been described as the shift or movement of these "tools, techniques, procedures and/or the legal titles" to accomplish a human purpose (Resman & Zhao 1991). All of these definitions reflect those generally used by the research community in the area of technology transfer and are loaded with such terms as "artefacts", "technology" and "tools".

These definitions assume a certain cultural or boundary context of technology transfer and this activity is dominated by this boundary context that can effectively facilitate or form a barrier to the transfer process. The definitions within the technology transfer literature are an expression of boundary context and the underlying paradigm (values and assumptions) on which ITS tools and technologies are created, used, inherited, studied and expressed as artefacts.

It is important then, to acknowledge the cultural context in which tools and artefacts are developed. The tool, which is shaped by its culture, is not only used within that culture but is also used through the technology transfer process in other cultures. Culture, and how it is defined and expressed, becomes an important dimension to our understanding of ITS as tools and their creation, transfer, diffusion and implementation from one culture to another. Culture is a way of seeing the world, a paradigm that is expressed through various manifestations of structure (social and business), language, skills and behaviour (Kluckhorn & Strodtbeck 1961, Hofstede 1980 & 1998, Schein 1984 as described in chapter 2).

The social and business structures and skills required to design, make, understand and use tools, would also be significantly different from one type of culture to another, as well as the languages used to define and represent them. Culture comes to represent the context in which technological development takes place. If we look at the example of open systems architecture we see its origin in the North American Open systems movement as a direct result of USDOD ITS policy and requirements. The resultant worldwide push to open systems architecture standards (during the period of these case studies) and projected benefits can be seen in the analysis of the objective theory in the management of open systems architectures in chapter 4.

Is the objective open systems architecture necessarily going to translate in transfer, adoption and management approaches to the subjective situation of the Australian federal government case organisations?

This thesis acknowledges the contextual nature of knowledge about ITS management and attempts to deal with this issue through pluralistic research approaches.

3.3 Research Investigation and Resulting Research Problem, Question and Approaches

The motivation for this study was not only to investigate the objective management approach to open systems architecture within the Australian federal government but to also determine the subjective dimensions of its management. The research questions posed, as a result of the analysis of the literature and current research and management views and experiences in chapter 2 urge us to find a way of appropriately dealing with the differences in objective ITS management views versus subjective organisational context within and between organisations.

Research question 1 (as outlined below) motivated this part of the research approach.

Research Question 1

Do existing objective ITS management models, theories and approaches, adequately reflect an understanding of the ITS management process?

Objectivist Approaches

The approach was developed from an objectivist epistemological view of ITS management that has been the mainstay of the literature (as expressed through the ITS Management Model in chapter 2 – figure 2.1). It was also supported by the arguments put forward by Burrell & Morgan (1985) and later by Crotty (1998). Structural-functional models, such as the many discussed within chapter 2, underpin such an approach, which reflects the spirit and dominance of positivist research within the area of information systems management.

“We use ‘positivist’ here to characterise epistemologies which seek to explain and predict what happens in the social world by searching for regularities and causal relationships between its constituent elements” (Burrell & Morgan 1985 – pg 5).

Although Crotty (1998) would see positivism as a theoretical perspective rather than as an epistemology (objectivism being the higher level) the intent of such a focus is clear. Structural functionalism is explained through Spenser’s (1873) work in Sociology

“...in particular the parallels which he drew between societies and organisms, and the view that the parts of society function in ways which contribute to the maintenance of the whole...” (Burrell & Morgan 1985 – pg 43)

as well as Emile Durkheim's (1938) contribution to extending the objectivist-positivist view of structural-functionalism. This focus is evident in the ITS management and general organisational management literature over many years.

Research question 2 (as outlined below) was motivated by researcher and management views and experience.

Research Question 2

Do complex organisational environments and the effects of systems architecture implementations magnify (in subjective and relativistic ways) the limitations of the objective ITS management models, theories and approaches?

Subjective Approaches

In researching and developing the ITS Management Model (figure 2.1) it became obvious that while a great deal of research has been influenced by objectivist-positivist views that many of these researchers were cognisant of subjectivist-relativistic issues which have been expressed through the study of organisational context through constructionist accounts of ITS management. As constructionism represents the overarching epistemology of this study it became particularly important to understand the integration/reconciliation of the object and subject in determining a

meaningful understanding of “being-in-the-world” of open systems architectures (Crotty 1998, Haynes 2001b). This would seem to be particularly important in understanding ITS management in this environment. To this end the thesis firstly looked at idealised views of open systems architecture (Plato 1997, Rockmore 1996 (on Hegel), Kant 1978) management and associated technologies, which it was hoped through their application, would benefit organisations and society at large.

When viewing the history of ITS management, however, a variety of views (or contexts) regarding the success (or otherwise) of ITS and its management became apparent. For most researchers, however, the active study of these contextual issues were largely uncharted waters with debate raging over the best way to research such issues (Klein & Myers 1999, Hirschheim 1992, Galliers 1992).

It was decided that a relativistic view of case respondent accounts would constitute part of the overall research approach and an attempt to then reconcile objective and subjective views would be made to see how this could provide a better understanding of the research issues.

Research question 3 (as outlined below) was motivated by the overall epistemological stance taken by the researcher and the perceived requirement for integration/reconciliation of object/subject and the associated views encapsulated by the ITS Management Model (see fig 2.1 – created by the candidate - adapted from

Bunker 1994), Open Systems Architecture (OSA) Revised “Stages of growth” Model (see table 4.1 additional factors added by the candidate – adapted from Galliers and Sutherland 1991), the Disciplinary Model (see fig 5.1 – created by the candidate - adapted from Bunker & Dean 1997) and the proposed Perspectival ITS Management Model (see fig 6.2 created by the candidate).

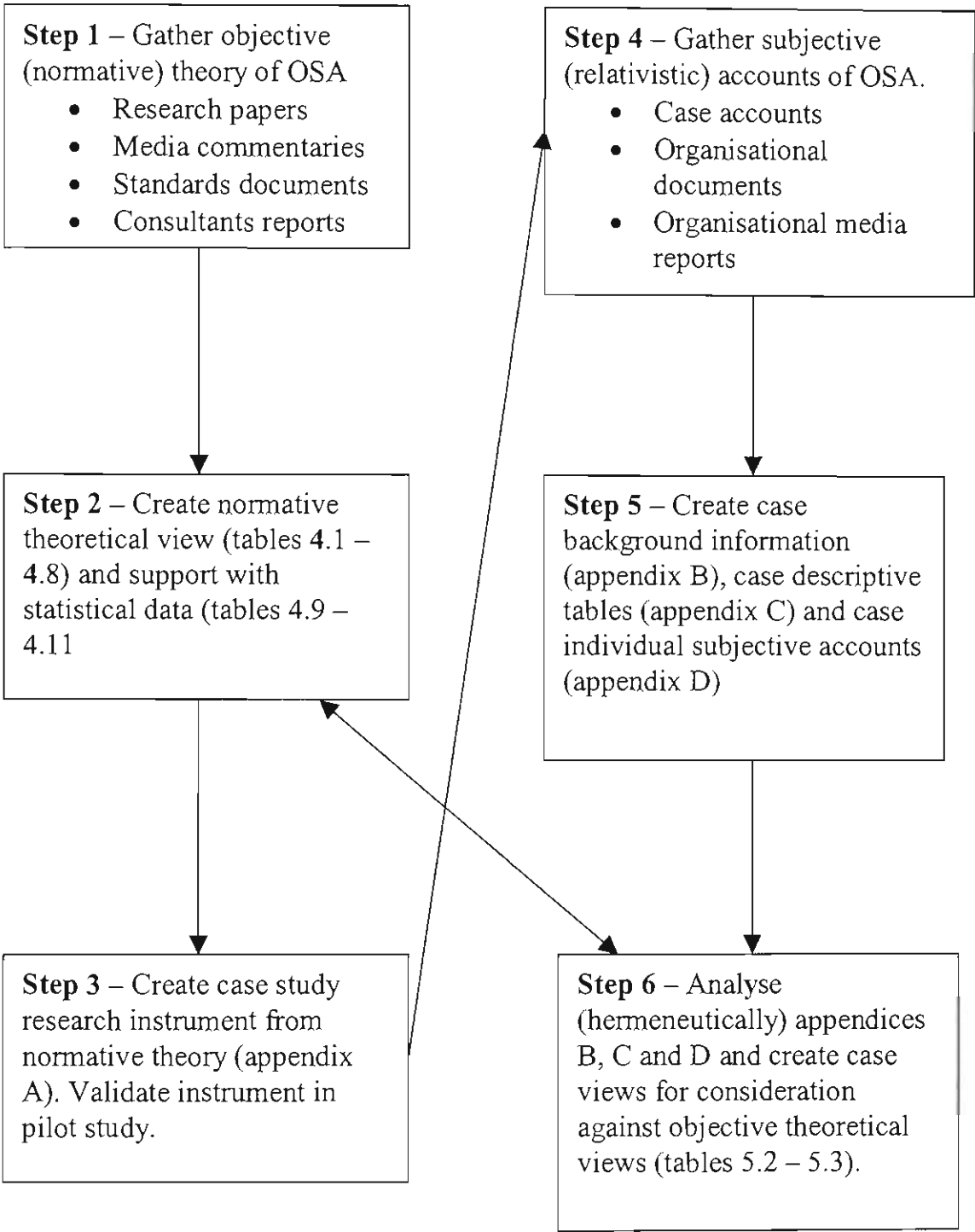
Research Question 3

Should the objective ITS management model be modified to incorporate a more subjective perspective of how to manage ITS? Would this modification enhance our understanding of ITS management?

3.4 Research Methods – Including Steps for Data Collections and Analysis

Figure 3.2 represents steps for data collection and analysis in this study.

Figure 3.2 – Steps for Data Collection and Analysis



Objective Methods

In order to research the objective management approach to open systems architectures it was decided to utilise some positivist (logical empirical) and relativist (historical and hermeneutic) methods for data collection and analysis (Hemple 1966 - see also figure 3.2). In *step 1* objective and expert sources of information were accessed and analysed in order to determine the normative view of management of open systems architectures. The idea of an *explanans* or “explanatory facts” (particular facts and uniformities expressed by general laws) was used to approach the interpretation of research papers, academic and expert media commentaries, standards documents, consulting reports and Federal Government policy documents. These were interpreted through the ITS Management Model (see figure 2.1) as well as the Galliers & Sutherland (1991) areas of ITS management importance and are presented as table 4.1. In *step 2* areas of commonality were synthesised from this information utilising descriptive statistics from general reports on Federal government implementations as well comparing expert opinion to produce an objective view

“where an event is explained where it is deductible from prior conditions and certain general laws” (Smart 1999 (on Hemple) – pg 286 as outlined in chapter 4).

These areas of commonality are presented as tables 4.9 - 4.11.

In *step 3* a semi-structured interview instrument was then developed and used to gather data from the case study organisations as well as to facilitate direct observation of the behavioural and cultural influences at work (see appendix A).

Subjective (Relativistic) Methods

Step 4 was to then to investigate subjective (relativistic) accounts of open systems architecture management. A case study format was observed as discussed by Benbasat et al. (1987), Swanson & Beath (1988) and more recently highlighted by Klein & Myers (1999). This approach to research is influenced by the richness and subjectivity of the data gathering process (Galliers 1992), however, detailed documentation of responses and observations ensures that the case study environment is fully described.

Benbasat et al. (1987) discuss the effectiveness of case studies and states that

"The key elements of data analysis are also critical to the written results of case research. As much as possible, the contextual and data richness of the study should be presented, and a clear chain of evidence should be established. The researcher's reasoning in establishing cause and effect or drawing out hypotheses should be clearly stated and defended. The research should move from objectives and questions, to assumptions and design choices, to specific data uncovered, and

finally, to results and conclusions. Readers should be able to follow this path readily" – pg 374.

Step 5 then saw the creation of appendices B – D as the output of step 4.

Step 6 saw relativistic hermeneutic interpretive methods (Ricoeur 1974), applied to the case data in order to enrich the contextual aspects from the case study respondents as well as to interpret data from other sources e.g. media commentaries to be interpreted more fully from a multitude of contexts (Mandelbaum 1967, Davies & Myers 1994). This takes the form of an *explanandum* (explanation event – Hemple 1966) though the intention is not necessarily to always frame an argument that fully explains an event (Hemple 1966). The explanandum for all six case studies are outlined in Chapter 5, section 5.3. That is to say that the explanandum is not being utilised in its strictly positivistic sense as it is also used as a vehicle to indicate where the subjective account varies from the normative view of the open systems architecture management through the eyes of a third party i.e. the researcher (Mandelbaum 1967 - more on this in section 3.8).

Retrospective Perspective (Historical View)

The objective and subjective data that were collected and interpreted for the open systems architecture management approaches were also combined with an historical methodological approach in order to study the cultural and ideological assumptions underlying phenomena and the roles played by key decision makers together from a long term economic, social and political viewpoint (Mandelbaum 1967, Mason et al. 1997). The objective and the subjective situations were assessed from a retrospective perspective in order to understand

“the richness of the human experience and the broad degree of complexity, intricacy, and unpredictability that surrounds any real circumstance” (Mason et al. 1997 – pg 307).

This historical perspective is most evident in the *POSTSCRIPT* chapter 7 of the thesis, which outlines objective and subjective views post case study period (1996 – 2001).

The justification for the plurality of research approaches (Kuhn 1970, Mingers 1997, Hirschheim 1992) is the long held belief that human science must resist settling down into a single paradigm (Khun 1970).

3.5 Research Instrument

A research instrument was developed to facilitate the collection of the subjective (relativistic) accounts of open systems architecture management and this was based around the ITS Management Model (figure 2.1) as well as the elements of importance to the successful management of ITS as identified by Galliers & Sutherland (1991). The theoretical background, constructs and importance of each of these seven elements have been described and related to the purpose of this study in chapter 2. These elements influenced the development of the research instrument used in this study by guiding the overall structure of the instrument as well as the range of questions proposed within each of the areas of inquiry.

The following summary of the overall structure of the research instrument used in this study identifies the general areas of inquiry in relation to the seven elements identified by Galliers & Sutherland (1991) and indicates the range of questions within each area of inquiry addressed by the study.

i) The Business Focus (STRATEGY) - How is the ITS role and implementation perceived within the organisation (strategic, support, process, turnaround)?

ii) Organisational Skill Mix (SKILLS & STAFF) - Does the implementation of a certain type of ITS affect the skill sets required to manage and implement the ITS? Are staff available within the marketplace that fit the ITS professional's profile?

iii) The Organisational Priority Concerns (STYLE) - How is the ITS to be used? What order of importance do managers (within the ITS function and outside of it) place on the use of ITS within the organisation?

iv) ITS Function Education/Training Needs (SKILLS & STAFF) - What are the needs for staff dealing with ITS technology, given the required skill mix? Are these requirements commensurate with more technical skills or less technical skills? How should training be delivered? Are the training needs consistent with courses that are currently available?

v) ITS Leadership Requirements (SUPERORDINATE GOALS) - What are the leadership skills that an ITS executive requires to perform his/her role in the company? This is linked closely with the Business Focus area described previously.

vi) ITS Architecture and Infrastructure (SYSTEMS) - What is the functionality and application of the ITS within the organisation? Should it be centralised, distributed, data or process driven and what are the infrastructure requirements?

vii) ITS Technical and Business Objectives (STRUCTURE & STRATEGY) -

How do the organisational participants see the selection, implementation and purpose of ITS within their organisation?

These elements have a major effect on the management and development of ITS within an organisation and also highlight other, more complex issues, due to the specific nature of the organisations being studied and their commitment to open systems architectures.

3.6 Justification of the Case Research Sites

This study utilised a theoretical approach to data gathering (normative models as well as descriptive statistics from the literature) in order to outline the normative situation for open systems architecture management in the general sense (see chapter 4).

A number of Australian federal government case study organisations were then studied which represented organisations that had or were in the process of implementing open systems architectures. Organisations were of varying sizes and in varying stages of open systems architecture implementation, to ensure that wide-ranging and relevant issues and factors were highlighted. The case study research for

this study was conducted late 1993 - 1996 and involved six Australian federal government organisations with different structures and cultures, involving 15 individual senior management subjects in all. Australian Federal government organisations were selected for this study as they had been early movers to open systems architectures and also had standard organisational operations that allowed for some control of organisational variability.

This selection process was enhanced by the project sponsor's knowledge of and access to the ITS marketplace, through their large client base and extensive network of contacts. The case approach, which was utilised for subjective data gathering was homogeneous (focuses and simplifies) and was criterion comparable (selecting individuals sites or groups on the same relevant characteristics). It was theory based (elaboration of theoretical constructs) as well as being reputational (instances chosen on the recommendation of a key informant which enhances believability) while documenting multiple cases within a market niche (to allow some comparison of case informant views to objective theory within that market). It focused on such things as: settings, actors, events, processes, organisation size, type, structure and planning methods. These are highlighted within each case to test for variations of condition under which the theoretical constructs of any normative model may operate (Miles & Huberman 1994).

These sampling strategies assisted in the anticipation of the effect of more flexible and varied ITS infrastructures on ITS management within these organisations, which was used primarily in an attempt to overcome the lack of operationalisation and generalisability of results, by presenting a rich picture of these effects in a focused manner, which is constructionist in nature.

3.7 Research Stages

The research project followed the stages outlined below with the identified outcomes and deliverables.

Stage 1 Construction of a semi-structured interview instrument (using the proposed theoretical ITS Management Model and the Galliers & Sutherland (1991) elements – see appendix A) as a basis to identify an objective view of open systems architecture management within the Australian federal government (see chapter 4), and also for use in subjective case studies involving a cross section of organisations from the Australian federal government.

Stage 2 A pilot case study of this instrument was performed to gain feedback and clarification of issues before full case studies were undertaken.

Stage 3 Application of the interview instrument (developed in stages 1 & 2) to organisations within a defined case study approach as well as the collection of data from other sources e.g. government policies, popular media, organisational artifacts. The organisations were selected through discussions with the project sponsor and appropriate marketplace representatives. Output was documentation of each case organisation's subjective accounts of open systems architecture management within the Australian federal government from 1993 – 1996 (see appendices B, C & D).

Stage 4 The analysis of the objective view and subjective case study accounts and other relevant data in order to develop possible modifications to the objective ITS Management Model (figure 2.1). This analysis was also done to specifically highlight how to reconcile/integrate object and subject so that a better understanding of “subject-as-object” could be developed (see chapter 5 section 5.3 – explanation sketches).

Stage 5 Development of the proposed Perspectival ITS Management Model (figure 6.2), which attempts to reconcile object and subject. This represents a constructivist approach to understanding ITS management, which results in a more useful and relevant view of ITS management.

Stage 6 Collection and analysis of objective and subjective ITS Management data within the Australian federal government post case study period (see chapter 7). This

represents a period of ITS outsourcing management (1996-2001) and is subsequently important in retrospect to the open systems architecture management findings.

3.8 Reconciliation of Object and Subject

It is the intent of this thesis to acknowledge, study and highlight contextual issues of ITS Management and so allow the proposed Perspectival Model of ITS Management (see figure 6.2) to be viewed through the integration/reconciliation of the object and subject. The temptation to build a single unified theory from the results of these multiple cases has been resisted (Galliers 1992, Gable 1992). Each case is illuminated by its own context so that readers may recognise these contextual factors and their influence on the ITS management within each organisation. This represents a point of departure from the objectivist approach to interpreting and modelling case based research. As such, some examples from each case are used to highlight the integration/reconciliation of the object and subject. Integration/reconciliation is not meant in the reductionist epistemological sense here, rather it is viewed as a

“...reinterpretation – as a new meaning, or fuller meaning, or renewed meaning”
(Crotty 1998 – pg 82) as in the case of a phenomenologist’s viewpoint.

The view of qualitative research outlined more recently in Klein & Myers (1999) effectively articulates the basis of the reconciliation/integration of object and subject

taken by this study. They outline seven principles of qualitative research that should be followed in order to produce good quality and effective research. This approach combines objective and subjective methods to data collection and treatment. In the following sections each step is explained within the context of this research project.

i) The Hermeneutic Circle - Data from the cases has been interpreted from individual managerial sources that were both within and outside the ITS function and also in the context of the Australian federal government ITS architecture and infrastructure of the period. These hermeneutic interpretations have been documented in detail in chapter 5, section 5.3 (and following), which outlines obvious and emerging contextual factors for each of the six case study organisations from each case informant's perspective. These contextual factors have been identified from the hermeneutic analyses of appendices B and D in comparison with the descriptive analysis of open systems architecture in the Australian federal government in tables 4.9 – 4.11. For, example if we examine tables 4.9, 4.10 & 4.11 in chapter 4 we can see that there is little observable change in hardware and software use over this period. The individual hermeneutic case analyses in chapter 5 highlight six quite different organisational views of hardware, software and ITS management during this period.

Multiple interviewees (i.e. the ITS executive manager, the ITS middle manager, and an ITS sponsor manager (GM or manager other than IIS manager)) were interviewed

to elicit their opinions as to the implementation and management of open systems architectures in their organisations, giving many different subjective views of the object (open systems architectures). Various sources of information were also utilised to highlight the objective open systems architecture management and decision-making climate in the Australian federal government during the period of the data collection. It should also be remembered that open systems architecture management policy, was shaped by Australian federal government policy and the prevailing attitudes of vendors and standard makers of the time (AGGOS 1993, Hollis 1993). The US Department of Defence (DOD) (and by association the US government) also influenced Australian federal government open systems policymaking. When we review the historical context of open systems standards during the study period we see that the US DOD (and government) had a profound influence on open systems standards around the world (AGGOS 1993, Tapscott & Caston 1993, McClelland 1994, Piper & Naghshpour 1996, Philipson 1994).

ii) Contextualisation of Qualitative Research – The ITS Management Model (see figure 2.1, chapter 2) was an objective expression of ITS management theory to date. It is interesting to note that these views have not changed considerably over the 10 years in which this study has been conducted and then subsequently interpreted (Galliers 1999). This model by its nature is objectivist in orientation and validation. It is also interesting to note that most researchers refer to organisational context and its effect on the particular constructs they are attempting to define and measure, whilst at the same time they attempt operationalise and generalise these constructs to other

organisations. These objectivist researchers are aware of the limitations of their constructs and their limited applicability to all organisations. This research sets about supplementing these objectivist approaches.

The ITS Management Model (see figure 2.1) attempts to overcome some of these limitations by being framed within a boundary of context and environmental constraints. Variables within the model also affect and are affected by the organisation context and environment. Care has been taken to firstly frame the model with data gathered on the objective management approach e.g. popular media accounts, policy and recommended infrastructure. Case data suggests a much more complex interaction between the participants within the ITS management process (which we see from the multiple perspectives within the model) and the organisation context and environment in which they operate.

By approaching the study in this manner, data about objective and subjective ITS management within a specific government context were collected, and used in assisting the enhancement of the knowledge base on which an ITS Management Model has been built (chapter 2). The approach has also allowed for observation and contextual presentation of the effects of organisational culture (the values, beliefs and norms held by members of the organisation) and organisational structure (the way in which culture and workflow manifest themselves) on ITS management. As a result of

the findings of this study a new Perspectival ITS Management Model (supplemented with emerging and existing models) has been proposed (figure 6.2).

The findings from these cases will assist with the possibility of applying this new model to other government and non-government organisations. If cultural values and beliefs are made explicit, researchers then have the capability to know if the case study in question will be applicable to understanding another organisation with contextual similarities.

iii) Interaction Between Researchers and Their Subjects - In order to better understand the interpretation of the data that were collected within these organisations, it is also helpful to know the background and experience of the researcher. The researcher in this case has had 13 years as an analyst in the Finance, Government and Insurance sectors, as well as being formally trained in historical interpretive methods and approaches. An interview protocol was developed with a pilot case organisation, which allowed the researcher to talk to individual organisational participants and feed their narrative back to them within one interview cycle. Participants in these case studies were extremely busy individuals so it became necessary to gather the responses as quickly and as painlessly as possible. The interview, record and feedback protocol that was developed with the pilot organisation proved to be very accurate. This does not mean, however, that the data is free from researcher bias as it still needs to be interpreted by the researcher, and so is

still subject to those influences that the researcher deems to be important. An attempt was made to limit this bias, however, by using the Galliers & Sutherland (1991) elements to focus the questions and their subsequent interpretation. This focus also represents a point of departure for object/subject reconciliation/interpretation.

iv) Abstraction and Generalisation – Due to the explicit nature of the contextualisation process, these cases will prove useful to any organisation that “recognises their reflection” in the mirror created by the researcher, using a combination of the data which has been gathered and its interpretation. In recognising their reflection an organisation must also recognise the mirror, and so understand the researcher’s background and the theoretical constructs used, is an important element of understanding the interpretation of the data (Mandelbaum 1967). Information is only as useful as the meaning ascribed to it. The production of an objective approach to the management of open systems architectures is an attempt to highlight normative requirements to open systems architectures and then compare these to subjective case accounts and their contextual characteristics.

This approach is objectivist in nature and structural-functionalist in character but it recognises that there is the potential for contextual differences between organisations in the management of their ITS. To this end the researcher has utilised multiple research methods (logical empirical methods to describe objective views about the management of open systems architectures as well as relativistic hermeneutic

approaches to case study analysis and their historical interpretation) in an attempt to flesh out the proposed Perspectival ITS Management Model (figure 6.2) and to better understand what the organisational contextual differences might be. There is also an effort to understand how these contextual differences might better represent a less objective view. The researcher is attempting to overturn the “one size fits all” approach to ITS management.

v) Dialogical Reasoning - An historical and contextual approach has been taken to the casework (Mason et al. 1997, Davies & Myers 1994, Hemple 1966) utilising explanation sketches (chapter 5, section 5.3) within the normative models and relativistic subjective case material as a vehicle to document case findings. Relativistic hermeneutic approaches to collection and interpretation (contextualisation) of data are also used.

Many researchers within the information systems discipline would question the validity of this approach in producing rigorous research outcomes. “It is merely story-telling” or “how do you prove your argument” are comments that are regular criticism of this research type. A nomological explanation is, however, an accepted historical research technique, which is based upon systematic protocol, and technique (Burrell & Morgan 1985). It relies on the vehicle of an explanation sketch where there is no explicit mention of any laws. It is clear, however, that the sketch of an explanation presupposes, first of all, various particular facts and secondly certain assumptions as

to how human beings will tend to behave in certain situations (sociology, psychology and economic theories). Nomonological explanation sketches include; analogy; generalisation; reasoning from statistics and working hypotheses. The ITS Management Model (see figure 2.1), the objective approach to the management of an open systems architecture in the Australian federal government and the application of the Galliers & Sutherland (1991) Revised Stage Theory Approach to the area of boundary context in this environment, represents an example of a nomonological explanation sketch by way of a working hypothesis. In the gathering and subsequent analysis of case material the researcher adds to the richness of the explanation of the ITS Management Model (see figure 2.1) and the Revised Stage Theory Approach (Galliers & Sutherland 1991) as well as assisting in the definition of the proposed Perspectival ITS Management Model (figure 6.2).

“Clearly the question whether a given explanatory argument is complete or partial can be significantly raised only if the explanandum (event) does or does not follow from the explanans (general laws). Completeness of explanation in this sense is relative to our explanandum sentence (Hempel 1966 – pg 106).”

In history...“This notion is self defeating for any particular event may be regarded as having infinitely many different aspects or characteristics, which cannot all be accounted for by a finite set, however large, of explanatory statements” (Hempel 1966 – pg 107).

The explanation will never be complete as we might see in a scientific axiom, so it will only become more rich and dense in nature with each case example.

That is not to say the explanation sketch does not have its own in-built logic, for an explanation sketch is an explanatory account that is not explicit and specific enough to be reasonably qualified as an elliptically formulated explanation or as a partial one. It is eventually supplemented so as to yield a more closely reasoned argument based on an explanatory hypothesis that readily permits critical appraisal by reference to empirical evidence. Each stage must be shown to lead to the next and thus be linked to its successor by virtue of some general principle. This makes the occurrence of the latter at least reasonably probable given the former - they combine a certain measure of nomological interconnecting with more or less large amounts of straight description.

Explanation of an action in terms of its underlying rationale will include, in particular, the ends the agent sought to attain, and the alternative courses of action he believed to be open to him. This does not subsume the explanandum under general laws, but shows

“that what was done was the thing to have done for the reasons given, rather than merely the thing that is done on such occasions, perhaps in accordance with certain laws” (Dray 1957 quoted in Hempel 1966 – pg 107).

The use of historical explanation as described by Hempel (1966) highlights that “What the preceding considerations do suggest is, rather, that the nature of understanding, in the sense in which explanation is meant to give us an understanding of empirical phenomena, is basically the same in all areas of scientific inquiry; and that the deductive and probabilistic model of nomological explanation accommodate vastly more than just the explanatory arguments of, say, classical mechanics: in particular, they accord well also with the character of explanations that deal with the influence of rational deliberation, of conscious and subconscious motives, and of the ideas and ideals on the shaping of historical events. In doing so, our schemata exhibit, I think, one important aspect of the methodological unity of all empirical science” – pg 124.

This gives an objective feel to the data that is then analysed through multiple relativistic interpretations and illustrates that the research techniques that are used within this study are valid and produce rigorous research outcomes.

vi) Multiple Interpretations – Relativistic hermeneutic approaches to the analysis and interpretation of the subjective case data have also been adopted (section 5.3 and following). Many views have been elucidated in the data treatment. These multiple narratives are an attempt to also interpret the data within a number of frames of reference. It must be remembered, however, that we are all captives of our own paradigms and that as much as a researcher would like to represent all points of view, that as humans we have our own values, assumptions and culture, which underpin the

way, we look at the world (Mandelbaum 1967). The rationale for using a hermeneutic approach is to interpret the data in as many different ways as possible, given the researcher's bias, so that a greater understanding of organisational context is attained. A recent example of a multiple approach to hermeneutic analysis is provided by Olson & Carlisle (2001) where they synthesise the work of DeVries & Miller (1987), Phillips & Brown (1993), Lee (1994) and Gadamer (1976).

vii) Suspicion OR Doubting the Research – Gathering the objective open systems architecture management data and subjective case research has obvious limitations. No research is value free. Even scientific research is a product of its political and social context (Burrell & Morgan 1985). The cultural underpinnings of the researcher, the positivist limitations of the internal machinations of the ITS Management Model, the more humanist elements in the model periphery and the viewpoints represented by the case participants are all open to criticism and the effect of complexity. The documentation of the study, however, has attempted to draw attention to these facts and make the context of the research explicit. Organisations, that wish to learn from these individual cases will not only “recognise their reflection” but also understand the structure of the mirror used to project the image.

3.9 Challenging Methodological Issues

Whilst the gathering of the data to frame the objective open systems architecture management approach was relatively straight forward, the decision to use a case study approach for subjective accounts of open systems architecture management meant that a structured interview instrument should be used to gain the maximum relevant and meaningful information from an organisation (that also related to the objective view). The semi-structured interview outline was extremely useful as a guide to interviewees but the pilot study highlighted the fact that a more tightly structured tool was required with the ability for the interviewee to add material where appropriate. The answers from the different interviewees, for example, were difficult to analyse due to the lack of structure in some questions.

The differing perspectives of the interviewees were also more of a problem than first anticipated. Responses from subjects external to and within the ITS department, indicated that perspectives about events and the meanings of terms were different across the organisation. A hermeneutical approach to analysis was utilised to overcome some of these issues.

The time spent conducting interviews was also an issue. The pilot organisation's managers were most generous with their time (about 3 hours per interview), however, subsequent talks with other potential case study participants revealed that any interviews which take over two hours of an interviewee's time, would be an impediment to an organisation's participation in the full study. A tightly controlled interview protocol of question/answer/feedback was also utilised to maximise the accuracy of the "one-shot" exposure to each of the interviewees.

The interview instrument has drawn heavily on the current literature as a basis for questions. A problem encountered was the timeliness of such literature. An Australian government department study (Cassidy 1990) was used as the basis of categories for occupational skill requirements in this case study. When interviewee responses were analysed it became obvious that these skill categories were no longer relevant to industry.

As a result of the pilot study, the semi-structured research instrument was redesigned so that it became more structured, concise but also open ended. The intention was to strike a balance between a tightly focused instrument for comparison of respondent answers to objective theory and the ability for respondents to "tell their story" so that individual comments could be more easily incorporated, thus, making it easier to interpret contextual information. Two slightly different versions of the instrument

were also developed so that they were more relevant to the two different types of interviewees (i.e. the non-ITS manager, and the ITS manager).

The study was to originally be a longitudinal study of a few government organisations over a 3-year period. Political instability in 1995 resulting in a change of government in 1996, meant that the data gathering strategy was changed and that depth of data gathering had to be sacrificed for breadth of coverage, and so more cases were found to provide a 'one shot' data gathering exercise over a greater number of organisations. This was to prove beneficial to the project for as soon as the new government took its place the major direction of ITS management changed considerably, from open systems development and management in-house to a majority of outsourced solutions (supposedly netting the government \$350 million 96/97, \$335 million 97/98 and \$300 million 98/99 (Hilvert 1996a). The result of this change of direction is dealt with in the *Postscript* (see chapter 7).

3.10 Conclusions

This chapter has outlined the general area of inquiry of this study in terms of the ITS Management Model (see figure 2.1) and the Galliers & Sutherland (1991) Revised Stage Theory Model which described objectivist theory as well as the research instrument that was created as a result of the analysis of the general ITS management literature which was used for the collection of subjectivist case study accounts. The

case-based research approach was then described in detail, outlining a description of the relativistic interpretive research techniques used within the study and how they would be applied to the case organisations. The general research method and its four stages were described in relation to the construction of the research instrument as well as its application to selected Australian federal government organisations and a pilot organisation. The collection of data for analysis and modification of the ITS Management Model (see figure 2.1) was described as the primary motivation of this study.

Chapter 4 will provide background and an outline of the objective approach to the management of open systems architectures in the Australian federal government sector as well as an insight into the environment in which the case organisations operated during the period of this study.

CHAPTER 4 – BACKGROUND TO THE OBJECTIVE THEORY OF THE MANAGEMENT OF OPEN ITS ARCHITECTURES AS IT APPLIES TO THE AUSTRALIAN FEDERAL GOVERNMENT

Chapter Overview

This chapter outlines and highlights what were the objective open systems architectures and the related ITS management issues from 1993 to 1996. This normative definition of open systems architectures underpins the content and structure of the case-based survey instrument (see appendix A) used to gather subjective accounts of open systems architecture management in the Australian federal government (see appendices B, C & D). This chapter ends with the presentation of statistical data that were published on the use of open systems ITS within the Australian federal government (from 1995 to 1997) thus providing the context and background for the case study subjective accounts (chapter 5).

4.1 Introduction

Open systems architecture management issues were derived through an analysis of the normative literature of this period as well as the policy that was set by the Australian federal government. The output from this analysis was then categorised utilising elements (strategy, structure, systems, staff, style, skills and superordinate goals) of the Revised Stage Theory approach of Galliers & Sutherland (1991). An

Open Systems Architecture (OSA) Revised Stages of Growth Model (see table 4.1) is presented as an objective representation of the literature by adding open systems architecture factors to the existing model which is outlined in chapter 2 (see table 2.5). Background information on the management of open systems architectures forms the basis to this objective approach.

4.2 Objective Theory of Open ITS Architectures

This section of the chapter starts with a summary of objective theory of open systems architectures which is represented by an Open Systems Architecture (OSA) Revised Stages of Growth Model (see Table 4.1). Additional factors have been ***highlighted** to indicate where open systems objective theory has impacted the development of the original model (see table 2.5 – chapter 2). These additional factors are discussed at length in this section (4.2) and section 4.3 of this chapter. During this period open systems architectures are guided by technical as well as business principles. A typical technical definition of an open systems architecture comes from the Australian Government Guide to Open Systems (AGGOS 1993) that defines open systems architecture as the ‘Open Systems Environment’ and the ‘Open Systems’ contained within. This document uses a definition of an ‘Open Systems Environment’ from the ISO (International Standards Organisation), which is also used by the IEC (International Electrotechnical Commission). These two organisations were influential in the development of the international open systems movement.

Table 4.1 – Open Systems Architecture (OSA) revised “stages of growth” model (adapted from Sutherland & Galliers, 1989, p23 reproduced in Galliers, 1991, pp 61-62) * adapted to denote additional OSA factors

	Stage					
Element	1	2	3	4	5	6
Strategy	Acquisition of hardware, software etc	IT Audit Find out and meet user needs	Top-down IS planning	Integration, co-ordination & control	Environmental scanning & opportunity seeking	Maintain comparative strategic advantage Monitor futures Interactive planning *Multi – vendor (flexible) OSA solutions
Structure	None	Label of IS often subordinate to accounting or finance	Data processing department Centralised DP shop End users running free at stage 1	Information centres Library records, OA etc. in same unit as information services	SBU coalition(s) many but separate	Centrally co-ordinated coalitions (corporate & SBU) *Matrix/task org'n *KW empowerment *Interoperability (I), portability (P)& scalability (S) of systems flattens structure
Systems	Ad hoc unconnected Operational Multiple manual and IS Uncoordinated Concentration in financial systems Little maintenance	Many applications Many gaps Overlapping systems Centralised Operational Mainly financial systems Many areas unsatisfied Large backlog Heavy maintenance load	Still mostly centralised Uncontrolled end-user computin Most major business activities covered Database systems	Decentralised approach with some controls, but mostly lack of co-ordination Some DSS adhoc Integrated office technology systems	Decentralised systems but central control & co-ordination Added value systems More DSS-internal less adhoc Some strategic systems (using external data) Lack of ext & int data integration Integration of communications technologies with computing *Lack of OSA standards for effective migrat'n	Interorganisational systems (supplier, customer, government links) New IS based products External-internal data integration *Simple flexible client/server systems *Shared info *I, P, S makes systems flexible *Multi-vendor systems knowledge
Staff	Programmers/contractors	Systems analysts DP Manager	IS Planners IS Manager Database Admin Data Admin Data Analysts	Business analyst IRM CIO	Corporate/business / IS planners (one role)	IS Director/ member of the board * IT Tech Director * IT Org'n impact Manager *Multi vendor management *Ext vendor rep
Style	Unaware	Don't bother me (I'm too busy	Abrogation/ delegation	Democratic dialectic	Individualistic product champion)	*Entrepreneurial Business team
Skills	Technical (very low level), individual expertise	Systems development methodology	IS believes it knows what the business needs Project management	Organisational integration IS knows how business works Users know how IS works (for their area) Business M'ment (for IS staff)	IS Manager- member of senior executive team Knowledgeable users in some IS areas Entrepreneurial marketing skills	All senior management understand IS and its potentialities *Technical skill breadth in ITS *Multi-vendor skills *Vendor –like skills in-house
Superordinate Goals	Obfuscation	Confusion	Senior management concern	Co-operation	Opportunistic Entrepreneurial Intrapreneurial	Interactive planning *ITS simple & integrated (I,P & S) *Paradigm shift

AGGOS (1993) defines an open systems architecture as

“the comprehensive set of interfaces, services and supporting formats, plus user aspects, for interoperability or for portability of applications, data or people, as specified by information technology standards and profiles” – pg 11.

Technical requirements take the form of a group of standards or ‘profile’ such as the GOSIP (Government Open Systems Interconnection Profile) standard for communications, POSIX (Portable Operating Systems Interface for Computing Environments) standard for operating systems or the NETSCAPE range of interface products for in-house world wide web (WWW) browsing, mail and conferencing environments. The environment also promotes individual standards such as C for programming, WINDOWS for graphical user interfaces and the X.400 based electronic messaging and application programming interface (API).

The ‘Open System’ on the other hand is

“a system that implements sufficient open specifications for interfaces, services and supporting formats to enable properly engineered applications software to be ported across a wide range of systems (with minimal changes); interoperate with other applications on local and remote systems and interact with users in a style that facilitates portability...The Open System is a manifestation of one or many of these Open System Environment Profiles” (AGGOS 1993 – pg 12)

It is at the level of defining open systems during this period that issues emerge. Standards are constantly being developed by a dearth of standards bodies (See Appendix D) under user and vendor pressure (DMR Group Australia 1991, Moad 1994, Head 1994, Flack 1994, Alberthal et al. 1993, Tory 1993, Johnson 1992, Porra 1993, Philipson 1994, Horey & Philipson 1995, Burgess 1997, Costello 1997). This raises various issues that require solutions and which still plague open systems architectures today. What constitutes a standard interface (and is there really a situation of vendor lock in e.g. WINDOWS)? What standards were and are truly independent? What is an open ITS product? Does the pressure by users and vendors on standards bodies really create a situation of de facto open standards e.g. WINDOWS ?

Three distinct areas define open systems architectures (DMR Group Australia 1991, Tory 1993, Tapscott & Caston 1993) and these areas also hold true today in the definition of E-commerce (DMR Group 1991, Robertson-Dunn 1994, Blair 1994, Plant 2000, Lawrence et al. 2000). These are:

- **portability** (the ease with which software can be transferred from one information system to another (DMR Group Australia 1991, AGGOS 1993 Porra 1993, Tapscott & Caston 1993);
- **scalability** (the ease with which software can be transferred from one graduated series of application platforms to another (DMR Group Australia 1991, AGGOS 1993, Porra 1993, Tapscott & Caston 1993)); and

- **interoperability** (the ability of two or more systems to exchange information and to mutually use the information that has been exchanged (DMR Group Australia 1991, AGGOS 1993, Porra 1993, Tapscott & Caston 1993))

DMR Group Australia (1991), AGGOS (1993) and Tapscott & Caston (1993) outlined the **key business reasons** that organisations may choose to implement open systems architectures. Reasons include: the move from personal to workshop computing; changing much of the way people communicate with each other; the move from islands of systems to a more integrated system architecture and infrastructure; and the move from internal departmental computing to a more enterprise based model.

When an organisation chooses to implement open systems architectures, information is treated as a corporate resource that is easily accessed and shared. People skills become the organisation's most important area of value and focus (DMR Group Australia 1991, Chulov 1994). Data that are locked up in the many different organisational computer systems becomes more easily accessible and available from any level in the organisation as systems become more data driven when redeveloped under an open environment. Applications and data become more vendor independent allowing more strategic choices for the organisation and all applications as they are redeveloped have a similar 'look and feel' due to the more standardised use of graphical user interfaces (GUIs). Hardware, systems software, communications facilities and business applications are integrated to the maximum extent possible

allowing for a 'seamless' system at the user level (DMR Group Australia 1991, Tory 1993, Zampetakis 1994). System flexibility is in-built to enable systems to respond rapidly to change and ITS costs and procedures are kept to a minimum in order to support business objectives.

Independence from a proprietary architecture is seen as adding flexibility to the management and use of ITS. At the time this study was conducted organisational independence from hardware vendors was seen as having made considerable progress (DMR Group Australia 1991, Blair 1994), however, software independence in the area of operating systems, applications and databases was seen as having made little progress (DMR Group Australia 1991, Moeller 1993).

Vendor independence of organisations was also seen as leading to the fuller use of the range of products and services offered by suppliers, thus, encouraging greater market competitiveness especially in areas such as the use of standard interfaces between system components. Bridging the gap between open and proprietary systems whilst maintaining existing proprietary systems was also a critical issue in the move towards a more comprehensive open systems architecture. This is especially the case in the Australian federal government as many of the government departments at the time of this study had large and significant legacy system investments that could only be redeveloped over considerable time. The long-term benefits of moving to open systems architectures included "strategic economic advantages that will flow from a more competitive environment" (AGGOS 1993 – pg 17).

UNIX and DOS (and from the mid 1990s WINDOWS) operating systems have enabled the price of computers to be lowered as less hardware platforms were being marketed. The amount of software that can be run on these systems also increased dramatically. Standard Apple Mac and PC platforms enabled users to realise the many benefits of applying standard universal computing architectures.

Cost within an open systems architecture was not only minimised by more standard hardware, software and communications platforms but also by the ability to make changes to computing architectures and infrastructures in a faster and more flexible manner. As a result, organisations no longer suffered proprietary systems 'lock-in' as the cost differential between proprietary systems solutions and open systems architectures during the period of this study was expected to decrease (AGGOS 1993). This was due to the adoption of common standards that would also benefit vendors in their development work.

This would enable them to share development activities as well as benefiting organisations by enabling them to train staff more easily as hardware, software and communications are developed. Common interfaces utilised within open systems architectures would also underpin this less complex and more standard approach to systems. The downside, however, was the requirement for multiple vendor technical skills, which would take information to the desktop (DMR Group Australia 1991,

Zampetakis 1994). The benefits of these approaches are seen today in the e-commerce revolution (Plant 2000, Lawrence et al. 2000).

“Standards in general, and open systems in particular, do not simply provide benefits. They are becoming an imperative for business success and survival in the 1990’s and beyond” (Tapscott & Caston 1993 – pg 164).

This has also been proved by the successful adoption of e-commerce technologies and approaches (Kalakota & Robinson 2001).

4.3 Objective Theory of the Management of Open Systems Architectures - Galliers & Sutherland (1991) Revised Stages of Growth Model

It has been argued (in chapter 2) that an objective approach to the management of ITS in general can be achieved through the ITS Management Model (figure 2.1) and the Galliers & Sutherland (1991) Revised Stages of Growth approach and its seven S categories. It is also argued that this approach can also be applied to an objective view of the management of open systems architectures. A review of open systems architecture objective theory has been categorised and explained utilising the Galliers & Sutherland (1991) Revised Stages of Growth. The following sections of this chapter outline this analysis in detail.

Strategy refers to the plan or course of action leading to the allocation of a firm's scarce resources over time, to reach identifiable goals (Galliers & Sutherland 1991). With the implementation of open systems architecture in an organisation, application strategy would change significantly (reflected in the move through support through to strategic direction in applications (DMR Group Australia 1991 – pg 97).

Interoperability, connectivity, portability and scalability of the computing architecture and infrastructure move from one of a fixed proprietary view to more plug compatible and flexible components which are more easily controlled due to the nature of simple solutions (DMR Group Australia 1991, Tory 1993). Changes can be made to organisational, and subsequently to the ITS strategy relatively easily, due to the nature of the standards in place. Business units are more easily connected due to the nature of the technology and information and various systems aspects are more easily shared.

Maintaining strategic direction, however, is perceived to be an issue as organisations disengaged from more prescriptive proprietary solutions to a multi-vendor multiple technical and business solution scenario (DMR Group Australia 1991, Gordon & Martin 1993, Tapscott & Caston 1993, Zampetakis 1994). Table 4.2 outlines the features of objective architecture strategy characteristics according to the definition outlined in the previous section. **Open systems salient features have been *highlighted.** This table forms the basis for the semi-structured interview instrument

(see appendix A) used to collect subjective accounts of open systems architecture management (see chapter 5).

Table 4.2 – STRATEGY Objective Characteristics

Open Systems Business Focus Defining Applications Direction	Open Systems Business Objectives
*Strategic Turnaround Factory Support	Automating Operations *More efficient communications with customers and clients Expansion overseas markets *Improve quality of business decisions Product quality control or improvement Increase user department autonomy Improving research and development capabilities *Increase business decision speed *Minimising IT costs Reducing business costs *Reduce product or service lead time *Streamline supplier relationships Supporting basic functions

Structure refers to the “characterisation of the organisational chart” (Galliers & Sutherland 1991 – pg 97). The organisation is more easily flattened and dispersed due to the nature and structure of the technology (Hungerford 1992a & 1992b, Tapscott & Caston 1993). The client/server technology structure leads to greater empowerment of the individual knowledge worker at the lower levels of the organisation. Information and technology are more easily controlled, however, due to the nature of technology and the promise of interoperability, portability and scalability of the open systems architecture. Table 4.3 outlines the features of the objective architecture structural characteristics, which in turn would facilitate changes to the overall organisational structure according to the definition outlined previously. Open systems salient

features have been ***highlighted**. This table forms the basis for the semi-structured interview instrument (see appendix A) used to collect subjective accounts of open systems architecture management (see chapter 5).

Table 4.3 – STRUCTURE Objective Characteristics

ITS Department Structure	Organisational Characteristics
Hierarchical/role *Matrix/task Person/professional Web/power	*Move applications off mainframes to smaller systems Reduce size and /or number of mainframes *Database redesign *Data interchange between applications *Interoperability between applications Network management *Multivendor network m/ment EDI with customers EDI with suppliers New operating systems *Systems based on IT standards Real time computing Fault tolerance Distributed databases CASE Object oriented programming *Client-server applications On-line transaction processing Image processing LANs WANs

Systems refer to the “procedural reports and routine processes such as meeting formats “ (Galliers & Sutherland 1991 – pg 97). These ideas extend to encompass hardware, software, data communications, associated technologies and their configuration within the organisation. Systems that surround the open systems architecture are simplified due to the nature of the technology standardisation whilst

flexibility remains a key platform of the client/server nature of the systems configuration. Information is more easily shared and disseminated to the lower levels of the organisation due to the nature of the client/server and information repository approaches.

Interoperability, portability and scalability of the open systems architecture means that surrounding organisational systems can be changed as required to suit the current configuration of the organisation open systems architecture. Vendor support and expertise may be an issue, however, due to the fragmented nature of solutions provided around multiple vendors working with multiple standards. Migration issues are also a challenge as systems are redeveloped from legacy platforms to more open architectures and infrastructures, which may not be as robust as their proprietary counterparts and may not have any standard approaches to system building (DMR Group Australia 1991, Head 1994, Zampetakis 1993, Tim 1993, Tapscott & Caston 1993, Robertson-Dunn 1994, Zampetakis 1994).

Table 4.3 outlines the features of objective architecture systems characteristics according to the definition outlined in the previous section. Open systems salient features have been ***highlighted**. This table forms the basis for the semi-structured interview instrument (see appendix A) used to collect subjective accounts of open systems architecture management (see chapter 5).

Table 4.4 – SYSTEMS Objective Characteristics

Open Systems Technology Profiles
OPERATING SYSTEMS *MS-DOS MVS, VM OR VSE OS/2 *UNIX VMS
GRAPHICAL USER INTERFACES DECWindows Macintosh *Microsoft Windows Presentation Manager Motif Open Look Internally Developed
NETWORKING LAN Manager OSI SNA *TCP/IP X.25 Token Ring Ethernet
DATABASES (RELATIONAL) DB2 Sybase *Oracle Ingres Informix
OPEN SYSTEMS FRAMEWORKS Application Environment (X/OPEN) *GOSIP *POSIX (IEEE) SAA (IBM)

Staff refers to the “demographic” description of important personnel categories within the firm such as the engineers, entrepreneurs and MBAs (Galliers & Sutherland 1991 – pg 97). As the technology becomes more standard and interoperability, portability and scalability of the ITS architecture and infrastructure become a reality, the role of the business analyst becomes more important whilst that of the ITS “boffin” becomes less important. Although general technical skills become more important in a multi-vendor environment, business skills in the use and application of ITS become central to the type of roles and tasks which are performed within the organisation utilising an open systems architecture. IT managers and organisation managers become more attuned to what the technology can do for the organisation rather than what the technology can do as a technical solution.

This impact has human implications as organisational members become more responsible for the system architecture and infrastructure solutions for their organisations. The reliance on vendor organisations for business recommendations becomes more fragmented with multiple vendors vying for business and influence within the organisation. This can have a destabilising effect (DMR Group Australia 1991, Markoff 1993, Crowe 1993, Robertson-Dunn 1994). Table 4.5 outlines the features of objective architecture staff characteristics according to the definition outlined in the previous section. Open systems salient features have been ***highlighted**. This table forms the basis for the semi-structured interview instrument (see appendix A) used to collect subjective accounts of open systems architecture management (see chapter 5).

Table 4.5 – STAFF Objective Characteristics

ITS Department Positions
Operations
*Applications system architecture delivery
*Data Management
Systems Administration
Communications
*Technical Architecture
Quality Assurance
*Vendor relations
*EUC
*Help desk
Outsourcing
Research & Development
Insourcing
*IT Training
*Client Support
*Client Management
Department Management

Style refers to the “characterisation of how key managers behave in achieving the organisations goals” and cultural style (Galliers & Sutherland 1991 – pg 97). Managers would now be able to devote more time to the business case as technical problems become less evident and interoperability, portability and scalability of the open systems architecture become a reality. This allows key managers to become more entrepreneurial in their approach to developing key business strategies in the organisational setting.

The organisation, however, should have key personnel who are capable of assuming this role. Proprietary offerings are much more prescriptive in nature and thus have an influence on the organisational culture which would have to change with the implementation of any new ITS. If the organisation now has the capability to produce

its own business solutions then the culture of the management team should also be able to seize the opportunity (and do something with it) in terms of organisational goals and behaviour (Computerworld 1994, Champy 1994, Horey 1994). Table 4.6 outlines the features of objective architecture style characteristics according to the definition outlined in the previous section. Open systems salient features have been ***highlighted**. This table forms the basis for the semi-structured interview instrument (see appendix A) used to collect subjective accounts of open systems architecture management (see chapter 5).

Table 4.6 – STYLE Objective Characteristics

IT Manager Characteristics
*Interpersonal skills Informational skills Decision making skills *Learning about the business Establishing the IT department's credibility *Increasing organisation's technical maturity *Creating an IT vision & selling it *Implement visionary architecture to support the company

Skills refer to the distinctive capabilities of key personnel in the firm as a whole (Galliers & Sutherland 1991 – pg 97). ITS staff need to be less technically specialised while being technical generalists as well as being able to deal more with organisational and business issues. Users also become more involved with the design and development of application systems within the open systems architecture due to the less technical and more standard nature of these platforms as well as the multitude of user oriented systems development tools that accompany them. CASE tools, fourth

generation programming languages and easier communications configurations all contribute to the user's ability to become more involved with these systems.

A breadth of technical skills is required, which is not necessarily in evidence with proprietary legacy platforms. Organisations now have to cope with a variety of vendors and a lack of vendor business solution expertise. With the rapid pace of change in both technology and standards (and with little or no vendor support) organisations have to assume vendor roles and expertise in-house over a broad range of technology. Large organisations are usually better equipped to cope in terms of size, but small organisations may find themselves stranded, with a lack of skills to produce good quality and reasonably priced open systems architecture (Zampetakis 1994, Hungerford 1992a & 1992b). Table 4.7 outlines the features of objective architecture skills characteristics according to the definition outlined in the previous section. Open systems salient features have been ***highlighted**. This table forms the basis for the semi-structured interview instrument (see appendix A) used to collect subjective accounts of open systems architecture management (see chapter 5).

Table 4.7. – SKILLS Objective Characteristics

Required Skills and Training Characteristics
<p>*OS Standards</p> <p>*UNIX</p> <p>*Oracle</p> <p>4 G Languages</p> <p>Data Comms</p> <p>Systems Monitoring Tools</p> <p>Object Oriented Programming</p> <p>*Client/server</p> <p>EDI</p> <p>*OS Solutions</p> <p>*IT Managerial Skills</p> <p>*IT Technical Skills</p> <p>*Communication skills</p> <p>Analytical/problem solving</p> <p>Inquiring Mind</p> <p>*Supplier Interface</p> <p>*Multivendor skills</p> <p>*Vendor Management</p> <p>LANs</p> <p>*Client Management</p> <p>*Project Management</p> <p>*People Skills</p> <p>Desktop tool set (GUI)</p> <p>BPR</p> <p>*Data Management</p> <p>Re-use skills</p> <p>*Data Modelling</p> <p>Security</p> <p>*Relational Databases</p> <p>*Architectural Skills</p> <p>*Business Skills</p> <p>Job Process Skills</p> <p>*Training Skills</p> <p>*Applications Skills</p> <p>Systems Administration</p> <p>*Strategic Thinking</p> <p>Position Specific Skills</p> <p>Network Management</p> <p>CASE</p>

Superordinate Goals refer to the significant meanings or guiding concepts that an organisation imbues in its members such as shared values of the organisational culture (Galliers & Sutherland 1991 – pg 97). The implementation of open systems architectures enables an organisation to remove the technological barriers and complexities that accompany more proprietary ITS solutions. It is an attempt to standardise and simplify the ITS environment so that more effort can be placed on deriving the ever important business solutions for survival in the modern marketplace.

Open systems architectures amplify the message that the business goals are important and that technology is a mere facilitator of these goals. AGGOS (1993) highlights the fact that key elements of the Australian federal government's vision for open systems architectures include "increased connectivity of systems; increased access to information; increased integration of applications and more efficient development and procurement of applications. The vision for open systems shows that it will impact the whole manner in which we use computer technology to access and use information" – pg 16.

Tapscott & Caston (1993) state this in another way when they discuss the "new paradigm shift in IT" which is

"driven by a business need for more flexible, powerful, integrated architectures that can meet a new set of business requirements" – pg 160

thus changing the way in which we work within our organisations (DMR Group 1991). Table 4.8 outlines the features of objective architecture superordinate goals characteristics according to the definition outlined in the previous section. Open systems salient features have been ***highlighted**. This table forms the basis for the semi-structured interview instrument (see appendix A) used to collect subjective accounts of open systems architecture management (see chapter 5).

Table 4.8. – SUPERORDINATE GOALS Objective Characteristics

ITS Priority Concerns
Internal organization of IT function
*Identification opportunities for IT use
*Integrating diverse technologies
Organisational impacts of IS
*Relations between IT/users
Cost justification of IT projects
*User involvement
*Aligning IT with business strategy
*Development & management of EUC
*Technological constraints
IT staff resources
*User awareness and education
*IT project management & implementation
*IS maintenance
Coping with new IT
*Location of IT function in organization
IT security
*Data management and control
IS long range plan
Top management support for IT
Budget constraints of IT
*More effective IS/IT development

The implementation of personal computer (PC) and client-server based information ITS within organisations, and more flexible and varied ITS communications technologies and infrastructures to link organisations, have added a new dimension to the ITS management process. The stability of more mature proprietary (“closed”) ITS architectures is gradually being replaced in many organisations, by modular, multi-vendor (“open”), networked, user-driven ITS architectures, and more complex ITS infrastructures (Hollis 1993). Added to this, ITS is being used to drive a more volatile organisational, business and global environment (DMR Group Australia 1991, Tapscott & Caston 1993). Decentralisation may create incompatible islands of technology which may be overcome by moving to open systems architecture to successfully link these islands (Fink 1994). Are our current ITS planning methods, as summarised in the ITS Management Model (figure 2.1), able to deal with this situation effectively?

While the open systems architecture development and use, was partly in response to changes in organisational requirements (culture, structure and ways of doing business), parallel changes in ITS management theory take longer to filter through. Many organisations find themselves having to independently evaluate, and in some cases, make drastic changes, to their ITS management approaches in order to meet new strategic objectives, whenever a new ITS technology or approach is developed. This situation can be just as drastic within government organisations. These government organisations (in the case of open systems architecture and late developments in outsourcing) form a considerable part of any nation’s economy and

so their effective use of ITS resources is critical to the nation's health, well being and viability both domestically and globally.

4.4 Australian Federal Government Policy on Management of Open Systems Architectures

The literature review in chapter 2 reflects the objective ITS Management Model (figure 2.1). The model highlights the external environmental effects on the organisational context (boundary) of a typical organisation. The change in context in turn affects how the organisation manages its ITS resources. Government is in the business of providing services to the community, on the whim of the politicians of the day. External environmental factors and their effect on organisational context play a large part in how government ITS is acquired, implemented and managed making the strategic business requirements less strategic and more operational in both nature and orientation.

What environment confronted the Australian federal government departments managing the acquisition and use of ITS from 1993–1996? In the case of Australian federal government departments, conforming to open systems architecture standards and policy was mandatory at the time of this study and it was this environmental factor which had a major impact on government ITS management and planning approaches during this time.

The public sector in Australia is a large user of ITS resources. Historically they have been forced by various budgetary measures to utilise multiple vendor offerings outside of their core business applications. In 1993 it became official federal government policy to conform to Government Open Systems Interconnection Profile (GOSIP) compliant systems and technologies in line with the United States Department of Defence (USDOD) policy (Crowe 1993). The reasoning behind this decision was to force ITS strategy, connectivity and systems economies on various (and very large) government departments. By late 1994 this policy was being criticised and by late 1995 this policy was abandoned (Barry 1995) but the early move to GOSIP compliance meant that government was a good source of to study open information technology and systems architectures due to the direction that was being set in train by the initial adherence to GOSIP and resultant architectures (Cranswick 1992, Doherty 1993).

The type of influence that institutional standard adoption will have is clearly articulated by King et al. (1994) and Piper & Naghshpour (1996) and is seen to have both productive (early adopter & technology push) and counterproductive (innovation & market pull limiting) effects.

Colvin (1993) relates the experiences of a small Australian federal government agency migrating to open systems. Whilst primarily being an office automation environment, the agency, also had a scattering of business applications. Only one of these applications was developed in-house. The remainder were purchased 'off the

shelf and related to generalised requirements like finance and registry functions. Colvin (1993) examined the rationale behind the migration to open systems and the decision made in adopting new technology. All 'off the shelf' applications were abandoned at the time of migration. The reasons behind the migration are examined and some conclusions drawn. Colin finds that the cost of hardware and software maintenance of an ageing ITS can be significantly reduced by the adoption of new open technology. Small organisations that find themselves dominated by office automation applications should also find that moving platforms is cost efficient as training and learning is kept to a minimum due to GUI based software.

Migration planning is very important for success, and users should be included in this process. Small organisations embrace these changes as migration from a proprietary system to a more open architecture and infrastructure forces users to assess their real ITS requirements. The selection of an

“application generation development vendor with a strong multi-platform capability” – pg 325

is important for system success and painless migration. It can be seen from this case study that many of the influential factors in the success of this migration to open systems architectures are boundary contextual and environmental in nature. Business size and structure, resource availability and vendor characteristics and relationship to the organisation are key to this particular case.

Many organisations in the government sector have walked the same road and many have found that ITS management theory did not meet their needs in these more complex and unstable architectural and policy environments. Many government departments have been first in the use of these technologies (as outlined in tables 4.1 – 4.8) while defining non objective management approaches at the same time. These approaches will be examined in greater detail in chapter 5.

4.5 Australian Federal Government Use of Open Systems Architectures

Data that are described within the tables in this chapter section were obtained from MIS Magazine for the periods noted on the tables. In table 4.9 we can see that the Australian federal government was a leader in the use of accepted open systems architecture PC operating systems. The use of these systems, however, remained relatively stable over time.

Table 4.9 - Personal Computing Operating Systems Used by the Australian Government (% of total sites)

OS-PC		May '95	March '96	March '97	June '97
OS/2	GOV	9.8	8.8	8.8	9.9
	PRIVATE	12.6	10.7	10.7	7.8
MAC	GOV	15.4	13.2	13.2	33.1
	PRIVATE	15.4	13.5	13.5	10.9
WINDOWS	GOV	87.1	91.7	91.7	92.7
	PRIVATE	84.7	89.2	89.2	88
UNIX	GOV	No data	6.7	6.7	8.9
	PRIVATE	No data	7.2	7.2	5.9
WIN95	GOV	No data	5.1	5.1	32.8
	PRIVATE	No data	4.9	4.9	32.9
WIN NT	GOV	No data	6.4	6.4	16.9
	PRIVATE	No data	6.6	6.6	16.9
DOS	GOV	No data	no data	98.1	97.7
	PRIVATE	No data	no data	98.1	94.2

OS-PC = PC operating system GOV= government sector PRIVATE = private sector

In table 4.10 we can also see that the government is at the forefront of open systems architecture mainframe operating systems. This figure also remained stable over this period of time.

**Table 4.10 - Mainframe Operating Systems Used by the Australian Government
(% of total sites)**

OS – MF		May '95	March'96	March '97	June '97 CommServ
MVS	GOV	3.7	3.4	No data	No data
	PRIVATE	4.8	4.0	No data	No data
VMS	GOV	16.1	16.7	16.7	28.1
	PRIVATE	16.6	16.4	16.4	14.2
OS/400	GOV	9.8	9.5	9.5	6.6
	PRIVATE	22.9	20.1	20.1	18.7
UNIX	GOV	63.6	63.4	63.4	64.6
	PRIVATE	51.2	52.3	52.3	51.6
IBM AIX	GOV	9.9	8.8	8.8	9.9
	PRIVATE	11.3	10.8	10.8	11.3
UNIXSVR4	GOV	no data	16.5	16.5	10.3
	PRIVATE	no data	9.4	9.4	8.1
OSF/1	GOV	no data	no data	No data	10.9
	PRIVATE	no data	no data	No data	4.0
SUNOS	GOV	no data	no data	15.8	13.9
	PRIVATE	no data	no data	10.8	6.5
HP/UX	GOV	no data	15.8	15.8	16.9
	PRIVATE	no data	11.9	11.9	12.7
SOLARIS	GOV	no data	12.0	12	19.2
	PRIVATE	no data	8.1	8.1	10.8
SCO UNIX	GOV	no data	no data	7.8	No data
	PRIVATE	no data	no data	7.2	No data
Netware	GOV	55.8	55.3	55.3	69.5
	PRIVATE	56.2	59.5	59.5	54.4
PICK	GOV	no data	no data	No data	10.6
	PRIVATE	no data	no data	No data	4.4
WIN NT	GOV	no data	15.5	15.5	28.1
	PRIVATE	no data	12.5	12.5	22.8
MPE	GOV	no data	8.5	No data	No data
	PRIVATE	no data	4.7	No data	No data
MCP	GOV	no data	7.8	No data	No data
	PRIVATE	no data	2.6	No data	No data

OS-MF = mainframe operating system GOV= government sector PRIVATE = private sector

Table 4.11 indicates that the government has set the trend for the use of open systems architecture databases over this period being well ahead of the private sector.

Table 4.11 - Databases Used by the Australian Government (% of total sites)

<u>DBASES</u>		<u>May '95</u>	<u>March '96</u>	<u>March 97</u>	<u>June '97</u> <u>CommServ</u>
DB2/400	GOV	no data	no data	9.5	6
	PRIVATE	no data	no data	20.1	18
SYBASE	GOV	no data	3.1	3.1	6.3
	PRIVATE	no data	2.6	2.6	3.1
RDB	GOV	no data	no data	4.5	7
	PRIVATE	no data	no data	4.1	3
INGRES	GOV	no data	9.7	9.7	10.3
	PRIVATE	no data	5.6	5.6	5.1
ORACLE	GOV	no data	23.0	23.0	25.2
	PRIVATE	no data	12.9	12.9	13.5
INFORMIX	GOV	no data	9.1	9.1	No data
	PRIVATE	no data	5.5	5.5	No data
UNIVERSE	GOV	no data	no data	3.4	No data
	PRIVATE	no data	no data	2.5	No data

DBASES = databases used GOV= government sector PRIVATE = private sector

All tables indicate the Australian federal government's lead in the implementation of open systems architectures over the private sector. This would seem to indicate a level of maturity of open systems architecture implementation in the Australian federal government by the end of the case studies. The case material, discussed in chapter 5, will give a more detailed account of the breakdown and composition of some open systems architectures across a range of organisational types and sizes within the Australian federal government.

4.6 Conclusions

This chapter has provided objective and statistical background material for the discussion of the Australian federal government case analysis in chapter 5. It has been indicated that Australian federal government organisations faced an environment of vast technological change and ambiguity of standards during the period. These organisations maintained open systems architecture stability and modest growth by

utilising the open systems architecture de facto standards of the day e.g. WINDOWS, UNIX and ORACLE.

Chapter 5 will now introduce detailed cases in order to explore some the subjective factors behind this larger picture regarding how these individual organisations managed their open systems architectures and how these differed from the objective view.

CHAPTER 5 - DATA ANALYSIS: Australian Federal Government Case Interpretations of Management of Open ITS Architectures from a Subjective Perspective.

Chapter Overview

This chapter outlines the hermeneutic interpretation of subjective case study accounts from 6 Australian federal government organisations. Case study subjective accounts (see appendices B and D) were documented as a direct result of the administration of a semi-structured interview instrument (see appendix A) as well as the gathering of other organisational artefacts (reports and diagrams) and secondary subjective account materials (media reports and general Federal government reports). These case study texts were then hermeneutically analysed to reveal contextual factors (both obvious and emerging, in section 5.3 of the chapter as explanation sketches) that influence the management of open systems architectures within these case organisations.

These factors and their influence reveal subjective meaning of the management of ITS for these organisations and this chapter then argues that this meaning highlights the limitations of the objective views of open systems architecture management. A tool based model of the IS discipline (developed and adapted by the candidate) is then used to explain how to more effectively view and reveal

meaning of both objective and subjective elements of open systems architecture management.

5.1 Introduction

This chapter details fifteen (15) individual hermeneutic interpretations (section 5.3 – explanation sketches) of fifteen individual subjective accounts (see appendices B and D) within six (6) Australian federal government case studies of ITS management of open systems architecture. Case data was gathered over a period of two and a half years from late 1993 to early 1996 utilising an interview instrument (see appendix A) that was constructed from objective open systems theory and views, as well as Australian government open systems policy (as described in chapter 4). The instrument structure was based on an analysis of objective open systems architecture management factors as well as the Galliers & Sutherland (1991) Revised Stage Theory approach. The instrument was designed to capture information about how these organisations viewed the management of open systems and the contextual variables affecting these architectures within these organisations (strategy, structure, systems, staff, style, skills and superordinate goals).

Interviews were conducted with 15 respondents (key informants who are all senior managers) from 6 different government organisations. Responses came primarily from ITS management (10 male and 2 female) from various areas of the ITS

department. Non-ITS senior management (3 male) who had some form of close interaction with the ITS department were asked to respond, wherever possible, in order to give a balanced organisational view of ITS management concerns. These responses have been included in the data where applicable. It must be noted that these non-ITS managers did not contribute answers to any questions that were of a technical nature.

Whilst 15 respondents across 6 Federal Government organisations does not constitute a statistically valid sample of the population of open systems implementors, it is nonetheless useful to look at these organisations and their respondents in comparison to one another as well as in comparison to the objective open systems management approach (as outlined in chapter 4). These organisations were amongst the top users of open systems technologies (4 were ranked 10th, 11th, 16th and 47th by the MIS top 100 ITS users survey (MIS (1996))). These organisations should be highly relevant (due to these high levels of usage of open systems technologies) in shedding light on how subjective accounts vary or may be reconciled/integrated to the objective theory and views of this period.

Respondents to the study were mostly asked to rank and rate areas of importance to them in each of the questions asked. Ranking and rating were asked for in order to check that both were consistent i.e. while a respondent might rank five issues 1 to 5 they might all be very important. Ranking and rating data did not prove to be entirely forthcoming as most respondents wanted to discuss the merits of their responses rather than how various factors ranked or rated in relation to one another. In the initial comparison to the norm, all responses were therefore treated

as equally important, with the number of times they occurred across cases being used as an indicator of how important they were.

Not all respondents answered all questions due to the technical nature of some of the questions. A respondent could also give more than one answer within each question as “pick lists” created from objective (normative) theory were used to prompt respondents. The number of respondents (N) to each question is given at the top of each Table (see appendix C). Respondents were asked to identify those issues of concern at present (NOW) and in the future (FUTURE).

Whilst each case is disguised to preserve anonymity, appendix B outlines detailed case organisation background information, obtained from the analysis of corporate documents, commentaries, articles and preliminary descriptive analysis of respondent accounts. This case background information was hermeneutically analysed to determine a generic list of obvious contextual factors that were critical in the organisations’ approach to managing their open systems architectures. These are listed in the summary section (5.2.2) of this chapter

It must be stressed that these factors (constructed from a general analysis of appendix B) only represent a point of departure for the analysis as there should be a decipherment of the “hidden meaning” of the text in the “apparent meaning” of the text (Ricoeur 1974) in hermeneutic interpretation. Various other factors did emerge upon analysis of the organisational background and individual background

data. These included: technical, proprietary, social, historical and adaptive factors, which are listed in summary section 5.2.3 of the chapter.

These factors (both obvious and emerging) were then considered within the deeper hermeneutic analysis of each organisation's subjective view of the management of open systems architectures in section 5.3. Appendix D presents individual subjective case account details (implied rationale of management of open systems architectures), which are told in the words of the individual respondents representing relativistic multiple viewpoints within and between each organisation. This data was first descriptively categorised in tabular format (appendix C) and then individual case respondent accounts (appendix D) were hermeneutically analysed within each case organisation to identify elements of agreement and absence of agreement with objective open systems architecture management (see tables 5.2 – 5.3).

The topic subheadings within each case table reflect the outline of the semi-structured interview instrument (see appendix A).

A technology transfer research perspective was then utilised (in section 5.4) in order to better understand the subjective case materials and the nature of the emerging factors and their relevance to such research. Conclusions are then drawn in section 5.5 and these form the basis for the construction of a proposed Perspectival ITS Management Model (figure 6.2) that is to be used to support and supplement current objective research into ITS management within organisations.

5.2 Organisation Contextual Factors - Mutual Contingency of Skills and Tools

When an ITS tool such as an open systems architecture (or its components) is created various features are designed into it, which make assumptions about its intended use (Bunker 2001). In defining skills we mean **technological skill sets but also, outcomes, conceptual expression, building techniques and cultural context**, (as encapsulated by the seven S categories within the Galliers & Sutherland (1991) revised stage theory approach) as these are also important in understanding how and why the tool was made and should be used (Young 1971). In the case of this thesis we can clearly see what these assumed skill sets are in the chapter 4 analysis of the objective open systems architecture and the seven S categorisation of the objective view of open systems architectures (tables 4.2-4.8).

Tool-making assumes skills and ways of life that are transmitted by interpersonal communication and tradition rather than genetics - storytelling, group behaviour, social activities and a sense of historical perspective all contribute to the types of skills that are considered "worthwhile" and are therefore developed. The creator of the tool must also have foresight as to the use of the tool - the process of creating the tool involves knowledge as to the desired outcome of the use of the tool, so here creativity plays a vital role in the process (Young 1971).

Tools are made by a technique that is learned from others and involves symbolic communication (language) - giving meaning to, representing and describing

physical and conceptual tools. This symbolic communication may have various subtleties that an outsider may view as 'alien' and never completely understand, making total understanding of the tool and its functions and associated skills virtually impossible. Tools are also made according to an evolutionary convention (gradual) - software and hardware tools are excellent examples of incremental tool building. Above all, tools are made and used in a cultural context - each organisational or national culture has certain attributes that make it different from others (Young 1971, Ciborra 1998).

Johnson (1997) discusses these same issues from the perspective of four types of value meanings we find within technology. Included are: moral/metaphysical (past intended use of the technology), support (present intended use of the technology), material (in-built characteristics which influence the use of the technology) and expressive values (motivation for use of the technology), all of which contribute to the assumed skill sets required to utilise the technology. It becomes obvious that tool-making is not only technical in nature but is bound by cultural values and an understanding of how the tool has been created for use in an acceptable manner. This understanding reflects a certain level and mixture of skills and Ayres (1978) in discussing his ideas on the theory of economic progress of civilisation states that the

"....absolute mutual contingency of skills and tools is of supreme importance for an understanding of technology as a function of human behaviour" – pg 108.

Skills and technology are bound together as technology is created and used as a result of an assumed skill set that is heavily influenced by core assumptions and values. This relationship between skills and tools is, therefore, critical to our understanding of successful tool creation and use within a given culture and from one culture to another (be it a commercial organisation, ethnic group or nation). The skill sets assumed in the creation, use, inheritance and knowledge of the tools become key to identifying potential for appropriate transfer of the tool from one culture to another (Bennet-Thatcher & Srite 2000, Claver et al. 2001).

Culture not only influences the creation of a tool but in doing so ensures that certain cultural assumptions become built into the tool. This requires the recipient of the tool, in a situation of technology transfer, to have those assumptions as a basis for their value or at the very least a deep understanding of the cultural assumptions underpinning the tool. They must also have the skill sets that are a logical extension of these assumptions (Peled 2001, Bennet-Thatcher & Srite 2000, Claver et al. 2001). An absence of appropriate skills may not be understood or highlighted until well after the tool has been implemented and used for a time.

Time is an essential factor and this situation of delayed technology transfer problems has been described as "emergent bias". Friedman & Nissenbaum's (1996) work on bias in computer systems highlights that emergent bias occurs typically after a system design has been completed and societal knowledge, cultural values or population has changed (time-lag). In the case of this study we can see that the idea of emergent bias may account for the divergence in ideas from the objective to the subjective management of open systems architecture in

the 6 government cases. Time becomes a critical factor in the reconciliation/integration of object and subject. We shall return to this theme in the final section of this chapter (5.5) and again in chapter 6.

5.2.1 Case Organisation Contextual Interpretation

The method of selection of these organisations and informants (research sites) was explained in chapter 3. This selection has also been given weight by the fact that **5 out of these 6 organisations were rated in the MIS Spring, 1996 Top 100 ITS Users list** (MIS 1996). These were Organisation 5 (ranked 10), Organisation 4 (ranked 11), Organisation 1 (ranked 16), Organisation 3 (ranked 47) and Organisation 6 (ranked in the 20 most interesting and innovative users of IS not rated in the top 100).

This list is considered an authoritative examination of

“the operating environment and information technology strategies of the 80 largest information technology and telecommunications using organisations in Australia, plus another 20 whose use of information technology is interesting or noteworthy”. (MIS 1996 – pg 10).

The list is centred on the number of screens as a measure of ITS use within an organisation. This is justified as the most objective measure available as it not only expresses a measure of investment in ITS but also its level of use throughout the organisation. The list also analyses organisations by state location, industry sector,

operating system and DBMS use. Government organisations account for almost half of the list, thus, giving an indication of how important ITS is for this sector.

“This public sector dominance indicates the size of modern government and the importance of information technology in its operations. Governments, even more than the private sector, are driven by information and the need to properly store and manipulate that information.” (MIS 1996 – pg 13).

Respondent demographic data, such as age and length of time in the job, were not captured by the interview instrument used within this research study. In retrospect this may have allowed a greater understanding of the reasons for the respondents attitudes. It must be noted, however, that at the time of this study open systems architectures were mandated Australian federal government policy which, was one of adherence to the GOSIP framework as created by the US Department of Defence.

The ITS departments in each of the case study organisations ranged in size from 4 to 1178 staff and the number of screens (including dumb terminals and PCs) supplied by the ITS department to each organisation ranged from 400 to 20,500. Business activities of these organisations included: Public Administration and Defence (2) Community Services (1) ITS Services (1) and Transportation and Facilities Management (2).

5.2.2 Case Organisation Interpretation - Obvious Contextual Factors Influencing Management of Open Systems Architectures

Table 5.1 represents the more salient features of each organisation. These factors were generated from the initial hermeneutic analysis and interpretation of the case organisational background information (see appendix B). These organisations have been referred to as 1 – 6 to preserve their anonymity as any reference to their business function would make them easily identifiable.

Table 5.1 – Case Organisation Characteristics

Org	Sector	Org Struct	No. Staff	ITS Dept Structure	No ITS Staff	Non-ITS Respond Position	ITS Respond Position	No. Screens	Annual Rev'nue	ITS Dept Budget
1	Transport	Hierarch/dist 8 offices	28,000	Hierarch	650	1) E&M consult	2)Inf. Arch. Director 3) Proj. Director	11,000	600 mill PA	120 mill PA + 120mill *****
2	Transport	Hierarch/dist 8 offices	600	Hierarch	4 (+ 6 cont)		1)CIO 2)ITS Project Manager	400	?	1.4 % of revenue PA
3	Govt Services	Hierarch	*40 govt orgs	Hierarch/ Task	100		1) Dir Corp Plan & Proj	5,000	24.5 mill PA (ITS services ONLY)	**40cPCU ***ECC 24 mill PA
4	Public Admin	Hierarch/dist 25 offices	17,700	Hierarch	1,178	1)Exec Man Corp Proj	2)Exec Man ITS 3)SES Spec ITS 4) Project Manager	18,500	78 bill PA	119 million PA + 120 million *****
5	Comt'y Services	Hierarch/dist 700 offices	16,000	Hierarch	450	1) Div Man	2) Dept Sec Syst 3)Sect Head Plan & Co-ord	20,500	13.6 bill budget PA	102 million PA + 187 mill *****
6	Public Admin	Hierarch/dist 8 offices	3,534	Hierarch	270		1)Chief Exec ITS 2) Dir Tech Appl'ns	3,050	18 mill PA	?

- NOTES:
 ? refers to no data supplied
 * refers to the number of government departments serviced by this organisation
 ** PCU refers to per computing unit
 *** ECC refers to estimated computing costs
 **** 1 off budget allocation of \$120 million over 2 years for architecture upgrade
 *****1 off budget allocation of \$120 million over 10 years for architecture modernisation
 *****1 off budget allocation of \$187 million over 4 years for EUC architecture upgrade

Obvious generic contextual factors that emerge from the hermeneutic interpretation and analysis are:

- **government sector type** (indicative of the importance of ITS in meeting business objectives)
- **organisational structure** (indicative of the cultural context/stability for ITS management)
- **number of staff** (indicative of the size and complexity of the organisation)
- **ITS department structure** (indicative of cultural values and approach to managing ITS)
- **number of ITS staff** (indicative of the size and complexity of the ITS department as well as the allocation of resources to management of ITS)
- **position/role of non-ITS respondent** (highlights effect of position on perceptions of non-ITS management)
- **position/role of ITS respondents** (highlights effect of position on perceptions of ITS management)
- **number of screens** (indicative of diffusion of ITS when used in conjunction with number of staff factor)
- **annual revenue** (or total organisational budget - indicative of the allocation of resources to management of ITS when used in conjunction with the ITS department budget factor)
- **ITS department budget** (or overall percentage of revenue - indicative of the allocation of resources to management of ITS when used in conjunction with the ITS annual revenue factor)

These types of factors have been traditionally used to contextualise ITS management research findings (Galliers 1987a & 1987b, 1991, 1993, 1999). This

chapter looks now at generic emerging factors which come from a deeper hermeneutic interpretation and analysis, that highlight deeper contextual issues which become more evident upon more detailed exploration of the case material (see appendix D and section 5.3 of this chapter).

5.2.3 Case Organisation Interpretation - Emerging Contextual Factors Influencing the Management of Open Systems Architectures

As hermeneutic analysis of the background materials and case accounts progressed, a number of generic emerging contextual factors became evident as being influential on the management of open systems architectures within these organisations at this point in time.

These included:

- **level of use of ITS** (high, medium, low (from overall analysis of case use - indication of technology diffusion and pervasiveness))
- **size of organisation by domestic and global standards** (assists in understanding the context of comparative factors between organisations e.g. differences in ITS use by small, medium and large organisations)
- **culture of privatisation versus public ownership** (indication of drive for cost effectiveness and use of world's best practice philosophies versus mandatory public service provision)

- **immediate history of organisational development** (indicative of in-house cultural factors affecting ITS diffusion, implementation, innovation and use)
- **proportion of ITS staff to general staff** (indication of importance of ITS)
- **level of ITS redevelopment effort** (i.e. special grants relating to open systems architecture are indicative of the level of commitment to open systems architecture)
- **level of focus on cost cutting** (efficiency) through ITS versus process improvement (effectiveness) (indicative of different objective pressures on open systems architectures)
- **level and type of focus on how to fund ITS** (corporate overhead versus user pays may be indicative of relative importance of ITS)
- **overall experience and focus of the ITS executive** (indicative of the characteristic ITS drivers that pervade the organisation)
- **level and focus of development of user awareness of ITS** (indicative of spread of ITS skills and responsibilities to end users)
- **how respondents perceive their organisation and the ITS structure** (level of consistency between respondents may be indicative of cultural and ITS solidarity of vision)
- **ITS department service orientation** (process and systems provision (role) versus service and solutions provision (consulting) indicative of support versus strategic orientation)
- **innovative ITS practices** ((such as strategic alliances) evidence of paradigm shift in the use of ITS))

These factors were considered in the hermeneutic analysis of the subjective account data and are highlighted where applicable in the analysis of the subjective case data in section 5.3 as detailed explanation sketches.

5.3 Case Organisation Interpretation - Subjective Case Account Data (Explanation Sketches)

Individual case subjective *explanandum* (Hemple 1966, Mandelbaum 1967) were conducted, by way of the seven S format categorised using Galliers & Sutherland (1991). This was achieved by interpreting case materials (supplied in the case respondent characteristics (see appendix B) and individual subjective case accounts (see appendix D)) as a vehicle to link and compare the objective and subjective views on the management of open systems architectures. The # symbol is used to indicate where the non-ITS respondent had a HIGH level of agreement with the objective view of open systems architectures.

High Level Analysis

Firstly, comparative tables in appendix C are interpreted into categories of HIGH (67% +), MEDIUM (34 – 66%) and LOW (0 – 33%) agreement (based on number of respondents within each case) with the salient characteristics of open systems architectures (as explained by the analysis of the objective literature and the tables listed in chapter 4). These tables are 5.2 and 5.3 in this chapter.

**Table 5.2 - Factors Affecting Level of Agreement with Objective Literature NOW
By Organisation Number**

Element	Level of Agreement With Normative Literature					
	1	2	3	4	5	6
STRATEGY						
ITS Manager Focus	Medium #	High	High	High	Medium #	High
ITS Application Focus	High	Medium	High	High	Medium	High
TS Business Objectives	Medium	Low	Medium	Medium #	Medium	Low
STRUCTURE						
ITS Department	Low	Low	High	High	Low	Low
ITS Tech Objectives	Medium	Medium	High	Medium	Medium	Medium
SYSTEMS						
OSA Definition	Medium	Low	Medium	High	Medium	Low
OSA Profiles	Medium	High	Low	High	Medium	High
STAFF						
ITS Dept Positons	Low	Low	Medium	Low	Low	Low
STYLE						
ITS Management Characteristics	Medium	Low	High	High	Medium #	Medium
SKILLS						
ITS Skill Sets	Low	Low	High	Low #	Low	Medium
ITS Education & Training	Low	Low	Low	Low #	Low	Medium
SUPERORDINATE GOALS						
ITS Priority Concerns	Medium#	Low	Medium	Medium #	Medium #	Low

**Table 5.3 - Factors Affecting Level of Agreement with Objective Literature FUTURE
By Organisation Number**

Element	Level of Agreement With Normative Literature					
	1	2	3	4	5	6
STRATEGY						
ITS Manager Focus	High #	High	High	Medium	Medium #	Medium
ITS Application Focus	High	High	High	High	Medium	High
TS Business Objectives	Medium	Medium	Medium	Medium #	Medium	Medium
STRUCTURE						
ITS Department	Low	Low	High	Low	Low	Low
ITS Tech Objectives	Medium	Medium	High	Medium	Low	Low
SYSTEMS						
OSA Definition	Medium	Low	Medium	High	Medium	Low
OSA Profiles	Medium	High	Low	Medium	Medium	High
STAFF						
ITS Dept Positons	Low	Low	Medium	Low	Low	Medium
STYLE						
ITS Management Characteristics	Medium	Medium	High	High	Medium #	Medium
SKILLS						
ITS Skill Sets	Low	Medium	High	Low #	Low	Medium
ITS Education & Training	Low	Low	Low	Low #	Low	Medium
SUPERORDINATE GOALS						
ITS Priority Concerns	Low	Low	Medium	Medium #	Low #	Low

As we can see by this analysis there is little agreement with the objective view of open systems architecture especially in organisations 1,2,& 6 now as well as 1 & 6 in the future. There was also little in common between organisations regarding levels of agreement (HIGH, MEDIUM, LOW) except in relation to ITS staff positions where there appeared to be a unified ambivalence. Organisational and

individual subjective accounts (appendices B & D) were then interpreted to highlight obvious and emergent factors for each case organisation in order to explain why there is a general lack of agreement with the objective view and with each other in the management of open systems architectures (as outlined in section 5.3 of this chapter). What follows in this chapter is a deeper level hermeneutic analysis of each individual case account (and each respondent within each organisation). This section follows the hermeneutic analysis of appendix B for obvious contextual factors and appendix D for emerging and individual respondent perspectives.

5.3.1 Case Organisation 1

Obvious Contextual Factors

At the time of this study Organisation 1 was within the transportation sector of the Australian federal government and had a hierarchical//distributed organisational structure of 28,000 employees and revenue of 600 million dollars p.a. The ITS department was also hierarchical in nature with 650 employees who were responsible for the delivery of ITS systems via 11,000 screens. This department had a budget of 120 million dollars p.a. plus a one-off 120 million dollar allocation over a 2 year period for an architectural upgrade. Respondent 1 was a non-ITS manager whose role encapsulated that of Engineering and Maintenance (E& M) Consultant. Respondent 2 was an ITS manager whose role was that of Information Architecture Director. Respondent 3 was an ITS manager with the role of Project Director.

Emerging Contextual Factors

Organisation 1

- had a mission of cost effective and safe transportation for customers
- had a high use of ITS (16th on the MIS list of top users of ITS))
- was a large organisation by global standards
- was undergoing privatisation
- had a high ITS staff to general staff ratio
- had a traditional organisational structure
- had high organisational revenue but large "bottom line" losses
- had a high ITS spend
- had a diverse core technology (2 separate systems)
- had a large redevelopment effort underway utilising open systems standards
- found that rationalising these systems was difficult
- found that their attitude to the efficient use of ITS was coloured by "bottom line" losses
- the ITS Chief Executive (CIO) influenced the perception of ITS and his focus is on: ITS being internally oriented; influenced by previous experience of cost reduction; customised service measurement of IT benefits and performance; ITS alignment to strategy; ITS being vital to business operations; the need for lower ITS technology costs; the need for a high spend on ITS people, and the combining of an existing ITS department with an already established consulting arm.

Organisation 1 (Respondent 1) - Engineering and Maintenance (E&M)
Consultant

- reports to the CIO and therefore may be influenced by his views
- assists non-ITS staff and departments to integrate with the ITS architecture
- has no staff reports and is therefore less bound by organisational conventions
- has knowledge of business/ITS cycles
- is focussed on EUC issues in open systems architectures
- is focussed on the lowering of productivity from the open systems architecture implementation

Organisation 1 (Respondent 2) - Information Architecture Director

- reports to the CIO and therefore may be influenced by his views
- has a standards and policy orientation and may be influenced by open systems (objective) standards
- is oriented towards architectural solutions
- has 5 staff reports and so may be more bound by organisational conventions
- has a business appreciation
- is an open systems architecture “salesman”
- is focussed on lowering the ITS spend
- is appreciative of the unknown impact of open systems architecture development (from legacy systems)
- has a traditional view of open systems architectures

Organisation 1 (Respondent 3) – ITS Project Director

- reports to the Systems Development Director and may be influenced by his views
- has multiple project skills which are influential in his views of ITS
- has 40 staff reports and may be bound by organisational conventions
- has a technical orientation
- is an open systems architecture “salesman”
- is focussed on lowering the ITS spend
- thinks that open systems architectures are important (drives user acceptance and integration)
- thinks that the ITS department will become less important due to open systems architecture implementation
- feels that there should be effort to raise the profile of ITS staff as a result of the open systems architecture implementation

5.3.2 Case Organisation 2

Obvious Contextual Factors

At the time of this study Organisation 2 was within the transportation sector of the Australian federal government and had a hierarchical//distributed organisational structure of 600 employees. The ITS department was also hierarchical in nature with 4 employees (+ 6 contractors) who were responsible for the delivery of ITS

systems via 400 screens. This department had a budget of 1.4% of revenue p.a. (which was not stated). Respondent 1 was an ITS manager whose role was that of the Chief Information Officer. Respondent 2 was an ITS manager with the role of Project Manager.

Emerging Contextual Factors

Organisation 2

- had a mission of cost effective management of and equitable access to transport facilities
- had a low use of ITS
- was a small organisation by global standards
- was undergoing privatisation (privatisation, rationalisation of ITS and resultant rise in productivity all put pressure on the open systems architecture)
- had a small ITS staff to general staff ratio
- had a traditional organisational structure but was moving to a matrix structure
- highlighted that respondents 1 & 2 see the ITS department organisation differently
- had a low ITS spend (which was seen as very positive)
- had a large redevelopment effort underway (systems rationalisation) utilising open systems standards
- found that systems must pay and be strategic for a +ve reaction from users

- had a user-pays philosophy towards ITS
- found that their attitude to the efficient use of ITS was coloured by “bottom line” improvement and the ITS expense containment challenge
- the ITS Chief Executive (CIO) influenced the perception of ITS (his focus and experience is on user awareness and education to influence the responsibility for ITS cost and use (user-pays) and that the users do not like this. All of this relates to new technology applications which would become more successful over time as users become educated).

Organisation 2 (Respondent 1) – Chief Information Officer

- reports to CEO and therefore may be influence by his views
- is responsible for project based staff management and reporting, ITS services and the ITS strategic plan as well hardware, software and communications architectures (has business as well as technical ITS skills)
- has limited staff reports and is therefore less bound by organisational conventions
- has an internal to ITS focus
- thinks that applications are essentially support/factory in nature
- has a user-pays orientation to ITS
- thinks that technology is central to an open systems architecture platform
- is focussed on the mainframe to client server development through open systems architectures
- thinks that as a result of open systems architectures the user/vendor relationship is critical

- thinks that open systems architectures require a balanced skill outlook for ITS
- feels that contract negotiation skills are important for ITS due to outsourcing trends

Organisation 2 (Respondent 2) – Project Manager

- reports to CIO (technical support) and therefore may be influence by his views
- has a helpdesk orientation and sees this as being integrated and connected to other ITS functions through expertise
- has a budget and planning orientation (project management skills)
- has no staff reports and so may be less bound by organisational conventions
- has an external to ITS orientation
- has a user orientation (sees value in open systems architectures which includes, EUC platforms and function, project management issues and service level agreement implications)
- has a user-pays orientation
- is management skill focussed as a result of open systems architectures
- sees the need for a balanced workload between ITS and the end users (roles and workload)
- sees the ITS manager as an informational decision-making role

5.3.3 Case Organisation 3

Obvious Contextual Factors

At the time of this study Organisation 3 was within the government services sector (a consulting group) of the Australian federal government servicing 40 government agencies. It had a revenue of 24.5 million dollars p.a. (ITS services only). This organisation was responsible for the delivery of ITS systems via 5,000 screens. This organisation had a staff of 100 ITS professionals in a hierarchical/task organisation structure with a budget of 120 million dollars p.a. plus a one-off 120 million dollar allocation over a 2 year period for an architectural upgrade. The only respondent was a ITS manager whose role encapsulated that of Director of Corporate Planning and Projects.

Emerging Contextual Factors

Organisation 3

- had a mission of providing cost effective common ITS services on a competitive basis to itself as well as other government agencies
- was influenced by its recent organisational history (amalgamation of the branches of three former government departments each of which already had experience in providing ITS services)
- had a mixed organisational culture due to the overall role structure BUT task orientation of its business (management and support teams to multiple agencies)

- had a high use of ITS (47th on the MIS list of top users of ITS))
- had a high revenue but also a high ITS spend (neutral use of funds)
- was a small organisation by global standards
- was undergoing privatisation and commercialisation which was a radical departure from past practices (cost effective and competitive ITS delivery, high service and customer satisfaction levels, total quality management)
- was consulting oriented
- was management committee driven
- had a history of innovation and leadership in ITS in government
- had a diverse core technology with a redevelopment effort underway utilising open systems standards
- had multiple service offerings over multiple platforms (consultant focus)
- had strategic alliances (consultancy)

Organisation 3 (Only Respondent) - Director Corporate Planning and Process

- has a project planning orientation (multi-skilled)
- has no staff reports and is therefore less bound by organisational conventions (however this is in line with the consulting culture of the organisation)
- sees the value in ITS and client service
- sees the need for cost justification of ITS to clients (more EUC)
- is focussed on technical client/server aspects of open systems architectures (data management)
- is business oriented

- is outsourcing oriented
- feels that cheaper ITS means a backlog of projects
- is focussed on legacy integration issues
- is client management focussed (facilitation of communications with a sales and marketing view)

5.3.4 Case Organisation 4

Obvious Contextual Factors

At the time of this study Organisation 4 was within the public administration sector of the Australian federal government and had a hierarchical//distributed organisational structure of 17,700 employees and revenue of 78 billion dollars p.a. The ITS department was also hierarchical in nature with 1,178 employees who were responsible for the delivery of ITS systems via 18,500 screens. This department had a budget of 119 million dollars p.a. plus a one-off 120 million dollar allocation over a 2 year period for an architectural upgrade. Respondent 1 was a non-ITS manager whose role encapsulated that of Executive Manager, Corporate Projects. Respondent 2 was an ITS manager whose role was that of Executive Manager ITS. Respondent 3 was an ITS manager with the role of Strategic Enterprise Systems (SES) Specialist in ITS. Respondent 4 was an ITS manager with the role of ITS Project Manager.

Emerging Contextual Factors

Organisation 4

- had a mission of collecting revenue, properly payable, so as to fund services and support for the people of Australia
- had a high use of ITS (11th in the MIS survey of ITS users and 3rd largest in the Federal Government))
- was a large organisation by global standards
- had a high ITS staff to general staff ratio
- had a traditional organisational structure
- had high organisational revenue but is revenue oriented in its business objectives and role
- had a high ITS spend
- had a large redevelopment effort underway (modernisation) utilising open systems standards which promised a single integrated ITS architecture accessible from anywhere
- found that redeveloping these systems was a long process
- was training oriented
- was strategic planning oriented (communication to organisation)
- had an EUC orientation which was important for communication of ITS security issues to general staff
- was not historically innovative (but modernisation has changed this view)
- had its ITS organisational structure in transition

Organisation 4 (Respondent 1) – Executive Manager Corporate Projects

- reports to the CEO and therefore may be influence by his views
- has no staff reports and is therefore less bound by organisational conventions
- had a business focus
- feels that staff are unsophisticated users of ITS
- sees the efficiency and effectiveness benefits of ITS (business analysis)
- feels that interpersonal skills become important as a result of open systems architectures
- is user oriented
- will consider new business approaches

Organisation 4 (Respondent 2) – Executive Manager ITS

- reports to CEO and therefore may be influence by his views
- has a technical orientation and may be influenced by open systems (normative) standards
- is oriented towards user support and training
- has 7 staff reports and so may be more bound by organisational conventions
- is responsible for 1200 staff in his group across 3 areas of impact (operation and functionality of ITS infrastructure and staff contracts and training)
- has a business/technology focus
- feels that users are uneducated in the ways of ITS and open systems architectures
- is focussed on lowering ITS and business costs

- is data focussed
- is supplier management oriented
- is ITS contract management oriented
- feels that ITS management should be communicating a vision of ITS
- is multi-vendor oriented (open systems architectures)
- feels that standards education is necessary

Organisation 4 (Respondent 3) – SES Specialist ITS Position

- reports to the executive manager ITS and may be influenced by his views
- has leading edge open systems knowledge which may influence his views on open systems
- has open systems committee and thought leadership roles which may influence his views on open systems
- has no direct staff reports but sees himself as stabilising the open systems architecture within the organisation through his knowledge and management of open systems architectures
- is business and technology focussed
- feels that there needs to be EUC management and understanding of open systems architectures (user requirements)
- is focussed on lowering ITS costs
- feels that the organisation is in a state of flux
- feels that the transition from legacy to open systems architectures is a painful one
- is an open systems architecture “salesman”

- sees the need for open mind sets for open systems architectures
- recognises a requirement for ad hoc skills and education for open systems architectures

Organisation 4 (Respondent 4) – ITS Project Director

- reporting line is disrupted by the ITS department restructuring effort (see figure B.8) and a move from the Melbourne office to the Canberra office was a culture shock for her
- has multiple project skills which are influential in her views of ITS
- has a technical orientation
- has 5 staff reports and may be bound by organisational conventions
- sees the need for a business orientation now and a technical orientation in the future
- recognises requirements for off-the-shelf or outsourcing applications
- feels that the organisation is in a state of flux
- is technically oriented (data – EDI)
- sees open systems architectures in terms of EDI applications
- recognises open systems architectures as a business enabler
- but also recognises that open systems architectures are just another application

5.3.5 Case Organisation 5

Obvious Contextual Factors

At the time of this study Organisation 5 was within the community services sector of the Australian federal government and had a hierarchical//distributed organisational structure of 16,000 employees and budget of 13.6 billion dollars p.a. (service NOT revenue driven). The ITS department was also hierarchical in nature with 450 employees who were responsible for the delivery of ITS systems via 20,500 screens. This department had a budget of 102 million dollars p.a. plus a one-off 187 million dollar allocation over a 2 year period for an architectural upgrade. Respondent 1 was a non-ITS manager whose role encapsulated that of Division Manager. Respondent 2 was an ITS manager whose role was that of Department Secretary, Systems. Respondent 3 was an ITS manager with the role of Section Head, Planning and Co-ordination.

Emerging Contextual Factors

Organisation 5

- had a mission of getting people into jobs and reducing unemployment
- had a high use of ITS (10th on the MIS list of top users of ITS and the 5th largest government user))
- was a large organisation by global standards
- had a high ITS staff to general staff ratio

- had a traditional organisational structure
- is moving from a devolved organisational structure to reasserting management in the organisation (disruptive)
- had high organisational budget with a customer service orientation
- had a high ITS spend (pressure to lower this spending)
- had a diverse core technology with a mainframe oriented culture
- had a large client/server redevelopment effort underway to negate disparate systems
- found that there was a lack of effective technology standards
- found a lack of consistency in the user interface
- has spent a lot of money on special projects
- has multiple consulting efforts required for these special projects

Organisation 5 (Respondent 1) – Division Manager

- reports to the CEO and therefore may be influence by his views (former head of Social Security)
- assists area managers with ITS (consultant role)
- has 26 staff reports and therefore may be bound by organisational conventions
- has a business focus and sees the need for business skills
- feels that systems integration is important
- feels that efficiency and effectiveness of open systems architectures is important
- sees the need for mixed ITS skills for open systems architectures

- recognises the need to move from proprietary to open systems architectures skill sets
- is focussed on the need for ITS/business and business/ITS appreciation
- appreciates that business needs should be met by ITS and specifically open systems architectures

Organisation 5 (Respondent 2) – Deputy Secretary Systems

- reports to the CEO and therefore may be influence by his views (former head of Social Security)
- has a technology and management orientation
- has 4 staff reports in higher level management and so may be more bound by organisational conventions
- has an ITS focus
- feels that systems integration is important
- feels that open systems architectures has resulted in a short-term loss of ITS expertise
- feels that ITS applications are visibly support but invisibly strategic in nature
- is focussed on efficiency and effectiveness of ITS
- recognises the complex nature of the mainframe to client server migration
- is an open systems architectures “salesman”
- feels that the ITS department need more business and communications skills
- feels that open systems architecture and networking skills are also required

Organisation 5 (Respondent 3) – Section Head, Planning and Co-ordination

- reports to the Deputy Secretary, Systems and may be influenced by his views (formerly in management ITS within the Immigration Department)
- is ITS planning and management oriented (is involved in most ITS projects)
- has an ITS training orientation
- has 3 staff reports at lower level management and may be bound by organisational conventions
- has a balance of ITS and business orientation
- feels that applications are support oriented in nature
- is focussed on efficiency and effectiveness of ITS
- recognises the complex nature of the mainframe to client server migration
- feels that open systems architectures are based on de facto standards
- is an open systems architectures “salesman”
- sees the need for diverse ITS technical skills for successful open systems architectures

5.3.6 Case Organisation 6

Obvious Contextual Factors

At the time of this study Organisation 6 was within the public administration sector of the Australian federal government and had a hierarchical//distributed organisational structure of 3,534 employees and revenue of 18 million dollars p.a. The ITS department was also hierarchical in nature with 270 employees who were

responsible for the delivery of ITS systems via 3,050 screens. This department did not divulge their budget. Respondent 1 was an ITS manager whose role was that of Chief Executive ITS. Respondent 2 was an ITS manager with the role of Director of Technical Applications.

Emerging Contextual Factors

Organisation 6

- had a mission of assisting and encouraging informed decision making, research and discussion within governments and the community, by providing a high quality, user oriented and dynamic statistical service
- had a moderate use of ITS
- was a medium sized organisation by global standards
- had a high ITS staff to general staff ratio
- had a traditional organisational structure
- had moderate organisational revenue
- had a neutral ITS spend
- had a large desktop enterprise architecture
- had a midrange systems dominance
- was an early leader in WWW development
- was attempting to move all ITS staff under one command
- was attempting to break a stodgy and non-innovative image

Organisation 6 (Respondent 1) – Computer Services Division Chief Executive

- reports to the organisation CEO and therefore may be influenced by his views
- has a management and technical orientation and may be influenced by open systems (normative) standards
- is responsible for 220 staff and so may be more bound by organisational conventions
- feels that ITS management should have a business/ITS focus
- is focussed on lowering the ITS spend
- feels that ITS applications are factory/support in nature as users don't understand them
- is focussed on open systems architectures for business applications
- sees the requirement for a mixed technical focus for the delivery of the open systems architecture
- feels that the ITS manager should sell the ITS vision
- recognises that the ITS department should communicate with users directly

Organisation 6 (Respondent 2) – Director of Technical Applications

- reports to the Computer Services Division Chief Executive and may be influenced by his views
- is responsible for user support (management and service oriented)
- has 15 staff reports and may be bound by organisational conventions
- is business/client focussed
- is focussed on lowering the ITS spend

- feels that ITS has a bureau mentality
- sees the need to deliver technology to users
- recognises the need for a client oriented ITS leader/manager
- sees the need for a mix of business/technical skills to deliver open systems architectures successfully
- recognises that there needs to be ITS and EU staff development in open systems architecture implementations

5.4 Discussion

If we read tables 5.2 and 5.3 in conjunction with the obvious and emerging factors in each case organisation we can begin to understand why there is a lack of agreement with the objective view of open systems architecture management and with each other.

For example, Organisation 1 has a MEDIUM-LOW level of agreement both NOW and in the FUTURE with objective open systems architecture views (except where the non-ITS respondent has a HIGH level of agreement – see # symbol) as well as a spread of levels of agreement with the other organisations regarding the management of open systems architectures.

If we look at the obvious contextual factors at play within this organisation and how these might influence the level of agreement we can see that the large and complex nature of the organisation, the large number of ITS staff supporting a

high level of ITS usage (with a high budget) might drive the organisation to a “bread and butter” functional approach to ITS management when combined with the history of “bottom line” losses that the company has sustained. This is especially important in the drive to corporatisation that the organisation is undergoing. These factors all contribute to the ambivalent attitude that this organisation has to open systems architectures.

In another company the same combination of factors may well have contributed to a “gung-ho” attitude to embracing the newly mandated architecture, however the historical losses combined with the drive to corporatisation here negated this effect.

The fact that Organisation 1 was also driven by cost effective use of ITS (whilst having a large investment in technology) and was also in the process of merging 2 separate ITS architectures (which was proving difficult) would also add to the overall ambivalence to objective perspectives on open systems architectures.

If we drill deeper into an interpretation of individual accounts (see appendix D) we can see that there is a “trickle down” management effect of the CIO’s views on ITS management to those respondents who were interviewed. Perspectives such as ITS internal orientation, cost reduction, customised service, measurement of ITS performance, strategic alignment from a business point of view, low cost ITS with an investment in people are evident across all 3 respondents accounts of open systems architectures within Organisation 1.

To illustrate this point an example is given from Organisation 1 utilising Hemple's explanatory account approach. Explanation sketches (Hemple 1966) combined with relativistic interpretations (Mandelbaum 1967) utilising an "ideal" statement/theory (*explanans*) and then "actual" description (*explanandum*) are a useful vehicle to link and compare the positivist and relativist views of the objective and subjective management of open systems architecture.

Explanans - The ideal open systems architecture development direction sees vendor independent, interoperable (I), connected, portable (P), scalable (S), flexible (due to IP + S), easily controlled (due to IP + S) and simple systems solutions (due to IP + S) (see tables 4.1 and 4.4 for details).

Explanandum – (derived from Case Organisation 1 interview transcripts-see appendix D) - The state of the ITS architecture at the time of the interviews was outlined at length and the following information technology was identified as core. *Operating systems* included MS-DOS (assuming migration to Chicago) and UNIX. *GUIs* included Microsoft Windows and Motif. *Networking* technologies are TCP/IP, X.25 and Ethernet. *Databases (relational)* were DB2 and Ingres (may migrate to Oracle) whilst *open systems architecture frameworks* that were used were Common Applications Environment (X/OPEN) and POSIX (IEEE). These types of technology were chosen as part of the open systems architecture approach due to their fit with the environment of this organisation. They also met the current business needs, were of reasonable cost with vendor support and they worked towards a long term architecture. The vendors who developed and supported them also looked like being in business in the long term. *Respondent 3* highlighted the importance of MVS, UNIX and Teradata operating systems both now and in the future while de-emphasising database programs such as DB2, Ingres and Teradata for the success of the open systems architecture in this organisation.

Interpretation – (based on the list of criteria in tables 4.1 and 4.4 as well as the obvious and emergent factors listed for this organisation in section 5.3.1) On the surface we can see from the information given by the respondents that there is convergence with the objective view of an open systems architecture as communications, operating systems and GUIs are part of the standard

profile of this organisation as well as minimal cost of ITS and the migration of proprietary systems to open systems (influenced by business sector, organisational structure, number of staff and screens as well as available ITS budget). Upon deeper hermeneutic analysis of over-riding organisational factors and individual accounts, we can see that there is a divergent subjective view in the reasons given for the open systems architecture (fit with the environment as well as the requirement for vendor support of the open systems architecture of this organisation). This is also possibly due to the same factors influencing convergence but also because of the historical factors at play such as the new executive manager's (IT) experience with the previous organisation and the necessity to ready the organisation for privatisation (based on the previous executive manager's experience).

The above analysis represents one example of the interpretation of these factors for Organisation 1. There could also be many others. The intent in providing this example is to illustrate how many different subjective views are derived during the process of hermeneutic analysis. If we also compare the overall results of the subjective case analysis data to the Open Systems Architecture Revised Stages of Growth Model (table 4.1) then these variations would indicate that many of these organisations have a long way to go to achieve a reasonable level of agreement with the overall normative ideal of open systems architectures. We must the ask the question, is convergence with the objective view of open systems architectures necessarily what these organisations should aim for (as per the mainstream views within the literature) ?

How can we best explain, understand and effectively utilise the variations in agreement from the objective theory and "best practice" approaches that were

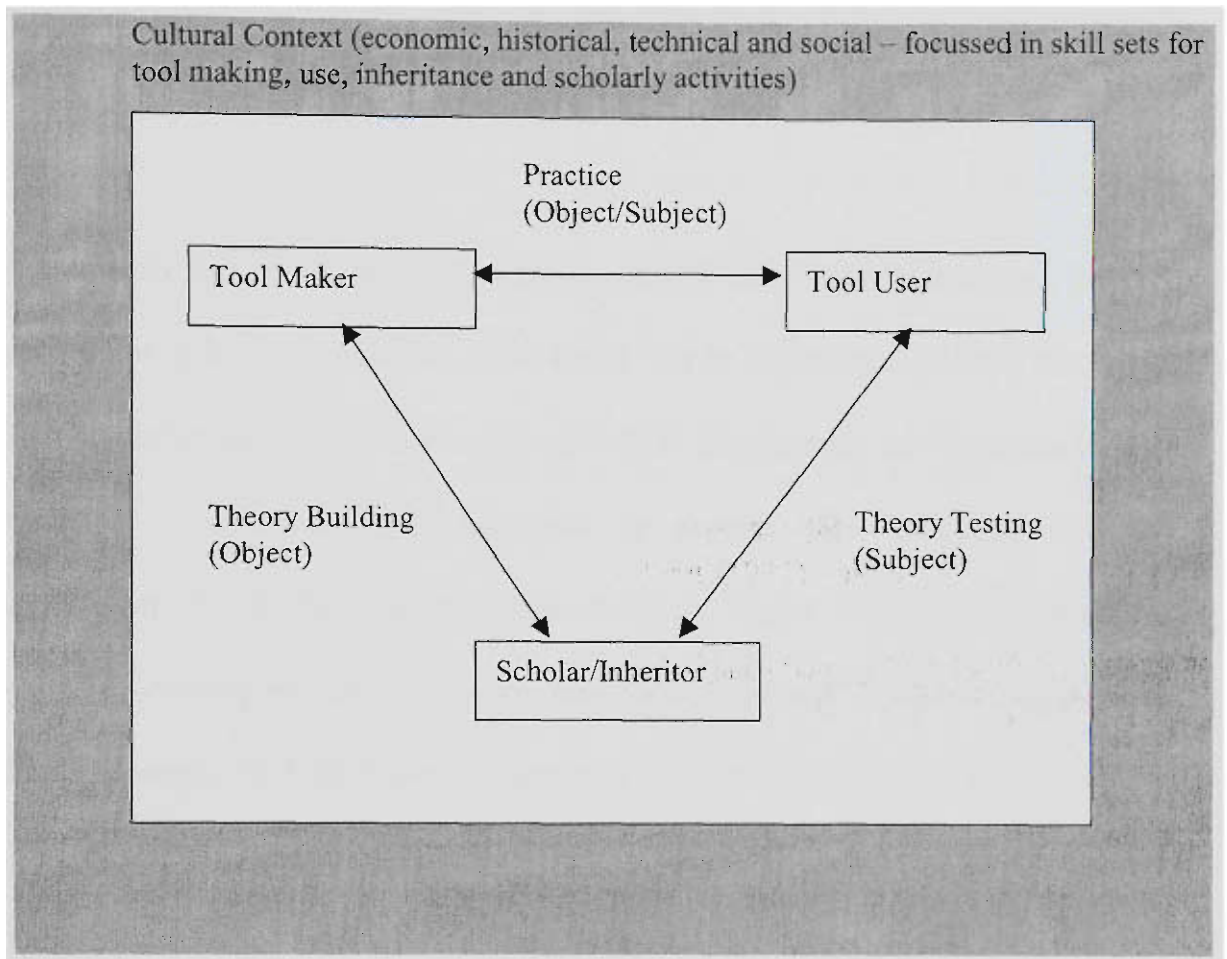
advocated for the successful management of open systems architectures within the Australian federal government ?

5.5 Limitations of Objective Views of Opens Systems Architecture Management - (Tool Based Model of the IS Discipline)

From the analysis in section 5.3 it is clear that complex organisational environments and the effects of systems architecture implementations magnify (in relative ways) the limitations of the objective ITS management models, theories and approaches as evidenced by the convergence and divergence with objective theory (see tables 5.2 & 5.3 and appendix D). There are significant levels of disagreement within, and across cases with the objective views of open systems architecture management that are influenced by subjective contextual factors of each organisation.

In utilising the idea of tools being created within a specific context (as outlined in section 5.2) it is argued that the IS Discipline can be represented by a tool focussed model which better explains the complexities of objective and subjective views. In this model three entities play a role; the Tool Maker (creates the ITS object), the Tool User (utilises ITS in a subjective manner), the Scholar/Inheritor studies (the object/subject relationship) and inherits the discipline (see figure 5.1 adapted from Bunker & Dean 1997).

Figure 5.1 – The Disciplinary Model
 - adapted from Bunker & Dean (1997) – pg 4



The Tool Maker is the entity responsible for the physical manifestation of the tool (the object). The Tool User takes the tool and applies it for the advancement of practice or theoretical purposes (the subject). The Scholar/Inheritor studies tool making and use and attempts to understand the domain of knowledge and skill that enhances the tool creation and use (object/subject) as well as learning from the creation, use and understanding of the tool (subject/object). Each of these roles can be discrete in nature or combined in an individual. These three roles interact within a context that encompasses and reflects cultural factors that influence the way the tool is being built, used, studied or understood. This model can be applied to the definition of any discipline, not just ITS. Context plays an important role in

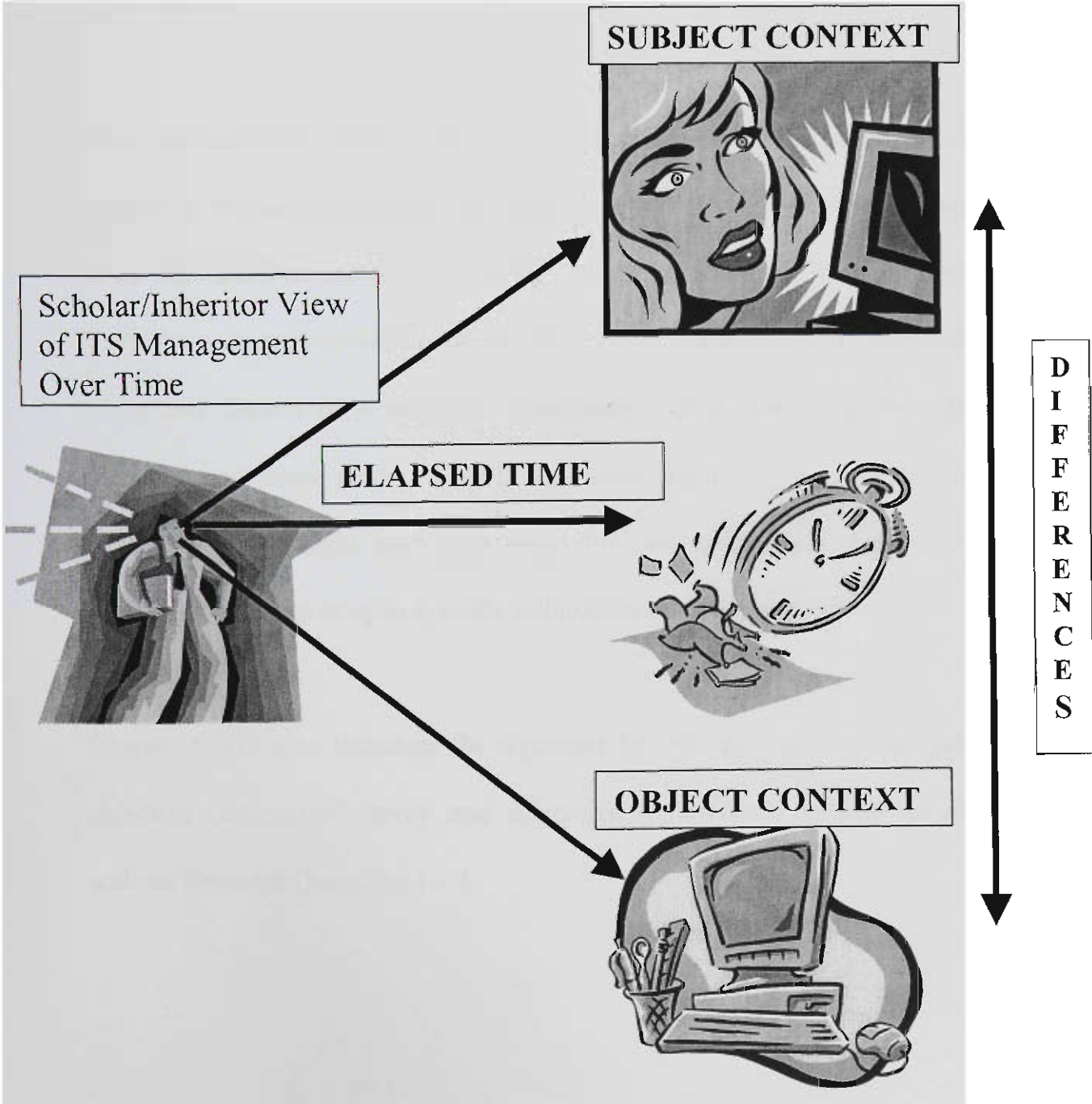
the application of this model to ITS as it is context which defines the paradigmatic assumptions which underpin the discipline. The economic, historical, technical, and social values within the culture are focussed in skill sets for tool making, use and scholar/inheritance activities.

If we apply this model to the discipline of ITS then Tool Makers can be ITS vendors or in-house developers. Tool Users can be organisational staff members, Scholars/Inheritors can be academics or R & D departments in organisations and students, organisational staff members or anyone who learns through the application of ITS. These descriptions are by no means exhaustive. Academics, vendors, developers, organisational staff members and students could also, simultaneously, be Tool Makers, Users and Scholar/Inheritors. As we can see by these examples, any entity can take on any or all of these roles in almost any combination. The roles themselves have in-built assumptions but are not necessarily discrete in nature. The IS Disciplinary Model analyses 3 roles in the process of tool creation and this gives us greater insight into the role of tool making and use as well as highlighting how tools are used, studied and inherited within a context. An analysis of the context of the development of ITS tools will serve to highlight the underlying values and assumptions of this worldview, which in turn affect the skills required to effectively make, use, inherit and study these tools.

The context of ITS tool creation reflects a number of important considerations for researchers. All tools have technical, proprietary, social, historical and adaptive characteristics. All of these characteristics may affect the implementation and use

of ITS that have been created by one culture for use within another. Time also plays an important part in this in the reconciliation/integration of object and subject (Haynes (2001a). As was previously mentioned the contextual differences between Tool Maker and User may not be evident until some time has elapsed (emergent bias) as the contextual factors become more obvious in object/subject reconciliation/integration. Diagram 5.1 represents the effect of time on reconciliation/integration of object and subject.

**Figure 5.2 – The Effect of Time
With Regard to Object/Subject Reconciliation/Integration**



The context of ITS tool development over time, therefore, influences the structure and intended use of these tools as well as the skill sets required for effective use. This model brings the convergence and divergence of the objective and subjective management of open systems architecture within this study into sharp focus and assists us to understand why there are differences in the objective and subjective understanding of open systems architecture management.

5.6 Conclusions

This chapter has provided subjective background and detailed analysis of the 6 Australian federal government case study organisations. It has been indicated that these organisations showed marked differences in agreement from the objective open systems architecture ideals and that these differences were attributable to contextual factors of a technical, proprietary, social, historical and adaptive nature. A tool based model of the IS Discipline (figure 5.1) was then utilised to explain how we might more effectively view and make sense of objective and subjective elements of open systems architecture management.

Chapter 6 will now introduce the argument for the integration/reconciliation of objective (normative) theory and subjective (relativistic) practice which will address Research Questions 1 – 3.

“...it is unfortunate that in order to help make sense of what is a complex, socially constructed world, academics and practitioners have created “cartoon” explanations of the realities they perceive – and the concept of knowledge is here included, as data has been accorded the status of knowledge”- Tom Butler (2000) – pg 1465.



CHAPTER 6 – DISCUSSION AND CONCLUSION

Chapter Overview

This chapter restates the research questions, problem and approach addressed by this thesis. It then goes on to discuss the importance of phenomenological views regarding the reconciliation/integration of object/subject with regard to the current limitations of objective ITS management theory. The chapter then proposes a perspectival ITS management model which addresses the issues surrounding the major research findings.

6.1 Research Problems, Questions, and Approach

This thesis focuses on the following research problem:

ITS management is a complex issue which organisations have grappled with as ITS has become more strategic and less operational in nature. New directions in systems architecture such as open systems, have magnified this complexity and the subjective nature of ITS management i.e. each organisation represents a different ITS management context. Approaches to ITS management to date, however, have been predominately objective character and positivist in orientation. A more subjective perspective (with a relativist orientation) may be helpful in providing a better understanding of the ITS management process, thus ensuring more successful management, planning and control of ITS for individual organisations.

The research problem was to investigate the objective approach to the management of open systems architecture boundary context issues using the Galliers & Sutherland (1991) Revised Stage Theory Approach (7 S's - strategy, structure, systems, staff, style, skills and superordinate goals) as well as the proposed open systems architecture models of the day, and compare this to the subjective approach to management of open systems architecture in the Australian federal government from 1993 - 1996. This investigation was conducted in order to see if the three research questions could be satisfactorily answered.

Research Question 1

Do existing objective ITS management models, theories and approaches, adequately reflect an understanding of the ITS management process?

Research Question 2

Do complex organisational environments and the effects of systems architecture implementations magnify (in subjective and relativistic ways) the limitations of the objective ITS management models, theories and approaches?

Research Question 3

Should the ITS management model be modified to incorporate a more subjective perspective of how to manage ITS? Would this modification enhance our understanding of ITS management?

In order to better understand the nature of the problem an ITS Management Model (adapted from Bunker 1994) was created (see figure 2.1) similar to other models of the day, and this was further developed over the period of the study. Galliers & Sutherland (1991) was seen as a useful categorisation of the boundary context issues

affecting open systems architecture management. Objective approaches to ITS management and in particular open systems architecture management were developed as an extension of the literature (both academic and management press) which were indicative of the objectivist understanding of the topic (management of open systems architecture).

Subjective approaches to open systems architecture management were then investigated and recorded using case studies of 6 Australian federal government departments. These cases expressed the subjective (relativistic) understanding of the topic (management of open systems architecture). The hermeneutical analysis resulting in explanation sketches (section 5.3 and following) was used as a vehicle to discuss subjective views regarding objective approaches to open systems architecture management.

6.2 Reconciliation of Object and Subject

As a result of the analysis of the 6 case study organisations the major conclusion which has been drawn from this study highlights the number of subjective (context specific) perspectives of open systems architecture management that are reflected by these cases (and the individual respondents within each case - see section 5.3). The study illustrates the need to reconcile the object or objective model of open systems

architecture management with the subject or subjective management of open systems architectures in order to illuminate the effective management of ITS from multiple perspectives.

Integration/reconciliation of object and subject is not meant in the reductionist sense. Useful reductionist views to object/subject integration/reconciliation of ITS management and development, are evident in recently emerging philosophical approaches (as outlined in chapter 2).

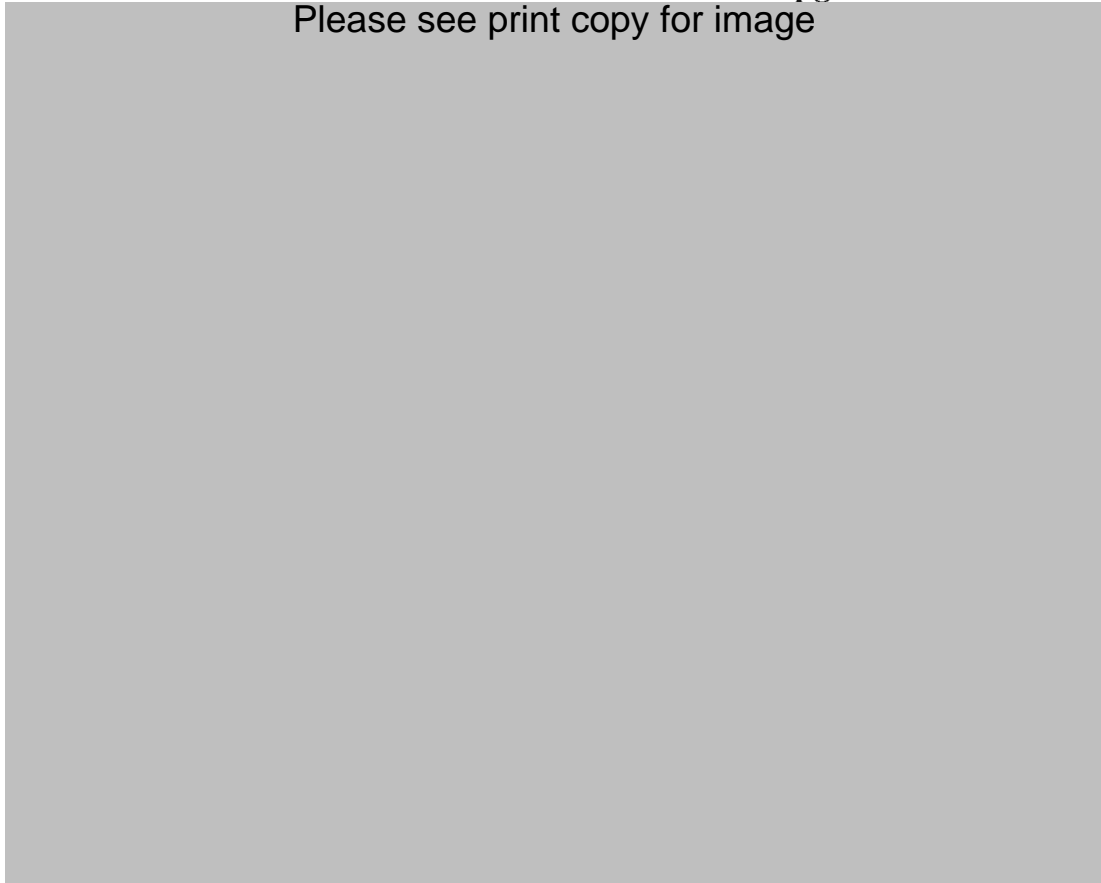
Chapters 4 & 5 of this thesis have respectively outlined the objective and subjective implementation of open systems architectures within the Australian federal government. In order to make sense of this analysis this chapter will now concern itself with the theoretical and practical issues of reconciling the research object (open systems architectures in Australian federal government organisations) with the research subjects (6 case organisations and their members).

The Galliers & Sutherland (1991) seven S approach has been outlined in this thesis as a way of understanding the boundary context issues involved in ITS management.

Plant (2000) elaborates on the Galliers & Sutherland (1991) 7s framework (see figure 6.1). He states that this model reflects the sentiment that

“a firm is the comprehensive sum of its parts, and that the internal dynamics of an organisation clearly determine that organisation’s ability to compete, the premise being that both the strategy and the structure of the organisation determine management’s effectiveness.” – pp 72-73.

Figure 6.1 The McKinsey 7s Framework-originally proposed by Pascale & Athos (1981) - (Source: Waterman et al. 1980 – pg 7 from Plant 2000 – pg 72)
Please see print copy for image



He stresses, however, that because of the messy and unclear nature of the seven S relationships it is difficult for an organisation to develop, deliver and sustain an internal structure to facilitate competitive strength and organisational effectiveness.

The subjective case data collected in this thesis project (in appendices B, C & D) and analysed in chapter 5 also highlights “the messy and unclear nature of the seven S relationships” while the objective view expressed in theory and proposed application of ITS would have us believe otherwise (see chapters 2 & 4 of this thesis).

Plant’s (2000) description of the seven S interconnections and their effect on the organisation directly reflect the unstable architectural issues that are important areas in the implementation of a new approach to ITS or the new technologies associated with ITS that occur within and at the organisational boundary.

This seven S approach has been used to collect both objective and subjective information regarding these issues in the management of open systems architecture.

Galliers (1991) highlights problems within this type of approach by saying that

”...it follows that IS strategy should contain not only IT strategy , but also such organizational issues as change management and a human resource strategy associated with IS – in other words, a strategy that takes into account the manner in which one might move from A to B, and the necessary organization, people and skills associated with this movement” – pg 60.

There appears to be a necessity in supplementing ITS management approaches with organisational perspectives, and in fact Galliers has made great strides in the

development of ITS management theory that effectively incorporates organisational perspectives in a number of research projects (Galliers 1999, Newell et al. 2000, Newell et al. 2003). These approaches build on ideas that see object/subject integration/reconciliation in a reductionist sense. It should be acknowledged, however, that most organisational issues are subjective in orientation as they are driven by contextual factors such as those that are in evidence in the 6 organisational case studies.

A major problem highlighted by this thesis are the differences in the objective and the subjective views of the management of open systems architectures in the Australian federal government and the issue of their integration/reconciliation. It is proposed that the ideas which surround technology transfer (particularly the IS Disciplinary Model adapted from Bunker & Dean 1997) hold the key to developing an approach to the integration/reconciliation of objective and subjective views, from an anti-reductionist viewpoint. This is specifically in relation to the ITS Management Model (figure 2.1) and its application to our understanding of the management of open systems architectures from a constructionist epistemology.

6.3 Proposed Perspectival ITS Management Model

The ITS Management Model (figure 2.1) assists us in tracking the emerging theory or objective analysis of ITS management over the years. The Disciplinary Model (see

figure 5.1) then gives us insight to the subjective values and assumptions inherent in the implementation, management and use of ITS. It would seem that the key to better understanding ITS management and integrating/reconciling the object and the subject would be to effectively combine the ideas contained in both models.

This reconciliation is effectively expressed in the “Perspectival Thinking Approach” of Haynes (2001a) as outlined in chapter 2 of this thesis, which encapsulates a transformatory view of subject/object integration/reconciliation through the idea of “intentionality”.

It is the idea of intentionality or “reaching out into” (Crotty 1998) that Brentano (1973) and Husserl (1965) develop as the basis for the phenomenological understanding of interaction between subject and object. This is a useful vehicle to combine ideas from both the ITS management model (figure 2.1) and the disciplinary model (figure 5.1). The mind (conscious subject) reaches out to and into the object in order to derive meaning or ‘knowing’.

“There is no answer to the question whether philosophy must begin with the object (realism) or with the ego (idealism). The very idea of phenomenology puts the question out of play: consciousness is always consciousness of, and there is no object which is not an object for. There is no immanence of the object to consciousness unless one correlatively assigns the object a rational meaning,

without which the object would not be an object for. Concept or meaning is not exterior to Being; rather, Being is immediately concept in itself, and the concept is Being for itself.” (Lyotard 1991 in Crotty 1998 – pg 45)).

Butler (2000) points to the work of Gadamer (1975) in hermeneutics and Heidegger (1976) in his work defining Being as very influential in our understanding of the ideas that “‘lived experience’ of social actors arises out of the web of encounters and dialogues that characterise individual existence or ‘*Being-in-the-world*’” – pg 1462.

It is these ideas of intentionality and Being (in-the-world) that lead us to understand that Tool Makers, Tool Users, Scholar/Inheritors define and are defined by the tools that they use within their context (values and assumptions) and this is expressed through assumed (objective) and actual (subjective) skills. At this point we must also remember that skills are defined as “**technological skill sets but also, outcomes, conceptual expression, building techniques and cultural context**”. Tools and skills have a mutual contingency (Ayres 1978) and are socially constructed (Latour 1993). We are able to see from the case analysis in chapter 5 that skills (both objective and subjective) have a major influence on the views (or construction of ideas) of organisational respondents (Haynes 2001b).

If we go back to our example given in section 5.3 this highlights an analysis of the objective and subjective factors at play within Organisation 1. These factors have been represented in table 6.1 (a combination of information from tables 4.1, 5.1, 5.2

and section 5.3.1). Based on the obvious contextual factors of Organisation 1 we might assume that there should be strong support for the objective view of an open systems architecture within this organisation. It would seem, however, that Organisation 1 respondents have an overall subjective ambivalence towards any sort of agreement or concurrence with the objective view as evidenced from the level of agreement data and the underlying emerging contextual factors. On the surface, an organisation of this typology might have embraced the promise of open systems architectures. If we take a closer look at obvious and emerging factors at play (also supported by section 5.3.1) within this organisation, we can begin to understand the subjective nature of the reasons causing this ambivalence towards open systems architectures.

Table 6.1 – Obvious and Emerging Contextual Factors – Organisation 1

GALLIERS & SUTHERLAND (1991) SEVEN ELEMENTS	OPEN SYSTEMS STAGE (6) OBJECTIVE VIEW TOOL MAKER	OPEN SYSTEMS FOCUS ORGANISATION 1 LEVEL OF AGREEMENT WITH OBJECTIVE VIEW SUBJECTIVE VIEW – TOOL USER	
		ITS Manager Focus	M#
Strategy	Maintain comparative strategic advantage Monitor futures Interactive planning *Multi – vendor (flexible) OSA solutions	ITS Application Focus	H
Structure	Centrally co-ordinated coalitions (corporate & SBU) *Matrix/task org'n *KW empowerment *Interoperability (I), portability (P)& scalability (S) of systems flattens structure	ITS Business Objectives	M
		IITS Department	L
Systems	Interorganisational systems (supplier, customer, government links) New IS based products External-internal data integration *Simple flexible client/server systems *Shared info *I, P, S makes systems flexible *Multi-vendor systems knowledge	ITS Technical Objectives	M
		OSA Definition	M
Staff	IS Director/ member of the board * IT Tech Director * IT Org'n impact Manager *Multi vendor management *Ext vendor rep	OSA Profiles	M
		ITS Dept Positions	L
Style	*Entrepreneurial Business team	ITS Management Characteristics	M
Skills	All senior management understand IS and its potentialities *Technical skill breadth in ITS *Multi-vendor skills *Vendor –like skills in-house	ITS Skill Sets	L
		ITS Education and Training	L
Superordinate Goals	Interactive planning *ITS simple & integrated (I,P & S) *Paradigm shift	ITS Priority Concerns	M#

**ORGANISATION 1
OBVIOUS CONTEXTUAL FACTORS
TOOL USER**

Sector	Org Struct	No. Staff	ITS Dept Structure	No ITS Staff	Non-ITS Respond Position	ITS Respond Position	No. Screens	Annual Revenue	ITS Dept Budget
Transport	Hierarch/dist 8 offices	28,000	Hierarch	650	1) E&M consult	2) Inf. Arch. Director 3) Proj. Director	11,000	600 mill PA	120 mill PA + 120mill****

EMERGING CONTEXTUAL FACTORS – TOOL USER

- mission of cost effective and safe transportation for customers
- high use of ITS (16th on the MIS list)
- large organisation by global standards
- was undergoing privatisation
- high ITS to general staff ratio
- traditional organisational structure
- high revenue but large “bottom line” losses
- high ITS spend
- diverse core technology (2 different systems)
- large systems redevelopment effort
- rationalising systems difficult
- attitude to ITS use affected by losses
- ITS CIO influenced the perception of ITS

Level of Agreement Key - H = High (67%+), M = Medium (34 – 66%), L = Low (0 – 33%),
= non ITS respondent had a high level of agreement

It is evident, from the analysis in this table (and in the individual respondent analyses for this organisation in section 5.3.1 – explanation sketches), that ITS transfer, adoption and diffusion (including ITS management approaches) are context dependent and that many contextual influences are only known from deeper analysis of the subject/s under study which might indicate emerging contextual factors. Many studies within ITS, however, are conducted from an ontologically objective, rational, Western, process oriented perspective, which is positivist in research orientation while attempting to be reductionist and generalisable in nature. This is reflected in a world-view that underpins our understanding of ITS transfer, adoption and diffusion (and management). How does the context of the open systems architecture objectives (and assumed skills to accomplish these objectives) impact this world-view ?

Ciborra & Hanseth (1998) take up the idea of the characteristics of objects (in the case of actor network theory) as having the attributes of inscription and translation. They refer to inscription as “the way technical artefacts embody patterns of use”. Translation is referred to as design, where user interests may be translated into specific needs according to typical ideal models. This presents the more typical normative view of ITS management. Ciborra & Hanseth (1998) then develop the idea of *Gestell* as an attempt to bring “Heideggers’s philosophy to bear on to the field of business organizations and information systems” by such notable authors as Winogard & Flores (1987) and Ehn’s (1989) work on IT as tools that are ready to use. Ciborra & Hanseth (1998) state that these works “need to be overcome” as they

are misleading to the real intention behind Heidegger's work which is about "anything *but* the tool". By Ciborra & Hanseth's definition

"*Gestell* means literally the reunion of the placing, arranging, regulating, ordering...*Gestell* does not deliver the nearness to things. It does not deliver "the world" (that is the "there" where man's existence unfolds). Everything instead is just undifferentiated standing reserve of resources ready to be deployed" – pp 318 – 321.

By this definition the idea of ITS as a tool (object) to be reconciled with contextual factors (subject) in a reductionist sense is clearly limited in firstly its ability to represent subjectivist (relativistic) views of Being-in-the-world but also in its ability to be truthful to Heidegger's feelings with regard to technology i.e "Gestell delivers "representations" of all that subsists, and these become the "real world".

Wax (1997) puts much the same ideas forward in his work on negating positivism. He posits that Positivism subsumes relativism by reductionism. He talks about his observance of the effects of a positivistic research ethos on young anthropological researchers at the University of Chicago in Robert Redfield's era (the 1940's).

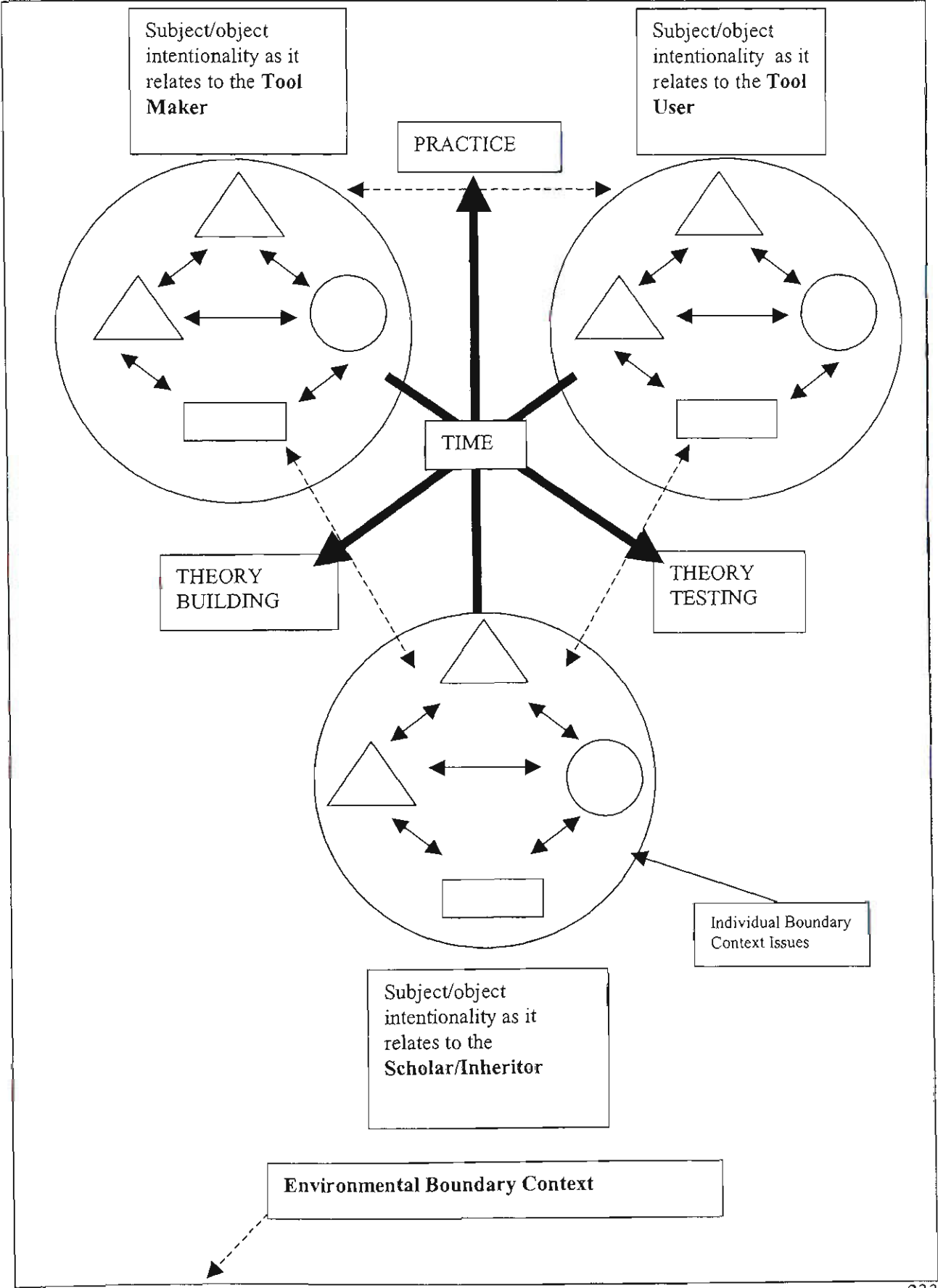
"Among the better field workers, their native impulse was to report in a simple, frank, and reflexive fashion. Rarely was such a straightforward account acceptable: the manuscript had to address "a problem" with hypothesis derived

from a theoretical system, no matter how bizarre, irrelevant, or subsequent to the actual investigation. Outstanding fieldworkers were discouraged or humiliated and sometimes could not earn a doctorate. The bitter irony was that a later generation of scholars might be avid for the original data, while relegating the theoretical systems and consequent hypotheses to the historical dustbin” – pg 21.

This thesis has highlighted the convergence and divergence of the boundary context issues in the management of open systems architecture, skills, resources and attributes (skill contextual factors) of the 6 federal government departments at the centre of this study.

It is proposed that a new Perspectival ITS Management Model (figure 6.2) will assist us to more effectively understand management of open systems architectures within organisations by actively encouraging Tool Makers, Tool Users and Scholar/Inheritors to view the process through the anti-reductionist integration/reconciliation of the subject/object under scrutiny. As we can see from the model, the three entities all have a view of ITS management that is bounded by their own context. Each entity then looks to the reconciliation of the subject/object under scrutiny (Scholar/Inheritors, Tool Makers, Tool Users) through their own “intentionality” (theory building, practice, theory testing) thus giving the study of ITS management a perspectival orientation that has been somewhat limited in other models and approaches.

**Figure 6.2 - Perspectival ITS Management Model
(Integration/Reconciliation of the Subject-Object)**



The Perspectival ITS Management Model allows each entity (Tool Maker, Tool User, Scholar/Inheritor) to have their own view of ITS management (the shapes and arrows within the 3 circles represent 3 different perspectives of the ITS Management Model as outlined in figure 2.1). Each entity will also view every other entity through their own intentionality, and so for example, an ITS Management Scholar/Inheritor will study ITS Tool Makers and Tool Users from a theoretical perspective, which over time will be affected by what the Scholar/Inheritor observes (reconciling the object of ITS with the subjects under study within the community of practice).

In viewing table 6.1 using the Perspectival ITS Management Model we can see that the objective view of open systems architectures and the subjective view from organisational participants in the study in Organisation 1 could be integrated/reconciled in a transformatory manner to better understand the underlying ITS management issues. This would be a different method to use in understanding this organisational case study rather than attempting to reduce the contextual factors to the objective view, which is more usual in positivistic approaches and methods.

For instance, while Organisation 1 would seem to be a logical candidate for an open systems architecture based on the obvious contextual factors in table 6.1, there are many emerging contextual factors that would allow us to understand this organisation's ambivalent attitude towards open systems architectures (OSA). This organisation's mission of cost effective and safe transportation for customers, may

necessitate it to utilise systems other than those which fall within an OSA. High revenue with large bottom line losses may also make the organisation reluctant to redevelop applications into an open environment, with the associated costs that this entails. Having 2 core systems to maintain and redevelop may be focussing ITS management efforts into more “bread & butter” ITS issues rather than encouraging a redevelopment into an entirely different OSA platform.

This organisation may be better served looking to acknowledge the subjective influences on its ITS management style, in order to incorporate them into more effective ITS management outcomes, rather than observing normative OSA approaches to achieve an OSA outcome. As this organisation was being forced to move to an OSA in spite of the contrary emerging contextual factors in evidence, then there is the likelihood of problems in its management of ITS. Organisation 1 needs to recognise the contextual factors which underpin its ITS management style and outcomes, and determine how they can more effectively use these factors to transform the organisation rather than reduce them to a normative view of OSA.

If we think about the evolution of ITS management theory to date we see its emergence from the structural/functionalist paradigm. Much of the theory has evolved from the management science literature which attempts to place a positivist slant on the structure of the organisation and the management of people and ITS theory. This theory mostly addresses “within” organisation issues (although Galliers

(1999) stresses that this situation needs to be rectified) and that this indicates that better control of ITS (management and planning) can be had by more efficiently enforcing strategy, policy and procedure throughout the organisation.

As is highlighted by each case study and individual respondent view, organisational life and the context which surrounds it diverges from the theoretical objective understanding of open systems architecture which represent the more positivistic views of how an open systems architecture can be managed. The contextual issues which surround each organisation and each respondent blur the theoretical picture representing an integration/reconciliation of the subject/object for each participant and each organisation.

A single theoretical understanding of the phenomenon under scrutiny (and its linkage to the data collected) is not that useful in an attempt to gain knowledge and understanding of open systems architecture management in the case of individual organisations. A perspectival approach, such as that highlighted by the Perspectival ITS Management Model (see figure 6.2) allows a multi-faceted analysis to take place (albeit a complex one) that gives us greater insight into all of the subjects and objects under scrutiny.

“It is precisely because interests and beliefs are shared that the notion of integration is paramount in an organisational learning culture (Haynes 2001a – pg 29)”.

A different (and enriched) understanding of open systems architecture management can be obtained by utilising the approach summarised within the Perspectival ITS Management Model. The key to its effective use is not to attempt to reduce understanding of ITS management, as we have seen in much of the theory to date, but to allow multiple perspectives to stand as individual multiple “constructions” which serve to illuminate the process of ITS management and the required skill sets **(technological skill sets but also, outcomes, conceptual expression, building techniques and cultural context)** from many different points of view as supported by Haynes (2001b). As Butler (2000) states

“knowledge of social phenomena defies objectification and representation. Institutional knowledge does not therefore exist as an objective phenomenon outside the heads of the knowers” – pg 1465.

Instead of viewing tables 5.2 – 5.3 and 6.1 in terms of a reductionist understanding of open systems architecture management i.e. comparison to and compliance with normative theory, they can be viewed as individual examples of open systems architecture management in their own right. The subjective contextual factors that

influence the divergence from and disagreement with objective theory become a more important area of focus than the fact that there is a divergence from or disagreement to objective theory. If we again go back to the Organisation 1 example outlined in section 5.3.1 of the thesis we can see that the obvious and emerging factors which influence the ambivalent attitude towards the objective theory of open systems architectures can also add a new dimension of understanding about open systems architectures objective theory and what it means to Organisation 1.

The intention is not to understand the differences and rectify them (which is the mainstay of objectivist theory), the intention is to utilise these differences to add to and transform our understanding of the complexities of open systems architectures and their subjective meanings.

The integration/reconciliation of object/subject from this anti-reductionist perspective becomes transformational in intent “Although a technological understanding of being is our destiny, it is not our fate....Although the technological understanding of being governs the things have to show up for us, we can be open to a transformation of our current cultural clearing” (Dreyfus 1993 in Ciborra & Hanseth 1998). Ciborra & Hanseth (1998) outline four ways in which transformation may happen (as developed by Dreyfus (1993)):

- Releasement – a comportment towards technology which expresses a “yes” and a “no” at the same time

- Openness to the mystery – remaining open to hidden meaning in technology as well as rehabilitation of astonishment at that which has hidden meaning
- A new sense of responsibility – responsibility in accepting what is beyond our control or which cannot be foreseen.
- Shifting fluctuations at centre stage – taking up practices that are at the cultural margins (make them central) while de-emphasising those practices that are currently central.

In integrating/reconciling object/subject from an anti-reductionist and transformational perspective we become free to see influences and factors at play that we may not ordinarily be able to. These are illustrated within these cases of open systems architecture management by the obvious and emerging contextual factors of each organisation. These factors may then be used to review what might constitute an open systems architecture (from a variety of perspectives) and also to take a “fresh” look at how open systems architectures may be managed.

6.4 Conclusions

Let us now look at each of the following research questions in turn to assess how the thesis has addressed each one.

Research Question 1

Do existing objective ITS management models, theories and approaches, adequately reflect an understanding of the ITS management process?

The theoretical and practical analysis conducted within this thesis indicates that objective ITS management models are limited in their positivist and reductionist orientation. While these models address key issues within the area it is suggested that they should be effectively supplemented with more constructionist approaches (as outlined within this thesis) such as the proposed Perspectival ITS Management Model (figure 6.2).

Research Question 2

Do complex organisational environments and the effects of systems architecture implementations magnify (in subjective and relativistic ways) the limitations of the objective ITS management models, theories and approaches?

This thesis has provided examples which illustrate that perspectival complexity becomes an issue of great focus when discussing multiple implementations of systems and their subsequent management, across multiple organisations (even if

they are within the same sector). The positivistic and reductionist orientation of much of the current objective theory does not explain this type of complexity (while acknowledging it) to any meaningful effect. This has left many ITS managers with little in the way of subjectivist approaches to understand what is happening within a particular organisation.

Research Question 3

Should the ITS management model be modified to incorporate a more subjective perspective of how to manage ITS? Would this modification enhance our understanding of ITS management?

The Perspectival ITS Management Model (figure 6.2) assists us to understand the management of ITS within organisations from a more subjective perspective which may allow potential researchers an insight into multiple perspectives which relate to each organisation. It does not attempt to reduce or generalise accounts of implementation and management of ITS, rather, it allows the researcher or Scholar/Inheritor (as well as the Tool Maker and Tool User) the ability to understand why there is a different perspective in each case, and to learn from these views.

The Perspectival ITS Management Model (figure 6.2) may assist the ITS manager to better understand the multiplicity of views, values and contexts within the organisation.

CHAPTER 7 – POSTSCRIPT: Australian Federal Government Management Of ITS Architectures (Outsourcing 1996 – 2001)

Chapter Overview

This chapter explains objective ITS outsourcing theory from a general and then specific Australian federal government perspective. It then goes on to look at subjective accounts of the whole-of-government outsourcing initiative and how these varied in assumptions made regarding **technological skill sets, outcomes, conceptual expression, building techniques and cultural context** which were embedded in objective ITS outsourcing theory. It is explained how these variations in assumptions affected the outcome of this initiative. The chapter then suggests how the Perspectival ITS Management Model (see figure 6.2) developed by the candidate, may have given a transformational insight into the whole-of-government ITS outsourcing initiative. Taking a non-reductionist view of ITS outsourcing in order to reconcile/integrate object/subject and develop a different way of understanding ITS outsourcing, may have allowed for a better understanding of the use of ITS by government organisations and government ITS policy making.

7.1 Introduction

It is interesting to note that upon the installation of a new Australian federal government in 1996, the winds of change swept through many government departments. Many of the open systems architecture ITS management objectives

outlined in chapter 4 of this thesis, were abandoned in favour of consolidating and outsourcing much of the ITS architecture and infrastructure across government departments in a whole-of-government outsourcing initiative (Macrae 1996, Hilvert 1996(a), Kern 1997, Hilvert 2001, Seddon 2001). By 2001, however, this direction had failed and was abandoned by the federal government. Why did this occur and would the Perspectival ITS Management Model (figure 6.2) have been an additional useful and effective way of assisting in our understanding of ITS outsourcing, use and management of ITS by government organisations and government ITS policy makers?

7.2 Objective Theory of Outsourcing ITS Architectures

ITS outsourcing has been part of the research and practice landscape from the late 1980's with much of the theory being formulated from studies conducted across many organisations (although almost all of these have had a Western business orientation).

The Australian Computer Society (ACS) issued a paper on Outsourcing and contracting out of IT products and services. (ACS 1997). In it, the society stated that reasons for outsourcing included:

- Cost savings
- Focus of core business
- Access to skills

- Access to technology
- Flexibility
- Accountability

It also outlined some critical issues to do with ITS outsourcing and these included:

- Transaction costs;
- Hidden/additional costs;
- Lack of flexibility;
- Loss of control;
- Human resource problems;
- Lock-in, vulnerability and dependence;
- Privacy and confidentiality;
- Intellectual property and competition, and
- Opportunity cost.

The paper also flagged wider issues for whole-of-government outsourcing such as:

- High risks due to the large scale of systems, long lead times, potential service loss and differences in organisation requirements;
- Difficulties for outsourcing providers to absorb such large government contracts;
- Critical, complex and volatile nature of public sector information requirements due to the nature of political decision making;

- Use of outsourcing to attempt to circumvent inflexibilities in public sector accounting systems, and
- Need for ITS sourcing processes in government to be open, accountable and participatory.

Peter Seddon's (2001) review of the literature to date highlights that while many authors celebrated the early successes of ITS outsourcing (Applegate & Montealegre 1991, Seger & McFarlan 1993 and Davis & Applegate 1995) other researchers (Lacity 1992, Lacity & Hirschheim 1993 & 1995, Huber 1993, Willcocks & Fitzgerald 1994, McFarlan & Nolan 1995 and Strassman 1995) were highlighting the complexities of ITS outsourcing arrangements and indicating that expected benefits were not always forthcoming.

Seddon (2001) also highlights that in the late 1990's that reasons for success and failure of ITS outsourcing arrangements became much clearer and that by the year 2000 authors such as Lacity & Willcocks (2001) were able to offer a list of "proven practices" for successful ITS outsourcing arrangements. These include (as taken from Lacity & Willcocks 2001, Sambamurthy et al. 2001, Cullen 1997 and as appear in Seddon 2001):

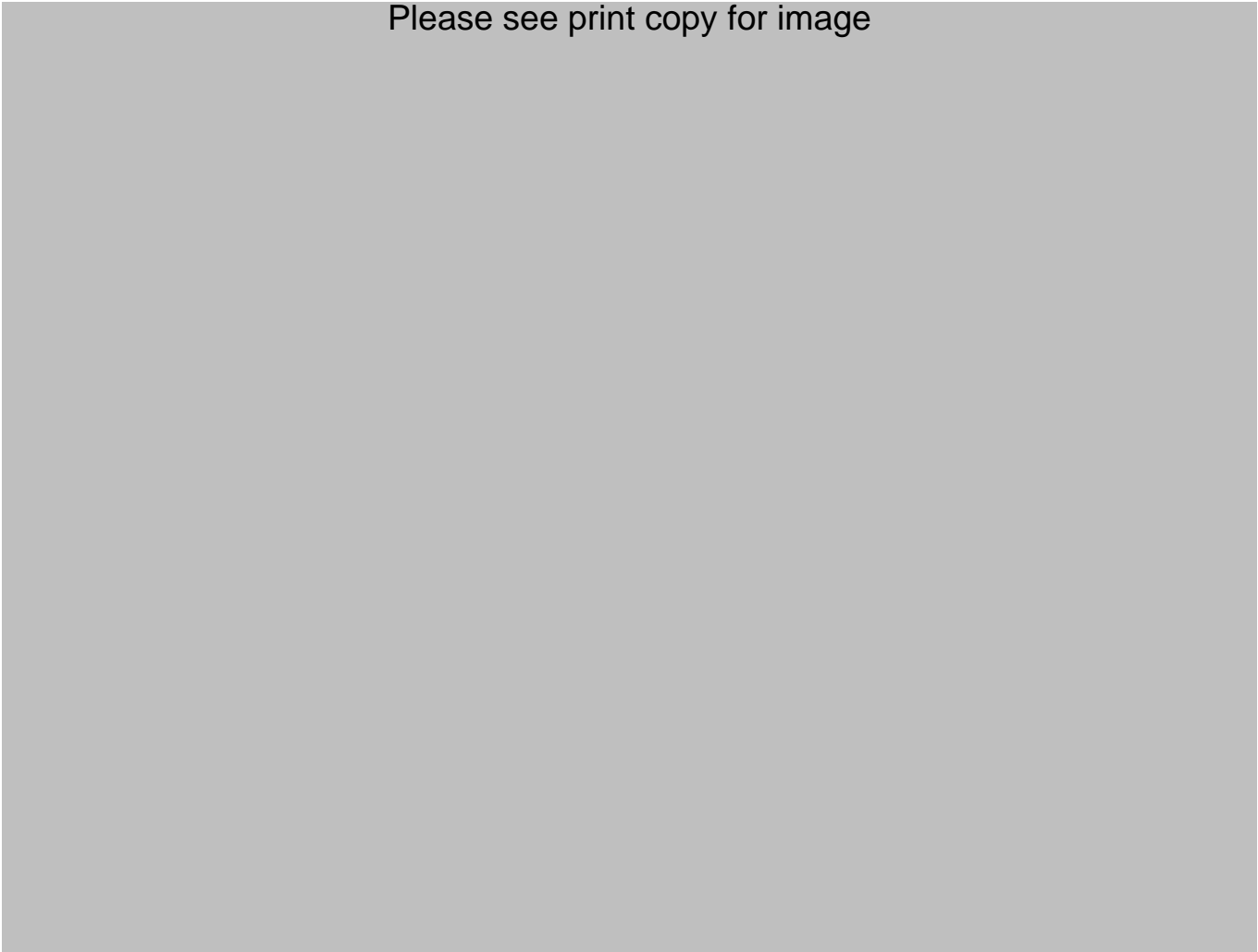
1. the use of a selective sourcing strategy rather than an all-or-none outsourcing strategy (company which is outsourcing);
2. identification of core IT capabilities to keep in-house (company which is outsourcing);

3. identification of non-core IT capabilities for potential outsourcing (company which is outsourcing);
4. conducting a rigorous evaluation of market options and supplier offerings (company which is outsourcing);
5. clearly defining IT outsourcing expectations and mitigating risk in a contract (company which is outsourcing);
6. implementing post-contract management processes and structures to enable supplier success (company which is outsourcing);
7. supply of expertise that is currently lacking (outsourcing supplier);
8. capitalisation on economies of scale (outsourcing supplier), and/or
9. taking on of responsibilities not considered critical to the customer organisation (outsourcing supplier), and
10. use of regularly negotiated service level agreements (monthly) as the basis of a sound ongoing management of IT sourcing relationships.

In research which falls outside of the Seddon (2001) paper there is also evidence of other emerging issues in ITS outsourcing. Hancox & Hackney (2000) develop 4 frameworks to ITS outsourcing which they utilised in their examination of private sector organisations (PSOs) and local government authorities (LAs) (see table 7.1).

Table 7.1 Comparison of a sample of LAs and PSOs via the four conceptual frameworks – from Hancox & Hackney (2000) – pg 232

Please see print copy for image



Their findings are somewhat contrary to the ACS (1997) and Seddon (2001) in that, core competencies do not seem to be a major issue for the organisations that they studied. Lowering transaction costs seemed to be a major driver for both LA’s and PSOs (where the market was successfully used). Neutrality was expressed in the case of organisation theory i.e. in the case where conflict with vendors was not a major issue and partnerships were more likely to be recognised by PSOs as LAs have constraints imposed by formal legislation.

Hancox & Hackney (2000) were also keen to point out that their study highlighted issues that were not ordinarily tackled by outsourcing studies. These were:

- resentment caused by the (threatened) imposition of outsourcing from outside the organisation;
- antipathy that can be felt by not-for-profit organisations towards outsourcing providers who are driven by profit;
- tactics used to frustrate outsourcing (imitation of service delivery practices of outsourcers, identifying common interests with existing users, exploiting loopholes in the rules of sourcing decisions), and
- the political dimension introduced by the involvement of different elected power centres.

In fact more recent research looks at these softer issues to complement the usual outsourcing practices. Kern & Willcocks (2000) tackle outsourcing supplier and client relationships along 8 dimensions of interaction. These are:

- Product/service exchange;
- Financial exchange;
- Service enforcement and monitoring;
- Communication/information exchange;
- Cultural adaptation of organisation and staff;
- Investments in resources, knowledge and time;
- Shared, adapted and reinforced vision, and
- Social and personal bonds.

These interactions are all occurring against a background of behavioural attributes which include:

- Commitment/Conflict;
- Co-operation/Dependency;
- Expectations/Power, and
- Satisfaction/Trust.

Time and relationship focus work on the factors within the outsourcing relationship to produce either an embedded or contractual arrangement with the parties. All of these activities are happening within a given context. Kern & Willcocks (2000) highlight the critical relationship issues for a successful collaboration. These issues add a more human (or relativistic) dimension to outsourcing theory and approaches.

As a result of this analysis of the normative literature we can see that the following issues are important objective considerations for the outsourcing of ITS (see table 7.2).

Table 7.2 - Objective Considerations for the Outsourcing of ITS

Based on ACS (1997), Seddon (2001), Hancox & Hackney (2000),
Kern & Willcocks (2000)

Reasons	Critical Issues	Wider Issues	Proven practices	Soft Issues
<ul style="list-style-type: none"> *Cost savings *Core business *Skills access *ITS access *Flexibility *Accountability 	<ul style="list-style-type: none"> *Transaction costs *Hidden/add costs *Lack of flexibility *Loss of control *HR problems *Lock in & dependence *Privacy/confidentiality *IP and competition *Opportunity cost 	<ul style="list-style-type: none"> *High risks – large systems, long lead times, potential service loss and organisational differences *Difficulties for providers to absorb large govt. contacts *Critical. Complex and volatile govt. info requirements (politics) *Use of outsourcing to circumvent inflexible govt. accounting systems *ITS sourcing processes should be open accountable and participatory 	<ul style="list-style-type: none"> *Selective sourcing strategies (OC) *Core ITS capabilities kept in-house (OC) *Non-core ITS capabilities outsourced (OC) *Rigorous outsourcing evaluation (OC) *Clearly defined expectations and risks *Post-contract management processes and structures (OC) *Outsourcer supply of missing expertise (OS) *Capitalisation on economies of scale (OS) *Taking on non-critical responsibilities (OS) *Regularly negotiated service level agreements (OC & OS) 	<ul style="list-style-type: none"> *Resentment towards outsourcing *Antipathy towards outsourcing *Tactics to frustrate outsourcing *Exercise of political influence *Product/service exchange *Financial exchange *Service enforcement and monitoring *Communication/information exchange *Cultural adaptation of organisation and staff *Investments in resources, knowledge and time *Shared, adapted and reinforced vision

The next section of this chapter analyses Australian federal government outsourcing (objective) theory and the policy that underpinned it (from 1996 – 2001) which was driving the whole-of-government outsourcing initiative. This extends the normative literature within this section and lays the foundation for the reconciliation/integration of this objective literature with the subjective accounts of outsourcing from the Australian federal government in section 7.4.

7.3 Objective Theory of Outsourcing ITS Architectures – Australian Federal Government Policy (1996 – 2001)

These outsourcing policies had been mooted by the previous government just prior to the 1996 election and then taken up with gusto by the new incoming administration although “suggestions that savings could be brought forward from five to three years was viewed with scepticism” (Hilvert 1996a – p 33). Ironically the outgoing government had commissioned the report on data centre consolidation in order to identify and analyse information on data centre economics against a background of world wide trends in order to propose a data centre consolidation strategy (Hilvert 1996a). 11 out of 13 Federal Government organisations were represented, but problems started to emerge when the consultants associated with the report gave “wildly fluctuating” estimates of data centre consolidation savings by the 4 largest government organisations. Heads of government organisations were troubled by the disparities in the consolidation estimates (\$90 million down to \$55 million per annum in the space of 1 month) as well as the fact that some were shown in a poor light in contrast to worlds “best practice” even on the lower benchmarking estimates. The consultant’s method of benchmarking performance measures was also a contentious issue with organisation heads (Hilvert 1996a).

In light of the report’s recommendations, open systems ITS technical objectives were still being met to some degree within the new management focus, as the technical platforms were now becoming independent of the business aims of government.

Organisation heads, however, did not agree on the estimates of realisable savings as these were made on the assumptions that internal consolidation of data centres (would) move organisations in line with global best practice and also that outsourcing vendors would operate 30% profit margins (Hilvert 1996a).

Organisations within this study were greatly affected. The new government administration decided 3 things (Hilvert 1996a):

- Office of Government Technology (OGIT) would undertake a “scoping” exercise (including initial market testing and business case development for outsourcing of Commonwealth IT infrastructure;
- “In principle”, government IBM data centres were to be consolidated and outsourced in clusters (scoping exercises and tenders would be conducted), and
- Results of the scoping exercises and other assessments (including savings estimates) were to be considered in the budget of May 1997.

All major IT acquisitions now had to be cleared through OGIT and the Department of Finance. Central to these decisions was the expectation that the Federal Government would save \$985 million dollars over 5 years (96 – 01). Cost savings estimation were \$350 million (96-97), \$335 million (97-98) and \$300 million (98-99) with an annual drop in spending from \$2 billion to \$1.6 (Hilvert 1996a).

The current federal government used data from the previous government administration's ITS report to support its case for ITS cost reduction. It was stated by the current government that the report called *Clients First* (OGIT 1995) made the suggestion that \$1 billion could be saved over 5 years through outsourcing. In fact the report quoted IBM Australia as suggesting these estimates and subsequently made no recommendations from them.

In the next financial year (1996/97) the federal government's budget included a 2% reduction in organisation running costs, which in due course, would be filtered through to ITS.

In 1997, one year after taking over the government Seddon (2001) states the then Minister announced a whole-of-government ITS outsourcing initiative. He cites details from the Minister's media release to highlight elements of the plan.

"This initiative will build on the experiences of other governments and private sector organisations, here and internationally, who have already successfully outsourced...The government is committed to achieving the best value for its information technology dollar, to support the delivery of services at the lowest cost to the taxpayer...The initiative creates substantial opportunities for small to medium sized Australian enterprises. Partnering arrangements with vendors will be encouraged. This will enhance the international competitiveness of local companies through the opportunities created to work with leading edge outsourcers. Small to medium enterprises are also expected to fulfil a significant

role in the provision of regional support services which will still be required under outsourcing, particularly for desktop services” – pg 5.

Anticipated cost saving estimates were then revised in the 1997/98 budget to \$37.9 million in 98/99, \$87 million in 99/00 with on-going reductions in organisation budgets of \$99.2 million from 2000/01 onward (Seddon 2001, ANAO 2000).

7.4 Outsourcing Findings - Subjective Accounts of Outsourcing ITS Architectures - Australian Federal Government

All of the objective views of outsourcing were set against internal federal government department politics where battles were being fought over the benefits of outsourcing versus consolidation or “clustering”. General control and security of information was also of concern to department heads as was the thought of having to establish relationships with other departments where IT was the only common link (in other words having to deal with and rely on other departments that were not part of the normal work process - Hilvert 1996b).

In 1996 for instance, the Chairman of the data centre consolidation and modernisation study, addressed his peers about the results of his report to the Government Information Services Policy Board regarding the fate of the Federal Government’s IBM compatible mainframe data centres (affecting 13 government organisations, employing 755 people and costing \$174.8 million dollars to run p.a.). The report highlighted savings through internal consolidation (rather than outsourcing) but

recommended that all data centres be merged into 3 clusters and half of the staff be made redundant in order for world's "best practice" to be achieved. There was also an expected saving of \$235 million dollars over a five year period (Hilvert 1996b).

This report galvanised an 8 to 3 organisation management opposition to its recommendations. This set the internal political stage for an adversarial situation between the federal government administration and a majority of its heads of organisations/departments.

Studies also pointed to the fact that consolidation, outsourcing and e-government was fraught with problems such as: overestimation of savings, underestimation of costs, legal/privacy problems of information and technology sharing and security issues (Hilvert 1996b, Macrae 1996). Many studies reflected the poor calculation and evaluation of costs and benefits and many commentators went as far as to say these new ITS strategies and management approaches were "flawed, the facts wrong or that the estimates were dubious from the very outset" (Hilvert 1996a).

It was a generally accepted fact, however, that the government's long term strategy was to outsource ITS where possible (Macrea 1996, Hilvert 1996a). It is also interesting to note that outsourcing and e-government was also seen as a way of downsizing the labour force within the public service both in terms of IT resources but also general public servant numbers (10,500 staff were expected to be dropped from the government payroll by the end of the 96-97 financial year – Hilvert 1996d). This was a significant fact in the consideration of outsourcing versus clustering in the

eyes of many department heads as ITS change as well as organisational downsizing was viewed as a double trauma. The fear was also that if consolidation was embraced this would make it easier for the government to outsource the architecture and infrastructure resulting in further downsizing and loss of ITS management control. It was also feared by organisation heads that the government would use the study of data centre consolidation to justify more cuts to IT spending.

Another point to note was that the government sought interest from the largest outsourcing companies in Australia in order to break the impasse over the organisations' arguments against consolidation and outsourcing (Hilvert 1996b). This move saw major computer vendors in a situation where they were giving outsourcing policy advice to the government, and then delivering systems based on this advice (which to any observant bystander would seem to represent a conflict of interest).

The year 1997 found the Australian Computer Society recommending caution regarding whole-of-government IT outsourcing (ACS 1997) issuing a draft paper for comment (see previous section on ITS outsourcing objective theory) which was also to be made available to the Senate Finance and Public Administration References Committee (then holding an enquiry into ITS outsourcing). Many of the issues that surfaced in the initial move towards outsourcing were echoed by this report.

A government cabinet reshuffle and subsequent department restructures had thrown the government's ITS outsourcing strategy into disarray (Tebbutt 1998). Senator Kate Lundy (a government opposition spokesperson on ITS outsourcing) was quoted as

saying that “The biggest flaw in the outsourcing program is that it inhibits the government’s ability to put in place different administrative arrangements and accommodate policy changes” (Tebbutt 1998 – pg 2).

If we “fast forward” to **2000/01** we can see some of the fallout and results from the change in Australian federal government ITS management strategy in 1996.

In 2000 a media release by the Commonwealth Scientific and Industrial Research Organisation (CSIRO 2000) highlights concerns from the research organisation that outsourcing would compromise their ability to maintain their world-class research output. Dr Pauline Gallagher of the organisation is quoted as saying:

“Outsourcing does not make business sense for CSIRO and other science organisations. From a consultation with CSIRO staff and management we know that the organisation has already contracted out all of its standard service requirements and has a well-balanced cost-effective mix of in-house specialist and contract support” – pg 1.

The Commonwealth Auditor General’s Department, then wrote a very unflattering report on IT outsourcing (ANAO 2000) which, was largely ignored by the government (ABC 2000, Osman 2001). The report focussed on the effectiveness of the clustering approach to ITS outsourcing (Seddon 2001, ANAO 2000).

A recommendation of the report was to give the Office of Assets Sales and Information Technology Outsourcing (OASITO) the responsibility of looking after

the outsourcing of IT infrastructure for “whole-of-government” (Clennell 2001). Of course, this centralised approach was not accepted by many government departments. There was also a general lack of understanding by OASITO of government business processes which was further complicated by pressure to settle contractual arrangements in a hurry. It was also contentious (with department heads within each cluster) as to whether service level agreements for each cluster were representative of all departments’ needs.

The subsequent Humphry Report (Humphry 2000) also recommended against outsourcing. It was also reported that many organisations such as the Department of Health and Aged Care were unlikely to achieve their planned savings from outsourcing (Crabb 2001). The government opposition made calls for the Minister’s resignation (ABC PM Radio Program Online 2001, Crabb 2001) and all outsourcing bids were put on hold. Many government unions were also highly critical of the government’s history of decision-making regarding ITS outsourcing (Nadenbousch 2001, CPSU 2001, Clennell 2001). OASITO’s role would be phased out within six months due to this opposition and individual departments would look after their own ITS sourcing needs. In fact Clennell (2001) stated that organisations like Centrelink, CSIRO and ANSTO would likely ignore government recommendations to outsource due to the risks involved.

All of these difficulties also threw the ITS outsourcing tendering process into disarray (Tebbutt 1998, Crabb 2001, Osman 2001). In a media release on 17 Jan, 2001 from

Kate Lundy (Lundy 2001), the government opposition spokesperson on IT, she highlights that

“according to an Australian Institute of Engineer’s survey on government contracting practices...32% of IT industry professionals rate government ‘below average’ as an informed buyer of information technologies” – pg 1.

This put the government at risk from unscrupulous ITS outsourcers as they could not negotiate with them in an informed manner. Another media release from Lundy (2001) also highlighted the fact that only 30% of outsourcing contracts were awarded to SMEs due to the nature of lockout for these firms which was caused by “clustering” of government organisations’ ITS requirements into large scale contracts. There seemed to be a general level of disappointment with the government’s outsourcing approach from the IT industry within Australia.

John Hilvert (2001) states

“Yet seven years on since outsourcing was first mooted, many believe the real cost of outsourcing is yet to be counted. And the climate of antagonism between those who say outsourcing is on track and those who are adamant the initiative has lost its way has permeated the Canberran atmosphere to a point where insiders tip a wind back of the ambitious program”- (Hilvert 2001 – section 1).

A blow-out in the number of clusters due to effects of budget cuts, internal politics as well as government pressing outsourcers for greater savings with greater penalties for non-compliance, meant that original estimates had been badly miscalculated.

“When it was first agreed, the contract was said to be worth an estimated \$250 million over 5 years. By the time the first tender was issued, with a number of organisations dropping out of the group, it had shrunk closer to \$150 million” – (Hilvert 2001 – section 2).

Seddon (2001) highlights that estimates once again dropped in light of the Australian National Audit Office (ANAO 2000) and Humphry (2000) reports that for total outlays of \$1,211 million dollars, estimated savings across whole-of-government only reached \$262 million dollars.

Initial reports on clustering (back in 1996) had also been reviewed in light of the blow-out in groups (due to unwillingness of department heads to work with one another). Geoff Seymour’s report in 1996 recommended departmental clustering of IT where there was duplicate architecture and infrastructure. Seymour in 2001 revised this view somewhat by saying “Why should two departmental secretaries agree to work together on IT...To me the question is if it’s sensible for them to work together on IT, what shouldn’t they be combining together on all their businesses?”- (Hilvert 2001 – section 2).

Another issue being hotly debated by media commentators at the time (Hilvert 2001) was the fact that the government business case for outsourcing had never been officially released and the validity of government warnings as to public comments on the government IT initiative and outsourcing RFTs documents in terms of confidentiality breaches. How the Office of Government Information Technology

(OGIT) was acting is up to individual interpretation, however, the fact that government ITS strategy was now entering mainstream public debate was an interesting fact. A PA consulting report was also released in 2001 that concluded that only 49 percent of Australian public sector organisations were satisfied with their outsourcing projects (61 percent cross sector average – Hilvert 2001).

Many media analysts were highlighting the breakdown of the centralised approach to clustering and outsourcing (in 2001 in light of Humphry report recommendations the government allowed individual department heads to oversee outsourcing) as well as the security, service, delivery and privacy issues inherent in the process.

In 2001 a Senate enquiry was convened into IT outsourcing. A report is yet to be published.

7.5 Conclusions

Application of the Perspectival ITS Management Model may have been helpful in understanding the various participant views in the case of the outsourcing direction by the Australian federal government. In clarifying the objective view (Tool Maker) and then looking at this against the subjective view (Tool User) of IT outsourcing there may have been a better understanding of the outsourcing direction and its application.

was good, which was supported by other examples of ITS outsourcing from a global perspective (Seddon 2001).

The government would have benefited however, from examining (or having someone examine for them) their own assumptions regarding ITS outsourcing (objective) and then also examining their government department management's subjective views on the matter. Table 7.3 has been constructed to show the differences between the objective outsourcing view and subjective accounts of the process.

Table 7.3 – Differences Between Outsourcing Objective and Subjective Views

OUTSOURCING OBJECTIVE VIEW – TOOL MAKER				
Based on ACS (1997), Seddon (2001), Hancox & Hackney (2000), Kern & Wilcocks (2000)				
Reasons	Critical Issues	Wider Issues	Proven practices	Soft Issues
<ul style="list-style-type: none">*Cost savings*Core business*Skills access*ITS access*Flexibility*Accountability	<ul style="list-style-type: none">*Transaction costs*Hidden//add costs*Lack of flexibility*Loss of control*HR problems*Lockin &dependence*Privacy/confidentiality*IP and competition*Opportunity cost	<ul style="list-style-type: none">*High risks – large systems, long lead times, potential service loss and organisational differences*Difficulties for providers to absorb large govt. contacts*Critical. Complex and volatile govt. info requirements (politics)*Use of outsourcing to circumvent inflexible govt. accounting systems*ITS sourcing processes should be open accountable and participatory	<ul style="list-style-type: none">*Selective sourcing strategies (OC)*Core ITS capabilities kept in-house (OC)*Non-core ITS capabilities outsourced (OC)*Rigorous outsourcing evaluation (OC)*Clearly defined expectations and risks*Post-contract management processes and structures (OC)*Outsourcer supply of missing expertise (OS)*Capitalisation on economies of scale (OS)*Taking on non-critical responsibilities (OS)*Regularly negotiated service level agreements (OC & OS)	<ul style="list-style-type: none">*Resentment towards outsourcing*Antipathy towards outsourcing*Tactics to frustrate outsourcing*Exercise of political influence*Product/service exchange*Financial exchange*Service enforcement and monitoring*Communication/information exchange*Cultural adaptation of organisation and staff*Investments in resources, knowledge and time*Shared, adapted and reinforced vision
OUTSOURCING SUBJECTIVE VIEW – TOOL USER – based on secondary information sources				
<ul style="list-style-type: none">*Lack of security of information*Forced networking of govt depts based only on ITS not on proecesses*Political control of ITS resources	<ul style="list-style-type: none">*Overestimation of savings*Underestimation of costs*Legal/privacy issues from ITS sharing across govt depts*Mandated outsourcing not suitable for all	<ul style="list-style-type: none">*Mandated clustering not suitable for all*Excuse to downsize public service*Loss of ITS control by govt depts	<ul style="list-style-type: none">*Perceived conflict of interest by govt depts of OS companies advice to govt.*Lack of independent information on outsourcing*Inflexible nature of outsourcing	<ul style="list-style-type: none">*Lack of understanding of govt business processes*Differing service level requirements*Anti-central control view within govt depts

By examining the objective and subjective views of ITS outsourcing in the Australian federal government, we can see that there are clear discrepancies between objective

and subjective perspectives which underpinned the spectacular failure of many aspects of the whole-of-government outsourcing initiative.

Seddon (2001) highlights lessons to be learned in the whole-of-government IT outsourcing initiative include:

- Don't cluster – economies of scale are outweighed by increase in co-ordination costs required for clustering;
- Gaining commitment of all participants is essential – this would seem to be an elementary approach for all ITS projects but was seemingly ignored by the Australian federal government. A low transfer rate of ITS staff from government to private ITS providers was also a direct result of lack of commitment by key players;
- The transition to outsourcing is hard – underestimation of complexity usually occurs (government clustering requirements were poorly defined whilst getting a provider to deliver them back to multiple organisations was much more complex than anticipated), and
- ITS outsourcing cost savings are surprisingly hard to measure and many be unattainable – this was evidenced by the yearly downward revision of estimated savings by the government.

These lessons highlight the differences in assumptions made regarding **technological skill sets, outcomes, conceptual expression, building techniques and cultural context** (discussed in chapters 5 & 6 of this thesis) between the government and IT

vendors setting the objective policy (Tool Makers) and those organisations that had to implement it (Tool Users). If the Perspectival ITS Management Model (see figure 6.2) had been utilised as a method of analysis in this case, then the resulting outcome for the whole-of-government ITS outsourcing initiative might have been different. The ITS outsourcing initiative may have been transformed into a “fresh” understanding of what ITS services are and what they mean for the government and its employees. In being bounded by a reductionist approach to understanding and applying ITS outsourcing theory, critical opportunities were missed to reconcile/integrate the object/subject of ITS outsourcing. A transformation of views on ITS outsourcing, management and use by government organisations and government ITS policy makers may have assisted in the fulfilment of a more successful set of outcomes to the process of ITS outsourcing.

Kate Lundy’s comment that **“The biggest flaw in the outsourcing program is that it inhibits the government’s ability to put in place different administrative arrangements and accommodate policy changes”** (Tebbutt 1998 – pg 2), seems to be a very obvious observation, however, while Lundy had this insight apparently the policy makers and IT vendors did not. The consideration of a subjective view such as this in a non-reductionist sense should add to the transformation of theory and understanding of ITS outsourcing. The reality of the situation (that Lundy is an opposition spokesperson) places limits on this view being actually considered unless there is a conscious effort on the part of all participants in the process to take the view into account.

Another example from the subjective accounts also assists us to understand the value of utilising the Perspectival ITS Management Model. Geoff Seymour's revision of his earlier stance on clustering and outsourcing represents an aspect of reconciliation/integration of object/subject in 2001 when he stated **"Why should two departmental secretaries agree to work together on IT...To me the question is if it's sensible for them to work together on IT, what shouldn't they be combining together on all their businesses?"** (Hilvert 2001 – section 2).

This is a fundamental change in understanding from the earlier view held by Geoff Seymour (a subjective participant who was a high level manager) within the process of whole-of-government outsourcing. He is able to see past the reductionist view of the application of ITS outsourcing theory to ITS, and view the entire business picture sensing and synthesising a multitude of perspectives. It is easy to highlight such transformation with the passing of time but proactive application of a perspectival model such as that represented in figure 6.2 requires further study.

CHAPTER 8 – SUMMARY OF RESEARCH FINDINGS, CONTRIBUTIONS, LIMITATIONS AND OPPORTUNITIES

8.1 Introduction

During the conduct of this study several major research findings, contributions, limitations and opportunities emerged which highlighted issues in the reconciliation/integration of the subject/object in the area of ITS management.

8.2 Summary of Research Findings

The theoretical and practical analysis conducted within this thesis indicates that objective ITS management models are limited in their positivist and reductionist orientation. While these models address key issues within the area it is suggested that they might be effectively supplemented with more constructionist approaches (as outlined within this thesis) such as the Perspectival ITS Management Model (figure 6.2).

This thesis has provided examples that illustrate that perspectival complexity becomes an issue of great focus when discussing multiple implementations of systems and their subsequent management, across multiple organisations (even if they are within the same sector). The positivistic and reductionist orientation of much of the

current objective theory does not explain this type of complexity (while acknowledging it) to any meaningful effect. This has left many ITS managers with little in the way of subjectivist approaches to understand what is happening within a particular organisation.

The Perspectival ITS Management Model (figure 6.2) may assist us to understand the management of ITS within organisations from a more subjective perspective which may allow potential researchers an insight into multiple perspectives which relate to each organisation. It does not attempt to reduce or generalise accounts of implementation and management of ITS, rather, it allows the Scholar/Inheritor (as well as the Tool Maker and Tool User) the ability to understand why there is a different perspective in each case, and to learn from these views.

The Perspectival ITS Management Model (figure 6.2) should assist the ITS manager to better understand the multiplicity of views, values and contexts within and outside the organisation.

8.3 Research Contributions

This thesis has made significant contributions in the following areas:

- Development of a useful theoretical and practical critique of objective (positivist) methods and approaches to ITS management (in particular open systems architecture management in the Australian federal government from 1993 – 1996, as well as management of ITS outsourcing within the Australian federal government from 1996 - 2001). This critique looked at a wide range of issues and is a useful tool for academics and practitioners to develop a better understanding of ITS management.
- Critical analysis of the breadth of ITS management theory encompassing the general business requirements, ITS business unit requirements, ITS architecture and infrastructure, the ITS planning processes, organisational context and external environmental factors. These topics were reviewed in depth to in order to give an wholistic view of the theoretical landscape.
- Creation of the ITS Management Model (figure 2.1) as a normative representation of the “state-of-play” within current IT management theory. This model was developed as a direct result of the analysis of ITS management theory during the period of this thesis project.
- Application of a constructionist epistemology to the research problem and questions, which combined objective (positivist) and subjective (relativist) research approaches and methods to the understanding of ITS management. This

type of study is infrequently undertaken, however, a growing number of researchers such as Mingers (1997) are calling for the application of multiple and diverse methodologies to ITS research problems in order to more effectively understand our discipline.

- Critical analysis of an objectivist theoretical perspective describing open ITS architectures and their relevance to Australian federal government policy through the development of additional open systems architecture (OSA) factors to add to the “Revised Stages of Growth” Model (Sutherland & Galliers 1991) and the production of table 4.1.
- Development of a subjectivist case perspective on open ITS architectures through the application of hermeneutical analysis (to develop explanation sketches) to Australian federal government case material in chapter 5. This enabled a more comprehensive understanding of obvious and emerging contextual factors and their influence on the management of open ITS architectures.
- Development of a Perspectival ITS Management Model (figure 6.2) that gives insight into the integration/reconciliation of object/subject in the area of ITS management from a phenomenological perspective. It is suggested that this model may be used to supplement (not replace) existing normative theoretical views. A number of studies are currently being undertaken by the candidate to apply the model to relevant industry problems (Anh Tuan & Bunker 2003, Nguyen & Bunker 2003)

- Application of the Perspectival ITS Management Model (figure 6.2) to the secondary source material on Australian federal “whole-of-government” ITS outsourcing as a “proof-of-concept” for the model. The application of this model gave insight into the lessons learned from Australian federal government ITS outsourcing approaches.

8.4 Research Limitations

A major limitation of the research is that in order to explain the Perspectival ITS Management Model the thesis does exactly what the model recommends against. Ideas, theories and philosophies are all boiled down into a reductionist view of what are essentially complex, multi-faceted, perspectival and highly subjective concepts. The temptation to reduce the facts at hand is too great, when the ultimate objective of the exercise is to convince the reader of the validity of the research.

This raises many problems within our accepted research paradigm and our cultural view of what constitutes valid research and research outcomes. While this thesis breaks with the view of objective (normative) theory and research approaches as the only acceptable form of ITS research, and proposes a perspectival model (figure 6.2) as a supplementary view of ITS management, it is an entirely different matter to find a suitable vehicle of expression for the ideas that underpin such a model.

If the thesis remained totally true to the constructionist epistemology then narrative, metaphor, analogy and other more detailed and voluminous forms of representation would be more appropriate. Documentation of these forms as we know, would mean that this thesis would occupy volumes of text, which for a reader would represent a barrier to understanding the research outcomes. Due to this limitation only major research highlights have been presented as evidence in this document.

Mandelbaum (1967) gives insight into the limitations of this type of research which includes: the richness of the organisational context; limitations of traditional methods of documentation to reflect this richness, and the application of value judgements by the researcher which contribute to the overall “synthetic” nature of the research process.

8.5 Future Research Opportunities

The application of a perspectival ITS management approach within these organisations highlights the need for much broader (relativistic) and combined IT/management/client service skills across ITS professional categories, if the implementation, use and maintenance of ITS by organisations is to be successful.

Skill diversity, flexibility and transformation appear to be the key requirements for these organisations. ITS professionals within ITS environments, may be required to have the skills and knowledge to understand the ITS situation (general business, ITS

and user requirements, ITS and the planning cycles) and how this relates to and is affected by boundary context factors (**technological skill sets, outcomes, conceptual expression, building techniques and cultural context**).

These trends have significant implications for educational institutions and organisational and vendor training programs.

We are currently seeing the costs of computer technology decrease while functionality increases, but are there hidden, associated ITS skill costs (in terms of breadth and context) that need to be met in order to gain the productivity and effectiveness benefits in the implementation and use of ITS in all organisations? Further development of the Perspectival ITS Management Model (figure 6.2) would assist organisations to better understand and meet these skill requirements by viewing management of ITS from a transformatory perspective.

Individual organisations have their own unique context which can lend additional understanding to the application of the Perspectival ITS Management Model (figure 6.2). This model is currently being applied in the field in a number of organisations to test its applicability and robustness as an aid to understanding ITS management issues.

BIBLIOGRAPHY

- Acar, W & Winfrey, F.L. (1994) "The resilient organisation: sustaining organisational renewal and performance". Journal of Strategic Change, 3: 165-173.
- Ackoff, R.L. & Emery, F.E. (1972) On Purposeful Systems, London, Tavistock.
- Adams, W. (1972) "New Role for Top Management In Computer Applications", Financial Executive, April. 54-56.
- Alberthal, L. (1993) "Will Architecture Win the Technology Wars? Maybe, but that's not the whole picture." Harvard Business Review, May: 162-170.
- Alberthal, L., Manzi, J., Curtis, G., Davidow, W.H. [and others]. (1993) "Will Architecture Win the Technology Wars?" Harvard Business Review, May: 162-170.
- Aldrich, H.E., Fowler, S.W., Liou, N. & Marsh, S. J. (1994) "Other People's Concepts: Why and How We Sustain Historical Continuity in Our Field." Organization, 1(1): 65-80.
- Allaire, Y. & Firsirotu, M. (1994) "Theories of Organisational Culture", Organisation Studies, Egos: 193-226.
- Alloway, R.M. & Quillard, J.A. (1983) "User Managers' Systems Needs", MIS Quarterly, June: 27-41.
- Alter, S. (1996) Information Systems: A Management Perspective (2nd ed), Benjamin-Cummings.
- Alvesson, M. (1985) "On Focus In Cultural Studies of Organisations", Scandinavian Journal of Management Studies, November: 105-120.
- Angyal, A. (1941) Foundations for a Science of Personality, Harvard University Press.
- Anhtuan, A. & Bunker, D.J. (2003) An Exploration of IS Adoption Using a Skills-Focussed Approach (in press).
- Anthony, R.N., (1965) Planning and Control Systems: a Framework for Analysis, Boston, MA, Harvard School Press.
- Applegate, L. & Montealegre, R. (1991) "Eastman Kodak Organization: Managing Information Systems Through Strategic Alliances", Harvard Business School Case, 9-192-030, Boston Massachusetts.

Australian Broadcasting Corporation (ABC) (2000) "Fahey under scrutiny for IT outsourcing", Transcript from ABC 7:30 Report – <http://www.anu.edu.au/mail-archives/link/link0011/0173.html>

Australian Broadcasting Corporation (ABC) (2001) "Call for Finance Minister to resign over outsourcing" Transcript from PM Monday, January 15 – <http://www.abc.net.au/pm/s233811.htm>

Australian Computer Society (ACS) (1997) "ACS Urges Caution on Whole-of-Government IT Outsourcing" ACS Media Release Friday 11 July Canberra – <http://www.acs.org.au/news/outsourc.htm>

Australian Government Guide to Open Systems (AGGOS - 1993) Information Exchange Steering Committee, Commonwealth of Australia.

Australian National Audit Office (ANAO) (2000) Implementation of Whole-of-Government Information Technology and Infrastructure Consolidation and Outsourcing Initiative, Audit Report No.9 tabled 06/09/2000, Commonwealth of Australia, 2000 - <http://www.anao.gov.au/Publications> .

Avgerou, C. (2001) "The significance of context in information systems and organisational change" Information Systems, No. 11: 43-63.

Ayres, C.E. (1978) The Theory of Economic Progress: The Fundamentals of Economic Development and Cultural Change, Third Ed, New Issues Press, Western Michigan University, Kalamazoo, Michigan.

Ball, L. & Harris, R. (1982) "SMIS Members: A Membership Analysis", MIS Quarterly, March: 19-38.

Barrett, J. L. (1994) "Process Visualisation: Getting the Vision is Key", Information Systems Management, Spring: 14-23.

Barry, T. (1995) "Caught in a Web-Australian Government Network Policy", AUUG '95, September 18-21, Sydney: 1-10.

Bashein, B. J., Markus, M. L., & Riley, P. (1994) "Preconditions for BPR Success, and How to Prevent Failures", Information Systems Management, Spring: 7-13.

Baskerville, R. & Smithson, S. (1995) "Information technology and new organisational forms: choosing chaos over panaceas", European Journal of Information Systems, 4: 66-73.

Baskerville, R., Myers, M., Nielsen, P.A. & Woodharper, T. (1997) "Panel- the impact of action research on information systems", Information Systems and Qualitative Research, Proceedings of the IFIP TC8 WG8.2 International Conference on Information Systems and Qualitative Research, 31st May – 3rd June, Philadelphia, Pennsylvania, USA: 69.

Benbaset, I., Dexter, A., Drury, D. and Goldstein, R., (1984) "A Critique of the Stage Hypothesis : Theory and Empirical Evidence", Communications of the ACM, Vol. 27, No. 5, May: 476 - 485.

Benbaset, I., Goldstein, D. & Mead, M. (1987) "The Case Research Strategy in Studies of Information Systems", from MIS Quarterly, September: 369 - 386.

Benjamin, R.I. & Blunt J. (1992) "Critical information technology issues: the next ten years", reproduced from Sloan Management Review, Summer: 7-19 in Galliers, R.D. & Baker B.S.H. Strategic Information Management: Challenges and strategies in managing information systems. Butterworth Heinemann, Oxford, 1994.

Bennet-Thatcher, J. & Srite, M. (2000) "Bounded Rationality, Formal Implementation Processes, and Conflicting Subcultures: A Theoretical Framework", Proceedings of Americas Conference on Information Systems, August 10-13, Long Beach California: 1650-1654.

Berg, P.-O. (1985) "Techno-culture: The Symbolic Framing of Technology in a Volvo Plant", Scandinavian Journal of Management Studies, May: 237-256.

Bertalanffy, L. von (1950) "The theory of open systems in physics and biology", Science, Vol. 111: 23-9.

Bhabuta, L. (1988) "Sustaining productivity and competitiveness by marshalling IT" in Proceedings: Information Technology Management for Productivity and Strategic Advantage, IFIP TC-8 Open Conference, Singapore, March.

Blaikie, N. (2000) Designing Social Research, Polity, Great Britain.

Blair, B. (1994) "Halcyon days are over for hardware vendors", The Computing 100 Winter: 46-48.

Boynton, A.C. & Zmud, R.W. (1987) "Information Technology Planning in the 1990's: Directions for Practice and Research", MIS Quarterly, March: 59 - 62.

Braa, K. & Vidgen, R. (1999) "Interpretation, intervention and reduction in the organisational laboratory: a framework for in-context information systems research" Accounting, Management and Information Technologies (9): 25-47.

Brancheau, J.C. & Wetherbe, J.C. (1987) "Key Issues In Information Systems Management", MIS Quarterly, March: 23-45.

Brancheau, J.C., Janz, B.D. & Wetherbe, J.C. (1996) "Key Issues in information systems management: 1994-95 SIM Delphi Results", MIS Quarterly, June v20 n2: 225-227.

Brentano, F. (1973) Psychology from an Empirical Standpoint, Routledge & Kegan Paul, London.

Broadbent, M. & Weill, P. (1997) "Management by Maxim: How Business and IT Managers Can Create IT Infrastructures", Sloan Management Review, 38 (3): 77-92.

Broadbent, M., Weill, P. & Neo, B.S. (1999) "Strategic context and patterns of IT infrastructure capability", Journal of Strategic Information Systems 8: 157-187.

Broadbent, M., Weill, P., O'Brien, T. & Neo, B.S. (1996) "Firm Context and Patterns of IT Infrastructure Capabilities", Melbourne Business School, University of Melbourne: 1-34.

Brown, C.V., McLean, E. & Straub, D.W. (1996) "Partnering Roles of the IS Executive", Information Systems Management, Spring: 14-19.

Bunker, D.J. (1991) An Exploration into the Management of the Information Systems Function: A Further Study, A Project Report submitted in partial fulfilment of the requirements for the degree of Master of Commerce (Honours), School of Information Systems, UNSW, May.

Bunker, D.J. (1994) "Research in progress: management of open systems architectures - a case study", Australian Unix and Open Systems User Group, Annual Conference, Melbourne, September 6-9: 145-155.

Bunker, D.J. (1998a) "Information Technology and Systems (IT&S) As Tools: Cultural Bias and the Implications for International Technology Transfer (ITT) ?" Proceedings of the Association of Information Systems Conference, Baltimore, August: 818-820.

Bunker, D.J. (1998b) "A Philosophy of Information Technology and Systems (IT&S) as Tools: Tool Development Context, Associated Skills and the Global Technology Transfer (GTT) Process", MIS-shaped or misshaped ? Emerging issues in the new global arena, Proceedings of IFIP WG8.7 Working Conference, Helsinki, Finland: 199-214.

Bunker, D.J. (2001) "A Philosophy of Information Technology and Systems (IT & S) as Tools: Tool Development Context, Associated Skills and the Global Technical Transfer (GTT) Process", Information Systems Frontiers 3:2: 185-197.

Bunker, D.J. & Dean, R.G. (1996) "Towards an Information Systems Paradigmatic Framework", Association for Information Systems Proceedings of the Americas Conference on Information Systems, August 16 - 18, Phoenix, Arizona USA: 596-598.

Bunker, D.J. & Dean, R.G. (1997) "Information Systems as Tools: Towards an Information Systems Paradigmatic Framework", Philosophical Traditions in Information Systems - Challenges of an Interdisciplinary View - Faculty of Commerce Workshop University of Wollongong July 10-11.

Bunker, D.J. & Dean, R.G. (1998) "Information Technology and Systems (IT&S) As Tools: the Cultural Context of Tool Creation and Use and Its Effect on the Technology Transfer Process" the electronic journal Philosophical and Conceptual Foundations of Information Systems,
<http://www.cba.uh.edu/~parks/fis/bunker.htm>

Bunker, D.J., Dean, R.G. & Edmundson, R.H. (1992) "The management of the information systems function", from the Proceedings of the Third Conference on Information Systems, Wollongong, NSW, Australia, 5-8 October: 161-196.

Burgess, G. (1997) "Service buffet", MIS, July: 28.

Burrell, G. & Morgan, G. (1985) Sociological Paradigms and Organisational Analysis, Gower, England.

Butler, T. (2000) " Making Sense of Knowledge: A Constructivist Viewpoint" Proceedings of Americas Conference on Information Systems, August 10-13, Long Beach California: 1462-1466.

Cash, J., McFarlan, F.W. & McKenny, J. (1983) Corporate Information Systems Management: Text and Cases, Irwin Press, Homewood, Ill.

Cash, J.I., McFarlan, F.W. & McKenny, J.L. (1988) Corporate Information Systems Management, Dow Jones-Irwin.

Cassidy, M.J., (ed), (1990) Education and Training Needs of Computing Professionals and Para-professionals in Australia, Information Paper No. 1, Volume One: Data and Findings, Department of Employment, Education and Training Economic and Policy Analysis Division.

Chae, B. & Courtney, J. F. (2000) " Hegelian Inquiring Organisations: Guiding Principles, Design Guidelines, and IT Support" Proceedings of Americas Conference on Information Systems, August 10-13, Long Beach California: 1497-1502.

Champy, J. (1994) "The challenge for IS is greater than ever" The Australian Tuesday June 28: 25.

Champy, J. (1995) Reengineering management: The mandate for new leadership. New York, Harper Business.

Chulov, M. (1994) "National body brings IT into the fold", The Financial Review, Monday May 16: 37.

Churchman, C.W. (1971) The Design of Inquiring Systems: Basic Concepts of Systems and Organisations, Basic Books, Inc, Publishers, New York.

Ciborra, C. (1997) "Crisis and Foundations: An Inquiry Into the Nature and Limits of Models and Methods in the IS Discipline", Proceedings of 5th European Conference on Information Systems, Cork, Ireland, June 19-21: 5-16.

Ciborra, C. U. (1998) "Viewpoint – Crisis and foundations: an inquiry into the nature and limits of models and methods in the information systems discipline", Journal of Strategic Information Systems 7: 5-16.

Ciborra, C. U. (2000) From Control to Drift: the Dynamics of Corporate Information Systems. Oxford University Press, Oxford.

Ciborra, C. U. & Hanseth, O. (1998) "From tool to gestell: agendas for managing the information infrastructure", Information Technology & People (11): 305-327.

Clarke, T.D. (Jnr) (1992) "Corporate systems management: an overview and research perspective", reproduced from Communications of the ACM, 35 (2), February: 61-75 in Galliers, R.D. & Baker B.S.H. Strategic Information Management: Challenges and strategies in managing information systems, Butterworth Heinemann, Oxford, 1994.

Claver, E., Llopis, J., Reyes Gonzales, M. & Gasco, J.L. (2001) "The performance of information systems through organisational culture", Information, Technology & People, Vol. 14 No. 3: 247-260.

Clennell, A. (2001) "Too many risks in outsourcing for Centrelink and CSIRO, says union" smh.com.au, Monday January 15
– <http://www.old.smh.com.au/news/0101/15/national/national12.html>

Colvin, P. (Dept Commerce, ANU) (1993) "Open Systems - A Painless Process", AUUG '93 Proceedings, Sept: 315-325.

Commonwealth Public Sector Union (CPSU) (2001) "Humphrey Report: ATO's Outsourcing Folly Exposed" – Tax Section Bulletin, 19 January – <http://www.cpsu.org.au/tax/tax190101.htm>

Commonwealth Scientific & Industrial Research Organisation (CSIRO) (2000) "Australian Government Policy threatens CSIRO work", Media Release, 6 August
– <http://publiccareers.ninemsn.monster.com.au/articles/6330/>

Computerworld (1994) "Senior management concerns: they worry about costs", May 6: 6.

Conner, D.R., Finman, B.G. & Clements, E.E. (1987) "Corporate Culture and Its Impact On Strategic Change in Banking" from Journal of Retail Banking, Vol. IX, No. 2 Summer: 16-24.

Costello, J. (1997) "WA's bill of health", MIS September: 35-37.

Courtney, J.F. (2001) "Decision making and knowledge management in inquiring organizations: toward a new decision-making paradigm for DSS", Decision Support Systems 31: 17-38.

Courtney, J.F. & Porra, J. (2000) "Mini-track on the Philosophical Foundations of Information Systems", Proceedings of Americas Conference on Information Systems, August 10-13, Long Beach California:1458-1461.

Crabb, A. (2001) "No savings in IT outsourcing", The Age, 16 January
– <http://www.theage.com.au/news/2001/01/16/FFXBRYINZHC.html>

Cranswick, K. (1992) "The Apple Isle Goes Open." OSR, Sep: 30-34.

Crotty, M. (1998) The Foundations of Social Research, Allen Unwin, Australia.

Crowe, D. (1993) "Open for debate", OSR, Nov: 18-19.

Cullen, S. (1997) Information Technology Outsourcing Survey, Melbourne, Australia: Deloitte and Touche Consulting Group.

Damsgaard, J. & Scheepers, R. (2000) "Managing the crisis in intranet implementation: a stage model", Information Systems Journal (10) 131-149.

Davenport, T. & Linder, J. (1994) "Information management infrastructure: the new competitive weapon ?" Proceedings of the 27th Annual Hawaii International Conference on System Sciences, IEEE Computer Society Press C.A.: 885 – 896.

Davies, L. & Myers, M. (1994) "Scholarship and Practice: The Contribution of Ethnographic Research Methods to Bridging the Gap", TC8AUS IFIP Information Systems International Working Conference, Gold Coast Queensland, Australia: 239-248.

Davis, F.D., (1989) "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology", MIS Quarterly, September: 319-339.

Davis, K. & Applegate, L.M. (1995) "Xerox: Outsourcing Global Information Technology Resources", Harvard Business School Case 195-158, Boston, Massachusetts.

Davis, G.B. & Olson, M.H., (1985) Management Information Systems Conceptual Foundations, Structure, and Development, McGraw-Hill.

Deans, P.C., Karwan, K. R., Goslar, M.D., Ricks, D.A. & Toyne, B. (1991) "Identification of key international information systems issues in U.S.-based multinational corporations", Journal of Management Information Systems, 7 (4): 27-50.

Dekleva, S. & Zupancic, J. (1996) "Key issues in information systems management: a Delphi study in Slovenia" Information and Management, 31: 1-11.

Denison, D.R., Hart, S.L. & Kahn, J.A. (1995) "From chimneys to cross-functional teams: Developing and validating a diagnostic model", Academy of Management Journal, 39 (4): 1005- 1023.

Devlin, B.A. & Murphy, P.T., (1988) "An architecture for a business and information system", IBM Systems Journal 27: 60-80.

De Vries, K. & Millar, F.R. (1987) "Interpreting Organisational Texts", Journal of Management Studies (24:3): 233-247.

Dexter, A.S., Janson, M.A., Kiudorf, E. & Laast-Laas, J. (1993) "Key information technology issues in Estonia", Journal of Strategic Information Systems, June; 2(2): 139-152.

Dickson, G., Leitheiser, R., Wetherbe, J. & Nechis, M. (1984) "Key Information Systems Issues for the 1980s", in MIS Quarterly, September: 135-159.

DMR Group Australia (1991) Open Systems – An Investment Strategy for the 1990's Copyright DMR Group Australia Pty. Ltd.

Doherty, P. A. (1993) "World class Unix and Ingres - a case study of an open systems implementation at the department of planning and environment", AUUG 93: 89 - 102.

Dreyfus, H.L. (1993) "Heidegger in the connection between nihilism, art, technology and politics", in Guignon, C. (ed) Heidegger, Cambridge University Press, Cambridge.

Drury, D. (1983) "An Empirical Assessment of the Stages of Growth", MIS Quarterly, June: 59-70.

Duncan, N.C. (1995) "Capturing flexible information technology infrastructure: a study of resource characteristics and their measure", Journal of Management Information Systems, 12 (2): 37-57.

Dunphy, D. (1981) Organisational Change by Choice, McGraw Hill, Sydney, 1981.

Durkheim, E. (1938) The Rules of Sociological Method, Glencoe, Ill.: Free Press.

Earl, M. J. (1983) "Emerging Trends In Managing New Information Technologies", Oxford Centre for Management Studies Research Paper 83/4 in Piercy, N. (ed), (1986) The Management Implications of New Information Technologies, Croom Helm, London.

Earl, M. J. (1987) "Information Systems Strategy Formulation", in Boland, R.J. (Jr) and Hirschheim, R.A., (1987) Critical Issues in Information Systems Research, John Wiley and Sons Ltd: 157-178.

Earl, M. J. (1989) Management Strategies for Information Technology. Prentice Hall, Hemel Hempstead.

Earl, M. J. (1992) "Putting information technology in its place: a polemic for the nineties" reproduced from Journal of Information Technology, 7: 100-108 in Galliers, R.D. & Baker B.S.H. (1994) Strategic Information Management: Challenges and strategies in managing information systems. Butterworth Heinemann, Oxford.

Earl, M. J. (1993) "Experiences in Strategic Information Systems' Planning", MIS Quarterly, March: 1-22.

Earl, M. J. (1996) "Integrating IS and organization: a framework of organisational fit", In: Earl, M.J. (ed) Information Management: The Organisational Dimension, Oxford University Press, Oxford.

Earl, M. J. & Feeny D.F. (1994) "Is your CIO adding value", Sloan Management Review, Spring: 11-20.

Earl, M. J. & Sampler, J. (1998) "Market Management to Transform the IT Organisation", Sloan Management Review, Summer: 9-17.

Eason, K., (1988) Information Technology and Organisational Change, Taylor and Francis.

Edwards, B.R., Earl, M.J. & Feeny, D.F. (1989) "Any way out of the labyrinth for managing information systems ?" Oxford Institute of Information Management, Templeton College, Oxford University, Working paper RDP89/3.

Elgarah, W., Courtney, J. & Bunker, D.J. (2001) "A Dialectical Approach to Decision Support Systems Design", Proceedings of the Americas Conference on Information Systems, Boston, August 3-5: 282-288.

El-Imad, J. & Tang, N.K.H. (2001) "Generic Strategies for the Efficient and Effective Use of Information Systems in Business" from Proceedings Seventh Americas Conference on Information Systems: 1738-1744.

Ein-Dor, P. & Segev, E., (1978) "Strategic Planning for Management Information Systems", Management Science, Vol. 24, No. 15, November: 1631 - 1641.

Emery, F.E. & Trist, E.L. (1965) "The causal texture of organisational environments", Human Relations, Vol. 8: 21-32.

Emery, F.E. & Trist, E.L., (1960) "Socio-technical systems", in Churchman, C.W. and Verhulst, D. (eds), Management Science, Models and Techniques, Vol. 2, Pergamon : 83-97.

- Enh, P. (1989) Work-Oriented Design of Computer Artifacts, Arbetslivscentrum, Stockholm.
- Feeny, D.F., Edwards, B. & Simpson, K. (1992) "Understanding the CEO/CIO Relationship", MIS Quarterly, 16: 435-438.
- Fink, D. (1994) "Information Systems Planning in a Volatile Environment", Long Range Planning, Vol. 27, December: 108 – 114.
- Flack, D. (1994) "Forcing an Open-Systems Definition" open computing, September: 11.
- Flynn, D.J. & Goleniewska, E. (1993) "A Survey Of the Use Of Strategic Information Systems Planning Approaches in UK Organisations", Journal of Strategic Information Systems, (2) 4: 292-319.
- Foster, L.W. & Flynn, D.M., (1984) "Management Information Technology: Its Effects on Organisational Form and Function", MIS Quarterly, December: 229-236.
- Frank, R., Gertz D. & Porter J. (1996), "Leadership For Growth" Strategy & Leadership, Vol. 24, No. 5 September / October 9.
- Friedman, B. & Nissenbaum, H. (1996) "Bias in Computer Systems", ACM Transactions on Information Systems, Vol 14, No 3, July: 300-347.
- Gable, G. (1992) "Using case studies to strengthen survey research: an example in information systems", from the Proceedings of the Third Conference on Information Systems, Wollongong, NSW, Australia, 5-8 October: 691 - 703.
- Gadamer, H.G. (1975) Truth and Method, The Seabury Press, NY.
- Gadamer, H.G. (1976) Philosophical Hermeneutics D.E. Linge (trans). Berkeley: University of California Press.
- Galbraith, J. (1973) Designing Complex Organisations, Addison - Wesley.
- Galliers, R.D. (1987a) "Information systems planning in the United Kingdom and Australia – a comparison of current practice" in Oxford Surveys in Information Technology, Volume 4: 223-225.
- Galliers, R.D. (1987b) " Information technology for comparative advantage: serendipity or strategic vision?" Keynote address of the AUSCAM National Conference. Perth, Western Australia, 23 October.
- Galliers, R.D., (1991) "Strategic information systems planning: myths, reality and guidelines for successful implementation", European Journal of Information Systems, 1 (1): 55-64.

Galliers, R.D., (1992) "Choosing information systems research approaches", from Galliers, R. (ed), Information Systems Research: Issues Methods and Practical Guidelines, Blackwell Scientific Publications, London: 144-162.

Galliers, R.D. (1993) "IT strategies: beyond competitive advantage", Journal of Strategic Information Systems, Vol 2 No 4 December: 283-291.

Galliers, R.D. (1994) "Relevance and Rigour in Information Systems Research: some personal reflections on issues facing the Information Systems research community", TC8AUS IFIP Information Systems International Working Conference, Gold Coast Queensland, Australia: 111-119.

Galliers, R.D. (1999) "Editorial - Towards the integration of e-business, knowledge management and policy considerations within an information systems strategy framework", Journal of Strategic Information Systems, 8: 229-234.

Galliers, R.D. & Baker, B.S.H. (1994) Strategic Information Management: Challenges and Strategies In Managing Information Systems, Butterworth-Heinemann.

Galliers, R.D., Merlani, Y. & Spearing, L. (1994) "Coping with information technology ? How British executives perceive the key information systems management issues in the mid-1990's", Journal of Information Technology, Vol. 9 (1) March: 223-238.

Galliers, R. D. & Sutherland, A. (1991) "Information systems management and strategy formulation: the 'stages of growth' model revisited", Journal of Information Systems, Vol 1: 89-114.

Gao, Y. & Oppelland, H.J. (1994) "Using IT to Support MIS Planning" in IFIP TC-8 Joint Meeting; 1994 May; Bond University, Gold Coast Australia: 285-297.

Gibson, C. & Nolan, R. (1974) "Managing the Four Stages of EDP Growth", Harvard Business Review, January – February: 76-88.

Gordon, P.J. & Martin, A. (1993) "Open Systems Strategies in UK Companies" Proceedings of the 16th IRIS, Bansler, J.P., Bodker, K., Kensing, F. Norbjerg, J. & Pries-Heje, J. (eds) Copenhagen 7-10 August.

Gorry, A.G. & Scott Morton, M.S. (1989) "A Framework for Management Information Systems", Sloan Management Review, March: 49-61.

Gottschalk, P. (2000) "Studies of key issues in IS management around the world" International Journal of Information Management, 20: 169-180.

Gunsteren, L.A. van, (1987) "Planning for Technology as a Corporate Resource: a Strategic Classification", Long Range Planning, Vol.20, No.2: 51-60.

- Guo, Y. & Hall, D. (2001) "Technological Support of an Inquiring Organization: Moving from Conceptualisation Towards Implementation" Proceedings of the Americas Conference on Information Systems, Boston, August 3-5: 2036-2042.
- Hackney, R., Burn, J. & Dhillon, G. (2000) "Challenging Assumptions for Strategic Information Systems Planning: Theoretical Perspectives", Communications of AIS Volume 3, Article 9: 2-23.
- Hancox, M. & Hackney, R. (2000) "IT outsourcing: frameworks for conceptualising practice and perception", Information Systems Journal, 10: 217-237.
- Handy, C. (1993) Understanding Organisations, Penguin, U.S.A.
- Harrison, W. L. & Farn, C.K. (1990) "A comparison of information management issues in the United States of America and the Republic of China", Information and Management, 18: 177-188.
- Hartog, C. & Herbert, M. (1986) "1985 Opinion Survey of MIS Managers : Key Issues", MIS Quarterly., December: 351-361.
- Haynes, J.D. (1997) Meaning As Perspective: A Phenomenology of Information Systems, Unpublished PhD Thesis, Bond University, Australia.
- Haynes, J. D. (2001a) "Churchman's Hegelian Inquiring System and Perspectival Thinking", Information Systems Frontiers 3:1: 29-39.
- Haynes, J. D. (2001b) "Philosophical Foundations of a Dialectical Analysis as a Research Methodology: Transformation of the Self in Hegel's Dialectic", Proceedings of the Americas Conference on Information Systems, Boston, August 3-5: 1987-1989.
- Head, B. (1994) "Threat from Microsoft's NT spurs UNIX users into action", Australian Financial Review, June 24:35.
- Hegel, G.W.F. (1977) Phenomenology of the Spirit. Oxford University Press-translated by A.V. Miller (analysis of the text and forward by J.N. Findlay).
- Heidegger, M. (1976) Being and Time, Harper and Row, NY.
- Heidegger, M. (1977) The Question Concerning Technology and Other Essays, Harper & Row, New York, N.Y.
- Hemple, G.C. (1965) Aspects of Scientific Explanation, New York, The Free Press.
- Hemple, G.C. (1966) "Explanation in Science and History", in Dray, W.H. (ed) (1966) Philosophical Analysis and History, Harper Row, NY.

Hilvert, J. (1996a) "Where will the budget axe fall ?" MIS May.

Hilvert, J. (1996b) "Mutiny in Canberra" MIS July.

Hilvert, J. (1996c) "Hitting where it hurts" MIS October.

Hilvert, J. (1996d) "Outside the square" MIS November.

Hilvert, J. (2001) "What's gone wrong in Canberra ?" MIS
– http://www.misweb.com/magarticle.asp?doc_id=8530

Hirschheim, R. (1992) "Information Systems Epistemology: An Historical Perspective", from Galliers, R. (ed), Information Systems Research: Issues Methods and Practical Guidelines, Blackwell Scientific Publications, London: 28-60.

Hirschheim, R., Earl, M., Feeny, D. & Lockett, M. (1988) "An Exploration Into the Management of the Information Systems Function: Key Issues and an Evolutionary Model", from Proceedings on the Joint International Symposium on Information Systems Sydney, February: 63-86.

Hofstede, G. (1980) Culture's consequences: international differences in work-related values, Sage, Beverly Hills.

Hofstede, G. (1998) "Attitudes, Values and Organisational Culture: Disentangling the Concepts", Organization Studies 19/3: 477- 493.

Hollis, P. (1993) "Why move to open systems ? The business case", Proceedings AUUG 1993, Sydney: 111-121.

Horey, J. (1993) "Swelling costs keep recovery on the rocks", The Australian, Tuesday May 25: 15.

Horey, J. (1994) "Welcome to the stability decade", The Australian, March 22:35.

Horey, J. & Phillipson, G. (1995) "Operating systems: IT winners survey", The Australian, March 21: 25.

Huber, R. (1993) "How Continental Bank Outsourced Its 'Crown Jewels'", Harvard Business Review, January-February:121-129.

Hufnagel, E.M. (1987) "Information Systems Planning: Lessons From Strategic Planning", Information Management, Vol 12: 263 - 270.

Humphry, R. (2000) Review of the Whole-of-Government Information Technology Outsourcing Initiative, December 2000, Commonwealth of Australia
– <http://www.dofa.gov.au/HumphryReview/>

Hungerford, K. (1992a) "The realities of open systems: considerations and benefits", OSR feature Part 1, OSR, March: 16-19.

Hungerford, K. (1992b) "What are open systems?" OSR feature Part 2, OSR April: 40-42.

Hunt, J.W. (1972) The Restless Organisation, John Wiley and Sons.

Husserl, E. (1965) Phenomenology and the Crisis of Philosophy, New York: Harper & Row.

Husserl, E. (1970) The Crisis of European Sciences and Transcendental Phenomenology, Northwestern University Press, Evanston, IL.

Information Technology Review Group (1995) Clients First: the challenge for Government information technology – Report of the Minister of Finance's Information Technology Review Group, March 1 – www.finance.gov.au/pubs/itrg/itrg-tc.html

Ives, B., Olson, M.H. & Baroudi, J.J. (1983) "The Measurement of User Information Satisfaction, " Communications of the ACM, October 26 (10): 285 - 293.

Jackson, I.F. (1986) Corporate Information Management, Prentice-Hall.

Jenster, P.V. (1987) "Using Critical Success Factors in Planning", Long Range Planning, Vol.20, No.4, Aug: 102-109.

Johnson, G. (1992) "Managing strategic change-strategy, culture and action" Long Range Planning 25 (1): 28-36.

Johnson, D. G. (1997) "Is the Global Information Technology Infrastructure a Democratic Technology ?" Computers and Society, September: 20-26.

Juniper, J. & Metcalf, M. (2001) " Innovation: Coffee Shop System Development Innovation Occurs When Worldwide Views Argue" Proceedings of the Americas Conference on Information Systems, Boston, August 3-5: 2116- 2120.

Kalakota, R. & Robinson, M. (2001) e-Business 2.0 Roadmap For Success, Addison- Wesley NJ.

Kanellis, P. & Paul, R.J. (1996) "Will Information Systems Continue to Disappoint ?" Proceedings of the Americas Conference on Information Systems, August 16 - 18, Phoenix, Arizona USA: 752-754.

Kant, I. (1978) Critique of Pure Reason. Translated by Norman Kemp Smith. Philadelphia.

Kern, T. (1997) "The gestalt of an information technology outsourcing relationship" in Proceedings of the 18th International Conference on Information Systems, DeGross, J. & Kumar, K. (eds), Atlanta: 37-58.

Kern, T. & Willcocks, L. (2000) "Exploring information technology outsourcing relationships: theory and practice", Journal of Strategic Information Systems, 9: 321-350.

Khandelwal, V.K. (2001) "An empirical study of misalignment between Australian CEOs and IT managers", Journal of Strategic Information Systems 10: 15-28.

Khandwalla, P.N. (1977) The Design of Organisations, Harcourt Brace Jovanovich, Inc.

Kienholz, A. (2000) "Metaknowledge Management in Inquiring Organizations: Towards a Knowledge Ecology", Proceedings of Americas Conference on Information Systems, August 10-13, Long Beach California: 2162-2164.

Kim, H.S. & Kim, J.J. (1995) "Information Systems Management Issues for Korea", Proceedings of the 1995 Korean MIS Conference.

King, W.R. (1978) "Strategic Planning for Management Information Systems", MIS Quarterly, March: 27-37.

King, W.R. (1988) "How Effective Is Your Information Systems Planning?" Long Range Planning, Vol.21 No.5, Oct: 103 - 112.

King, J.L., Gurbaxani, V. Kraemer, K.L. McFarlan, F.W., Raman, K.S. & Yap, C.S. (1994) "Institutional Factors in Information Technology Innovation", Information Systems Research 5:2: 139-169.

King, J. & Kraemer, K. (1984) "Evolution and Organisational Information Systems : An Assessment Of Nolan's Stage Model", Communications of the ACM, Vol. 27, No. 5, May: 466-475.

Klein, H. & Myers, M. (1999) "A Set of Principles for Conducting and Evaluating Interpretive Field Studies", MIS Quarterly 23 (1): 67-94.

Kling, R. & Tillquist, J. (1997) "Cultural models of Managerial Discourse in IT-enables Organisational Change", AMCIS :1-3.

Kluckhorn, F.R. & Strodtbeck, F.L. (1961) Variations in Value Orientations, Evaston, Il: Row Peterson.

Kuhn, T. (1970) The Structure of Scientific Revolutions, 2nd ed, Enlarged, University of Chicago Press.

Lacity, M.C. (1992) An Interpretive Investigation of the Information Systems Outsourcing Phenomenon, unpublished PhD dissertation, University of Houston, USA.

Lacity, M.C. & Hirschheim, R. (1993) Information Systems Outsourcing: Metaphors, Myths and Realities Wiley, Chichester.

Lacity, M.C. & Hirschheim, R. (1995) Beyond the Information Systems Outsourcing Bandwagon: The Insourcing Response Wiley, Chichester.

Lacity, M.C. & Willcocks, L.P. (2001) Global It Outsourcing: In Search of Business Advantage, Wiley, Chichester.

Latour, B. (1993) We Have Never Been Modern. Harvester, Wheatsheaf.

Lawrence, P. & Lorsch, J. (1967) Organisation and Environment, Harvard Business School.

Lawrence, E., Corbitt, B., Fisher, J., Lawrence, J. & Tidwell, A. (2000) Internet Commerce: Digital Models for Business (2nd ed), Wiley.

Leavitt, H.J. (1978) Managerial Psychology, The University of Chicago Press.

Lederer, A.L. & Mendelow, A.L. (1986) "Issues in Information Systems Planning", Information and Management 10: 245-254.

Lederer, A.L. & Mendelow, A.L. (1987) "Convincing Top Management of the Strategic Potential of Information Systems", MIS Quarterly, Dec: 525-534.

Lederer, A.L. & Sethi, V., (1988) "The Implementation of Strategic Information Systems Planning Methodologies", MIS Quarterly, 12 (3): 445-461.

Lederer, A.L. & Sethi, V. (1992) "Meeting the challenges of information systems planning", reprinted from Long Range Planning, 25, (2) 68-80 in Galliers, R.D. and Baker, B.S.H. (1994) Strategic Information Management: Challenges and Strategies In Managing Information Systems Butterworth- Heinemann.

Lee, A.S. (1994) "Electronic Mail as a Medium for Rich Communication: An Empirical Investigation Using Hermeneutic Interpretation," MIS Quarterly (19:2): 143-157.

Lien, L. (1993) "Transferring technologies from developed to developing industrial and commercial environments", from IFIP Transactions Diffusion, Transfer and Implementation of Information Technologies L. Levine (ed), Proceedings of the IFIP TC8 Working Conference on Diffusion, Transfer and Implementation of Information Technology, Pittsburgh, PA, USA, 11-13 October: 87-98.

- Loftin, R.D. & Moosbrucker, J.M. (1982) "Organisation Development Methods in the Management of the Information Systems Function", MIS Quarterly, September: 15-28.
- Luftman, J.N., Papp, R. & Brier, T. (1999) "Enablers and Inhibitors of Business-IT Alignment", Communications of AIS, Volume 1, Article 11: 2-32.
- Lundy, K. (2001) Media Releases, 3 January - 31 January
– <http://www.katelundy.com.au/Jan2001>
- Lyotard, J.F. (1991) Phenomenology, State University of New York Press, Albany.
- McClelland, G. (1994) "Open Systems Architectural Deployment" overheads used in a presentation to AUUG 1994, Melbourne, September 7-9: 1-16.
- McFarlan, F.W. & McKenny, J.L. (1983a) Corporate Information Systems Management. The Issues Facing Senior Executives. Richard D. Irwin Inc.
- McFarlan, F.W. & McKenny, J.L. (1983b) "The Information Archipelago - Governing the New World", Harvard Business Review, Jul – Aug: 91-99.
- McFarlan, F.W., McKenny, J.L. & Pyburn, P. (1983) " The Information Archipelago - Plotting a Course", Harvard Business Review, Jan – Feb: 145-156.
- McFarlan, F.W. & Nolan, R.L. (1995) "How to manage an outsourcing alliance", Sloan Management Review, Winter (9): 9-23.
- McKay, D.T. & Brockway, D.W.(1989) "Building IT infrastructure for the 1990s." Stage by Stage, 9 (3): 1-11.
- McKenney, J.L., Mason, R.O & Copeland, D.G. (1997) "Bank of America: The Crest and Trough of Technological Leadership" MIS Quarterly, 21(3): 321-353.
- McKenny, J. & McFarlan, F.W., (1982) "The Information Archipelago - Maps and Bridges", Harvard Business Review, Sept – Oct: 109-119.
- McLean, E.R., Kappelman, L.A. & Thompson, J.P. (1993) "Converging end-user and corporate computing", Communications of the ACM, Dec; 36 (12): 79-92.
- Macrae, M. (1996) "Changing face of the public Sector" MIS 100 Spring: 74-75.
- Mandelbaum, M. (1967) The Problem of Historical Knowledge: An Answer to Relativism. Harper Torchbooks, Harper & Row, New York, Evanston, and London.
- Markoff, J. (1993) "Crashes feared along way to the new superhighway", Australian Financial Review, 28 June: 43.

- Martin, E. (1982) "Critical Success Factors of Chief MIS/DP Executives", MIS Quarterly, June: 1-11.
- Martin, E.W., Dehayes, D.W., Hoffer, J.A. & Perkins, W.C. (1994) Managing Information Technology: What Managers Need to Know, Macmillan Publishing Company, New York.
- Mason, R.O., McKenney, J.L. & Copeland, D.G. (1997) "An Historical Method for MIS Research: Steps and Assumptions", MIS Quarterly, September: 307 - 320.
- Miles, M.B. & Huberman, A.M. (1994) Qualitative Data Analysis: An Expanded Sourcebook, 2nd Edition, Sage Publications, Thousand Oaks, CA.
- Mingers, J. (1997) "Combining Research Methods in Information Systems: Multi-Paradigm Methodology" in Proceedings of the 5th European Conference on Information Systems, Cork, Ireland, 19-21 June: 760-776.
- Mintzberg, H. (1973) The Nature of Managerial Work, New York, Harper and Row.
- Mintzberg, H., (1979) The Structuring of Organisations, Prentice-Hall Inc.
- MIS Magazine (1996) Top 100 List – spring.
- Moad, J. (1994) "At Last ! STANDARDS that Stick", Datamation, October 1: 60-61.
- Moeller, D. (1993) "OSI faces dump as IBM loses patience", The Australian Tuesday, May 25: 17.
- Monk, P. (1993) "The Economic Significance of Infrastructural IT Systems", Journal of Information Technology (8) 14-21.
- Morieux, Y.V.H. & Sutherland, E. (1988) "The Interaction Between the Use of Information Technology and Organisational Culture", Behaviour and Information Technology, Apr; 7 (2) 205-213.
- Morris, C.R. & Ferguson, C.H. (1994) "How Architecture Wins Technology Wars", Harvard Business Review, March-April: 86-96.
- Myers, M. (1997) Qualitative Research In Information Systems. MISQ Discovery Archive.
- Nadenbousch, B. "Review Criticises Government It Outsourcing" APESMA Professional Update, Vol 11, No 1, February -
http://www.apesma.asn.au/newsviews/prof...update/february_2001/it_outsourcing.htm

Newell, S., Swan, J.A. & Galliers, R.D. (2000) "A knowledge-focused perspective on the diffusion and adoption of complex information technologies: the BPR example", Information Systems Journal 10: 239-259.

Newell, S., Huang, J.C., Galliers, R.D. & Pan, S.L. (2003) "Implementing enterprise resource planning and knowledge management systems in tandem: fostering efficiency and innovation complementarity", Information and Organization 13: 25-52.

Nguyen, A & Bunker D.J. (2003) "An Exploration of the Value Compatibility Between an Australian Organisation and its Adopted Self-service Information System' (in press).

Nolan, R. (1976) "Business Needs a New Breed of EDP Manager", Harvard Business Review, March – April: 123-133.

Nolan, R. (1979) "Managing the Crisis in Data Processing", Harvard Business Review, March – April: 115-126.

Nolan, R. (1973), "Plight of the EDP Manager" Harvard Business Review: May - June: 143-152.

Office of Government Information Technology (OGIT) (1995) Clients First: the challenge for Government information technology, 1 March (www.finance.gov.au/pubs/itrg.itrg-tc.html)

Olson, D.L. & Carlilse, J. (2001) "Hermeneutics in Information Systems" from 7th Americas Conference on Information Systems: 2029-2035.

Osman, R. (2001) "All fall down" MIS 3rd June
– http://www.misweb.com/newsarticle.asp?doc_id=1115

Palvia, P.C. & Palvia, S. (1992) "MIS issues in India, and a comparison with the United States", International Information Systems: 101-110.

Palvia, P.C., Palvia, S.C.J. & Whitworth, J.E. (2002) "Global information technology: a meta analysis of key issues", Information & Management, 39: 403-414.

Parker, M., Benson, R. & Trainor, H. (1988) Information Economics, Prentice Hall, London.

Pascale, R.T. & Athos, A. (1981) The Art of Japanese Management, Simon & Schuster, New York.

Peled, A. (2001) "Network, coalition and institution: the politics of technological innovation in the public sector", Information Technology and People, Vol 14 No. 2: 184-205.

Perrow, C. (1979) Complex Organisations: A Critical Essay, 2nd ed, Scott, Foresman and Company, Glenview, Illinois.

Pervan, G. H. (1993) "Results from a study of key issues in Australian IS management", Proceedings of the fourth Australian conference on information systems, University of Queensland, Brisbane, Australia, 28-30 September: 113-128.

Pervan, G. (1996) "Results from as Study of Key Issues in the Australasian IS Management" ACIS: 509 – 520.

Peters, S.C.A., Heng, M.S. H. & Vet, R. (2002) "Formation of the information systems strategy in a global financial services company", Information & Organisation 12: 19-38.

Pettigrew, A.M. (1988) The Management of Strategic Change, Basil Blackwell, NY.

Philipson, G. (1994) "The client is no optical illusion" MIS, July: 93-94.

Philipson, G. (1996) "Paper Shufflers as IT Leaders", MIS, March: 51-53.

Phillips, N. & Brown, J.L. (1993) "Analyzing Communication In and Around Organizations: A Critical Hermeneutic Approach," Academy of Management Journal (36:6): 1547-1576

Piper, W.S. & Naghshpour, S. (1996) "Government technology transfer: the effective use of both push and pull marketing strategies", International Journal of Technology Management, Vol 12, No 1: 85-94.

Plant, R. (2000) e-Commerce formulation of Strategy, Prentice Hall, Upper Saddle River, NJ.

Plato (1997) Complete Works, Edited by John M. Cooper. Indianapolis: Hackett Publishing Company.

Porra, J. (1993) The Open Systems Movement, University of Jyvaskyla/University of Houston 12/4.

Porter, M.E. (1980) Competitive Strategy, New York, Free Press.

Porter, M.E. (1985) Competitive Advantage, New York, Free Press.

Premkumar, G. & King, W.R. (1994) "Organisational Characteristics and Information Systems Planning: an Empirical Study," Information Systems Research, 5:2: 75-101.

Pyburn, P.J., (1983) "Linking the MIS Plan with Corporate Strategy: An Exploratory Study", MIS Quarterly, June 1983: 1-14.

Rachukool, N. (1997) Successful Management of New IT Infrastructures: Perspectives on Competitive Advantage Unpublished BUSS945 Information Systems Project, 1997.

Raghunathan, B. & Raghunathan, T.S. (1993) "Does the reporting level of the information systems executive make a difference ?" Journal of Strategic Information Systems, Vol 2, No 1, March: 27-38.

Resman, A. and Zhao, L. "The process of technology transfer" (1991) Journal of Technology Transfer, Spring.

Ricoeur, P. (1974) The Conflict of Interpretations: Essays in Hermeneutics, Northwestern University Press, Evanston.

Robertson-Dunn, B. (1994) "Sound architectures, successful open plans" MIS, April: 36-38.

Robinson, R. (1988) The International Transfer of Technology: Issues Theory and Practice, Ballinger Publishing Company (Harper and Row, Publishers Inc, Cambridge).

Rockart, J.F., (1979) "Chief Executives Define Their Own Data Needs", Harvard Business Review, March – April: 81-92.

Rockart, J. Earl , M. & Ross, J. (1996) "Eight Imperatives for the New IT Organisation" Sloan Management Review, Fall: 43-55.

Rockmore, T. (1996) On Hegel's Epistemology and Comtemporary Philosophy, Humanities Press, New Jersey.

Rosenthal, P.H. (1994) "The Emerging Enterprise Systems Architecture", Journal of Systems Management, February: 16-21.

Sambamurthy, V., Straub, D.W. & Watson, R.T. (2001) "Information Technology Managing in the Digital Era", in Dickson, G.W. & DeSanctis, G. (eds) Information Technology and the Future Enterprise, New Models for Managers, New Jersey: Prentice Hall: 281-305.

Schein, E. (1984) "Coming To a New Awareness of Organisational Culture", Sloan Management Review, Winter: 3-16.

Schein, E. (1986) "Are You Corporate Cultured?", Personnel Journal, Vol 65, No.11 November: 83-96.

Scott-Morton, M.S. (ed) (1991) The Corporation of the 1990s, Oxford University Press, Oxford, England.

Seddon, P.B. (2001) "Case Study Outsourcing - The Australian Federal Government's Clustered-Agency IT Outsourcing Experiment", Communications of the Association for Information Systems Vol 5 Article 13, May - <http://cais.aisnet.org/articles/5-13/article.htm>

Segev, K.N. & McFarlan, F.W. (1993) "General Dynamics and Computer Science Corporation: Outsourcing the IS Function" Harvard Business School Case, 193-178, Boston, Massachusetts.

Sethi, N.K., Movsesian, B. & Hicky, K.D. (1985) "Can Technology be Managed Strategically?", Long Range Planning, Vol.18 No.4, August: 89-99.

Shank, M.E., Boynton, A.C. & Zmud, R.W. (1985) "Critical Success Factor Analysis as a Methodology for MIS Planning", MIS Quarterly, June: 121-129.

Sixth Annual Survey of IS Management Issues (1993) "Critical Issues of Information Systems Management for 1993" MA: CSC Index.

Sizer, R. (1983) "Key Issues in Managing Information", Long Range Planning, Vol.16 No.5, October 1983 : 10-18.

Smart, N. (2000) World Philosophies, Routledge, London and New York

Sommerhof, G. (1969) "The abstract characteristics of living systems", from Emery, F. (ed), (1969) Systems Thinking, Penguin, Great Britain.

Somogyi, E.K. & Galliers, R.D. (1987) "Information technology in business: from data processing to strategic information systems", Reproduced from "Applied information technology: from data processing to strategic information systems" Journal of Information Technology, 2 (1), March 1987: 30-41, in Galliers, R.D. & Baker B.S.H. Strategic Information Management: Challenges and strategies in managing information systems, Butterworth Heinemann, Oxford, 1994.

Sorge, A. (1982) "Culture and Organisation", Journal of General Management, Vol. 7, 98/82: 62 -80.

Spenser, H. (1873) The Study of Sociology. London: Kegan, Paul and Tench.

Sprague, R.H. Jnr and McNurlin, B.C. (1986) Information Systems Management in Practice, Prentice-Hall.

Steinbrenner, K. (1994) "The Information Technology Infrastructure and Its Impact on the Institution" CAUSE Information Resources Library, July 25: 1-7.

Stevenson, D.A. (1995) Enterprise Architecture: Positioning Enterprise Architecture an extract from a paper presented by Dennis A. Stevenson to the Department of Information Systems, University of Cape Town, in partial fulfillment of the requirements of the degree of Master of Commerce in Information Systems, June.

Strassmann, P. (1995) "Outsourcing, A Game for Losers," Computerworld, Vol 29 (34) August 21: 75.

Sutherland, A. R. & Galliers, R.D. (1989) "An evolutionary model to assist in the planning of strategic information systems and the management of the information systems function" School of Information Systems Working Paper. Curtin University of Technology, Perth. Western Australia, February.

Swanson, E.B. (1987) "Information Systems in Organisation Theory: A Review", from Boland, R.J. (Jnr) and Hirschheim, R.A. (1987) Critical Issues in Information Systems Research, John Wiley and Sons Ltd: 181-204.

Swanson, E.B. & Beath, C.M. (1988) "The Use of Case Study Data in Software Management Research", The Journal of Systems and Science Software 8: 63-71.

Synnott, W.R. (1985) "The building blocks of IRM architecture.", Information Strategy: the Executive's Journal, 2 (Spring): 4-10.

Synnott, W.R. & Gruber, W.H. (1981) Information Resource Management, Wiley-Interscience, New York.

Tapscott, D. & Caston, A. (1993) Paradigm Shift: The New Promise of Information Technology, McGraw-Hill, New York.

Tavakolian, H. (1989) "Linking the Information Technology Structure With Organisational Competitive Strategy: A Survey", MIS Quarterly, September: 309-317.

Tebbutt, D. (1998) "Reshuffle muddles outsourcing" The Australian, 27th October: 35.

Tim, G. (1993) "Downsizing a natural result of economics and competition" Australian Financial Review, 28 June: 43.

Tory, D. (1993) "Open Computing -- the Paradigm for the 90's" AUUG '93 Proceedings: 123-139.

Vitalari, N.P., (1985) "The need for longitudinal designs in the study of computing environments": 243-265 in Mumford, E., Hirschheim, R.A., Fitzgerald, G. and Wood-Harper, A.T. (eds) Research Methods in Information Systems, Proceedings of the IFIP WG 8.2 Colloquium, 1-3 September, 1984, Manchester Business School, Elsevier Science Publishers B.V. (North Holland).

Vitale, M.R. (1986) "The Growing Risks of Information Systems Success", MIS Quarterly (10:4) December: 327-334.

Waema, T.M. & Walsham, G. (1990) "Information Systems Strategy Formulation", Information and Management, 18 (1) January: 29-39.

- Walsham, G. (1993) Interpreting Information Systems in Organisations Wiley.
- Ward, J.M., (1987) "Integrating Information Systems into Business Strategies", Long Range Planning, Vol.20 No.3, June: 19 -29.
- Ward, J. & Peppard J. (1996) "Reconciling the IT/business relationship" a troubled marriage in need of guidance" Journal of Strategic Information Systems 5: 37-65.
- Wax, M. L. (1997) "On Negating Positivism: An Anthropological Dialectic" American Anthropologist, Vol 99, No. 1, March: 17-23.
- Weill, P. (1992) "The role and value of information technology infrastructure: some empirical observations." Working Paper No 8, Graduate School of Management, University of Melbourne, Melbourne, Australia, 1992.
- Weill, P., Broadbent, M. & Butler, C. (1996) "Exploring how firms view IT infrastructure" Melbourne Business School, University of Melbourne, October 8:1-50
- Weill, P., Broadbent, M. & Clair, D. (1994) "Management by Maxim: the Formulation of Information Technology Infrastructures", Working Paper No 8, Graduate School of Management, Melbourne Business School, November: 1-25.
- Weill, P & Clair, D. (1994) "Information Technology Value and the Role of Information Technology Infrastructure Investment" Working Paper No. 3, Graduate School of Management, University of Melbourne.
- Willcocks, L. (1996) "Rethinking Capabilities and Skills In the Information Systems Function" Australian Conference on Information Systems 1996: 1-11.
- Willcocks, L. & Fitzgerald, G. (1994) A Business Guide to IT Outsourcing, Business Intelligence, London.
- Willcocks, L. & Lacity, M.C. (eds) (1998) Strategic Sourcing of Information Systems: Perspectives and Practices, Wiley, Chichester.
- Wilson, T.D. (1989) "The implementation of information systems strategies in UK companies: aims and barriers to success", International Journal of Information Management, 9 (4): 245-258.
- Wilson, I. (1994) "Strategic Planning Isn't Dead – It Changed", Long Range Planning, Vol 27 No 4, 12-24.
- Winogard, T. & Flores, F. (1987) Understanding Computers and Cognition: A New Foundation for Design. Ablex Publishing Corporation, Norwood, N.J.

Wrycza, S. & Plata-Przechlewski, T. (1994) "Key issues in information management. The case of Poland", Proceedings of the fourth international conference on information systems development, Bled, Slovenia: 289-296.

Yan, A. & Louis, M.R. (1999) "The Migration of Organisational Functions to the Work Unit Level: Buffering, Spanning, and Bringing Up Boundaries", Human Relations, Vol 52, No 1: 25-47.

Yetton, P.W. (1993) Executive Director, Fujitsu Centre for Managing Information Technology in Organisations, "False prophecies, successful practice and future directions in I.T. management", Inaugural Lecture, Commonwealth Bank Professor of Management Australian Graduate School of Management, The University of New South Wales, October, 1993.

Young (1971) An Introduction to the Study of Man, Oxford, Clarendon Press.

Zampetakis, H. (1993) "Hard Core of Organisations Swimming Against the Tide", Financial Review. Jun 28: 34.

Zampetakis, H. (1994) "Open systems: Users in the driving seat", Australian Financial Review Monday June 27: 33-38.