

**Project pluralism:  
combining the hard and soft paradigms in  
IS / IT strategy development in the NSW public sector**

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## **Certificate of authorship / originality**

I certify that the work in this thesis has not previously been submitted for a degree, nor has it been submitted as part of the requirements for a degree, except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Julien Pollack

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## List of abbreviations

|        |  |
|--------|--|
| AR     | Action Research  |
| BoK    | Body of Knowledge  |
| C/SCSC | Cost/Scheduling Control System Criteria                      |
| CST    | Critical Systems Thinking                                    |
| CT     | Communications Technology                                    |
| DFD    | Data Flow Diagram  |
| FMA    | Framework, Methodology, Area of application                  |
| HPRB   | Health Professionals Registration Boards                     |
| ICT    | Information / Communication Technology                       |
| IS     | Information Systems  |
| IT     | Information Technology                                       |
| KCI    | Knowledge Constitutive Interests                             |
| PEARL  | Participants, Engagement, Authority, Relationships, Learning |
| PERT   | Program Evaluation and Review Technique                      |
| PM     | Project Management   |
| PMI    | Project Management Institute                                 |
| SOSM   | System of Systems Methodologies                              |
| SSM    | Soft Systems Methodology                                     |
| TSI    | Total Systems Intervention                                   |
| UTS    | University of Technology, Sydney                             |
| WBS    | Work Breakdown Structure                                     |

## **Abstract**

This research examines pluralist practice, the combination of methodologies based in different paradigms. Two paradigms are discussed throughout this research, referred to as the hard and soft paradigms. The hard paradigm is commonly associated with positivism and quantitative data, while the soft paradigm is commonly associated with interpretivism and qualitative data. These two paradigms present considerably different perspectives on the world, and methodologies based on these paradigms tend to place different emphases on research and practice.

The combination of methodologies from different paradigms presents a number of problems for practice. These include the problem of paradigmatic incommensurability and issues related to practitioner skill diversity, and difficulties in reconciling the different perspectives that are brought to a situation by different methodologies.

This research explores pluralist practice through the combination of Project Management and Soft Systems Methodology, methodologies which are based on the hard and soft paradigms respectively. The combination of these methodologies is informed by aspects of the Critical Systems Thinking literature, and based on the Embedding model for pluralism.

The combination of these methodologies is explored in the context of an IS / IT strategy development project, in the NSW public sector. This project was set within an environment typified by changing stakeholder relationships, abstractly defined and changing goals, and a variety of external influences which altered throughout the course of the project. A combination of Project Management and Soft Systems Methodology, based on the Embedding model for pluralism, was used in the management of this project, and resulted in a project which is demonstrated to have provided lasting benefit to the organisation.

This is participative, practice based research, and Action Research has been used as the research methodology for this thesis. Action Research has been chosen as a way of linking theory and practice, allowing for the simultaneous development of theory and

practice, through cycles of active reflection. The interpretation of research findings has been informed by hermeneutic philosophies.

Learning outcomes resulting from this research predominantly relate to the combination of Project Management and Soft Systems Methodology, based on the Embedding model. Findings relate to how the problem of paradigmatic incommensurability affects pluralist practice, issues related to the use of tools and techniques governed by paradigms other than that for which they were designed, and specific adaptations that were made in suiting Project Management and Soft Systems Methodology to the needs of the project environment.



## Part A

|                                       |  |
|---------------------------------------|--|
| Part A:                               | 1) Introduction  |
| Part B: Research framework            | 2) Hard and soft paradigms<br>3) Research methodology                        |
| Part C: Methodologies for application | 4) Soft Systems Methodology<br>5) Project Management<br>6) Pluralism and CST |
| Part D: The project                   | 7) IT / CT Platform Project<br>8) Reflection and learning                    |
| Part E:                               | 9) Conclusion  |

Figure 1: Part A: Introduction

Part A provides a broad overview of this research. This section introduces the thesis and provides an outline of the research structure. The different fields that are of relevance to this research are introduced, and the relationships between these different fields is briefly discussed. Summaries are also provided of the research methodology, the intellectual framework that informs this research, the IT / CT Platform Project, and the learning outcomes that result from this research.

## Chapter 1 – Introduction

"... to reject no system and to accept none entirely, to neglect this element and take that, to select from all that appears to be good and true, and consequently durable — this in a single word, is ECLECTICISM ..."

(Cousin, 1853, p. xiii).

### Research focus

Traditional Project Management (PM)<sup>1</sup> and Soft Systems Methodology (SSM)<sup>2</sup> are approaches<sup>3</sup> to problem solving, exploration, learning and management that have enjoyed considerable widespread success over the last few decades. These approaches share a common root in systems thinking, but bring considerably different emphases to problem situations. Two different paradigms govern traditional thought on the practice of PM and SSM. These are the hard and soft paradigms, respectively<sup>4</sup>. PM "... as a professional discipline in the past two to three decades has apparently been biased to the hard systems approach, and it has heavily emphasised quantitative techniques in project planning, scheduling and control" (Yeo, 1993, p. 115). SSM has been influenced by the soft paradigm, and instead focuses on learning and exploration, through the facilitation of debate and the social negotiation of meaning. The hard and soft paradigms, and methodologies based on these paradigms, bring considerably different foci to problem situations.

A variety of different fields have recognised the benefit of the different emphases that the hard and soft paradigms bring to practice. For instance, the fields of systems thinking, evaluation and social research, information systems development and organisational change are all developing in ways that have been influenced by aspects

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<sup>1</sup> Project Management is a diverse field, being contributed to by a wide variety of authors, and could arguably be considered a developing field, not a single methodology. However, it is suggested that a homogeneous core of traditional practice exists in the field of project management, which can be considered to be equivalent to a methodology. The acronym 'PM' is used to refer to this traditional core throughout this thesis.

<sup>2</sup> SSM and PM are both discussed in detail, in Chapters 5 and 6.

<sup>3</sup> The term 'approach' is used throughout this thesis as an encompassing term, generally used to refer to a methodology, method, tool or technique. It is used in instances where it is immaterial which of the previous is being referred to. Differences between the preceding terms are identified in Chapter 2.

<sup>4</sup> The hard and soft paradigms are explored in detail in Chapter 2.

of both the hard and soft paradigms. Traditional PM, however, remains predominantly influenced by the hard paradigm (See Figure 2).

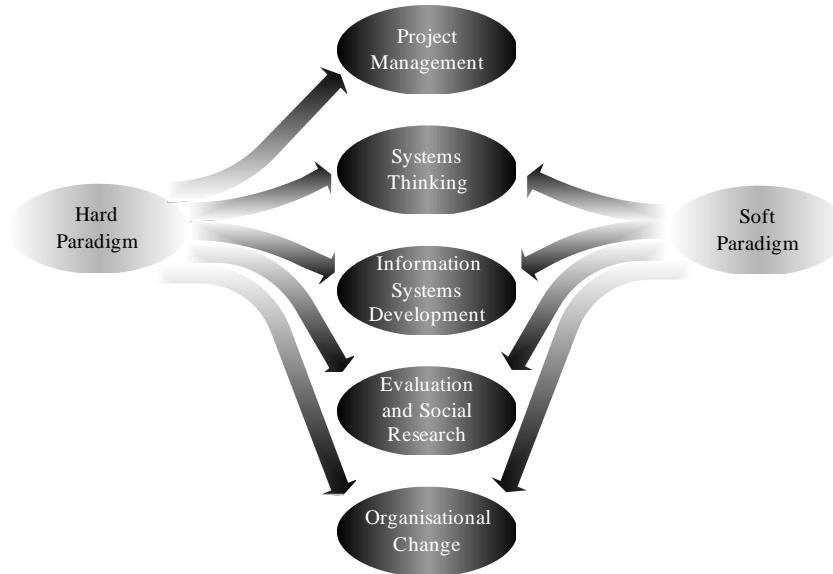


Figure 2: The influence of the hard and soft paradigms on selected fields

No one approach can be expected to be able to address all the difficulties inherent in all complex, diverse and changing problem situations. The same is true for paradigms. Managing an intervention with an approach or approaches from within only one paradigm necessarily entails operating from a perspective limited to that one paradigm. However, approaches from different paradigms can be combined, giving the opportunity to gain from the different perspectives that different approaches and paradigms bring to a problem situation. Indeed, there is a growing body of literature to suggest that pluralism, "... the use of different methodologies, methods and/or techniques in combination ..." (Jackson, 1999, p. 12), can provide many benefits that cannot be gained through the application of a single approach. This research explores how PM and SSM, approaches influenced by two different paradigms, can be combined to provide benefit to one specific complex problem situation, through application in practice.

However, combining different approaches from different paradigms involves particular philosophical and practical difficulties, such as the problem of paradigmatic incommensurability and issues related to practitioner culture and skills. In response to a growing awareness of the differences between the hard and soft paradigms, and the resultant differences in approaches that were developing within these paradigms, a

variety of schemes for the combination and classification of systems approaches have been developed under the banner of Critical Systems Thinking (CST)<sup>5</sup>. This research draws on the CST literature, in order to explore a pluralist combination of SSM and PM based on Embedding, a model for combining methodologies which involves the parallel application of approaches from the hard and soft paradigms.

The research focus for this thesis can then be stated as:

An examination of the pluralist combination of PM and SSM, based on the Embedding model for the combination of methodologies from the hard and soft paradigms, studied in the context of an IS / IT strategy development project in the NSW public sector.

This is practice based research, looking to improve practice through examination of guidelines for practice in the various literatures, applying those guidelines for practice in practice, then eliciting learning based on reflection upon the links between practice and the literature. Action Research (AR)<sup>6</sup> provides the methodology governing the practical exploration of Embedding, PM and SSM. These approaches are all practical approaches, and as such the efficacy of their combination must be understood in relation to actual practice, not just the theory of practice. These approaches have been applied in the IT / CT Platform Project, an IS / IT strategy development project in the Health Professionals Registration Boards (HPRB), part of the NSW public sector. AR has been chosen as the research methodology, as it is suited to addressing the needs of the development of theory through personal application in practice and the development of practice through reflection on theory.

### **Fields of research**

The research is structured in five parts (See Figure 1). Part A introduces the thesis and provides an overview of the research structure, methodology, project and contributions to knowledge. Part B establishes the research framework. Part B starts with an

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<sup>5</sup> CST, Embedding and pluralist practice are discussed in Chapter 6.

<sup>6</sup> AR and the research methodology for this thesis are discussed in Chapter 3.

examination of the differences between the hard and soft paradigms. Discussion of these differences contextualises this research in an ongoing debate, which has affected a variety of practical and academic disciplines. Understanding the differences between the paradigms also contributes to an understanding of the research methodology and the approaches applied in the IT / CT Platform Project. Part B concludes with an examination of AR, and the hermeneutics of interpretation, which have informed how the research data, the various literatures, and experiences gained in the project have been interpreted. Part C involves examination of the literatures on SSM, PM and CST. Discussion of these three fields provides an intellectual context for an examination of actions taken in the project. In Part D I discuss the use of the Embedding model in the combination of PM and SSM, in an IS / IT strategy development project in HPRB. Learning outcomes based on experiences in the project and reflection on the literature are then elicited. Part E concludes this research, reviews the thesis, reports on learning outcomes and contributions to knowledge, and then discusses possibilities for future research.

This is multidisciplinary research. Therefore, it is necessary to discuss a variety of different fields in order to thoroughly explore the subject matter of this thesis. Some readers will likely already be familiar with some of the topics discussed. However, due to the variety of fields addressed, prior knowledge of all these fields cannot be assumed. As such, the patience of individual readers is requested, while we examine sections of the various literatures with which the individual reader may be acquainted.

Research which examines an IS / IT strategy development project in the NSW public sector could be studied from many different perspectives. Established and extensive bodies of literature exist on IS / IT development, general strategy development, IS / IT strategy development, the Australian public sector, and health administration. These fields do affect this research and the particularities of how SSM and PM could be combined within the IT / CT Platform Project. An established body of literature also exists on AR, the research methodology for this thesis. However, it is important to understand that although it would have been both possible and valid for these areas to be the foci of this research, they are not. The former provide the context in which learning takes place. For instance, although some reference is made to the literature on IS / IT strategy development, IS / IT strategy development is not the focus of this

research, but rather the context in which this research takes place. Similarly, AR is the vehicle through which learning is structured, not the focus of this research. Learning which has emerged from this research predominantly relates to the pluralist combination of PM and SSM, not IS / IT strategy development or the process of using AR. Although the literature on PM, SSM and the comparatively new field of CST is already extensive, a number of omissions can be seen which this research addresses. The majority of learning resulting from this research occurs in relation to these three areas: CST, Embedding and pluralism in general; SSM; and PM.

Central to learning regarding the practice of multiparadigm pluralism, such as this, is an understanding of the differences between the hard and soft paradigms. The hard paradigm is commonly associated with a positivist epistemology, deductive, confirmatory and quantitative research which emphasises rigour in the research process. Practice based on the hard paradigm tends to emphasise efficient, expert-led delivery, and control to predetermined goals. The soft paradigm is commonly associated with an interpretive epistemology, inductive, exploratory and qualitative research, which emphasises relevance in research. Practice based on the soft paradigm tends to emphasise facilitated exploration of problem situations, learning and participation. These paradigms are based on different propositions concerning the nature of reality and knowledge, propositions which are mutually incompatible. By extension, it is often assumed that the paradigms as wholes are incommensurable and incompatible, with the researcher or practitioner forced to choose one or the other paradigm. Through the practical combination of approaches from both the hard and soft paradigms, this research explores the tension between the paradigms, and how this affects pluralist practice.

In exploring how PM and SSM can be combined, it is useful to understand how the two approaches have developed. PM and SSM have both been influenced by the hard and soft paradigms in different ways. However, they share a common root in systems thinking, and thus have some concepts in common. Throughout this research I use 'systems thinking' to broadly refer to a range of related disciplines that I draw upon, including aspects of operations research and management science. To Midgley (2003a, p. 80) operations researchers, management scientists, evaluators and systems practitioners are very similar. "These labels refer to people in a variety of semi-

independent research communities who have similar interests but slightly different emphases." Both SSM and PM have been influenced by hard systems thinking in their development (See Figure 3). However SSM, unlike PM, has also been influenced in its development by AR, interpretivism and the soft paradigm in general, providing a considerably different emphasis on practice than that apparent in the literature on PM.

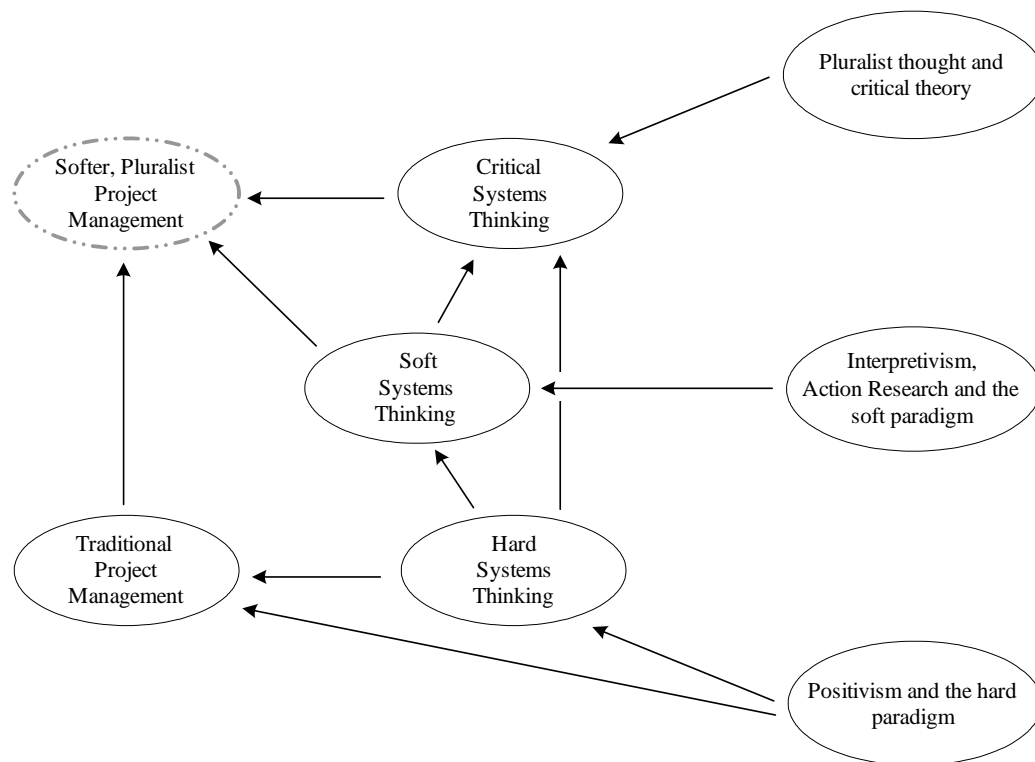


Figure 3: The genealogy of PM and systems thinking

SSM is an approach to problem solving, exploration and learning that focuses on the process of structuring debate and the social negotiation of meaning, in order to bring about improvement to situations that are considered to be problematic. In Chapter 4, I discuss aspects of the SSM literature which are of relevance to an understanding of actions taken in the project, including the philosophical basis of the methodology, and how the assumptions of the soft paradigm are embodied in the way the literature on SSM discusses concepts such as systems and human organisations. I then discuss the seven stage model of SSM, one of the ways that the methodology is most commonly represented, and identify the way in which SSM has been used in practice.

PM, on the other hand, embodies many of the assumptions of the hard paradigm, although this is often implicit in the PM literature. PM is both a growing and a pragmatic discipline, which has been extending into new practice environments. In Chapter 5, I discuss aspects of the literature on PM, in order to establish an understanding of the core of traditional PM practice. Through reference to established emphases in the field, I then demonstrate that the traditional literature on PM strongly aligns with the assumptions of the hard paradigm. However, undercurrents are also apparent in the PM literature, which suggest that there is a growing disquiet with regard to the adequacy of the hard paradigm to inform all project work, and a growing recognition of the potential value of incorporating the ideas of the soft paradigm into PM practice.

In Chapter 6, I examine the literature on pluralism, for insight into how different approaches can be combined. This review of approaches to pluralism predominantly draws on the CST literature, but also makes reference to developments in the evaluation, social science, organisational change and IS / IT literatures. Barriers to the adoption of pluralist practice are identified, and various responses to the problem of paradigmatic incommensurability that have been developed in the systems field are discussed. Different concepts relevant to an examination of pluralist practice are then examined, including Reed's (1985) four strategies, the oblique use of methods, and Total Systems Intervention. In light of these different concepts, I distinguish between Miles (1988) models for Grafting and Embedding, and then discuss the variation of Embedding that was applied in HPRB to manage the pluralist combination of PM and SSM.

Review of the CST literature reveals that the majority of interventions involving multiple approaches from different paradigms bears a strong resemblance to Grafting, and yet some authors (e.g. Miles, 1988; Mingers, 1995, p. 45; Ormerod, 1997a, pp. 50 – 2) suggest that Embedding may provide benefits that Grafting cannot. Case studies exist in the CST literature which are comparable with this research (e.g. Jackson, 1997a; Ormerod, 1995; 1997; 1999). Nonetheless very few case studies can be found in the literature that can clearly be classified as examples of Embedding. This research examines the practice of Embedding, in order to test its efficacy as an approach to pluralism.



PM and SSM bring different emphases to problem situations. Both the approaches have different strengths and weaknesses. However, through an understanding of these differences, pluralist combinations of the approaches can build upon their strengths, while complementing each other on the aspects of problem situations that they don't explicitly address. Higgs (2001, p. 47) comments that "... where your chosen strategy involves the blending of two approaches ... plan and implement research activities which address these combined goals and expectations ...". This research explores how Embedding can be used as the basis for a combination of PM and SSM, and how the combination of these approaches could be realised in the management of an IS / IT strategy development project in HPRB.

### **Research methodology**

This research involves both action and reflection on action. It is possible to distinguish between three different bodies of literature relevant to this research. These different groups, and some of the key authors I have drawn upon, are depicted below (See Figure 4). These three different categories of literature can be summarised as: the intellectual framework for the research, that informs the interpretation of the research process and research results; the research methodology, which informs the way in which research was conducted and data was gathered; and the approaches that were combined in HPRB in the development of an IS / IT strategic plan, and which form the focus of this research.

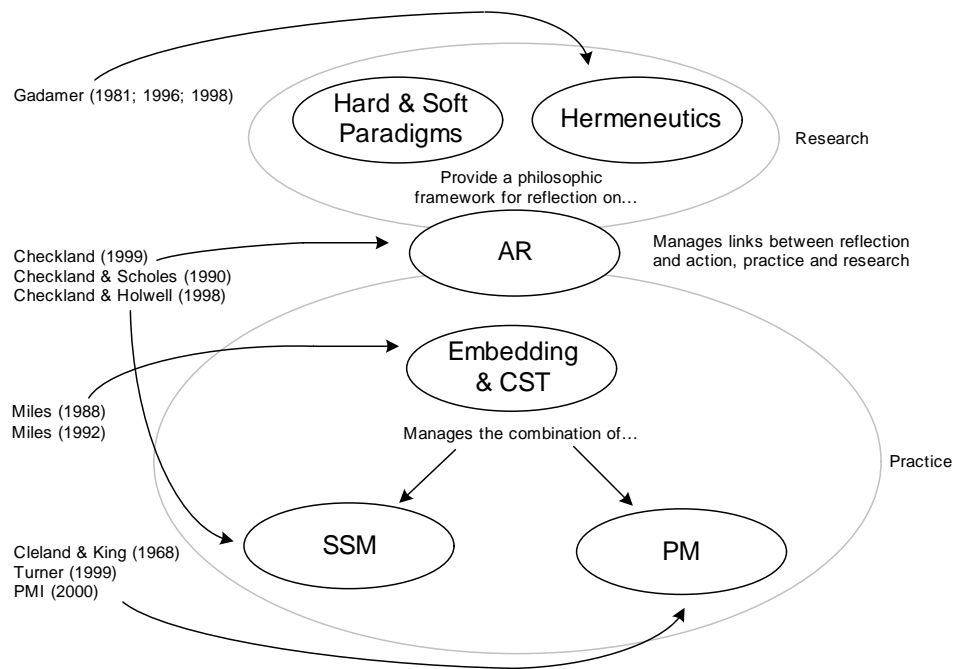


Figure 4: Fields relevant to this research

For theory to be relevant to practice, it must be tested and extended through application in real projects. For Ulrich (2001), competence in practice is best developed through critical reflection. Jarvis (1999) notes that active reflection on practice is becoming increasingly necessary for practitioners, while for Midgley (2000, p. 271) it is vital that there is adequate reflection on the actual practical implementation of methodology, if both methodology and practice are to develop, and that "... discourses about practice are meaningless if not related to engagement in practice."

Action Research has been chosen as the research methodology for this thesis, as it emphasises the reflective relationship between research and practice, allowing for their simultaneous development. In this research, AR can be considered as the way in which theory and practice are linked, providing the means by which relevant and rigorous lessons can be drawn from the relationship and interaction between practice and theory. It is a "... research strategy that integrates theory and practice through change and reflection ..." (Lau, 1997, p. 32). Although insight has been sought from the AR community in general (e.g. Stringer 1999), the form of AR used in this research has predominantly been based on that developed in association with SSM by Checkland and collaborators (e.g. Checkland, 1999).

AR is a very flexible approach to research. It is ideographic, not nomothetic; intensive, not extensive; theory driven, not data driven, and can be based in positivism or interpretivism (Mingers, 2003b, p. 238). Dick (1999, p. 2) identifies that because Action Research can be viewed as having two different outcomes: research outcomes; and action outcomes, it "... therefore requires two sets of procedures, one to achieve each of the outcomes." Different procedures have therefore been used to achieve results in terms of research and action, and this is reflected in Figure 4. In practice, goals were achieved using an Embedded combination of PM and SSM. Research goals were achieved through a particular style of AR (Checkland & Holwell, 1998a, p. 23), which emphasises the need for research to be explicit about the different intellectual frameworks which inform the research process.

As can be seen in Figure 4, two main areas inform the theoretical framework for this thesis: an understanding of the philosophical and practical differences between the hard and soft paradigms, informed by a wide variety of authors in the systems fields, education and social sciences; and an interpretive epistemology, predominantly informed by the philosophy of hermeneutics developed by Hans-Georg Gadamer (1996; 1998). An interpretive framework was considered appropriate to research into the practical application and combination of methodologies. This research works with the assumption that it is problematic to assume that statements regarding the use of methodologies, their efficacy and their appropriateness, should be made from a realist or positivist perspective. Rather, it is assumed that "... one's reading of a methodology is not impartial: it is filtered through the intervener's interpretive framework of ideas ..." (Midgley, 2000, p. 275), and thus learning concerning the use of a methodology or model must be understood in relation to the researcher's personal perspective. A hermeneutic research framework has proven appropriate for eliciting and understanding the influence of the research on research findings.

### **The project and learning outcomes**

Review of the literature on the approaches applied in practice, in Chapters 4, 5 and 6, has led to five different research questions, each of which addresses an aspect of the

research focus, and which are subsequently explored in practice. The five research questions follow.

- How appropriate was SSM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?
- How appropriate was PM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?
- Were difficulties encountered in using tools and techniques obliquely, operated under a paradigm other than that for which they were originally developed?
- Were practical or philosophical problems encountered in combining PM and SSM in such a way that equal emphasis was placed on the hard and soft paradigms in the IT / CT Platform Project?
- Was Embedding effective as a model for combining PM and SSM in the IT / CT Platform Project?

The pluralist combination of SSM and PM was studied in the context of the IT / CT Platform Project, an internal strategy development project within HPRB. The main deliverable for the project was an IS / IT strategic plan for HPRB, which was to act as the basis for debate on organisational IS / IT development needs over the next five years. HPRB is an agency of approximately 53 full-time equivalent staff, which provides professional, policy, administrative and financial support for nine independent statutory health professionals Boards, which in turn enables the Boards to provide a variety of services associated with the registration of health professionals in New South Wales. HPRB maintained a register of approximately 118,000 registered health professionals within NSW. To date, IS / IT support has been delivered within the Agency in a very cost-effective manner, through the combination of generic software applications, small, purpose built systems, the careful management of legacy systems and the use, where possible, of Government IS / IT services.

This organisation was set within the context of an increasing emphasis on electronic service provision within the NSW public sector. A variety of plans and guidelines (e.g., NSW Premier's Department, 2000a; NSW Premier's Department, 2002c; NSW Premier's Department, 2003; NSW Government, 1998; Office of Information Technology, 2002c) outlined requirements and guidance for the development of information systems and information technology within the NSW public sector.

The context for the project was dynamic, set in an environment of changing influences and stakeholder relationships. The project involved considerable exploratory work, aimed at developing a clearer understanding of the project, its goals, environment and the influences of the relevant stakeholders, as is typical for public sector projects (Hassen, 1997, p. 279), and often needed in projects which address the provision of information on and through IT (Checkland & Holwell, 1998a, p. 40). In response to the changing and developing goals for the project and the organisation, the approach taken to the project involved an emphasis on discussion, debate and the facilitation of learning, in order to stay abreast of environmental changes. Project processes were highly participative, involving a wide variety of internal and external stakeholders throughout the life of the project, and resulted in the delivery of an *IS / IT Strategic Plan for HPRB* (HPRB, 2003) that key stakeholders identified as successful and can be demonstrated to have provided ongoing benefit within the organisation.

Action Research cycles of reflection and action continued throughout the intervention, as a process of continually checking personal experiences against theoretical guidance from the literature. Reflection on the IT / CT Platform Project in relation to the literature on Embedding, CST, PM and SSM was used to elicit learning based on the relationship between theory and practical experience. This reflection is used to identify a selection of learning outcomes, which apply to the use of Embedding as the basis for combining SSM and PM, in environments with changing goals and needs.

As this is practice based research, the learning that results from this research is inherently context based. This research does not directly test theories or produce universal generalisations that I can claim are applicable in all situations at all times. However, this research does result in learning in relation to a number of different fields, and results in learning outcomes which may be used to inform practitioners when faced

with similar circumstances<sup>7</sup>. Learning outcomes cannot be proven in the same way as are hypotheses in the positivist frame of research. Rather, learning outcomes are developed over time by different practitioners rigorously reflecting on the application of principles in practice, and become transferable as generalities between different practice environments become apparent. Guidelines for practice are contributed to, not unilaterally defined through a single piece of research.

Reflection on practice has led to the identification of twelve specific learning outcomes, developed in relation to the research questions identified above, and which contribute to an understanding of the research focus. These learning outcomes relate to a variety of areas, such as the use of approaches governed by paradigms other than those they were originally designed for. New variants on the project life cycle have been created, which were found useful in informing practice and structuring work in a turbulent environment. Learning was elicited in relation to the hard and soft paradigms, in terms of ways of differentiating between them through personal reflection and in terms of the process of changing between the paradigms. Reflection on practice has led to learning regarding the use of Embedding as the model for pluralist practice, and the benefits that are provided by Embedding. Links are also made between the appropriateness of particular PM lifecycle models and the use of Grafting and Embedding in different project contexts.

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<sup>7</sup> Discussed in detail in Chapter 8.

## Part B

|                                       |  |
|---------------------------------------|--|
| Part A:                               | 1) Introduction  |
| Part B: Research framework            | 2) Hard and soft paradigms<br>3) Research methodology                        |
| Part C: Methodologies for application | 4) Soft Systems Methodology<br>5) Project Management<br>6) Pluralism and CST |
| Part D: The project                   | 7) IT / CT Platform Project<br>8) Reflection and learning                    |
| Part E:                               | 9) Conclusion  |

Figure 5: Part B: Research framework

Part B establishes the research framework for this thesis. This is established in two parts. In Chapter 2, I discuss the differences between the hard and soft paradigms, and how these differences have resulted in different approaches to research and practice. The differences between the paradigms are discussed through reference to the hierarchical relationship between paradigms, methodologies, methods, tools and techniques. The problem of paradigmatic incommensurability is then discussed, through reference to this hierarchical relationship.

Chapter 3 discusses Action Research, a research methodology which emphasises the mutual development of theory and practice, and allows the researcher to perform a practical investigation of a particular area of interest, or research focus, without a specific hypothesis. In this chapter I also discuss the intellectual framework which informs this research, predominantly drawing upon the form of hermeneutics developed by Hans-Georg Gadamer.

## **Chapter 2 – The hard and soft paradigms**

"I can readily agree with the positivists about the things they want, but not about the things they reject ... Positivist insistence on conceptual clarity is, of course, something I fully endorse, but their prohibition of any discussion of the wider issues, simply because we lack clear-cut enough concepts in this realm, does not seem very useful to me – this same ban would prevent our understanding of quantum theory" (Heisenberg, 1971, p. 208).

### **Introduction**

Over the last few decades a great deal has been written about the hard and soft paradigms. The hard paradigm has been alternatively referred to as rationalistic, positivistic, scientific, reductionist (Oakley, 2003, p. 26) or quantitative (Higgs, 2001, p. 46), while the soft paradigm has alternatively been referred to as hermeneutic, qualitative, phenomenological, interpretive, reflective, inductive or ethnographic (Ticehurst & Veal, 2000, p. 20). The dichotomy between the paradigms has been a pivot point in the development of many academic and practical disciplines. "The history of the philosophy of social science can be read as having been refracted through the constructivist-realist dichotomy ..." (Delanty, 1997, p. 110). Of the two paradigms, the hard paradigm is consistently reported as the more popular (Brocklesby, 1997, p. 191; Wolstenholme, 1999, p. 423; Mingers, 2003b, pp. 243 – 4). However, the establishment of soft systems thinking as the alternative to hard systems approaches "... was an event of great significance in systems thinking" (Jackson, 2000a, p. 41), and "... the debate has to date played an important role in promoting 'soft' research to a more equal footing" (Fitzgerald & Howcroft, 1998, p. 313).

Indeed, it is this divide between the hard and soft paradigms which occupies the heart of this thesis, as this research examines the consequences of, and benefits to be gleaned from, applying methodologies developed from both of these paradigms in the same project. This chapter examines the hard and soft paradigms, and their implications for research and practice. An understanding of the differences between these paradigms was found to be fundamental to an informed appreciation and practical combination of PM and SSM in the IT / CT Platform Project, through an awareness of the different foci and emphases that the paradigms bring to bear on a problem situation. The purpose of this



chapter is then to develop an appreciation of the understanding that I as both practitioner and researcher had of the different paradigms, so that the reader might understand how this subsequently affected both the actions taken and how these actions and their results were interpreted.

The hard and soft paradigms are often considered to be incommensurable, and thus incompatible, with researchers and practitioners working with the assumption that one is to make a choice between the paradigms. Were this assumption true, it would lead to significant difficulty for a piece of Action Research, such as this one, which seeks to practically combine methodologies from the hard and soft paradigms. The boundaries between the paradigms are explored in this chapter, and literature is highlighted which illustrates some areas where the distinction between the hard and soft paradigms starts to blur. Differences between the paradigms are discussed at the philosophical and conceptual levels, before their influence on the methodologies, methods, tools and techniques of research and practice are examined.

The pragmatic reader might wonder as to the benefit of examining paradigms in favour of proceeding directly to the examination of practice. The influence of a paradigm on practice can be subtle, but it is pervasive, affecting what is done, how it is done and why it is done. For instance, management science methods from different paradigms "... all have in common the basic mechanism of *modelling*, but they differ in terms of *what* they model (ontology), *how* they model (epistemology), and *why* they model (axiology)" (Mingers, 2003a, p. 559). Although the debate between the hard and soft paradigms has heavily influenced the development of the systems field, it is only starting to make a significant impact upon project management. "The terms 'hard' and 'soft' are commonly used in practice and within the literature on general and project management in a loose and ambiguous way ..." (Crawford & Pollack, 2004, p. 645). Use of these terms was found to be increasing (p. 645), with writers in the project management literature having recognised that identification and response to the differences between hard and soft aspects of project management can influence project success (e.g. McElroy, 1996; Wateridge, 1999; Yeo, 1993; Williams, 1999; Williams & Hillson, 2002; Jaafari, 2001). Nonetheless, little consistent recognition of the possibility of applying approaches based in different paradigms, to meet the needs of different problem situations, exists within the PM literature. Exceptions include the

acknowledgement that hard and soft issues require different approaches (Yeo, 2002), that hard approaches more often rely on quantifiable data (Williams, 1999), and that softer approaches tend to use non-quantitative data (Jafaari, 2001). In an effort to further address this, Crawford and Pollack (2004) analyse the implications of the hard and soft paradigms for project management practice, predominantly focusing on practice at the levels of methods, tools and techniques. This research develops the ongoing exploration of the influence of the hard and soft paradigms and their pluralist combination in a project management context.

At this point in this thesis it should be noted I acknowledge that more than two paradigms exist. In 1979, Burrell and Morgan identified four different paradigms of relevance to social science. At the time of writing, it was common to distinguish between three, not two, paradigms in systems thinking: hard; soft; and critical (e.g. Mingers, 2003a, p. 550). Although this thesis makes significant reference to research developed under the banner of Critical Systems Thinking, in that it informs pluralist practice, this research is predominantly concerned with the relationship between the hard and soft paradigms. It is beyond the scope of this thesis to provide a detailed account the history of the development of the hard and soft paradigms. Interested readers are referred to analyses by Midgley (2000) and Jackson (2000a), who address the development of the systems field, including the influence of the hard and soft paradigms. Enthusiastic readers are also referred to Midgley's (2003b) four volume set of edited papers, representing pivotal points in the development of the systems field.

## **The Schema**

A paradigm constitutes a way of understanding the world which has the tendency to dominate thinking in a research community. The influence of a paradigm can be seen in both the extremes of abstraction and practicality; from what a person considers valid as knowledge, to the way in which a practitioner applies a technique. In order to understand how approaches from different paradigms can be combined, it is first necessary to understand the relationship between the different levels of abstraction associated with the hard and soft paradigms, in particular the path from paradigm, to methodology, to method, to tools and techniques. The relationship between paradigm, methodology, method, tools and techniques can be thought of as a hierarchy (See Figure

6), such as that provided by Ragsdell (2000). Other researchers also note the value of perceiving paradigms as hierarchies and at different levels of abstraction (e.g. Mingers & Brocklesby, 1997; Fitzgerald & Howcroft, 1998, p. 318).

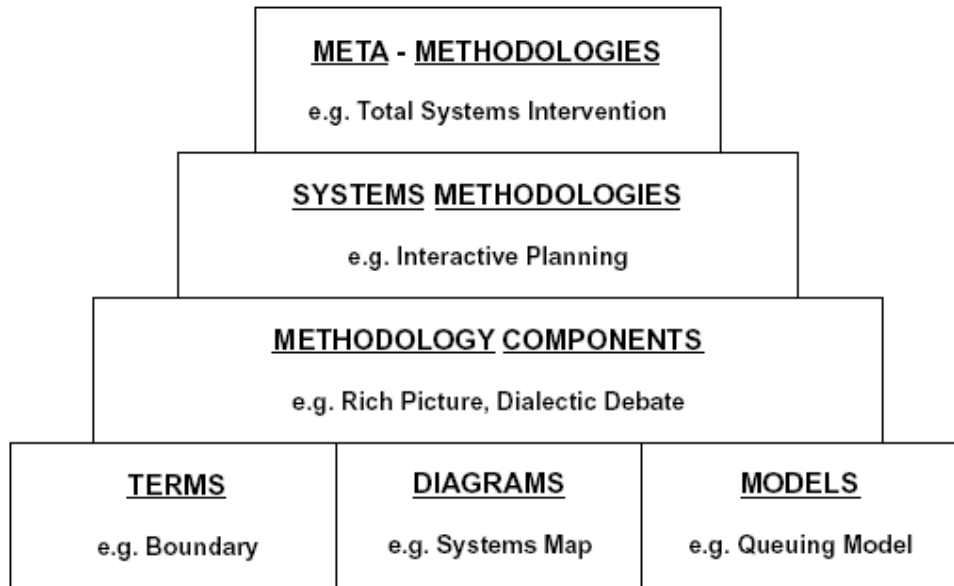


Figure 6: Hierarchy of systems tools (Ragsdell, 2000, p. 106)

However, for the purpose of this discussion of the research methodology, the above diagram has been restructured. The paradigm, methodology, method, tool and technique hierarchy is henceforth referred to as *The Schema* (See Figure 7).

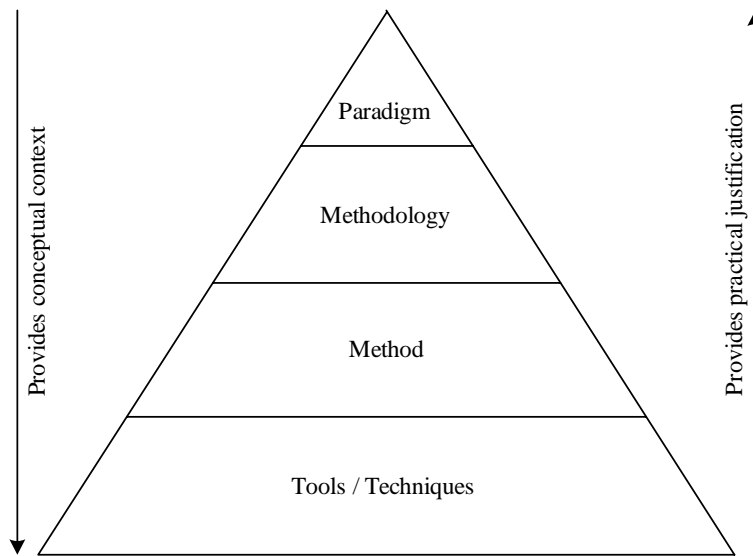


Figure 7: The Schema: a hierarchical relationship between the theoretical and practical

To avoid confusion, it is useful to define some of these terms. It is considered outside the scope of this thesis to develop an in-depth examination of what constitutes theory or philosophy, and as such they will be defined only on a functional basis. Philosophy and theory are seen as providing a formal conceptual framework for examining the world; an explicit perspective through which the world can be viewed. Likewise, 'paradigm' is broadly defined as "... a world view, spanning ontology, epistemology and methodology ..." (Healy & Perry, 2000, p. 121), "... based on a set of fundamental philosophical assumptions that define the nature of possible research and intervention." (Mingers, 1997b, pp. 429 – 30). Readers interested in a more thorough exploration of the ontology of paradigms are referred to Kuhn's (1962) *The Structure of Scientific Revolutions*.

Methodology develops within a particular paradigm and embodies the philosophical principles and assumptions of the paradigm (Mingers & Brocklesby, 1997, p. 491; Mingers, 1997b, pp. 429 – 30). Methodology differs from theory and philosophy in that it contains practical guidelines. Checkland (1981, p. 162) places methodology as the middle ground between philosophy and technique, containing elements of both, as while "... a technique tells you 'how' and a philosophy tells you 'what', a methodology will contain elements of both 'how' and 'what'." Methodology is here considered to be "... the logos of method ..." (Checkland, 1999, p. S36). It provides the principles on which method is based (Checkland, 2002, p. 105), and can be considered "... a higher-order

term than method and, indeed, than procedures, models, tools, and techniques, the use of all of which can be facilitated, organized and reflected upon in methodology" (Jackson, 2000a, p. 11). Similarly, learning about the effectiveness of a methodology can be linked to an understanding of the role of a paradigm in supporting the methodology (Jackson, 1999, p. 18).

Although a methodology may be a structured set of guidelines for the improvement of the effectiveness of an intervention (Mingers, 1997a, p. 1; Mingers, 1997b, pp. 429 – 30; Mingers & Brocklesby, 1997, p. 491), methodology still leaves room for interpretation. Methodology, for the purposes of this research, is perceived "... not as a prescription to be followed but as an explicit framework of guidance for sense making, leading to processes which can both be described and recovered" (Checkland & Holwell, 1998a, p. 169). As methodology then plays a role in sense making, the realisation of methodology in practice can never be entirely separated from the practitioner, who will bring their own history and values to any application of the methodology. "This means that it will never be independent of the user of it, as is technique" (Checkland & Scholes, 1990, pp. 284 – 5). Every use of methodology will be both situation-specific and user-dependant (Checkland, 2002, p. 106).

Method has a similar relationship to technique as that between methodology and method; "... a 'method' being an interrelated series of techniques oriented to achieve a specific purpose" (Midgley, Munlo & Brown, 1998, p. 476). Methods may include representational guidelines, such as modelling techniques, and procedural guidelines, which describe how work is to be conducted (Lind & Goldkuhl, 2002, p. 4). Although the distinction between methodology and method is not precise, methodology makes greater reverence to the philosophical principles of the parent paradigm, while method places greater emphasis on the coordinated application of technique, often by prescribing the sequence of activities to be taken. Method makes greater reference to the specific needs of a practice environment than methodology does. "The task of the user of a systems methodology is to embody the principles of the methodology in a *method* suitable for the specific situation addressed" (Checkland, 2002, p. 105 – original italics). 'Method' is used in this research in a way that is roughly analogous to how 'process' tends to be used in PM texts (e.g. PMI, 2000).

Techniques and tools, compared to the elements in the layers above them, are the most user independent, as they have been refined to a series of clearly delineated steps that admit little scope for individual interpretation. As such, they also allow for the creation of the clearest standards for their use, and thus the least ambiguous evaluation of the success or failure of their implementation. Techniques are specific activities with well defined purposes (Mingers, 1997b, pp. 429 – 30; Mingers & Brocklesby, 1997, p. 492), and can "... lead to an end point without the need for reflective intervention ..."

(Rosenhead, 1997, p. xiii). A tool is an artefact, such as computer software, that can be used to perform a particular technique (Mingers, 1997b, pp. 429 – 30; Mingers & Brocklesby, 1997, p. 492).

Referring back to *The Schema* (Figure 7), in order to understand the different layers in the hierarchy, it is also necessary to observe the relationship between the layers. The position on the hierarchy relative to other elements can be seen to signify a relationship of either theoretical contextualisation or practical justification. The upper layers in *The Schema* can be thought of as constituting the conceptual basis for the increasing practicalities in the successively lower layers. Philosophy provides a conceptual basis for methodology, methodology for method, and method for tool or technique. Each layer above provides an intellectual context for the layer below, setting a basis against which consistency of thought can be judged. The philosophical aspects of a paradigm provide the 'why' for methodology, while the methodology specifies 'what', and the technique specifies 'how' (Mingers, 1997b, pp. 429 – 30). More can be learnt about the application of the lower layers by reflecting upon their links to upper layers. One can "... learn more about these tools by reflecting on their links to methodologies, or about methodologies by reflecting on their links to theory" (Jackson, 1999, p. 19). Similarly, testing the real-world efficacy of the practice outlined in the lower layers provides justification for statements made in the upper layers. Practical application of the lower layers can be used to test the validity of claims made in the upper layers, resulting in either validation of claims or the need to reassess and rework statements about the nature of the world. Thus, it can be seen that "... philosophy, methodology and practice are all necessary for systemic intervention to flourish, and that each one of them should inform the other" (Midgley, 2000, p. 273).

## Differences between the hard and soft paradigms

Having established differences between the different levels of abstraction, and the relationship between paradigms and practice, we can examine the differences between the hard and soft paradigms. There "... is little value in a simplistic definition of 'hard' or 'soft' ..." (Crawford & Pollack, 2004, p. 651), as is demonstrated by the wide variety of authors who have contributed to discussion of the differences between the hard and soft paradigms. Perhaps the most significant contribution is from Burrell and Morgan (1979), who provided a system of four polarities for analysing philosophical assumptions about the nature of social science (See Figure 8). Discussion of the differences between the hard and soft paradigms will also be aided by systems of dichotomy produced by Fitzgerald and Howcroft (1998), who focus on philosophical differences and how they relate to research (See Figure 9), Spencer, Ritchie et al (2003), who examine tendencies for association with qualitative and quantitative research (See Figure 10), and Crawford & Pollack (2004), who focus on the influence of the hard and soft paradigms on PM practice (See Figure 11).

| The subjectivist approach<br>to social science |              | The objectivist approach<br>to social science |
|--|--------------|---|
| Nominalism                                     | Ontology     | Realism                                       |
| Anti-positivism                                | Epistemology | Positivism                                    |
| Voluntarism                                    | Human Nature | Determinism                                   |
| Ideographic                                    | Methodology  | Nomothetic                                    |

Figure 8: The subjective-objective dimension (Based on Burrell & Morgan, 1979, p. 3)

|              |              |               |
|--------------|--------------|---------------|
| Soft         |              | Hard          |
| Relativist   | Ontology     | Realist       |
| Interpretive | Epistemology | Positivist    |
| Subjectivist |              | Objectivist   |
| Emic/Insider |              | Etic/Outsider |
| Qualitative  | Methodology  | Quantitative  |
| Exploratory  |              | Confirmatory  |
| Induction    |              | Deduction     |
| Field        |              | Laboratory    |
| Idiographic  |              | Nomothetic    |
| Relevance    | Axiology     | Rigour        |

Figure 9: Summary of 'soft' v. 'hard' research dichotomies (Based on Fitzgerald & Howcroft, 1998, p. 319)

|                         |                                    |
|-------------------------|------------------------------------|
| Quantitative            | Qualitative                        |
| Scientific              | Naturalistic                       |
| Positivist              | Interpretivist/hermeneutic         |
| Realist                 | Idealist/relativist/constructivist |
| Objectivist/materialist | Subjectivist                       |
| Foundational            | Fallibilistic/anti-foundational    |
| Experimental            | Ethnographic                       |

Figure 10: 'Quantitative' and 'qualitative' research paradigms (Based on Spencer, Ritchie et al, 2003, p. 45)

|                            |                            |                       |
|----------------------------|----------------------------|-----------------------|
| Soft                       |                            | Hard                  |
| Ill-defined goals          | Goal clarity               | Clearly defined goals |
| Abstract concept           | Goal tangibility           | Physical artefact     |
| Qualitative                | Success measures           | Quantitative          |
| Open boundary              | Project permeability       | Closed boundary       |
| Many options               | Number of solution options | Single solution       |
| Facilitation/participation | Participation and role     | Expert driven         |
| Debate/negotiation         | Stakeholder expectations   | Technical performance |

Figure 11: Hard and soft dichotomies in PM practice (Based on Crawford & Pollack, 2004, p. 650)



## **Philosophical differences between the hard and soft paradigms**

At the level of ontology, the hard soft dichotomy is between realism on one side and nominalism or relativism on the other. Ontology relates to the nature of objects in the world. The realist perspective, associated with the hard paradigm, postulates that a world exists, external to, and independent of, individual cognition. The structures in this world are considered to exist, regardless of whether they are named, classified, or even known (Burrell & Morgan, 1979, p. 4). The external world is considered to consist of "... pre-existing hard, tangible structures ..." (Fitzgerald & Howcroft, 1998, p. 319). The "... realist perspective relies upon the availability of a set of formal constraints which have the characteristics of abstractness, generality, invariance across contexts" (Wilson, 1999, p. 162), to which all people essentially have equal and unvarying access.

Approaches based in the hard paradigm focus on gaining knowledge about the real world (Jackson, 1999, p. 21). Both the nominalist and relativist perspectives view reality as being interpreted through the labels and terms through which we make sense of it. There is no single and unambiguous structure to reality (Burrell & Morgan, 1979, p. 4), but rather reality is constructed in a way that "... will vary across different languages and cultures" (Fitzgerald & Howcroft, 1998, p. 319). Unlike those based on the hard paradigm, approaches based in the soft paradigm focus on developing an understanding of a variety of different perspectives on a situation (Jackson, 1999, p. 21).

Epistemology relates to the nature of knowledge. The hard and soft perspectives exhibit markedly different positions on the nature of reality and the possibilities for our having knowledge about it. At the level of epistemology, the divide between the hard and soft paradigms is typified by the positivist and interpretivist perspectives respectively. The logical positivists, starting with Hume, Russell and the early writings of Wittgenstein, relied on the principle of verifiability, rejecting as meaningless any statements without a direct empirical basis, such as those of metaphysics, ethics, theology and the validity of subjective experience (Wilson, 1999, p. 162). Positivist approaches assume the existence of universal laws, and the possibility of observer and value freedom in the natural and social sciences (Mingers, 1997a, p. 3), with empirical evidence being seen as "... the ultimate arbiter between theories" (Flood & Romm, 1997, p. 299). It could be said that the positivists won the debate between the paradigms, because the "...

dominant epistemological position subsequently expounded in the social science literature was and remains positivism" (p. 299).

Burrell and Morgan (1979) place anti-positivism in opposition to positivism, while other authors (e.g. Jackson, 2000a; Checkland & Holwell, 1988a; Weber, 2004) place interpretivism in this place. Regardless of the label with which it is expressed the qualities of the soft alternative to a positivist epistemology are broadly consistently described. No single body of work underlies the interpretive approach (Checkland & Holwell, 1998a, p. 46). It relies upon the philosophies of phenomenology and hermeneutics (Greene & McClintock, 1991), and includes approaches such as critical theory, social constructivism, and feminist evaluation (Kazi & Spurling, 2000). The social world is understood from the individual's point of view, rejecting the validity of the external observer (Burrell & Morgan, 1979, p. 5). The focus in understanding is on uncovering constitutive meaning in relation to social rules, practices and values (Flood, 1999, p. 56), with the belief that facts are only relevant in relation to standards of value (Vickers, 1968, p. 134) and that "... ideas matter ultimately only in proportion to their relevance to lived experiences" (Checkland & Holwell, 1998a, p. xiv). Social context plays an important part in understanding human phenomena. "Individuals simultaneously both remain free and are conditioned by their membership of a group" (p. 221). For an interpretivist perspective, the similarities in experience we share are simply objectifications, which are "... continually being constructed and re-constructed in dialogue and discourse among human beings, and in action which they take" (p. 22). Our theories about reality are then "... ways of making sense of the world and shared meanings are a form of intersubjectivity rather than objectivity" (Walsham, 1993, p. 5).

### **Conceptual differences**

An understanding of the differences between the hard and soft paradigms can be further developed by an examination of two concepts that the paradigms interpret in different ways: systems; and organisations. Particularly within the field of systems thinking, the term 'system' is used in significantly different ways by the different paradigms (Checkland, 1999, p. A10). The hard paradigm assumes the world to be objectively systemic (Jackson, 1999, p. 21), a set of systems which can then be engineered to meet particular objectives (Checkland & Holwell, 1998a, p. 41). This perspective can be

linked to a functionalist basis in the hard paradigm (Jackson, 1997a, p. 205; Jackson, 2003, p. 78), where systems in the world are perceived as similar to mechanistic processes, with stable, or predictably varying, relationships between the relevant variables. Systems are then understood in terms of the function that they perform (Clarke & Lehaney, 1997). The soft paradigm, on the other hand, makes "... no assumption that the real-world is systemic ..." (Jackson, 1999, p. 21). Systems concepts are useful devices and the definition of aspects of reality as systemic is seen as an intellectual tool, a framework for analysing aspects of perceived experience, instead of direct perception of reality. For the soft paradigm "... reality is not systemic, but it can be worthwhile to *define* it as systemic" (Checkland, 2000, p. 809). Reality itself may not be systemic, but the processes by which we come to understand the world can still be conducted in a systemic fashion (Checkland & Scholes, 1990, p. 25) (See Figure 12).

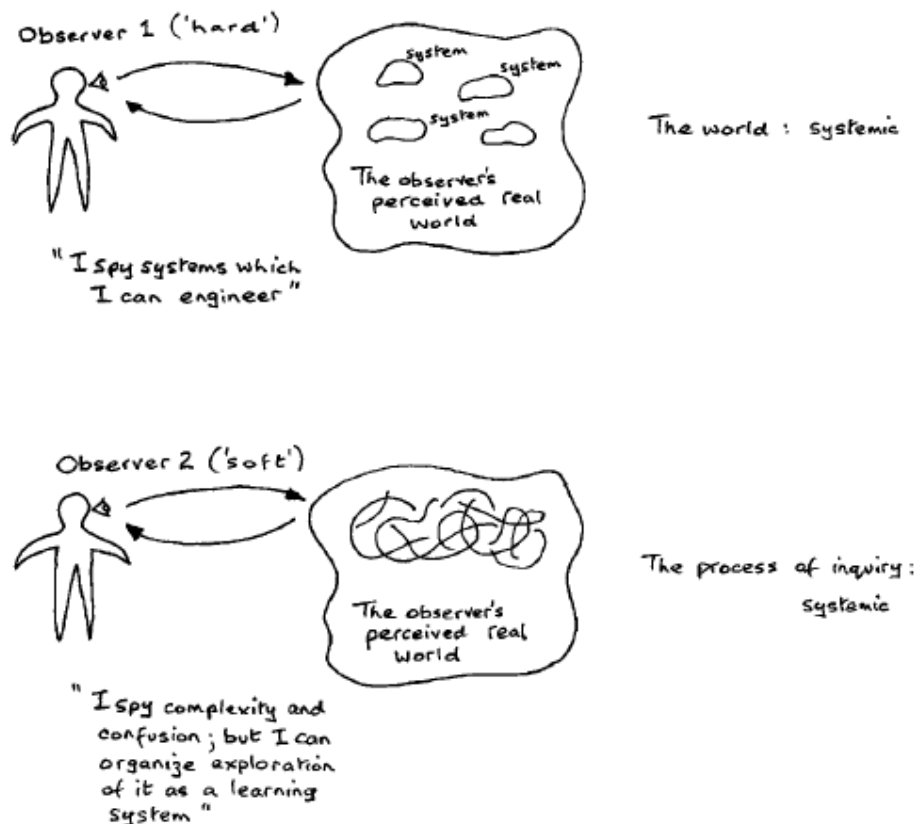


Figure 12: The hard and soft systems stances (Checkland, 1999, p. A11)

The hard paradigm tends to assume that people in an organisation act in predictable ways, with their actions being determined by their environment (Lane, 2000). "The

'hard' approach assumes that organizations are goal-seeking entities ..." (Checkland & Holwell, 1998a, p. 62). This is an extension of the functionalist emphasis within the hard paradigm, in which an organisation as a whole is treated somewhat like a machine to be engineered (Yeo, 1993; Lane, 2000, p. 6). In the hard paradigm, the "... machine metaphor is dominant. The goals of the controllers of the system are taken as given and the system parts are logically arranged to achieve maximum efficiency" (Jackson, 2000a, p. 136). The soft paradigm views human organisations more "... as cultural products, generated and maintained by actions and events rather than by components and feedback ..." (Beeson & Davis, 2000, p. 183). Organisations are seen as "... relationship managing entities ...", with goal seeking only being a special and occasional case in the continuing process of managing social relationships (Checkland & Holwell, 1998a, p. 62). Munro (1999), however, argues that soft systems thinking has not entirely escaped the machine centred view of human organisation, in that human organisations are still understood in terms of production and social utility, and measured in terms of efficiency and effectiveness. These concepts are explored further in relation to how they are embodied in PM and SSM, in later chapters.

### **Research and practice in the hard and soft paradigms**

Although variations exist, such as Oakley's (2003) system for determining the paradigmatic basis of research based on the referencing style of research papers, the qualities identified as associated with research and practice in the hard and soft paradigms in Figures 8 to 11 are broadly consistent across the literature. Of these dichotomies, some can be seen as transcending a divide between research and practice, while other qualities can be seen as being more related to research or to practice. The appropriateness to research and practice of approaches associated with the hard and soft paradigms can be thought of as context dependant. The extent that a "... research question is broad or narrow depends on purpose, the resources available, the time available, and the interests of those involved. In brief, these are not choices between good and bad, but choices among alternatives, all of which have merit" (Patton, 1990, p. 166). Different approaches can then be seen as suited to different tasks, contexts and practitioners.

The System of Systems Methodologies (SOSM), originally developed in 1984 provides a classification of problem contexts to which different approaches are suited (Jackson & Keys, 2003). SOSM, then, provided a framework by which "... the methodologies most suitable for the different classes of problem context are identified" (p. 59), and provides a basis for choice between different methodologies (Mingers & Brocklesby, 1997, p. 490; Midgley, 1997, p. 254). SOSM was originally based on four categories of problem contexts: mechanical-unitary; systemic-unitary; mechanical-pluralist; and systemic-pluralist (Jackson & Keys, 2003, p. 64). These four categories were aligned as two sets of dichotomies, one which defined the nature of the systems in which the problem of concern is located, and one which described the relationship between participants (Jackson, 1997b, p. 349). Decision makers and the problem situation fit into either of the unitary categories if there is agreement on goals within the problem situation. Decision makers and the problem situation fit into either of the pluralist categories if there is a lack of agreement on a common set of goals and objectives (Jackson & Keys, 2003, p. 63). The mechanistic – systemic dichotomy related to the level of complexity in the problem situation. This four category system was later expanded to six categories by Jackson (1987, p. 155), who included the possibility of coercive, power-dominated participant relationships (See Figure 13). SOSM was not attempting to provide a description of all possible situations to which systems methodologies could be applied. Rather, 'ideal-type' problem situations were presented, that could be used to "... classify methodologies according to their assumptions about problem situations" (Jackson, 1999, p. 15), increasing the possibility for "... critical reflection on methodology choice" (Midgley, 1997, p. 254). Given this, Midgley advises that SOSM should be used to offer direction to thinking, but not to direct it (p. 255). SOSM has been interpreted in a variety of different ways "... and certainly the originators themselves differ on the matter" (Mingers, 1997a, p. 8).

|        |         | Relationship between participants  |   |   |
|--------|---------|--|---|---|
|        |         | Unitary  | Pluralist   | Coercive  |
| System | Simple  | Simple-Unitary: key issues are easily appreciated, and general agreement is perceived between those defined as involved or affected.       | Simple-Pluralist: Key issues are easily appreciated, but disagreement is perceived between those defined as involved or affected.       | Simple-Coercive: key issues are easily appreciated, but suppressed disagreements are perceived between those defined as involved or affected.       |
|        | Complex | Complex-Unitary: key issues are difficult to appreciate, but general agreement is perceived between those defined as involved or affected. | Complex-Pluralist: key issues are difficult to appreciate, and disagreement is perceived between those defined as involved or affected. | Complex-Coercive: key issues are difficult to appreciate, and suppressed disagreements are perceived between those defined as involved or affected. |

Figure 13: The system of systems methodologies (based on Midgley, 1997a, p. 253)

The hard and soft paradigms are based on very different assumptions, differences which "... will lead to very different approaches to doing research; and very different bodies of knowledge will emerge from that research" (Checkland & Holwell, 1998a, p. 49). The hard paradigm's approach to research emphasises a transfer of natural science methods to human affairs (Jackson, 1997a, p. 205). The most respected approach to generating knowledge is still based in scientific investigation, "... since it produces 'public knowledge' which can be subject to public refutation" (Checkland & Scholes, 1990, p. 2). Research based on a positivist epistemology tends to assume that humans under study are predominantly passive and static (Kaplan & Duchon, 1988, p. 573), and emphasises formal propositions and hypothesis testing (Klein & Myers, 1999, p. 69) (See Figure 14). By comparison, "... the status of knowledge gained in the so-called social or human sciences is much less sure" (Checkland & Scholes, 1990, p. 3).

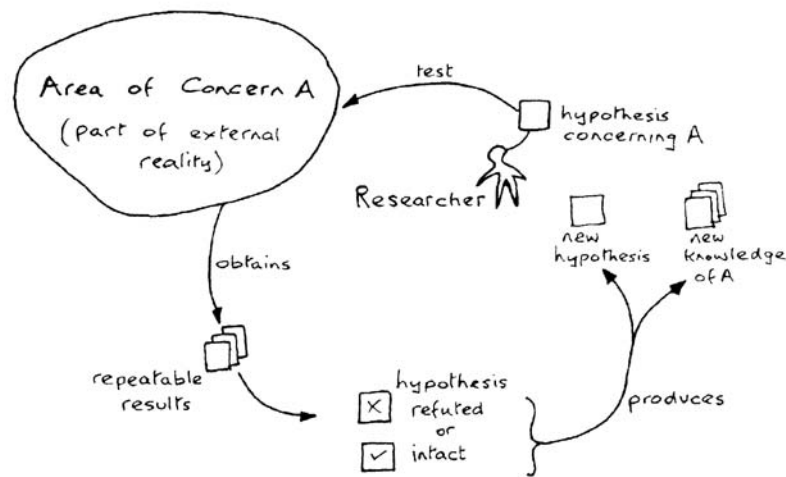


Figure 14: The cycle of positivist hypothesis-testing research in natural science (Checkland & Holwell, 1998a, p. 18)

While it is still the case that "... many different fields make the unquestioned assumption that 'research' means the testing of hypotheses" (Checkland & Holwell, 1998a, p. 19), this assumption is changing. Instead, the researcher can immerse themselves in a human situation, and follow it along the path it takes, as it unfolds. "This means that the only certain object of research becomes the change process itself. This is a difficult concept for those anxious to import hypothesis-testing into social research ..." (Checkland & Holwell, 1998b, p. 11). Research can be classified as interpretive if it is assumed that our knowledge of reality is developed through "... social constructions such as language, consciousness, shared meanings, documents, tools, and other artefacts" (Klein & Myers, 1999, p. 69). Ticehurst & Veal (2000, p. 19) have classified a variety of different approaches to research within a set of polarities, extending from quantitative and positivist research, to qualitative and critical-interpretive research (See Figure 15). My research is an example of Action Research, and would be placed towards the left of the polarity below.

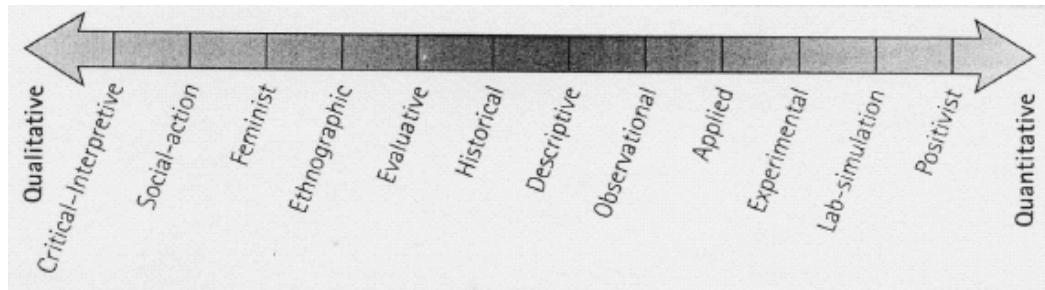


Figure 15: Approaches and methodologies (Ticehurst & Veal, 2000, p. 19)

Associations between the hard and soft paradigms and forms of data collection can also be seen. Quantitative data and techniques are generally associated with the hard paradigm, while qualitative techniques and data are generally associated with the soft paradigm in both research and practice (Munro, 1999, p. 513; Higgs, 2001, p. 46). Quantitative data is useful for simplifying complex situations, through the imposition of a common framework for analysis. This allows for broad generalisations to be made over large populations, based on statistically representative samples (Patton, 1990). As such, quantitative measures, which are used to provide data, which fits into pre-imposed frameworks for analysis, tend to be used in fields such as hard systems thinking (Stone, 1996). The objective in using quantitative techniques is often to provide "... scientific evidence for decision makers" (Rose & Haynes, 1999, p. 6). A necessary assumption is that the most important factors in a situation can be quantified through a predetermined scale (Munro & Mingers, 2002, p. 369), but given this, quantitative techniques can be used to translate subjective judgements into metrics (Leandri, 2001, p. 39), which then allows for simulation of the system through modelling techniques (Kirk, 1995) and use of mathematical techniques such as probability theory (Munro & Mingers, 2002, p. 369). These assumptions are tenable within the hard paradigm since it is also assumed that "... systems obey mathematical laws ..." (Jackson, 1999, p. 21). A significant contribution of the hard paradigm in social science and systems thinking was to popularise the use of mathematical models as aids to decision making (Jackson, 2000a, p. 135).

However, quantitative techniques face some limitations. Many important factors may not be able to be quantified (Munro & Mingers, 2002, p. 369), such as "... issues of meaning, attitude, or morale" (Pulley, 1994, p. 5). Cost, a common measurement in organisational settings, is arguably often inappropriately used (Korhonen, 2003, p. 26)



and is arguably only ever applicable to the parties of a market transaction (Vickers, 1968, p. 119). In many complex situations it is difficult to directly link effects to our actions and inactions (Vickers, 1965, pp. 72-3). In organisations it is often difficult to identify a single factor as being responsible for change (Van der Meer, 1999), with problems of causality often confounding attempts in social science to clearly measure outcomes (Rose & Haynes, 1999, p. 6). "There remain, however, important fields where this basic measurement is lacking and perhaps unobtainable ... the difficulty is largely due to the number of variables, some unidentified, which are operating at the same time" (Vickers, 1967, p. 17). In complex or changing situations it may not be clear how to measure relevant attributes, or what a quantification actually means. Quantitative techniques are then most useful when conditions are unambiguous (Reichardt & Cook, 1979, p. 8). Fashions apparently change in the way that research is conducted, and some authors are now suggesting "... mathematical models seem to be no longer in fashion, so that few authors now appear to believe that a good idea needs to be dressed up in borrowed mathematical clothes, as appeared to be necessary in the 1970s" (Crowe, 2002, p. 132).

A simple definition of qualitative research is that which relies on non-mathematical judgements (Higgs, 2001, p. 46). In a qualitative approach, uncertainties are not reduced to probabilities (Munro & Mingers, 2002, p. 369). Instead, the "... essence of qualitative inquiry is paying attention, being open to what the world has to show us, and thinking about what it means" (Patton, 1990, p. 140). The emphasis is on determining what exists in the research environment through observation and discovery, instead of assuming what kinds of things exist and then counting them (Fitzgerald & Howcroft, 1998, p. 319). Soft approaches then tend to come into their own exploring uncodified knowledge (Skyrme, 1997, p. 224), knowledge that has not yet been placed in categories. Qualitative techniques are often used to study groups and group interaction (Ticehurst & Veal, 2000, p. 47), and in analysing the cultural aspects of an organisation (Munro, 1999). Findings tend to not be generalisable, but rather specific to a case under investigation. The researcher is the actual research instrument in qualitative research, and any findings are subject to the influence of the researcher's personal perspective and preferences. "The validity and reliability of qualitative data depends to a great extent on the methodological skill, sensitivity, and integrity of the researcher..." (Patton, 1990, p. 11), as the researcher is the one who collects data, chooses what to notice and which

patterns to see in the interpretation process. Because of this, interpretive researchers tend to "... try to make their personal biases assumptions, etc., explicit when they describe their research ...", while researchers using a positivist epistemology tend to "... pay little attention to these matters when they describe their research" (Weber, 2004, p. vi).

Consistent differences can be seen in the assumptions that the hard and soft paradigms bring to the goals for research and practice. The "... goal seeking perspective was a foundation of the 'hard' systems approach ..." (Checkland & Holwell, 1998a, p. 46), with approaches based in the hard paradigm working with the assumption that goals are clearly defined at the beginning of an intervention (Jackson, 2000a, p. 136). For instance, Systems Engineering, a hard systems approach, "... answers the question *How* can this need be met? *What* the need is has already been defined" (Checkland & Scholes, 1990, p. 17). Similarly, hard approaches to research tend to be confirmatory, being concerned with hypothesis testing and theory verification (Fitzgerald & Howcroft, 1998, p. 319). Such approaches focus on "... the importance of activities sustaining pre-determined objectives in an economical, efficient and effective manner" (Brocklesby, 1995, p. 77), are aimed towards systematically finding the optimum means to reach a goal (Ho & Sculli, 1994, p. 48; Jackson, 1999, p. 21; Jackson, 2000b, p. S4), and "... are tested primarily in terms of their efficiency and efficacy ..." (Jackson, 1999, p. 21). Hard approaches work well when there is general agreement on objectives, and the problem is one of selecting the most efficacious means of reaching them (Checkland & Scholes, 1990, p. xiii). When there are multiple objectives, these are usually reduced to a single metric (Munro & Mingers, 2002, p. 369). However, hard approaches are also arguably only usable in stable and predefined circumstances (Jackson, 2000a, p. 137). In more ambiguous situations, it is not always clear how hard approaches should be started, as they tend to not address processes for accommodating between alternate perspectives on objectives (p. 136).

In contrast, soft approaches to research and practice tend to work with the assumption that problem situations often begin with no more than a vague feeling that there is some problem and that something should be looked at, "... both from the view of whether it is the thing to do and in terms of how to do it" (Checkland & Scholes, 1990, p. 17). As such they are suited to ambiguous situations, where goals are abstract or ill-defined

(Crawford & Pollack, 2004, p. 650). They focus on exploration, discovering patterns, laying the basic descriptive foundation and possibly the generation of hypotheses (Fitzgerald & Howcroft, 1998, p. 319). Soft approaches do not focus on optimisation. Rather, "... it is proposed that the 'best way' emerges from inter-subjective, rational argumentation" (Midgley, 2000, p. 196). An approach grounded in the soft paradigm allows for progress to be made without a problem necessarily being predefined "... in terms of means-end schemata ..." (Miles, 1988, p. 55), as it is understood that goals and other important attributes of a problem situation will become apparent through the process of exploration. This increased attention to problem definition "... reduces the chances of incorrect identification of the problem" (Kirk, 1995, p. 15). Indeed this difference between exploratory versus confirmatory research, and practice with ill-defined or well-defined goals can be seen as one of the central distinctions between the application of the paradigms. "We suspect that the most telling and fundamental distinction between the paradigms is on the dimension of verification versus discovery" (Reichardt & Cook, 1979, p. 17).

Differences between the hard and soft paradigms can also consistently be seen in research and practice in the relationship between the practitioner / researcher, participants / subjects, and the research environment in general in terms of an immersion – distance dichotomy. Approaches based on the hard paradigm tend to assume "... there is a single decision maker (or at least a consensual group) ..." (Munro & Mingers, 2002, p. 369), and are thus generally "... silent on the question of plural definitions of problem situations ..." (Brocklesby, 1997, p. 198). Interventions are conducted on the basis of expert knowledge (Jackson, 1999, p. 21), and solutions to problems are understood as not necessarily having to be transparent to the client to be effective (Munro & Mingers, 2002, p. 369). This tendency to be distanced from the object of study can also be seen in the emphasis that the hard paradigm places on research, which strives to control experimenter bias and the effect of context on variables (Kaplan & Duchon, 1988, p. 572), using a nomothetic perspective, which encourages systematic and scientific rigour (Burrell and Morgan, 1979, p. 3). In applied research "... the researcher acts in the expert role. Pure research calls for even less interaction with clients. Members of the client organisation are treated as passive subjects merely authorising the project and receiving results" (Ragsdell, 1998, p. 506). However, objective distance, control of variables and the production of reproducible

results comes at the cost of the naturalness of a situation (Fitzgerald & Howcroft, 1998, p. 319) and only "... buys 'objectivity' and testability at the cost of a deeper understanding of what actually is occurring" (Kaplan & Duchon, 1988, p. 572).

Approaches grounded in the soft paradigm tend to emphasise immersion, rather than distance. "Immersion in context is a hallmark of qualitative research methods and the interpretive perspective on the conduct of research" (Kaplan & Duchon, 1988, p. 571). It would be usual to expect soft approaches to recognise a range of decision makers and stakeholders (Munro & Mingers, 2002, p. 369), with whom the practitioner works directly, responding "... in real time, to the exigencies of whatever situation develops" (Brocklesby, 1997, p. 207). A variety of authors see a range of different benefits to a participative approach (e.g. Kirk, 1995, pp. 14 – 15; Ormerod, 1997, p. 420; Rose & Haynes, 1999, p. 13; Jackson, 1999, p. 21). However, as involving multiple participants in the research process may result in exposure to differing and potentially conflicting objectives and perspectives on the situation, the practitioner's role will often be that of facilitator of a group of participants (Munro & Mingers, 2002, p. 369), with techniques focused on structuring debate about possible changes (Jackson, 1999, p. 21). Expertise and knowledge are now acknowledged as being resident in the research participants themselves, instead of being brought in from outside. "If the intervener can be regarded as an expert at all, his or her expertise is in facilitation ..." (Midgley, 2000, p. 195). Due to the focus on involving participants, transparency and accessibility in the problem exploration process become important (Munro & Mingers, 2002, p. 369), and the success of an intervention is judged less in terms of the efficiency of delivery or the testing of a hypothesis, and more in terms of the alleviation of unease about a problem situation, with changes evaluated "... primarily in terms of their effectiveness, elegance and ethicality ..." (Jackson, 1999, p. 21). This corresponds to an idiographic perspective on research, which emphasises thoroughly getting to know the environment and people in question, through immersion in the situation under investigation (Burrell and Morgan, 1979, p. 3). Attempt is made to understand how other people "... construe, conceptualize, and understand events, concepts, and categories ..." (Kaplan & Duchon, 1988, p. 571). However, an emphasis on the naturalness of the context comes at the price of an inability to control variables or measure behaviour (Fitzgerald & Howcroft, 1998, p. 319).

## Paradigmatic incommensurability

The hard and soft paradigms are commonly thought of as incommensurable. The term 'incommensurable' is defined by the Oxford English Dictionary as "Having no common standard of measurement; not comparable in respect of magnitude or value" (Oxford University Press, 2004). The idea that there is no meaningful way to compare the hard and soft paradigms is supported by a variety of authors in the systems field (e.g. Flood, 1997, p. 8; Jackson, 2000a, p. 26). Different paradigms offer perspectives on objects and knowledge which are based on mutually contradictory propositions, being based in at least one set of mutually contradictory ontological or epistemological assumptions. This is illustrated in Burrell and Morgan's regularly reproduced model of four paradigms for social theory (See Figure 16). Different paradigms can then be thought of as mutually exclusive, "... since in accepting the assumptions of one, we defy the assumptions of all the others" (Burrell & Morgan, 1979, p. 25).

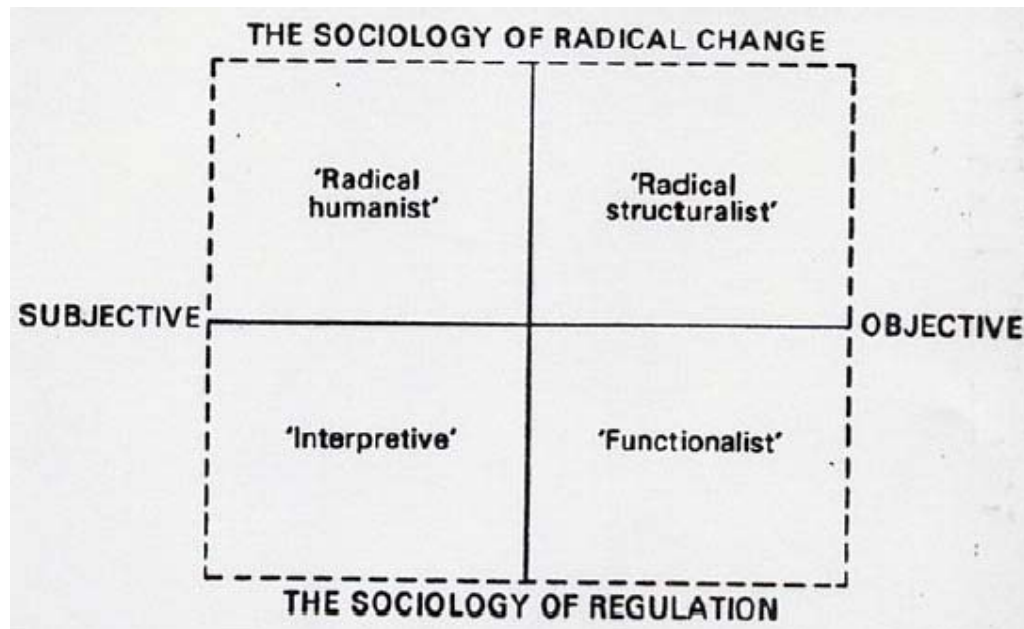


Figure 16: Four paradigms for the analysis of social theory (Burrell & Morgan, 1979, p. 22)

The incommensurability of paradigms can also be understood in terms of Gödel's Incompleteness Theorem. Gödel's proof, first published in 1931, involved "... the translation of an ancient paradox in philosophy into mathematical terms. That paradox

is the so-called *Epimenides paradox*, or *liar paradox*" (Hofstadter, 1980, p. 17 – original italics). Gödel showed that any system of arithmetic that can be developed is essentially incomplete. "In other words, given *any* consistent set of arithmetical axioms, there are true arithmetical statements that cannot be derived from the set" (Nagel & Newman, 1958, pp. 58 - 9 – original italics). By extension, it is then impossible to give a meta-mathematical proof of the consistency of a system which is comprehensive enough to encompass the whole of arithmetic (p. 58). There is no system of arithmetic that can be proven to be all inclusive, or true in all circumstances. Gödel's proof "... called attention in a most impressive way to the fact that a *proof* can be given of the *impossibility of proving* certain propositions within a given system" (Nagel & Newman, 1958, p. 10 – original italics). The implication of this is that all systems of arithmetic contain assumptions that cannot be proven through reference to that system. In other words all systems of arithmetic are constructed, but unprovable, ways of viewing the world. For instance, Euclidean geometry (geometry on a flat plane) and Riemann geometry (geometry on a curved surface such as a sphere) are both internally consistent, but no one geometry can be created which will consistently encompass them both, as they make different assumptions about the world. In the same way, statements made from within the bounds of Euclidean geometry are not necessarily transferable to Riemann geometry, due to the different assumptions that the two systems make.

Just as the example from geometry illustrates, one particular paradigm can be seen to possess particular unprovable assumptions which are not held by other paradigms. Statements made from within a paradigm are then only valid, or assessable, from a position bound by those assumptions. Therefore, the "... quality of scientific research done within a paradigm has to be judged by its own paradigm's terms" (Healy & Perry, 2000, p. 121). The problem of paradigmatic incommensurability will be further examined in Chapter 6, in terms of how it has influenced developments in the field of Critical Systems Thinking and models for pluralist practice.

### **Silos or pyramids?**

A number of authors accept the existence of a divide between the hard and soft paradigms in research and practice. Mingers (1997a, pp. 1 – 2) extends the bounds of paradigmatic incommensurability from the purely theoretical to the methodological,

stating that the methodologies which embody the different paradigms are also often said to be incommensurable, while Miles (1988, p. 55) notes that the ramifications of philosophical contradictions can extend to the practical, stating that "... there are those who consider that these two schools of systems thinking are, in practical terms, incompatible." However, to Reichardt and Cook (1979, p. 11) it is the paradigmatic perspective itself which has prompted academics to view approaches as incompatible, a perspective which is in error. Discussing different research and practice traditions in terms of paradigms portrays the development of systems thinking as an intellectual "... pattern of development driven by philosophical considerations and marked by shifting philosophical bases ..." (Spaul, 1997, p. 327). This is a useful tactic, "... but it carries the danger that philosophy is seen as the 'master key' for history" (p. 328). An alternative is to examine the problem of paradigmatic incommensurability in institutional terms, an alternative which highlights the socially created aspect of the situation, the patterns of allegiance, education, employment and the histories and contributions of significant individuals in the field (p. 328).

Common ways of understanding the divide between the hard and soft paradigms have "... become so deeply ingrained in our discourse about research methods that, for the most part, they are taken for granted. They have become folklore" (Weber, 2004, p. iii). The problem of incommensurability might actually be an institutionally entrenched argument (Mingers & Brocklesby, 1997, p. 497), supported by a tradition of theorists and practitioners choosing between paradigms, instead of mixing the paradigms to suit the situations that they face (Reichardt & Cook, 1979, p. 18). The difference between styles of research and practice "... reinforces the divide between systems approaches and negates any vision of a subjective-objective continuum; rather it reinforces a 'them and us' split in the systems communities." (Oakley, 2003, p. 25) Furthermore, the assumption of incommensurability may be based on an inaccurate conceptualisation of the paradigms. "The very idea of the incommensurability of conceptual frameworks is based on the belief that cultures and languages are fairly intact, non-evolving evolving entities" (Inghilleri, 2000, p. 134).

Nonetheless, the assumption that a divide exists between the hard and soft paradigms is even perpetuated by the way in which some authors choose to depict the differences between the paradigms. Two examples are reproduced below (See Figure 17). Note that

in Figure 17 it is the choice of graphic representation of each of these examples, rather than their content, which is under discussion at the moment. Fitzgerald & Howcroft (1998, p. 319) illustrate a divide between the soft and hard paradigms, while Jackson (1999, p. 21) depicts a divide of hard, soft and emancipatory approaches. In both examples, a clear divide can be seen between the different columns, with each column representing a different paradigm. Attributes are seen as belonging to one paradigm or the other, with no apparent cross-over depicted. Clear white space exists between the columns, signalling a clear divide between the paradigms, as if they exist as completely separate silos.

Figure 17: Depictions of the divide between the hard and soft paradigms (Note: the small size of these reproductions is a deliberate effort to emphasise the graphic structure of these documents).



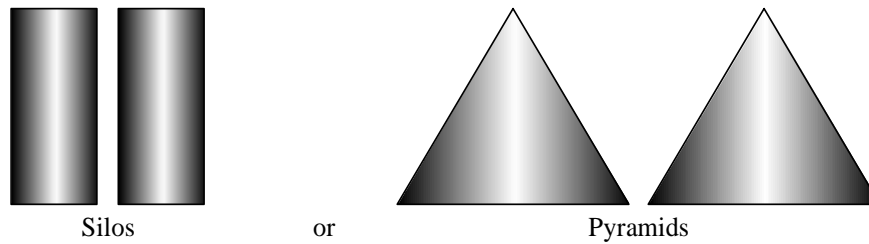


Figure 18: Silo and pyramid models of the paradigms

I maintain that the divide between the paradigms is not quite as clear as the white space between the above columns implies, and further analysis of the literature suggests that incommensurability between paradigms does not necessarily imply a boundary that cannot be crossed. For instance, Weber (2004, p. iv) examines ontology, epistemology, research object, research method, truth, validity and reliability, and finds that "... deep similarities rather than deep differences underlie ..." the paradigms, while Fitzgerald and Howcroft (1998, p. 313) see the divide less as a true dichotomy, and more as miniature hierarchies, where "... one end of each dichotomous pair is usually portrayed as superior to the other." Hanrahan et al (1999, p. 402) question "... the assurance of such dichotomies ..." in the research process. Others question whether the paradigms are actually incommensurable, calling for the idea of paradigmatic incommensurability to be opened up to challenge (e.g., Clarke, 2001, p. 14). The incommensurability thesis has "... been increasingly criticised in recent years in sociology, philosophy, and organizational behaviour ..." with strong arguments appearing in the literature against the incommensurability thesis (Mingers, 1997b, p. 412).

Midgley (1997a, p. 280) views the paradigms as both commensurable and incommensurable: commensurable in that the practitioner can draw on ideas from many different sources, but incommensurable in that "... we can never appreciate those ideas exactly as their original advocates do." Other authors think not in terms of whether or not paradigms are incommensurable, but in terms of degrees of incommensurability, or the "... extent to which paradigms are incommensurable ..." (Mingers & Brocklesby, 1997, p. 491). This becomes particularly significant when the paradigms are considered not as pure philosophies, but as assumptions which underpin action in the real world. The distinctions between the paradigms then become increasingly indistinct and questionable (Mingers, 1997a, p. 14). There is frequent overlap between, say, positivist and interpretive perspectives, with the research often being classified as one or the other

on the basis of a matter of degree, instead of a clear and undisputable distinction (Ticehurst & Veal, 2000, p. 20). For instance, the deduction / induction dichotomy is often used to typify the split between the hard and soft paradigms in research, but Ticehurst and Veal (p. 22) state that in research there is always a combination of induction and deduction, regardless of whether the research is based in positivist or interpretive assumptions.

It seems that many of the associations with the paradigms do not necessarily hold in all circumstances. For instance, Midgley (2003, p. 83) argues that "... observation and intervention do not have to be regarded as opposites (although they often are) ...". Furthermore, the use of a particular research method does not provide a clear indication of "... whether someone is a positivist or an interpretive researcher ..." (Weber, 2004, p. vii). Rigour and relevance are commonly used as indicators of the hard and soft paradigms respectively (See Figure 9), however this does not unilaterally have to be the case as rigour has been mistakenly associated with positivist research (Fitzgerald & Howcroft, 1998, p. 318). Neither can the qualitative – quantitative dichotomy, although indicative of a tendency, be used as a clear indicator of paradigmatic choice. Qualitative and quantitative methods cannot necessarily be linked to either of the paradigms (Klein & Myers, 1999, p. 55; Reichardt & Cook, 1979, p. 16). Patton (1990, p. 43) identifies that the difference between qualitative and quantitative techniques lies in the "... relative degrees of calculated manipulation." Both approaches involve human interpretation, selective application and construction. "Qualitative methods are no more synonymous with objectivity than qualitative methods are synonymous with subjectivity" (p. 55). Although correlation can be seen in the association of hard and soft approaches with quantitative and qualitative methods respectively, this only suggests a tendency, with many approaches from both sides of the polarity making use of both quantitative and qualitative methods (Coyle, 2000). For example, in the field of System Dynamics, debate continues over the relative merits of qualitative and quantitative modelling techniques, and on this basis, whether the field should be considered as hard or soft (Lane, 2000).

Another perspective on the divide between the paradigms can be illustrated by reference to *The Schema*, introduced earlier in this chapter. The original hierarchy presented a single pyramid, which depicts methodology following directly from the assumptions of

a particular paradigm, method from methodology, and so on. If the divide between the paradigms is assumed to be clear, then different paradigms could be depicted as standing next to each other, with open space between them, much as can be seen in Figure 17 (above). However, if the hierarchy is represented in a slightly different way, as in Figure 19 (below), *The Schema* can be used to demonstrate another aspect of the relationship between the paradigms, namely that "... while there may be paradigm incommensurability at the overall ontological and epistemological levels, some pluralist ecumenical accommodation is possible at the lower methodological levels ..."

(Fitzgerald & Howcroft, 1998, p. 322). At the philosophical level, abstracted from lived reality and defined through postulates and axioms, clear and distinct differences can be seen between the paradigms. However, as one moves down the levels, through methodology to method and technique, a decreasing amount of reference is made to abstracted propositions, and increasing reference is made to guidelines for action. The links between paradigm and method are not incontrovertible (Reichardt & Cook, 1979, p. 11). Instead, at the lower levels of *The Schema*, there is an increasing area in which methodologies, methods, tools and techniques can be applied in the service of a paradigm other than the one informing their development, or with which they are customarily associated. For instance, "... qualitative research can be done with a positivist, interpretive or critical stance" (Klein & Myers, 1999, p. 69). Approaches can actually be used with different paradigms (Mingers, 2003, p. 243). The "... 'soft-hard' categorisation may be a simplistic, reductionist and hence restrictive one, since 'hard' and 'soft' methods actually contain elements from the other side" (Zhu, 2000, p. 198). The practice of using an approach from one particular paradigm, but operated under the direction of a different paradigm, referred to as 'oblique' use (Flood & Romm, 1997), is more thoroughly examined in Chapter 6.

What is true for approaches seems to also be true for practitioners. Defining the paradigm in which a person operates, based exclusively on correspondence between their view of reality and the assumptions of the paradigm only defines them at the most abstracted of levels. "At the operational level of practice this categorisation is less useful because here the situation is more complex" (Brocklesby, 1997, p. 191). The diagram below (Figure 19) has been constructed to represent relative degrees of merging at the levels of methodology, method, technique and tool. Abstracted from practice, clear differences between philosophical or paradigmatic positions can be seen,

but at the lower levels of *The Schema*, and when guidelines for action are realised in practice, the influence of one paradigm, to the exclusion of all others, becomes less clear.

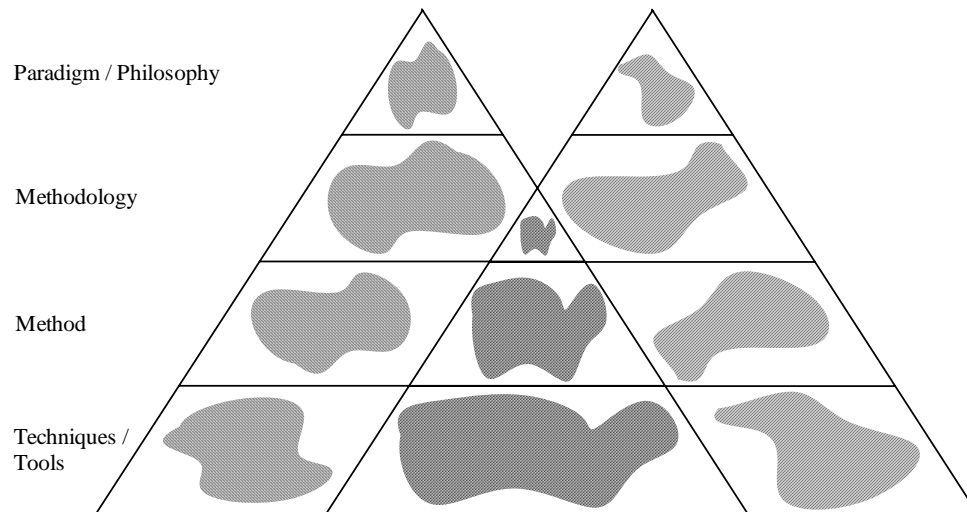


Figure 19: Areas of incommensurability and areas of ambiguity

## Conclusion

Some of the differences between the hard and soft paradigms and how they influence practice and research have been identified and explored. There is a tradition of thought that the hard and soft paradigms are incommensurable, and by extension that they are incommiscible. However, it has been shown that although the application of approaches based in a particular paradigm must be judged in terms of the paradigm's values and world view, and that at the more abstracted levels there are points at which the hard and soft paradigms are in direct opposition, at the lower levels, such as those of method, tool and technique, the distinction between the paradigms starts to blur. In fact, it is possible to apply some approaches under the service of a paradigm other than that in which they were originally developed. These observations have led to a reconceptualisation of the representation of paradigms from silos to pyramids, which might overlap, allowing for varying degrees of merging at the levels of methodology, method, tool and technique, a perspective which extends our understanding of the problem of paradigmatic incommensurability and pluralist practice.

## **Chapter 3 – Research Methodology**

"The lessons we have hereby received would seem to have brought us a decisive step further in the never-ending struggle for harmony between content and form, and taught us once again that no content can be grasped without a formal frame and that any form, however useful it has hitherto proved, may be found to be too narrow to comprehend new experience" (Bohr, 1958, p. 65).

### **Introduction**

This chapter examines the philosophical underpinning, the methodologies and the methods that have informed and guided this research process, including the approach to action, the relationship between theory and practice, and subsequent reflection and learning. First, the literature on the research methodology, Action Research (AR) is discussed. AR is discussed in general terms, before specific insights pertinent to this research are gleaned from the literature on the form of AR developed by Peter Checkland and collaborators. This chapter also distinguishes between the different methodologies involved in this research, some of which are used in the process of managing the research, and some of which are used to create change in the intervention and are the subject of this research. Dick (1999, p. 2) identifies that AR "... can be viewed as having two main outcomes – action and research. It therefore requires two sets of procedures, one to achieve each of the outcomes." In this research, AR has been used to govern inquiry into and reflection on the focus of the research (See Figure 20). Action in the project environment has been managed through Soft Systems Methodology (SSM) and Project Management (PM), combined through a variant on the Embedding model of pluralism, examined in Chapters 4, 5 and 6, respectively. The methodologies combined in the intervention, the difficulties involved in their combination, and lessons learned through the process of combining them form the basis of learning in this research.

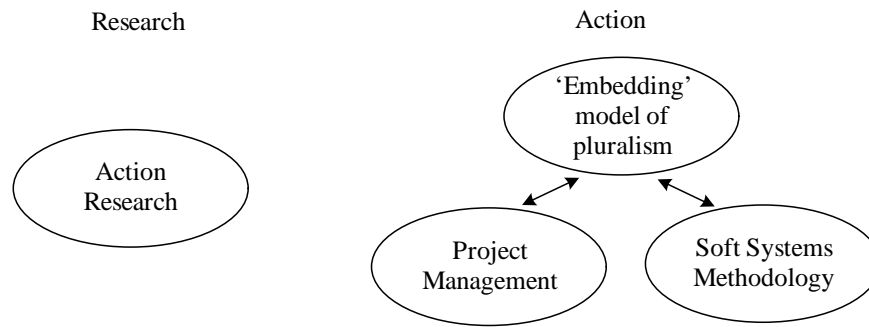


Figure 20: Approaches for research and action

After AR is examined, I discuss the interpretive philosophical underpinnings of this research, with reference to Gadamer's interpretation of hermeneutics. This is followed by the identification of a selection of criteria for the evaluation of interpretive AR. This chapter concludes with an examination of the processes used to collect data in the intervention, summary of the major AR cycles throughout this research, and how the process of interpretation has changed as the research progressed. Details of the intervention are expanded upon in Chapter 7.

### Action Research

The fundamentals of Action Research (AR) are discussed at the level of methodology (See Figure 21), the guiding principles of method, prior to discussion of the actual action in the IT / CT Platform Project. AR is particularly appropriate for this research as it assists in the "... understanding of change processes in social systems ..." (Lau, 1999, p. 149), and the literature supports an increasing interest in use of AR for research into social phenomena (Checkland & Holwell, 1998b, p. 9). This increase has been linked to an acknowledgement of greater ambiguity in social contexts. AR would appear to be highly appropriate for use in the analysis of these turbulent environments (Dick, 2003, p. 1). However, although recognised for its value in social research, researchers have reported that AR is complex and time consuming to conduct and report (p. 2), and "... difficult to apply in practice compared to applying survey research or case research ..." (Sankaran & Tay, 2003, p. 8).

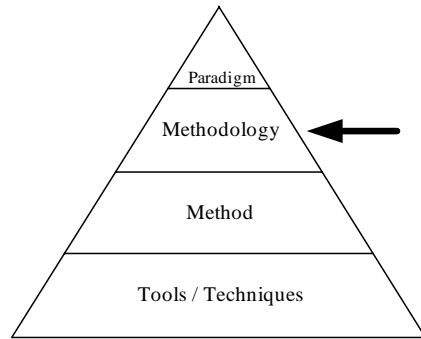


Figure 21: Research methodology

AR has been used by other researchers in studying a variety of business problems, including: marketing; product development; manufacturing; engineering; organisational change and transformation; information systems and e-commerce; accounting; small business; and management development (Sankaran & Tay, 2003, pp. 1 - 2). During the 1980s and 1990, a wide variety of different labels for forms of AR began to appear in the literature (Swepson, Dick et al, 2003, p. 247), and the term 'Action Research' is now used to refer to a general class of approaches to social enquiry and also "... to a specific sub-class of those methods as distinguished from 'action science', 'action learning', 'participatory action research', *etc*" (Baskerville, 1999, p. 3). The genealogy of the field is depicted below (See Figure 22). However, it has been noted that despite the variety of contributors and labels, most interpretations of AR are fundamentally the same (Swepson, Dick et al, 2003, p. 248), and the majority of versions of AR are "... distinguished more by their similarities than their differences" (p. 247).

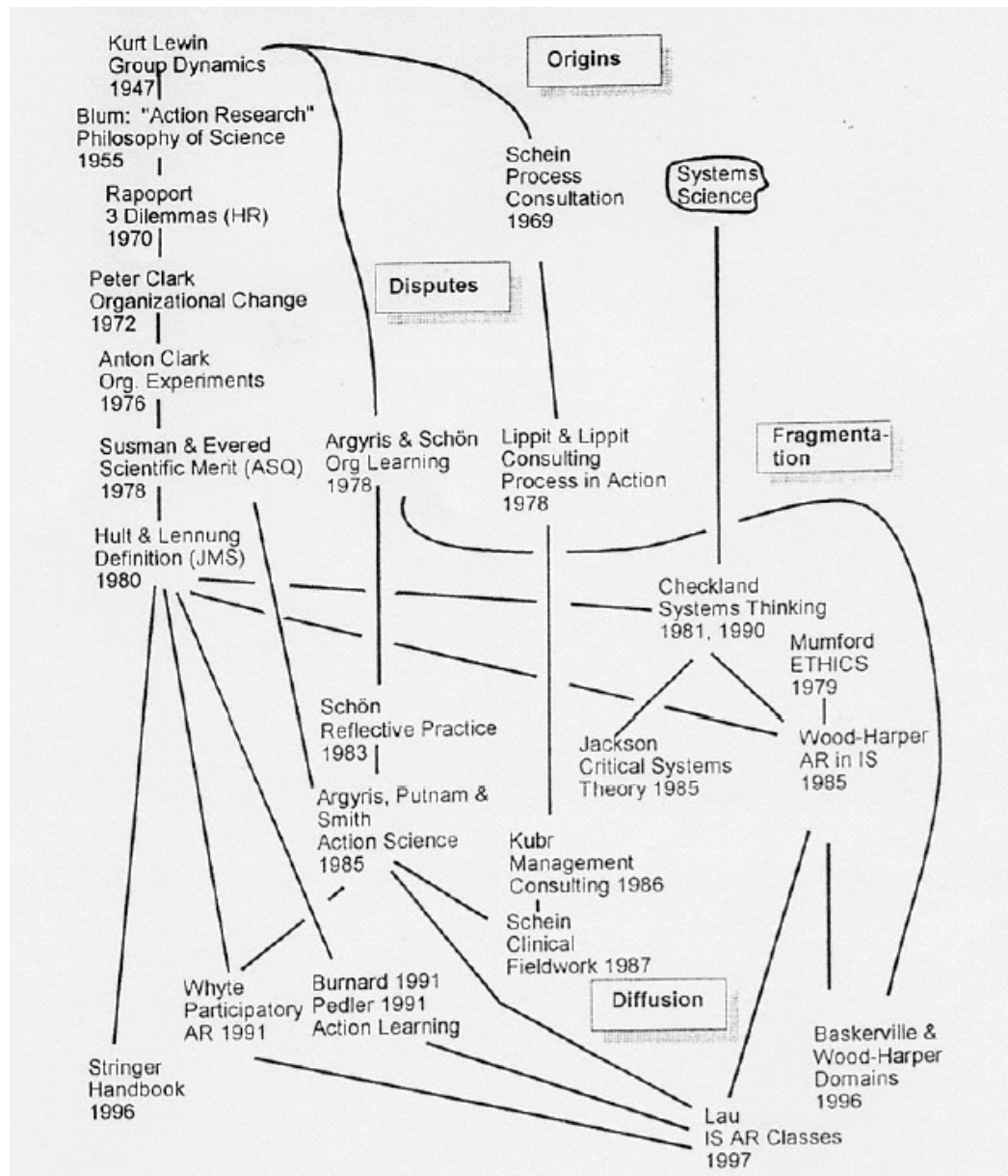


Figure 22: Genealogy of IS action research (Baskerville & Wood-Harper, 1998, p. 94)

Unlike approaches to research which are informed by the hard paradigm, such as Popperian science, "... action research is concerned primarily with *intervention* and not observation" (Midgley, 2003, p. 81 – original italics). It is not assumed that 'social laws', like physical laws, await discovery (Checkland & Holwell, 1998b, p. 16), and as such, the use of AR does not lead to laws which assume a degree of universality (Checkland & Holwell, 1998a, p. 27). Neither is it generally assumed that factoring aspects of the social world into quantified variables will necessarily lead to useful knowledge. Instead, it is thought that "... complex social processes can be studied best by introducing



changes into these processes and observing the effects of these changes" (Baskerville, 1999, p. 2). Popperian science (Popper, 1980), unlike AR, is distanced from the subject or inquiry. AR requires involvement in problem situations and a "... readiness to use *the experience itself* as a research object about which lessons can be learned by conscious reflection" (Checkland & Scholes, 1990, p. 16 – original italics). In AR, it is not that the principle of independent observation is abandoned, but rather that it takes second place to the principle of social utility (Midgley, 2003a, p. 83). Such an approach to research may be particularly appropriate to inquiry into PM practice, as:

"... whilst project management may provide opportunities for research, the nature of that research is qualitatively different from that which might be expected in other fields, whether scientific or professional, in which analysis rather than synthesis forms the mainstay of decision making. As a result, action oriented forms of research may be more prevalent and more appropriate." (Betts & Lansley, 1995, p. 215)

Generating practical insight is one of the main goals of AR. It "... enables a researcher to intervene in the organization while at the same time generate knowledge about the process" (Olesen & Myers, 1999, p. 323). An AR project does not just involve the application of pre-existing knowledge, but also involves the generation of situation-specific knowledge (Dash, 1997, p. 4). The emphasis is on generating "... data in a manner that supports decision making – even if *strongly* scientific conclusions cannot be reached" (Midgley, 2003a, p. 82 – original italics). This is achieved through the practical combination of theory and practice in research "... aimed at solving an immediate problem situation while carefully informing theory ..." (Baskerville, 1999, p. 2). Jarvis (1999, p. 134) notes that when there is a disjuncture between a practitioner's theory and practice, there is an opportunity for learning. AR formalises observation of potential disjunctures between theory and practice, by including action components and theory components, which "... can be described as a set of articulated concepts, methods, ideas, or founding principals, which serve to inform or shed light on the activity" (Olsen & Haslett, 2002, p. 455).

AR is an emergent process, appropriate if you have to leave open the possibility of adapting or changing the research methodology to suit changes in the situation (Sankaran, 2001, p. 5). Indeed, both the theoretical content of research and the methods

that are used in AR can be emergent (Dick, 2003, p. 1). AR is dynamically adapted to the needs of the practice situation, as they become apparent, with quantitative, qualitative and mixed methods all being considered appropriate to different situations (Greenwood & Levin, 1998, p. 7). Because of the emergent, changing nature of AR, it is not suited to testing hypotheses in the classical manner of laboratory science (Checkland & Scholes, 1990, p. 16). AR often begins with "... only a rough or fuzzy research question, and perhaps a fuzzy methodology" (Dick, 1999, p. 2), with only loose ideas about what is happening in the area of enquiry (Dick, 2003, p. 1). The researcher does not then deal with hypotheses but with themes of research within which lessons can be sought (Checkland & Holwell, 1998b, p. 14). It is for this reason that this research refers to a 'Research Focus' as opposed to a 'Research Question' or 'Hypothesis'.

It is difficult to clearly and unambiguously define AR, perhaps due to its emergent nature. At its most simple AR can be defined as a "... cyclic, reflective methodology ..." (Swepson, 2003, p. 102). Zuber-Skerritt (2002, p. 148) categorises the core values of AR contributing to a learning culture "... into nine concepts: systems thinking; synergy; collaboration and team spirit; openness; trust; focus on learning and questioning insight; symmetrical communication; and creativity." Baskerville (1999) notes widespread agreement on four common characteristics of AR: focus on action and change; a problem focus; an 'organic', iterative process; and, collaboration among participants. Greenwood and Levin (1998, pp. 7 – 8) take a slightly firmer view, stating that "AR is composed of a balance of three elements. If any one of the three is absent, then the process is not AR." The elements are action, research and participation. Participation is certainly an important aspect of AR, "... marking clear distinction from orthodox research that systematically distrusts insider knowledge as co-opted" (p. 50). Champion and Stowell (2003, p. 28) also view participation as essential to the character of AR, and yet not all others agree. For instance, neither Dick (1999, p. 2), nor Swepson (2003, p. 103) agree that participation should be considered a defining characteristic of AR, illustrating the lack of consensus in the field and the difficulty in clearly defining AR. Wadsworth (1998, p. 2) expresses the difficulty in unambiguously defining a piece of research as AR:

"It faces numerous barriers to its practice which mean that, even when we think we might be doing 'it', we often have our doubts! I have come to conclude that pretty much all of the research we are involved in, *is more or less an approximation* in the direction of 'it'. That is, every piece of research is more or less participatory. It more or less enables action as part of the process. And it all involves more or less critical reflexive, sceptical and imaginative inquiry."

AR is, however, consistently described as a cyclic activity, as opposed to the generally linear positivist research processes. Although the content of the cycle is variously described (See Table 1), at its most basic, AR can be considered to be an alternation between action in a problem situation and reflection on the effects of that action. Dick (1999, p. 4) recommends "... using brief and therefore multiple action research cycles (often by having cycles within cycles). At each cycle you pursue multiple sources of information." Early cycles may only yield ambiguous answers to questions, but reflection on past action provides deeper insight, that can be fed back in to improve current actions, with content and process successively refined through each cycle (Flood, 1999, p. 54; Dick, 1999, p. 2). Learning may develop throughout an intervention, but there is not necessarily any clear point where an AR intervention has to stop. In principle, the learning may go on and on, with the decision to end the intervention being an arbitrary step (Checkland & Holwell, 1998a, p. 14).

| Baskerville,<br>1999, p. 4 | Stringer,<br>1999, p. 44           | Stringer,<br>1999, p. 116             | Stringer,<br>1999, p. 18 | Baskerville,<br>1999, p. 9,<br>quoting<br>Susman and | Dash, 1997,<br>quoting<br>Karlsen, 1991 |
|----------------------------|------------------------------------|---------------------------------------|--------------------------|--|---|
| Diagnostic<br>stage        | Look,<br>define and<br>describe    | Plan and set<br>priorities            | Plan                     | Diagnosis  | Formulating<br>the approach             |
| Therapeutic<br>stage       | Think,<br>analyse and<br>interpret | Implement<br>modelling<br>and linking | Act                      | Action<br>planning                                   | Designing/<br>planning                  |
|                            | Act to<br>formulate<br>solutions   | Evaluate                              | Observe                  | Action taking  | Acquiring<br>data                       |
|                            |                                    |                                       | Reflect                  | Evaluating   | Analysis                                |
|                            |                                    |                                       |                          | Specifying<br>learning                               | Reflection/<br>interpretation           |

Table 1: Comparison of 5 different AR process models

Critical reflection on action, and examination of how personal values influence judgements, can also be considered fundamental to AR (Champion, 2000, p. 61). Reflection is central to the construction of knowledge through AR, "... whereby each reflection phase is used to reflect on data from the last action phase and to apply thinking to planning the next action" (Olsen & Haslett, 2002, p. 455). However, the researcher must be fully aware of the difference between the practice of AR and the description of practice, as even though "... there is a conceptual difference between the 'participation', 'action' and 'research' elements, in its most developed state these differences begin to dissolve in practice" (Wadsworth, 1998, p. 7). In reality these conceptually different stages of the AR process may not be easily or simply separated.

### Checkland's Action Research

Over the last thirty five years Peter Checkland, and collaborators, have made a significant contribution to the systems and AR communities. Flood (1999, p. 53) notes

three different strands in the maturation of Checkland's work: development of a unique form of AR; the realisation of an interpretive form of systemic theory; and the establishment of Soft Systems Methodology (SSM). SSM is an approach to problem exploration, facilitation and structured learning that is based on the combination of interpretive epistemology, systems modelling and AR. As mentioned earlier, in the IT / CT Platform Project, SSM has been combined with Project Management (PM) through a variation on the Embedding model for methodological pluralism. SSM is examined in detail in Chapter 4, PM is examined in Chapter 5, and Embedding in Chapter 6. Presently, I examine the guidelines for AR that Checkland has developed, and how these have influenced the way that AR has been realised in this research.

Checkland's contribution to AR can be summarised by the FMA model (See Figure 23). There are many descriptions of the FMA model (Sarah, Haslett et al, 2002, p. 537), however, the model consistently involves explicit recognition of three elements: a research framework (F); a methodology (M); and an area of application (A). Simply, particular "... linked ideas F are used in a methodology M to investigate an area of interest A" (Checkland & Holwell, 1998b, p. 13). Although there is not direct correspondence, the differences between F, M and A can be further understood in relation to *The Schema*. F can be thought of as at the level of theory or paradigm, informing the way that both M and A are understood by the practitioner.

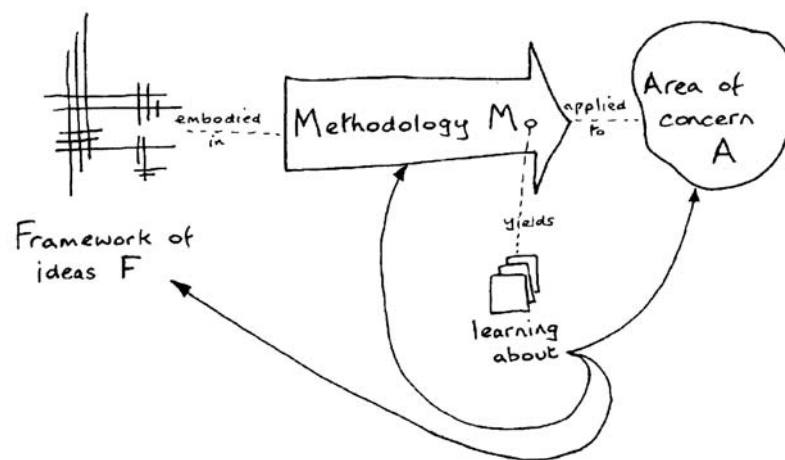


Figure 23: Elements relevant to any piece of research (Checkland and Holwell, 1998a, p. 23)

This model for AR has been found by some researchers to add rigour (Sarah, Haslett et al, 2002, p. 537), to provide clarity (p. 539), and to provide an intellectual structure to AR, which can lift reporting on AR findings above the level of the anecdotal and "... which will lead to findings and research lessons being recognized as such (Checkland & Holwell, 1998b, p. 14). As AR is an emergent process, changes or modifications to F, M and A can all be expected during the research process (p. 11). Being explicit about these three elements "... may then teach us not only about A but also about the adequacy of F and M" (p. 13). Indeed, the majority of learning resulting from this research is at the level of methodology. Sarah, Haslett et al (2002, p. 537) relate use of the FMA model to three forms of reflection: reflection on what happened (A); process reflection on how a methodology was used (M); and premise reflection, involving exploration of why certain actions were chosen over others (F). Interested readers are referred to Champion (2000, p. 60), who provides an example of the FMA model in use, and Olsen and Haslett (2002), who provide a case study of the use of the FMA model in a strategic planning project in Australia.

This approach to AR clearly distinguishes between "... on the one hand, a basic set of ideas, and on the other, a process (or methodology) for applying those ideas in an organized way ..." (Checkland, 2003, p. 291). Formalising the need to be explicit about the conceptual framework of applying AR is one of the central attributes that distinguishes Checkland's form of AR from many others. Most other AR "... omits the need for a declared-in-advance intellectual framework of ideas, a framework in terms of which what constitutes 'knowledge' about the situation researched will be defined and expressed" (Checkland & Holwell, 1998a, pp. 22 - 3). What constitutes knowledge in a problem situation should not be taken as given. In defining F, the researcher is in effect defining the epistemology of the research and defining what will count as knowledge (p. 24). Declaring the intellectual framework for an AR project can be thought of as a way of contextualising the research in relation to the range of possible forms of knowledge extant, allowing any research findings to be appropriately judged and understood. Furthermore, "... without a declared-in-advance epistemological framework it is sometimes difficult to distinguish research from novel writing" (pp. 22 - 3). Indeed, it has been said that the aim of AR should be to make research recoverable to interested parties, by declaring both the methodology used and the framework of ideas that

informed the study (Checkland & Holwell, 1998b, p. 18).

A recurring difficulty in interpretive research is the issue of how to transfer learning between settings, when research is freely admitted to be based on in-depth immersion in the research context, and that context-free generalisation is not the goal. Friend, Bryant et al (1998, p. 4) note that for learning to be successful, it must be underpinned by a coherent conceptual framework. Declaring the framework of ideas for a study can act as an aid to developing learning that is transferable between contexts. Transferability of learning is not guaranteed, but if the framework of ideas is carefully thought about, in relation to the methodology and the application area, "... it may be possible to pinpoint useful principles which can be tested in further action and – if we are lucky – transferred to a whole range of problematical situations" (Checkland & Holwell, 1998a, p. 156).

When faced with a new research context, there is often a variety of different frameworks of ideas that are a priori considered to be relevant (Hindle, Checkland et al, 1995, p. 455). In this sense, all practical action can be considered to already be theory-laden, as it is always possible to ask which particular intellectual frameworks would render particular observed actions meaningful (Checkland, 2003, p. 291). The F that a particular researcher brings to research can be deliberately chosen or unconsciously imposed. It may contain explicit or implicit theories about the methodology to be used, the application area, or about reality and how knowledge is developed. The researcher's initial framework of ideas may also be influenced by personal beliefs, values, understanding and opinions (Rose, 1997, p. 263). For instance, examples of frameworks considered relevant in a case study in the UK National Health Service included: organizational learning; transaction cost economics; decision modelling; purposeful activity modelling; and the loosely defined framework of health services management itself (Hindle, Checkland et al, 1995, p. 455).

Other authors in the general AR literature have also recognised the need to be aware of the frameworks of ideas that are brought to the research process. For instance, the "... action researcher must also bring a set of analytical frameworks to the process, among them, views on political economy, social structure, change processes, and ideology ..." (Greenwood & Levin, 1998, p. 99). McQuinn (2002, p. 382) also notes the significance

of the intellectual framework on the process of AR, stating that it "... is important when conducting an action research study to declare the intellectual framework, because the conclusions drawn from the research experience will be based on the mindset of the researcher." Examination of the methodological assumptions of interpretive study "... may require a more extended treatment than is expected of experimental or survey research reports. It provides information that identifies the research paradigm and provides readers with details of the purposes, and outcomes ..." (Stringer, 1999, p. 172 – 3). The process of uncovering the way in which my particular framework of ideas has influenced the research process has been aided by insight from the literature on hermeneutics.

### **Gadamer's Hermeneutics**

This research is informed by an interpretive epistemology (See Figure 24). Specifically, this research is informed by Hans-Georg Gadamer's hermeneutics, a branch of interpretivism which directly addresses the process of interpretation, and how individual interpretation is affected by constant changes in tradition and personal prejudices. The word 'hermeneutic' alludes to the Greek god Hermes, and is derived from the Greek *hermeneuein* (to interpret) and *hermeneia* (interpretation) (Rundell, 1995, p. 13). Hermeneutics, as a field of enquiry, can be then thought of as "... the theory or art of explication, of interpretation" (Gadamer, 1981a, p. 88). Hermeneutics, however, does not solely refer to the particular methods or techniques of a particular branch of study. "Above all it refers to a natural human capacity" (Gadamer, 1981b, p. 114). Gadamer (1981a, p. 93) compares hermeneutics to rhetoric, in that both are fields that can be studied and deliberately applied, both refer to a natural human capacity, and both allow for the capacity for intelligent interchange between humans.



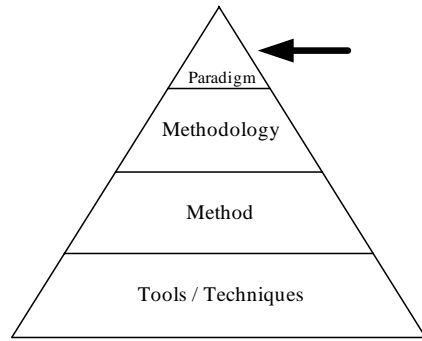


Figure 24: Research paradigm

Gadamer's interest in hermeneutics did not so much lay with specific problems faced with acquiring knowledge, as with general issues concerning the nature of human understanding (Bevir, 1991, p. 121). Gadamer draws on Heidegger's earlier works, in which he critiqued categorical and scientific thinking, a form of thinking which had preoccupied and framed western philosophy since the ancient Greek philosophers (Rundell, 1995, p. 20). Gadamer's hermeneutics emphasises the connection between the practice and theory of interpretation and understanding, and how these are influenced by our constantly changing relationship to tradition (Roberts, 1995, p. 3). For Gadamer, the knowledge that gives direction to action is applied in real and immediate situations. These are situations where there are no learned or mastered techniques that can relieve us from having to decide upon a particular course of action, based on our interpretation of the situation at a particular time. Hermeneutics, which addresses the way in which we interpret the world, is then neither theoretical, as mathematics is, nor is it a form of expert knowledge, such as mastery of a particular procedure, "... but a unique sort of science. It must arise from practice itself and, with all the typical generalizations that it brings to explicit consciousness, be related back to practice" (Gadamer, 1981a, p. 92). Hermeneutics can be thought of as enquiry into how we bring sense to the world, a process which for the most part is constant and unconscious, but can be consciously reflected upon and developed.

For Gadamer, the assumed starting point for hermeneutics is that misunderstanding is a basic attribute of our being in relation to others (Rundell, 1995, p. 29). Communication and understanding are considered to be intrinsically problematic. "In other words, social actors or interlocutors experience a permanent 'gap' in comprehension" (p. 12).

Awareness of this necessary gap in understanding can bring rigor to the process of interpretation, through avoidance of the assumption that we have direct access to the meaning intended by another.

"The laxer practice begins with the assumption that, when confronted with the utterances of another, correct understanding and agreement is the rule and misunderstanding the exception. On the other hand, the more rigorous practice starts with the assumptions that misunderstanding is the rule and that only by way of a skilful exertion can one avoid misunderstanding and reach a correct understanding." (Gadamer, 1981b, pp. 129 - 30)

It is the very nature of human understanding that precludes direct knowledge of others. This becomes clear in relation to understanding the works of past writers, who may have written in a different culture, at a different time, writing from a particular context, unlike our own, which would have given the words they used a different contextual significance. "Our concrete situation in the present or an inherent gap between hermeneutic and semantic meanings implies that we are at a distance from past works ..." (Bevir, 1991, pp. 76 – 7). The act of translation can also bring this gap in understanding consciously to the surface, by highlighting the existence of "... barriers between worlds (where 'worlds' refers to cultures, perspectives and persons) which make understanding problematic" (Rundell, 1995, p. 14).

Gadamer's hermeneutics can then be thought of as an argument against the alignment of scientific knowledge with truth, and the assumption that knowledge produced through scientific processes "... gives epistemological legitimacy to all forms of knowledge, notwithstanding the critiques of scientific culture" (Rundell, 1995, p. 26). Hermeneutics reverses the assumption that truth can be used to legitimate interpretation, as it questions the basis on which assumptions of the status of 'truth' are based, by examining the contexts that bring about one interpretation being considered as 'true', while another is not (Rundell, 1995, p. 10). Instead, no single truth is thought to emerge from, or be present in, an act or text. The "... fluidity (and thus multiplicity) of meaning is the starting point for hermeneutic analysis" (p. 12).

The understanding of reason that developed during the Enlightenment tended to either ignore or collapse the distance between past and present, so that it was assumed that

complete access to the past was possible (Rundell, 1995, p. 31). The Enlightenment and Romantic positions both viewed tradition as opposite to the free determination of reason, with both schools of thought taking a different position in relation to tradition and free determination, but still preserving the dichotomy between them. Gadamer takes a different position, understanding tradition and reason as intertwined and inextricable. "It seems to me, however, that there is no such unconditional antithesis between tradition and reason" (Gadamer, 1996, p. 281). Instead, reason is understood to exist in relation to history. It is not an independent faculty, but is constantly dependant upon the given context and circumstances in which it operates (p. 276).

It was instead assumed that there was no such thing as a privileged position from which nothing could be learnt, no position which could give complete access of understanding, and from which we did not need to be aware of the possible limitations of our position (Lawrence, 1981, p. xviii). Gadamer introduced the notion of 'prejudice', the fore-structure which predetermines our judgements and perspectives on the world (Rundell, 1995, p. 30). "Gadamer's notion of prejudice serves both to resuscitate this idea of distance and to restore it from collapse by locating it as an ontological condition" (p. 31). History and language are the frame from which the individual's process of understanding cannot escape, and which we can only experience from inside, as they form the horizons of our experience of the world. For instance, in the case of the interpretation of texts, the outcome can never be access to an original meaning, but rather a meaning for us, at a particular point in time (Roberts, 1995, p. 4). For Gadamer, the influence of prejudice and tradition was not a negative, to be avoided, reduced or ignored. Gadamer "... actually seems to have been concerned to highlight the positive role played by prejudice in all forms of human understanding" (Bevir, 1991, p. 123). Prejudice and tradition can instead be thought of as creative forces, providing the context in which understanding is developed. For instance, one can only understand past writers "... by appropriating them in a productive act" (pp. 76 – 7). Hermeneutic sensitivity is not concerned with neutrality or the extinction of one's self, such as scientific objectivity, but in being aware of one's own biases, fore-meanings and prejudices (Gadamer, 1996, p. 269). "The hermeneutic circle, then, is a combination of prejudice (or fore-understanding) and tradition" (Rundell, 1995, p. 31). Understanding can then be thought of as emerging through the interplay between tradition and

interpretation (p. 32), with the hermeneutic task consisting not of covering up any tension between prejudice, tradition and interpretation, but in consciously uncovering such tension (pp. 28 – 9).

The process of interpreting a piece of text involves constant projection of meaning. Meaning is projected for the text as a whole as soon as some form of initial meaning emerges from a text, which itself emerges because the reader approaches the text with a particular set of expectations. Meaning is constantly brought to the act of interpretation, and changes as one's prejudices change. Interpretation "... begins with fore-conceptions that are replaced by more suitable ones" (Gadamer, 1996, p. 267). Interpreting text is then a process of anticipating meanings and then correcting one's anticipations, "... precisely because human living already has that kind of structure" (Lawrence, 1981, p. xvii). When a text is approached with the knowledge that one's perspective is necessarily different from that of the author, "... there arises the need for a unique effort to avoid misunderstanding the meaning of old texts and yet to comprehend them in their persuasive force" (Gadamer, 1981a, p. 98). However, in avoiding misunderstanding, interpretation has to guard for the influence of "... arbitrary fancies and the limitations imposed by imperceptible habits of thought ..." in an effort to understand the object of interpretation as it is, instead of how we may have it be (Gadamer, 1996, pp . 266 - 7). Such interpretation involves awareness of personal bias. However, the same difficulties that apply to interpreting texts apply to interpreting one's own biases.

"Self-understanding can no longer be integrally related to a complete self-transparency in the sense of a full presence of ourselves to ourselves. Self-understanding is always on-the-way; it is on a path whose completion is a clear impossibility." (Gadamer, 1981a, p. 103)

Understanding texts or authors can be thought of as a function of self-understanding, as the developing interpretation is influenced by the changing prejudices of the interpreter. The process of making sense also has a circular and self-correcting nature, as meaning is constantly adjusted in the light of newly developing prejudice (Lawrence, 1981, pp. xviii - xix). Understanding, for Gadamer's hermeneutics, is not concerned with agreement, but the assumption of interpretations which must differ, with interpretation being a permanent condition, a condition which can never be avoided or transcended (Rundell, 1995, p. 38). All that is asked in developing a hermeneutically sensitive

understanding is remaining open to the meanings presented by the other text or person. "But this openness always includes our situating the other meaning in relation to the whole of our own meanings or ourselves in relation to it" (Gadamer, 1996, p. 268).

Interpretation, to Gadamer, refers to more than understanding the intention of a particular person or text, but is also an expression for getting behind the surface data and phenomena (Gadamer, 1981a, p. 100). The self-correcting character of interpretation is not towards a singular truth, and getting past the surface does not lead one to a single, unvarying understanding. "The very idea of a definitive interpretation seems to be intrinsically contradictory. Interpretation is always on the way" (p. 105). Because the hermeneutic experience is not simply concerned with registering what is directly apparent, but instead goes back to our guiding questions and interests, it involves significantly less certainty than one might find in the natural sciences (p. 110). Hermeneutic enquiry assumes the intersubjectivity of interpretation and understanding. The only sense of objectivity comes in having particular fore-meanings confirmed by experience. "Indeed, what characterizes the arbitrariness of inappropriate fore-meanings is not that they come to nothing in being worked out" (Gadamer, 1996, p. 267).

### **Hermeneutics and research**

Focusing on the process of interpretation and the development of meaning and understanding is of importance to the research process. Research can be thought of as a hermeneutic process, "... with its meaning being rewritten many times along the way, as the whole is continually being reconceptualized in the light of new learning" (Hanrahan, Cooper et al, 1999, p. 404). Gadamer's hermeneutics predominantly focuses on the interpretation of texts written by past authors. However, the insight that Gadamer provides in relation to interpretation and the influence of prejudice can transfer to other contexts, and has been used in this research to inform the interpretation and analysis of practical action. Cooke-Davies (2000, p. 75) provides another example of research into the practice of PM, informed by Gadamer's hermeneutic perspective. In his research the typical hermeneutic question regarding the interpretation of text becomes a questioning of how the researcher can ever know their interpretation of data is correct, given the influence of prejudice and prejudgements.

A hermeneutic emphasis on the process of interpretation can be seen as particularly appropriate to AR, where research is considered to be an emergent process, changing in relation to the developing understanding of the participants and the needs of a changing environment. An awareness of the biases through which research is framed can lead to a deeper understanding of the outcomes of research. Furthermore, avoiding admitting one's assumptions and biases in framing and analysing research data "... seems to be to be hiding something from the reader which is important to the meaning-making process" (Hanrahan, Cooper et al, 1999, p. 415). This bears significant similarity to the aforementioned need to be explicit regarding the research framework (F).

In examining the combination of PM and SSM, based on an approach to pluralism informed by the Embedding model, this research makes significant reference to personal reflection on a practical intervention. Instead of hermeneutics informing the interpretation of text, in the case of this research, it informs the interpretation of my past action and notes taken on past action. The reader might ask why this is necessary, as surely the reasons behind an individual's own actions are fully transparent to the individual in question. However, this is not necessarily so. It cannot be assumed that in writing up the research, I have full access to the way in which my actions, and the events I observed, were understood at the time. An individual's biases and prejudices continually develop and change in light of new experience and understanding. A hermeneutic awareness is necessary in interpreting my own actions and the situations I have observed, as it cannot be assumed I am simply retelling the situation as it was. Rather the project is inevitably reconstructed, framed by new learning and past experience. Awareness of possible biases and prejudices can then help the reader understand how description of the IT / CT Platform Project has been reconstructed, and how it was interpreted in the first place.

Having discussed hermeneutics, this research can now be classified in relation to the FMA model (See Figure 25). The area of concern (A), or the focus of inquiry, for this research is the use of an approach to pluralism informed by the Embedding model, and how this was realised in a practical combination of PM and SSM. The methodology (M) used to research the area of concern (A) is Action Research. A variety of intellectual frameworks (F) must be acknowledged in framing and influencing this research,

including: hermeneutics and interpretivism in general; the discussion on the divide between the hard and soft paradigms (See Chapter 2), and barriers to their combination (See Chapter 6); systems concepts (See Chapters 4 and 5); and personal biases.

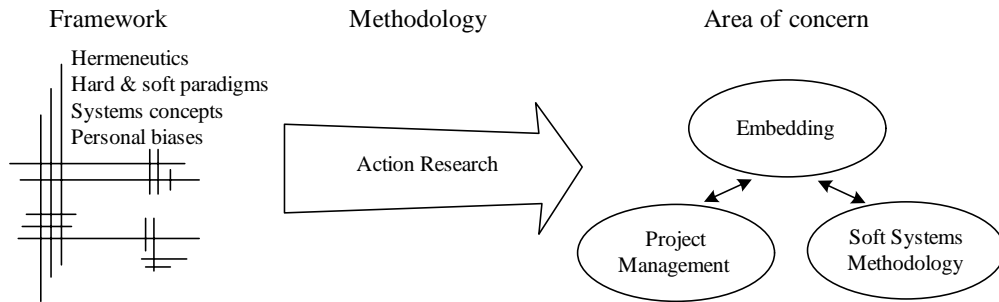


Figure 25: This research in terms of the FMA model

### Criteria for this research

Given the multidisciplinary nature of this research, it may be asked by what criteria it should be judged. This research investigates the practical combination and application of methodologies. However, it is problematic to provide or determine clear criteria by which the use of methodology can be evaluated. For instance, Checkland and Scholes (1990, p. 299) state that "... there is in principle no way in which it could be proved or disproved that this was the *best* way to do it, or that a *more competent* use of SSM would have achieved the results more quickly." The problems of evaluating methodology become more complex still, when methodologies are used in combination.

However, a significant body of literature has been developed on criteria for evaluating research. This research is informed by an interpretive epistemology, using qualitative techniques. The "... subject of 'qualitative criteria' is a hotly-debated issue" (Spencer, Ritchie et al, 2003, p. 38). Review of the literature suggests that the traditional criteria for evaluating research from within the hard paradigm cannot be indiscriminately transposed to research from within the soft paradigm. There "... can be no measure, outside of the paradigms, which can be used as a basis for comparing and adjudicating between the claims to knowledge of theories produced from within different paradigms ..." (Jackson, 2000a, p. 26). Positivist criteria are considered generally inappropriate for

interpretive research (Klein & Myers, 1999, p. 68), while the traditional "... criteria for evaluating the rigor of experimental and survey research – objectivity, reliability, validity, and generalizability – are inappropriate in naturalistic inquiry" (Stringer, 1999, p. 176).

Two broad perspectives on the possibility for criteria for qualitative research can be identified. At one extreme is the complete rejection of criteria. At the other end of the spectrum is a retention of concepts that are common to both qualitative and quantitative research (Spencer, Ritchie et al, 2003, p. 39). Swepson (2003) provides an example of the second position, identifying an implicit assumption in the research community that AR and science are completely different from each other (p. 99), but on enquiry finding "... more similarities than differences between the practice of good action research and the practice of good agricultural science" (p. 100). Klein and Myers (1999, p. 68) also reject the notion of the complete inappropriateness of criteria by which interpretive research can be judged. In conducting this research, I have found it useful to identify a selection of criteria that are appropriate to interpretive AR, and criteria that are generally applicable, regardless of the research paradigm.

Swepson (2003) provides some general criteria applicable to all research which aligns with a pragmatic perspective. The "... best a researcher can do is provide a 'warranted assertion' from a methodology which is fit for the specific research purpose and is internally consistent" (p. 99). The research methodology must be suited to the demands of the situation, and have a clearly defined purpose, which is open to critique, and clearly demonstrates how the purpose will be achieved "... within the contingencies of a local situation – relevance being a DETERMINANT of rigor, not a cost of rigor ..." (p. 108). Indeed, a difference in emphasis placed on rigour and relevance is considered by many to be a distinguishing feature of the difference between research conducted under the hard and soft paradigms (See Figure 9 – Chapter 2). This research involves inquiry into the practical combination of methodologies in a business setting. In such a situation, demonstrating the validity of the research through direct repetition is somewhat difficult (Champion & Stowell, 2003, p. 21). The situation cannot be directly recreated or the research undertaken in repeatable laboratory conditions.

"Demonstrating that the research has been undertaken with due concern for rigour,



when the situation cannot be recreated, is a considerable challenge" (Champion, 2000, p. 67). However, some frameworks have been identified in the literature which make this process easier.

This research uses the FMA model, described above, however, Champion and Stowell (2003, p. 22) argue that the FMA model does not go far enough in considering the manner in which research is conducted. They note that most action researchers identify the importance of the practical outcomes of social inquiry, "... particularly evidence of local improvement in the situation of concern" (p. 24). I demonstrate in Chapter 7 that this research does result in practical benefit to the organisation which formed the context of the project. Furthermore, Champion and Stowell's (2003) PEARL (Participants, Engagement, Authority, Relationships, Learning) model for validating authenticity has been used in structuring description of the project.

Klein and Myers (1999) also provide a set of seven principles for interpretive research, based on hermeneutics, anthropology and phenomenology. These seven principles are:

- The fundamental principle of the hermeneutic circle, which involves movement between different interpretations of field study material (p. 80).
- The principle of contextualisation, which seeks to develop meaning in relation to the constantly changing research context (p. 73).
- The principle of interaction between researcher and subjects, which involves "... critical reflection on how the research materials (or 'data') were socially constructed through the interaction between the researchers and participants ..." (p. 72).
- The principle of abstraction and generalisation, which emphasises the importance of any theoretical abstractions or generalisations that result from the research being related back to details of the field study, so that readers can understand how theoretical insights were developed (p. 75).
- The principle of dialogical reasoning, which emphasises the need to be clear about the philosophical underpinnings of research. This principle requires "... sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ..." (p. 72).
- The principle of multiple interpretations, which requires the researcher to

examine the influence of the social context on the area of inquiry, and taking account of multiple views points (p. 77).

- The principle of suspicion, which requires sensitivity to systematic distortions of possible biases (p. 72).

It should be understood that these seven principles are intended as principles for research, not requirements. For instance, Klein and Myers (1999) used these principles to evaluate three research papers. They found that the hermeneutic cycle was only implied in two of the three papers they evaluated and not present at all in the third. The three papers were considered to be particularly weak in the application of the fifth principle, dialogical reasoning, and in relation to the application of the third principle they state that in "... none of the papers are these kinds of effects of the researcher on the participants and vice versa acknowledged or analyzed" (p. 82). Nonetheless, they refer to these three research papers as "... very good examples of interpretive field research ..." (p. 79). It seems then that the requirements for good interpretive research vary in relation to the needs of the research situation. One model of research does not apply to all circumstances. Instead, "... good researchers get on and do something that works locally, even at the expense of methodological prescriptions" (Swepson, 2003, p. 108).

## **Research method**

Previously in this chapter I have discussed the philosophical underpinning of this research, namely Gadamer's hermeneutics and interpretivism in general, and the methodology that has been applied in managing this research, which is AR, specifically influenced by the form of AR developed by Checkland and collaborators. It is now possible to discuss this research at the level of methods, tools and techniques (See Figure 26), and the specific way that these have been applied in the exploration of the research focus.

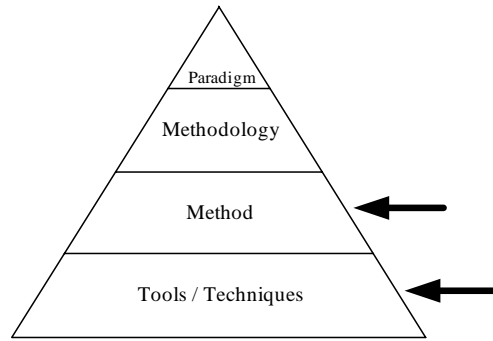


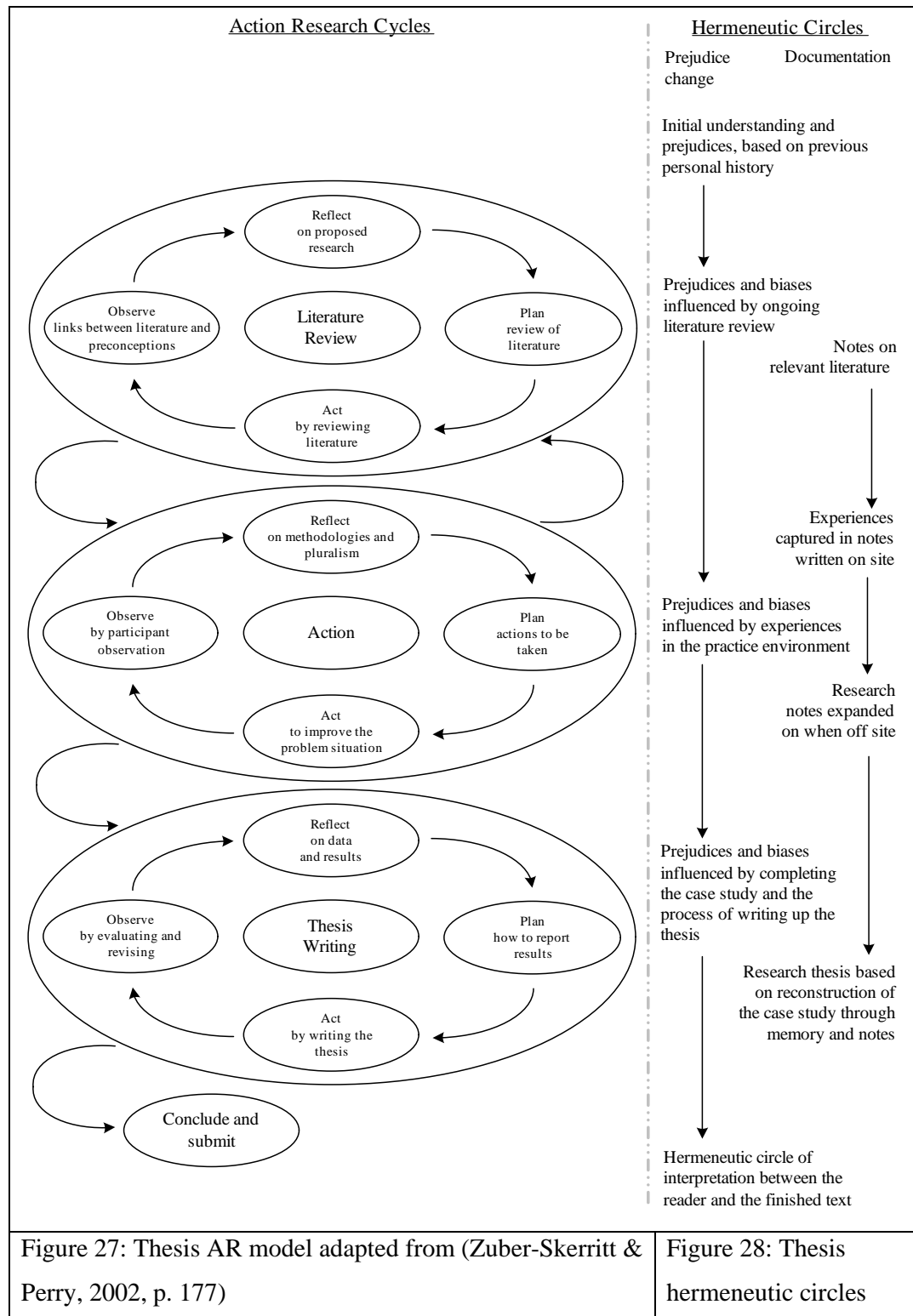
Figure 26: Research Method, Tools and Techniques

This research examines the use of a variant on the Embedding model for the combination of PM and SSM, through practical application of these approaches in an agency in the Australian public sector, the Health Professionals Registration Boards (HPRB). These approaches have been applied in the management of an Information Systems (IS) and Information Technology (IT) strategic plan development project. The development of the plan and the management of the project have been conducted using a combination of SSM and PM, while research into how these methodologies have been combined has been managed using AR.

The process of research is depicted below (See Figures 27 and 28), interpreted through two different frameworks. The Figure 27, on the left, depicts the three major AR cycles that have occurred in the process of conducting this research, a model which is based on one developed by Zuber-Skerritt and Perry (2002, p. 177). This framework separates the research process into two or more separate projects, "... with one feeding into the other as a reflective spiral of action research" (Sankaran & Tay, 2003, p. 8). This model distinguishes between 'thesis action research' and a 'core action research project' which is undertaken in an organisation to solve a critical organisational problem linked to its strategy (Sankaran, 2001, p. 7). The core AR project is aimed at practical improvement in the field, while the thesis AR can be considered the "... the independent action research in preparing the thesis (aimed at making an original contribution to knowledge)" (Zuber-Skerritt & Perry, 2002, p. 171).

Three major action research cycles are identified in this research, each of which included processes of reflection, planning, action and observation. These cycles

included: review of the literature, predominantly before the start of the intervention; action taken in the intervention; and the creation of the thesis for submission. It should be noted that many smaller cycles of AR occurred within these large cycles, in experimenting with various strategies for research and action. Figure 28, on the right, addresses hermeneutic circles of inquiry. It shows significant points at which my prejudices and biases changed during the research, and the different pieces of documentation that were produced during the research process, each of which is interpreted by a reader, with a changing set of biases and prejudices.



This research started with a significant period of literature review, during which the various literatures on the hard and soft paradigms, SSM, PM, and Critical Systems

Thinking (CST) were all examined. From this, a research focus was developed, which, despite going through a number of transformations during the research process, at the time of submission bears remarkable similarity to its original formulation. An organisation was identified as a potential research site. However, before negotiation of the scope of research had passed the preliminary stages, the organisation suffered considerable structural change, with the likelihood of further changes in the future. In response, a second research site was identified, and permissions to conduct this research were successfully negotiated at HPRB. Further details are provided in Chapter 7. This research commenced within HPRB on the 25<sup>th</sup> of March, 2002.

As part of my employment within HPRB as a Computer Systems Officer, I was engaged to manage an IS / IT strategic plan development project, which later became known as the IT / CT Platform Project. This project was managed through a combination of PM and SSM, and it is the process of combining PM and SSM that forms the focus of this research. PM and SSM were applied in a dynamic way, responding to the changing needs of the project. At times one or the other methodology was applied, while at other points in the intervention, the methodologies were applied simultaneously. The paradigm which informed action taken in the project also changed in relation to the needs of the environment, with both the hard and soft paradigms informing action at different points in the intervention.

This research predominantly makes use of qualitative data, collected through personal observations and informal discussion during the process of managing the IT / CT Platform Project. Observations were initially recorded in log books as they occurred in the working environment, or as soon as was practically possible. Note-taking procedures have been informed by aspects of the ethnography literature (e.g., Schwartzman, 1993). Due to time constraints present in the working environment, these notes were often not fully descriptive of the situation. As such, these notes were then used as a basis for an expanded record of actions taken and observations made. Expansion of these notes usually occurred later on the same day, at my personal residence, after the completion of the day's work, and were recorded in a diary format. Effort was made to expand on these notes on the same day that they were taken, so that as little as possible was lost from memory.

HPRB participants to the research include only those people who would be involved in this project as a normal part of their daily work. Research was into the combination of methodologies, not necessarily focused on the individual participants to the research. As such, people other than myself who were associated with the research can be considered participants in the research, but not the direct subjects of the research. Data on how and why particular methods and methodologies were combined by the researcher in particular ways has been gathered by personal observation, and so did not involve any extra work on behalf of other people who were associated with the project work. Details of ethical considerations, permissions for research and participation are expanded upon in Chapter 7.

As the project progressed, my understanding of both the literature and the project changed, altering the prejudices and biases through which I interpreted the intervention (See Figure 28). Some aspects of the literature were demonstrated to be of less consequence than originally thought, while other aspects of the literature gained new significance in light of experiences gained during the intervention, changing the ways in which I both interacted with the lived intervention, and which aspects of the intervention I chose to document in the process of keeping research notes. My prejudices and biases again changed after the project was completed, the intervention was brought to a close, and research within HPRB ended. This change was brought about through the third major AR cycle, the process of reflecting on the intervention and writing up the research for final submission. In passing, note should also be taken of the one final hermeneutic circle associated with this research, which occurs after this research is completed and submitted. This is the hermeneutic circle of interpretation that occurs between the completed text and you, the reader, who brings your own set of prejudices and biases to the interpretation of this work.

## **Conclusion**

In this chapter I have examined the philosophical underpinning, the methodology and the methods for this research. Gadamer's hermeneutics, a branch of interpretivism, has been identified as the central philosophical underpinning for this research. AR, the

research methodology for this research has been discussed, first at a general level, and then in terms of the specific form of AR developed by Checkland and collaborators. Distinction has also been made between the approaches that are used in the research and the action aspects of this research (See Figure 29). Criteria that are appropriate for the evaluation of interpretive AR, such as this, have been identified. In this chapter I have also made some preliminary discussion of the intervention which forms the focus of this research, an intervention into HPRB, in the management of the IT / CT Platform Project, a project which involved the development of an IS / IT strategic plan for the organisation.

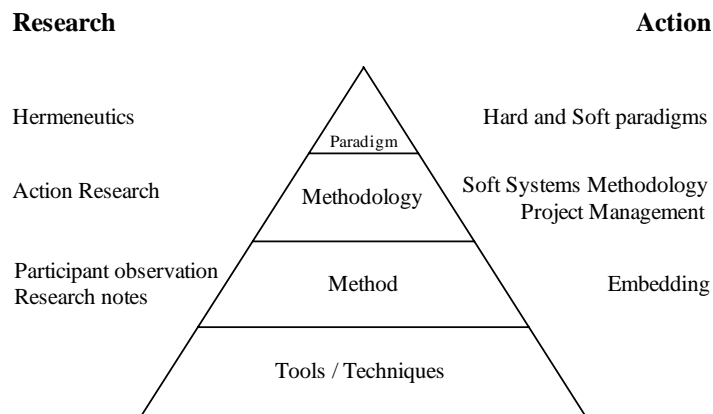


Figure 29: Paradigms, methodologies and methods for research and action

However, before I discuss the actual intervention, it is necessary to discuss the approaches that were applied. Chapters on SSM, PM and CST all follow. These chapters serve a variety of purposes. They inform the reader about the methodologies, so that actions taken in the intervention can be understood in relation to the literature on the methodologies. The majority of learning that occurs as a result of this research is about how these methodologies can be applied in combination, and so must be understood in relation to these methodologies. Furthermore, the reader can come to an understanding of how I interpreted these methodologies, and the prejudices and biases that I brought to their application in practice, through the way that I emphasise some aspects of these methodologies and not others.



## Part C

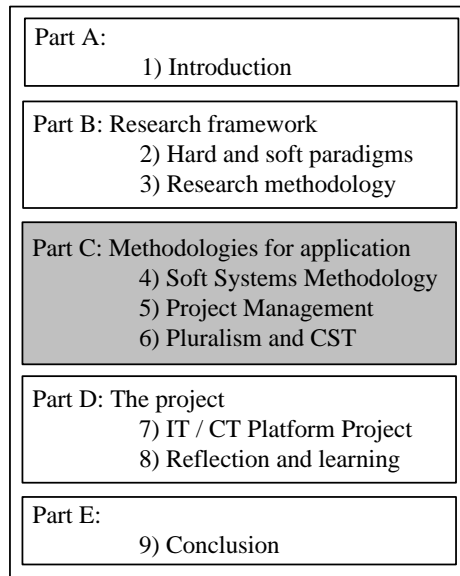


Figure 30: Part C: Methodologies for application

Part C involves an examination of the literature on the different approaches that have been applied in practice, and which form the subject of this research. Part C explores the literatures on Soft Systems Methodology, Project Management, pluralism and Critical Systems Thinking, in order to inform discussion of actions taken in the project.

Chapter 4 examines Soft Systems Methodology, a systems based approach to problem solving and learning, designed to bring about improvement to problem situations through structured debate and the social negotiation of meaning. Chapter 5 discusses Project Management, an approach which traditionally focuses on efficient delivery to predetermined goals, through a reductionist approach to planning and control. Chapter 6 examines the literature on pluralism and Critical Systems thinking for insight into different ways that approaches can be combined in practice. This discussion provides a basis for examining Embedding, a model for pluralist practice which has been applied in the IT / CT Platform Project.

## **Chapter 4 – Soft Systems Methodology**

"In the first case it emerges that the evidence that might refute a theory can often be unearthed only with the help of an incompatible alternative ... Also, some of the most important formal properties of a theory are found by contrast, and not by analysis. A scientist who wishes to maximise the empirical content of the views he holds and who wants to understand them as clearly as he possibly can must therefore introduce other views; that is, he must adopt a pluralistic methodology" (Feyerabend, 1978:30).

### **Introduction**

This chapter explores Soft Systems Methodology (SSM), one of the two main approaches for action used in this thesis. It is necessary to have developed a certain understanding of SSM, if one is to understand how SSM can be combined with other approaches, such as elements of traditional Project Management (PM), as in this research. I also discuss aspects of SSM that appeared significant to me, as a researcher, in order to clarify the prejudices and emphases that I brought to the hermeneutic circle of interpretation, and how these prejudices may have influenced both actions taken in the project, and their subsequent analysis. SSM is examined at a general level in this chapter. Other authors have provided thorough analyses of SSM, through a variety of frameworks. This chapter examines SSM in overview, although aspects of the methodology which are of particular importance to this thesis and are pertinent to an understanding of the use of SSM in managing the development of an IS / IT strategic plan in the public sector are examined in greater depth. The approach to this review of SSM parallels the analysis of PM, to follow, facilitating comparison of the two approaches.

This chapter starts with a brief history of the development of SSM. This is followed by discussion of the purposes to which the methodology is put and the reported benefits of using the methodology. The philosophical underpinning of SSM is also discussed. This includes an examination of the interpretive basis of SSM, and the ways in which human systems and organisations are represented in the epistemology of the methodology. The seven stage model of SSM, arguably the most common depiction of SSM, is also discussed, including a selection of tools and techniques associated with the

methodology that have relevance to discussion of the project. Finally, prior to a review of the way in which SSM has been used in the project, two different ways in which the methodology can be implemented, referred to as Modes 1 and 2, are discussed.

### **A brief history of the development of SSM**

In 1969, Peter Checkland and colleagues at Lancaster University in the United Kingdom "... began an action-research program designed to extend the usefulness of systems ideas to ill-structured management problems" (Jackson, 2000a, p. 246). Checkland had found certain disparities between his practice as a manager and the content of management text books. "Classical management science results from the great discovery that there are certain problem situations which have a logical shape which recurs – the queuing problem, the equipment replacement problem, the depot location problem etc." (Checkland, 2000b, p. S62). However, in practice, Checkland found that the majority of his time was not spent with this kind of problem, but rather on the idiosyncrasies of situations, which could not be generalised using mathematical formulae. In response to his observations in practice, Checkland developed SSM, not as a prescription of what to think, but instead as particular way of thinking which could be of benefit to management problems (Checkland, 1999, p. A42). SSM is a kind of systems thinking which starts with the assumption that the basic human capacity for problem solving can be translated into a methodology which structures active reflection (Checkland & Scholes, 1990, p. 277), resulting in a methodology which "... is simply an organized version of doing purposeful 'thinking'!" (p. 300). At the time, most versions of systems thinking, later described by Checkland as 'hard systems thinking' assumed that goal definition was not problematic. One of Checkland's contributions was the realisation that "... the inability to decide 'the system' and name 'its objectives' was often what caused the situation to be regarded as problematical in the first place" (Checkland & Holwell, 1998a, p. 12). SSM was developed as an aid to developing understanding in problem situations, both of what has to be done, and how to do it.

The subsequent development of SSM has been influenced by a variety of sources. It is part of the systems movement, and so has been strongly influenced by aspects of hard systems thinking. SSM is also identified as being firmly within the Action Research tradition (Rose, 1997; Attwater, 1997; Dick & Swepson, 1994; Salmela, Lederer, et al,

2000). Checkland (2003, p. 298) also acknowledges the work of Vickers (e.g., 1965; 1967; 1968), while the influence of Husserl's phenomenology, American pragmatism, the experimentalist, non-relativist pragmatism of E. A. Singer, the interpretive philosophical and sociological theories of Dilthey, Husserl, Schultz and Weber, and the social theory classification of Burrell and Morgan have all been identified as influencing the development of SSM (Jackson, 2000a, pp. 45, 247). Mathiassen and Nielsen (2000, p. 243) note that SSM has been thoroughly tested through application in practice, and Lane and Oliva (1998, pp. 216 – 7) identified over 400 cases contributing to the development of the methodology. SSM has been employed in a wide variety of contexts, for a wide variety of ends. Survey of some of the literature on SSM (Holwell, 2000; Mingers & Taylor, 1992; Ledington & Donaldson, 1997; Ferrari, Fares et al, 2002) demonstrates its use in the following fields: academic research; agriculture; commerce / banking; education; geography; information systems development; industrial; management; nursing; police; project management; public administration; rural development; and utilities. Within these areas of application, SSM was used for the purposes of conflict resolution, knowledge management, problem solving, performance measurement, policy formulation, problem definition and strategic planning. The reader is referred to Mingers (2000, pp. 745 – 6) for a summary of further application areas and case studies involving SSM. Although there is a considerable secondary literature on SSM, much of which summarises the methodology, reducing it to constituent elements or rules on what counts as the practice of SSM, the main references to the methodology in this chapter will be to the texts authored and co-authored by Checkland, as Holwell (2000) comments, that the tendency for misinterpretation makes "...use of the secondary literature something of a dubious undertaking" (p. 792).

### **The focus and use of SSM**

Using the analytical framework, the System of Systems Methodologies (SOSM), introduced in Chapter 2, Flood and Jackson (1991b, p. 327) categorised SSM as a methodology appropriate for complex-pluralist problem situations (See Figure 31), situations identified as those where issues are difficult to appreciate and disagreement is perceived between stakeholders (Midgley, 1997a, p. 253). This aligns the assessment that SSM's "... systemic nature makes it suitable for dealing with complex human

situations, and it can explicitly cope with differing stakeholder views ..." (Rose & Haynes, 1999, p. 10).

|                | UNITARY   | PLURALIST   | COERCIVE  |
|----------------|---|---|---|
| <b>SIMPLE</b>  | <ul style="list-style-type: none"> <li>• Operational research</li> <li>• Systems analysis</li> <li>• Systems engineering</li> </ul> | <ul style="list-style-type: none"> <li>• Social systems design</li> <li>• Strategic assumption surfacing and testing</li> </ul> | <ul style="list-style-type: none"> <li>• Critical systems heuristics</li> </ul> |
| <b>COMPLEX</b> | <ul style="list-style-type: none"> <li>• Cybernetics</li> <li>• GST</li> <li>• Socio-tech</li> <li>• Contingency theory</li> </ul>  | <ul style="list-style-type: none"> <li>• <b>Soft systems methodology</b></li> <li>• Interactive planning</li> </ul>             |   |

Figure 31: A system of systems methodologies (based on Flood & Jackson, 1991b, p. 327)

A wide variety of reasons for using SSM and reported benefits of its use can be identified in the literature. Very generally, "SSM defines a process through which its users inquire into purposeful human activity by means of systems ideas ..." (Mathiassen & Nielsen, 2000, p. 243) to bring about some change in a situation that will be seen as an improvement (Checkland & Scholes, 1990, p. 286). This is often achieved by facilitating the process of defining for a particular group what would count as an improvement to a problem situation and what would be considered culturally feasible and desirable (Checkland & Holwell, 1998a, p. 160). "By 'problem' is not meant the puzzle, paradox or conundrum which exercises the philosopher, but simply any situation in which there is perceived to be a mismatch between 'what is' and what might or could be" (Checkland, 1981, p. xii). SSM was not designed to address problems, but problem situations that are unstructured, where the designation of a clear and unambiguous objective is itself problematic (p. 155). Such an approach emphasises engagement with practice, not abstracted reflection. The basic criterion for success in using SSM is then

"... that the people involved felt that the problem had been 'solved' or that the problem situation had been 'improved' or that insights had been gained" (p. 146).

Other benefits to using the methodology, are reported to include the exploration of different world views (Mingers, 2003a, p. 563), a continuing process of goal definition (Neal, 1995, p. 8), and increased awareness of uncertainties during planning (Daniel, 1990, p. 81). Responses to a survey by Mingers and Taylor (1992, pp. 327 – 8) identified that some practitioners found the methodology to provide both structure for situations and facilitated thought about situations, to increase the speed of projects, to help make implicit beliefs about a situation explicit, and to aid in the development of a more holistic perspective on a situation. Development of an holistic perspective can be linked to a study conducted by Yeoman, Sparrow and McGunnigle (2000), where it was found that "... soft systems methodology accesses more cells than any other any other soft OR process ..." (Yeoman, Sparrow et al, 2000, p. 134). The term 'cells', in this context, represents different combinations of mental activity, each of which represents a kind of knowledge, under the framework detailed by Sparrow (1998).

SSM has also been classified by Mingers (2003a, p. 563), using a framework that shall be applied to an examination of PM in the following chapter. In the classification (See Figure 32), darker shading indicates a stronger alignment between the methodology and a particular attribute. In this classification, it can be seen that SSM pays an equal attention to the appreciation of the social, personal and material aspects of a problem situation. Mingers classifies SSM as leading to action to generate empowerment, enlightenment, accommodations and consensus. According to this classification, the strongest emphasis in the methodology is at the personal level, particularly in the analysis of different perceptions and world views and the assessment of alternative conceptualisation and constructions.

|          | Appreciation<br>of                                | Analysis<br>of                                       | Assessment<br>of  | Action<br>to                                    |
|----------|---|--|---|---|
| Social   | Social practices,<br>power relations              | Distortions,<br>conflicts<br>interests               | Ways of<br>altering<br>existing<br>structures             | Generate<br>empowerment<br>and<br>enlightenment |
| Personal | Individual's<br>beliefs,<br>meanings,<br>emotions | Differing<br>perceptions,<br>personal<br>rationality | Alternative<br>perspectives<br>and<br>constructions       | Generate<br>accommodations<br>and consensus     |
| Material | Physical<br>circumstances                         | Underlying<br>causal<br>structure                    | Alternative<br>physical and<br>structural<br>arrangements | Select and<br>implement<br>best<br>alternatives |

Figure 32: Classification of SSM (based on Mingers, 2003a, p. 563)

The focus in using SSM is often to learn "... about and improve a problematic situation by gaining agreement on feasible and desirable changes ..." (Mingers, 2003a, p. 563).

"SSM is a cyclic process for learning about a problematical real-world situation and taking purposeful action to improve it" (Atkinson & Checkland, 1988, p. 713).

However, the purpose may be more subtle than bringing about change or simply learning about a problem situation. The methodology can be "... used to develop understanding rather than bring about change" (Mingers & Taylor, 1992, p. 326). There is a consistent emphasis on learning in the literature on SSM. In fact, the unquestioned prime value in SSM "... is that continuous, never-ending learning is a good thing" (Checkland, 1981, p. 285). The methodology focuses on learning (Mingers, 1995, p. 45). What kind of learning is elicited depends upon the participants and the situation in question. For instance, using SSM can lead to lessons about the problem situation, the epistemology of the methodology, the methodology's processes or the way that it has been applied. Potential lessons are acknowledged as always there, awaiting their extraction through conscious reflection (Checkland & Scholes, 1990, p. 287).

Whether SSM is being used as a sense-making device or as an enabler for action, learning is an integral part of the process. Unlike hard systems methodologies, which focus on learning about how best to implement a particular solution or how best to reach a desired goal, learning within SSM is structured, but often only partially goal directed. Learning resulting from use of SSM has been found to be predominantly open-ended, and the methodology has been found to allow for "... open examination of factors which are not normally explicitly acknowledged" (Bond & Kirkham, 1999, p. 244). SSM was

designed to be a set of "... gentle guidelines which do actually guide the analyst while not distorting the problem into a preconceived or standard form" (Checkland, 1981, p. 16). The intention in using the methodology is to come to an understanding of how participants understand a problem situation.

"The questions to be answered are of the kind: how do these particular people, with their particular history, currently construe the world? How did they construe it in the past? What leads to some situations being seen as problematical? What would constitute improvements? What accommodations are possible, leading to what actions? How would they be judged?" (Checkland & Holwell, 1998, p. 158)

This may lead the practitioner of SSM to the assumption that they are gaining a naturalistic or 'true' understanding of the nature of a problem situation. "What is not recognized is that by already framing the process through SSM, one is directing change in a certain way – towards urging participants to explore the potential for accommodation ..." (Romm, 1996, p. 189). Furthermore, the influence of the expectations, desires and values of the practitioner must be taken into account, in understanding the way that a situation is interpreted.

Learning in a problem situation is not always a simple task, to be started and then completed in a single step. Multiple iterations through the process of using SSM may be required "... with perhaps many cycles of learning needed before some accommodation is reached" (Champion & Stowell, 2002, pp. 278). It is often the case that "... people fail to realize that making sense of a problem situation requires not one but many cycles of thinking, and that these may occupy months or years, rather than hours or awaydays" (Checkland, 2000a, p. 814). Furthermore, the point at which an intervention is finished is somewhat arbitrary, as the cycles of learning can, in theory, be continued indefinitely, either by the researcher, or by incorporation of the methodology into the daily practices of those involved in the situation. The outcome of this kind of research is "... learning which leads to a decision to take certain actions, in the knowledge that this will in general lead not to 'the problem' being now 'solved' but to a new situation in which the whole process can begin again ..." (Checkland, 1981, p. 213). This cyclical aspect of learning in SSM can be problematic for researchers and practitioners intent on clear definitions and measurements of progress, as an end point may not be clearly



demarcated and progression within the problem situation may not be apparent to participants.

The development of an understanding of stakeholder perspectives and the facilitation of debate to reach an accommodated position is a participative process. It has been found that choice of participants "... and the level of participation in the debate are crucial in defining and implementing change ..." (Callo & Packham, 1999, p. 314). SSM "... explicitly encourages user involvement from the beginning ... " (Mingers, 1995, p. 45). Participation can lead to greater understanding of the problem situation for all involved and greater acceptance of any changes proposed. Indeed, in reflecting on a previous intervention, Jackson (1997a, p. 231) comments:

"If anything the response was now 'yes, very good, this is obvious, what have you been spending your time doing?' This is a response that is disturbing to inexperienced users of SSM, but is actually just about the highest level of praise an SSM analyst can receive. When something is 'obvious' it has become part of the culture of the organisation; people act according to the obvious and things get implemented."

The process of using the methodology can become almost invisible, both to practitioners and participants. Practitioners may opt to use a Mode 2 application of the methodology, where the methodology is used to guide thinking more than strictly structure an intervention, as discussed in greater detail below. Otherwise the methodology may be used with participants, without revealing it to them (Checkland & Holwell, 1998a, p. 161). SSM does not have to be imposed, or even be "... overtly used to be successful. It is not necessary to announce the use of SSM for it to be successful, and this is an important part of its strength" (Checkland, 2000a, p. 807 – 8). Thus, participants may have engaged in SSM studies without being aware that they were engaging with a defined methodology.

### **Context and user dependence**

Regardless of whether the methodology is announced to participants, the way it is used is context dependant. No two implementations of the methodology will happen in the same way (Checkland & Holwell, 1998a, p. 162), and "... any potential use of it ought to

be characterized by conscious thought about how to adapt it to a particular situation" (Checkland & Scholes, 1990, p. 287). Because of this variation in practice, in many ways it is hard to make definitive statements about SSM, which "... fatally undermines the generalized assertions about SSM which are often found in the secondary literature..." (Checkland & Holwell, 1998a, p. 171). It is "... very difficult to describe what it is that contributes to the 'family resemblance' ... which characterizes uses of SSM by different skilled practitioners in different situations" (Checkland, 2000a, p. 801). Furthermore, it has been found that the realisation of the methodology depends "... upon context, use, and users of the methodology" (Atkinson & Checkland, 1988, p. 717). This context dependence partially explains the contradictory results found in a survey of SSM use by Mingers and Taylor (1992, p. 330):

"SSM was found to be both useful and useless for information systems development. It was found to be too radical but also quite like other methodologies. It was also suggested that the very thing SSM aims to do – uncover and debate soft, contentious issues – can itself be a problem ..."

It is not surprising, then, that SSM does not suit all people or situations. It has been found that for SSM to be effective it requires "... the presence of natural systems thinkers. If none should be present, SSM is likely to fall on infertile ground, and prove unfruitful" (Checkland, 2000a, p. 813). The emphasis on systems thinking in SSM has found to be strong, and that it "... is a complex intellectual task to develop a systems view of issues" (Yeoman, Sparrow et al, 2000, p. 134). However, in contrast to this perspective, Bolton and Gold (1995, p. 24) encourage the reader by stating that "... it is not difficult to think systematically." It has been identified that a high degree of skill in facilitation is "... required from the analyst not least in order to maintain their credibility" (Mingers & Taylor, 1992, p. 329). Furthermore, it has been found that the methodology can involve comprehensive documentation, that "... cannot be readily assimilated into an already busy working environment ..." (Beeson & Davis, 2000, p. 187), and that 'act now' people may find the initial stages of the methodology frustrating (Ellis & Green, 1996, p. 5).

## Criticisms of SSM

Of course, not all practitioners consider SSM a panacea, and some weaknesses and problems with the methodology have been identified in the literature. SSM has been found to be unable to deal with turbulent environments (White, 2000, p. 166). Using SSM has been found to be a time consuming process (Brocklesby, 1995, p. 77; Mingers & Taylor, 1992, p. 328), however, perhaps less so than many others methodologies (p. 325). SSM has also been identified as demanding "... a level of commitment from others that is not always easily obtained" (Brocklesby, 1995, p. 77). However, this criticism should apply less when the methodology is used as an internalised process to structure personal thinking of practitioners. By far the most regularly reported criticism concerning the capabilities of SSM relates to conflict and power issues, in that the methodology does not address certain issues in achieving open debate when there is an imbalance in power (Jackson, 1997b, p. 358; Callo & Packham, 1999, p. 315; Combs, 1996, p. 11; Flood, 2000, p. 9). Use of the methodology may be open to being diverted onto side issues by strong minded individuals (Ellis & Green, 1996, p. 2-3). Jackson (1997b, p. 358) notes that in such situations practitioners of SSM either have to walk away or "... fly in the face of their own philosophical principles and acquiesce in proposed changes emerging from limited debates characterised by distorted communication."

Checkland seems to disagree with criticisms that the methodology avoids conflict and seeks consensus, at the potential cost of ignoring those with less power in a problem situation. "It is wrong to see SSM simply as consensus seeking" (Checkland & Scholes, 1990, pp. 29 -30). Although the focus in using the methodology is often on facilitating debate in order to reach an accommodated position, so that coordinated action may be taken, debate, which may not always be harmonious, comes first. Checkland (1981, p. 17) notes that the "... methodology can orchestrate conflict as well as promote consensus." It has also been noted that people may find new ideas an attack on their security in an environment of change, and if the situation is not managed well they may feel that they have not been heard properly by other participants, if at all. "I have found that SSM is a wonderfully simple and rational way for encouraging people to express themselves clearly and to hear what others are saying without undue conflict" (Checkland, 2000a, p. 804).

These general criticisms concerning SSM and power issues are usually seen to be derived from the interpretive basis of SSM, which has, itself, been criticised as not providing a sufficiently efficacious rationale for bringing about radical change (Flood & Jackson, 1991a). In terms of Burrell and Morgan's (1979) four paradigms of social theory, introduced in Chapter 2, interpretivism is seen as part of the sociology of regulation, an approach which admits that change may occur, but it is a gradual change in an already continuously and gradually changing environment, unlike the sociologies of radical humanism and radical structuralism, which work with the intention of "...over-throwing or transcending the limitations of existing social arrangements" (p. 32). However, not all practitioners perceive SSM in a way that could be aligned with the sociology of regulation. For instance, White (2000, p. 179) notes that change in SSM "... is still characterized as a discontinuous step from an old order to a new one ...", a description which is more aligned with revolutionary change in the sociology of radical change than the sociology of regulation.

### **The philosophical underpinning of SSM**

SSM is supported by an interpretive framework (Checkland & Holwell, 1998a, p. 22). In fact, an interpretive foundation can be considered "... a necessary (and a defining) characteristic of SSM" (Holwell, 2000, p. 775). One of the aims of the methodology is then to take seriously the subjectivity which forms a basic constituent of social systems, and to examine this subjectivity, if not scientifically, then with intellectual rigour (Checkland & Scholes, 1990, p. 30). Adopting an interpretive philosophical stance, as opposed to a positivist position, is an important step in taking this subjectivity seriously. It is the introduction of interpretivism "... into the management and IS literature, that is a major contribution, if not the contribution, to both the management and the IS fields by Checkland" (Holwell, 2000, p. 777). However, the interpretive stance of SSM is also the characteristic of the methodology that has received the most criticism (Bergvall-Kareborn, 2002, p. 310).

The emphasis on philosophy in SSM is particularly strong, and the "... advantages of SSM lie in its philosophy, not the mechanics ..." (Ormerod, 1995, p. 88). Accounts of work which claim to be based on SSM must be expressible in terms of the epistemology

which underlies the methodology (Checkland & Scholes, 1990, p. 286), and in order to "... judge whether SSM is being employed correctly or not requires reference to the philosophy on which it is based ...." (Jackson, 2000a, p. 251). Thus, it is more important for people learning the methodology to pay attention to the philosophy on which it is based than the particular techniques that are associated with it. However others, such as West (2002, p. 38), assert that although philosophical and sociological aspects of the methodology are well explained, aspects of the methodology can be lacking in practical guidance.

The epistemological foundation of SSM assumes that each individual has a "...basic need for the support provided by his fellows in the community" (Checkland, 1981, p. 120). Society plays a significant role in the development and contextualisation of human experience. The beliefs of those in our social sphere give us a constantly developing benchmark by which we understand our personal experiences. SSM takes a social system to be a continually changing interplay of participants' conception of the roles, norms and values that they use to define a situation (See Figure 33). Each both "...continually defines, redefines, and is itself defined by the other two..." (Checkland & Scholes, 1990, p. 49). A uniform and equally accessible reality is not assumed to exist. Rather, it is assumed that individuals interpret reality through their individual appreciative settings, based on their individual expectations, histories and desires. However, the individual is anchored to social settings, and the individual is "... always, and already, tethered by the local community norms and standards that constitute it and which enable its rational acts" (Wilson, 1999, p. 164). Individual appreciative settings are tempered and normalised through social interaction, and meaning is negotiated with other individuals, so truth for the individual becomes defined through the relationship between their individual experiences and the norms of society. Due to this emphasis in the methodology on understanding how individuals interpret the world, SSM can be used as "... a tool for exploring the hermeneutic circle of enquiry ..." (Mingers, 2000a, p. 739).

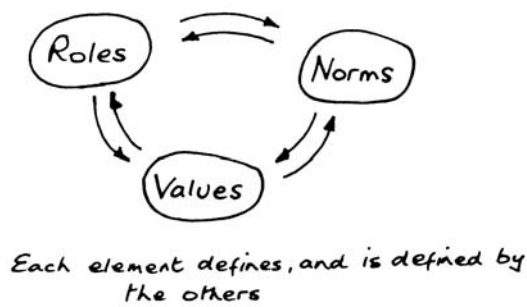


Figure 33: Roles, norms and values (Checkland & Scholes, 1990, p. 49)

Although SSM is ostensibly interpretivist, similarity has been identified between SSM and philosophies associated with different paradigms. Blurring between philosophies at the methodological level is not unexpected, as should be clear through reference to *The Schema*, introduced in Chapter 2. Furthermore, Rose (1997, p. 264) states that it is not sensible to expect that a methodology developed for intervention in real life situations will demonstrate scholastic purity or perfect consistency. "The researcher will be hard pressed to find any methodological approach displaying such purity and consistency" (p. 264). For instance, Probert (1997a, p. 136) sees similarities between aspects of SSM and the position put forward by Descartes, a philosopher often associated with the birth of empiricism. Rose (1997, p. 263), on the other hand, states that the "... epistemology of SSM also has something in common with that of Realism..." Such a statement is understandable, given the references to the 'real world' in the literature on SSM, e.g., "... conscious systems thinking about the real world ..." (Checkland & Scholes, 1990, p. 286) and "... comparing systems models with real-life ..." (Rose & Haynes, 1999, p. 10). However, "... the focus of attention for SSM is on people's perceptions of reality, their worldview, rather than on external reality as such" (Bergvall-Kareborn, 2002a, p. 309). Checkland regularly mentions the 'real world' but it appears that by this he is not referring to the 'real world' of the realists, but rather referring to the world of action and interaction, as opposed to the purely conceptual world of systems thinking, in which one attempts to construct models that are representative of observed phenomena. The world, in the epistemology that informs SSM, is considered to be constructed intersubjectively, not existing outside and independent of the individual.

## **Systems and systems thinking**

The interpretivist position of SSM can also be seen in the way in which systems and systems thinking are described. Whether hard or soft, systems thinking is generally the process of using systems concepts as an aid to understanding the world (Checkland & Scholes, 1990, p. 25). All authors draw on the same concepts regarding the meaning of the term 'system': hierarchy; emergence; communication; and, control (p. 19). Systems thinkers need to feel comfortable with these concepts, and the "...ability to conceptualize and think in layers is a vital sign of a systems thinker..." (Checkland, 2000a, p. 806).

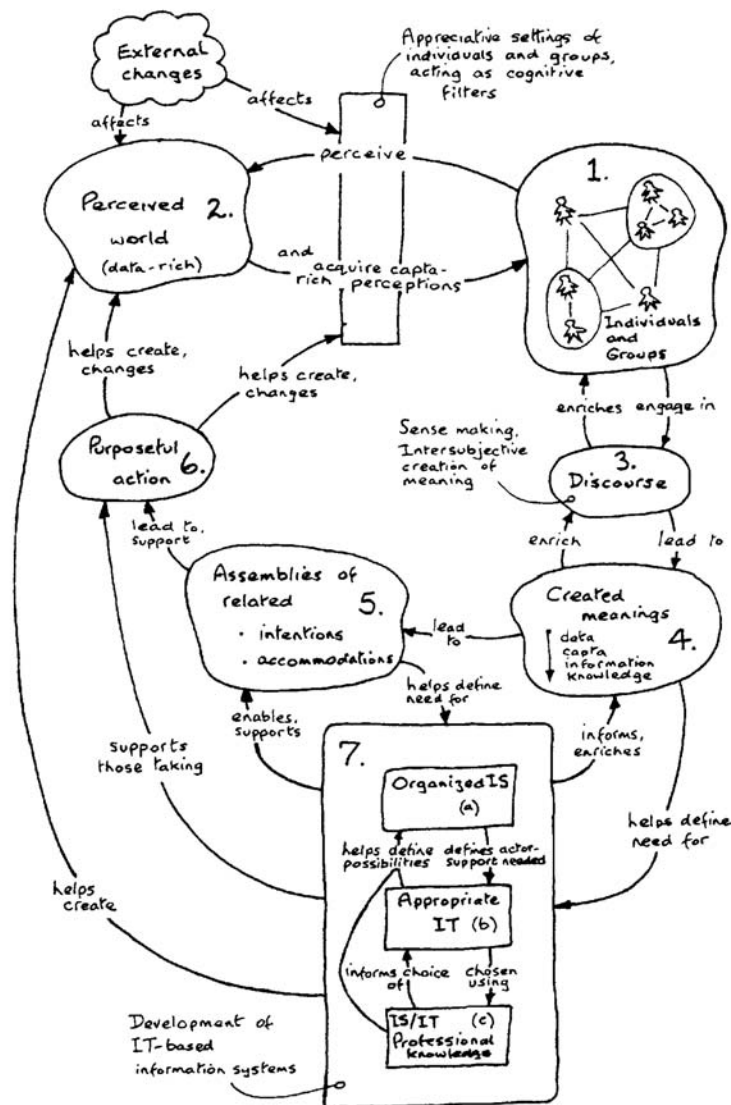
Hard systems thinking tends to assume that systems exist, and are observable, in the world. However, SSM makes "... no automatic assumption that the real world is systemic. If part of the real world is taken to be a system to be engineered, then that is by conscious choice..." (Checkland & Scholes, 1990, p. 286). Systems models in SSM are considered to be epistemological devices, created as aids to understanding, not direct representations of the world. Models of systems are understood to not be descriptions of the real world, which will always far exceed our ability to model, but constructs for use in debate about actions that might be taken (Checkland, 1981, p. 314). "Systems are thus tools of understanding devised by human minds for understanding situations, including situations in which human beings are constituents" (Vickers, 2003, p. 210). Furthermore, in SSM, systems diagrams are not of abstracted information flows or processes, but are models of systems of human activity, which can be used as the basis for debate regarding possible courses of action. The "... emergent property of a defined human activity system is the ability, in principle, to pursue the purpose of the whole..." (Checkland & Scholes, 1990, p. 24), such as working towards an organisational goal. Jackson (2000b, p. S5) notes that the use of human activity systems as the basis for models and the general use of systems models as the basis for debate instead of design are two major intellectual breakthroughs provided by SSM.

## **Organisations**

Similarly, the philosophy of interpretivism can also be seen to have influenced the way that organisations are represented in the literature on SSM. Unlike some of the more

common metaphors for organisations, such those based on machines or organisms, organisations are viewed as social systems in SSM. In forming a conception of an organisation, "... we first assume that the word always refers to a social unit, or a collectivity ..." (Checkland & Holwell, 1998a, p. 80) which maintains sufficient stability for people to recognise it as an organised group of individuals. An organisation is then seen as a social group, that people are willing to think of as if it has some ability of its own to act, even though actions seen to be taken by the organisation are only the cumulative result of the individual actions (p. 218). Despite logically structured relationships between individuals in an organisation, "... groupings develop something of the characteristics of a family: tensions develop, alliances form and re-form, and emotions colour what in principle should be objective professional relationships" (Checkland, 1981, p. 120). Some of the relationships which may develop are depicted in the *Processes for Organisation Meanings* model (See Figure 34).





Unlike the machine and organism metaphors, which tend to assume the possibility for unified directions for organisations, mandated by management, in SSM it is assumed that decision makers tend to exhibit 'bounded rationality' instead of all-seeing vision, looking for decisions which appear to meet the needs at the time they are made (Checkland & Holwell, 1998a, p. 45). Furthermore, the results of decisions made regarding organisational action are dependant upon the reactions of the people who must act upon those decisions. Thus, although management might set direction, the realisation of organisational action emerges from the action of a multiplicity of actors in the organisation; actors for whom behaviour is adaptive, creative and contentious (Beeson & Davis, 2000, p. 178). Accommodations are then not sought for their own sake, but so that people can work together towards some purpose, despite their differences, thus allowing purposeful action to be taken in the name of the organisation (Checkland & Holwell, 1998a, p. 113). "According to this perspective, the mutual accommodation of diverse human interests is more crucial to organizational performance than the optimum performance of technical activities in support of some overarching goal" (Brocklesby, 1995, p. 77). This is a fundamental shift from hard systems thinking.

### **The seven stage model of SSM**

The process of using SSM has been described in a few different ways, by Checkland and by other authors. It has been represented as four key activities, as two streams of analysis and as the seven stage model, while Dick (2000) provides a model of SSM based on four dialectics, which is examined in two case studies (Sankaran, Tay & Cheah, 2003). The two streams of analysis model (Checkland & Scholes, 1990, p. 29) and the four key activities of SSM (Checkland, 1999, p. A15) have not proved to be as popular as the seven stage model (Holwell, 2000, p. 779; Jackson, 2000a, p. 252). As such, this review will focus on the seven stage model as a framework for discussing the process of using SSM. The seven stage model (See Figure 35) is a description of purposeful action taken as a means of enabling action to be taken with the intention of improving a situation. The model appeared in *Systems Thinking, Systems Practice* (1981), and "... has proved resilient, not least because it is easy to understand as a sequence which unfolds logically. This makes it easy to teach, and that too helps explain its resilience" (Checkland, 1999, p. A13). It should be noted that although the seven

stage model is drawn as a sequence, with a starting and end point, the stages are not intended to be followed in a sequential manner. Rather, it was intended that the stages should be used in a way that suits the situation, allowing practitioners to start at any point and continue for as many iterations as is found necessary. The most important aspect of the stages "... is the relationship between them, rather than their order, and as long as that relationship is remembered the work does not have to start at stage 1 and proceed to stage 7" (Checkland, 1981, p. 210).

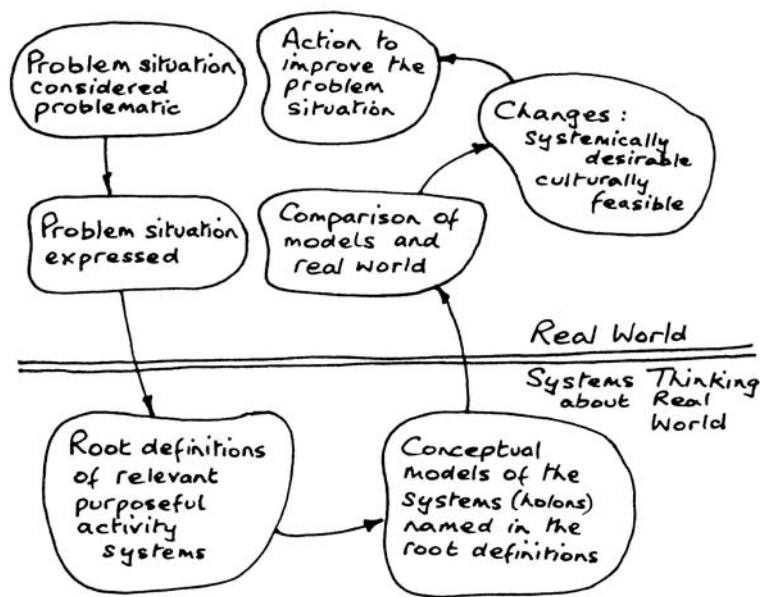


Figure 35: The conventional seven-stage model of SSM (Checkland & Scholes, 1990, p. 27)

### Stages 1 and 2: The problem situation unexpressed and expressed

The first two stages of the seven stage model involve examination of the current situation, so that a variety of different and relevant choices can be revealed (Checkland, 1981, p. 166). In the first two stages, the practitioner moves from a situation where there is a lack of expression, to a situation of increased expression. Instead of being seen as a preliminary to the other stages, finding out about what currently exists should be a continuous process of discovery. The first stage of the seven stage model involves an acknowledgement that many significant aspects of a problem situation will, at any one time, be unexpressed. Little else is written about the first stage of the seven stage model,

and it has been suggested by some that the 'finding out' stages of the methodology "... are poorly documented and inconsistently represented" (Reid, Gray et al, 1997, p. 177).

The second stage is often managed by "... examining elements of structure, elements of process, and the situation climate" (Checkland, 1981, p. 317). There are many techniques that can be used to manage this, but the one which has proved to be most widely recognised is that of drawing Rich Pictures (Holwell, 2000, p. 778; Jackson, 2000a, p. 253); cartoon-like drawings expressing whatever participants feel is relevant to the current situation. Rich Pictures are often used as a technique divorced from the rest of the methodology, and "...they are often considered to be the most memorable and reusable part of SSM ..." (Bronte-Stewart, 1999, p.83). Few guidelines are available on how to make Rich Pictures, but examples abound in the literature (e.g., Williams, 1999; Bronte-Stewart, 1999). Checkland (1999, p. A16) advises that participants "... need to develop skill in making 'rich pictures' in ways they are comfortable with, ways which are as natural as possible for them as individuals." However, Checkland does discourage the use of ready made symbols, and systems terminology, on the basis that they can predetermine what is expressed in a situation. Ho and Sculli (1994, p. 50) disagree, finding this restriction unnecessary and overly restrictive.

In the early stages of problem exploration, it can be best to seek many diverse views on what might be of significance to the problem situation, before decisions are made on which actions should be taken in improving the situation. "It has been found most useful to make the initial expression a building up of the richest possible picture of the situation being studied" (Checkland, 1981, p. 165). As with all models produced in SSM, it is the process of creation which provides benefits, rather than the actual models or Rich Pictures produced. "The discussion and debate that surround the drawing activities are the key to surfacing the current paradigm" (Ragsdell, 2000, p. 110). Although the process of creating Rich Pictures can be enjoyable, Gregory and Midgley (2000, p. 283) reported that the end of the second stage can be an emotional low, as at that stage only problems in the current situation have been identified.

### Stage 3: Root Definitions

Having explored perceptions of the current problem situation (Stages 1 and 2), participants move on to name the systems that are considered relevant to the problem situation (Checkland, 1981, p. 166). Stages three and four of the seven stage model involve defining systems of purposeful activity that are relevant to debate directed towards improving the situation. Named systems can be systems of activity that participants would like to be seen in the future, or systems of activity for taking action to improve the current situation. Stage three describes human activity systems in words (Root Definitions), while stage four involves graphically modelling these systems (Conceptual Models).

A Root Definition is a "... concise, tightly constructed description of a human activity system which states what the system is ..." (Checkland, 1981, p. 317), as defined from a particular point of view. The influence of interpretivism can again be seen in the acknowledgement that Root Definitions are created from a particular point of view (*Weltanschauung*), and cannot be taken as statements that apply universally. Proposing a Root Definition is tantamount to a statement that in one person's view, the subsequent modelling, comparison and debate will lead to illumination or improvement of the current situation (p. 167). Various guidelines have been created as aids to the creation of Root Definitions. Structurally, it is suggested that Root Definitions be presented in terms of what is being done, how it is being done, and why it is being done; a structure that is referred to as XYZ (Checkland & Scholes, 1990, p. 36) or PQR (Checkland, 1999, p. A23).

However, the most commonly recognised basis for the creation of Root Definitions is the mnemonic CATWOE (Customers, Actors, Transformation, *Weltanschauung*, Owner, Environment), and adequate Root Definitions should contain all these elements. If any are not included, they should be excluded consciously and for good reasons (Checkland, 1981, p. 224). Checkland has found the elements of CATWOE to be appropriate as the basis for outlining human activity systems. However, not all practitioners have been similarly satisfied with it. For instance, Bergvall-Kareborn, Mirijamdotter et al (2004) provide development on CATWOE. By way of contrast, Gregory and Midgley (2000, p. 283) found that CATWOE provided benefit to their

problem exploration process, but did not feel the need to create precise Root Definitions, as it was felt that sufficient clarity had already been gained. Similarly, Ellis & Green (1996) found the creation of Root Definitions to be the most difficult aspect of applying the methodology. Others take issue with specific aspects of CATWOE, such as the concept of Transformation. Checkland states: "*Any purposeful activity can be expressed in this form, in which an entity, the input to the transforming process, is changed into a different state or form, so becoming the output of the process*" (Checkland, 1999, p. A22 – original italics). However, Mathiassen and Nielsen (2000, p. 244) have often found difficulties in modelling systems of human activity as transformations, and present some developments on this concept.

#### **Stage 4: Conceptual Models**

Stage four involves an elaboration of the work done in creating Root Definitions, through the creation of Conceptual Models which express the transformation defined in the Root Definition. Checkland is quite firm about the relationship between Root Definitions and Conceptual Models. "Every element in the definition must be reflected in the model derived from it" (Checkland, 1981, p. 317). Although stages three and four are both used to describe systems of human activity, they do this in different ways, achieving different ends. Stage three defines the system through words, while stage four describes the system through modelling. These different approaches to defining the same system encourage participants to look at a system in different ways, providing the potential to increase the range of insight into the practicalities of the system in question. Checkland (1999, p. A26) provides clear instructions on how basic Conceptual Models can be created. Alternative developments on the Conceptual Model building process are provided by Atkinson and Checkland (1988) and Bergvall-Kareborn (2002a, b). Although guidelines to the creation of Conceptual Models are provided, it "... has in practice been clear that models cannot in fact be based on logic alone" (Checkland & Tsouvalis, 1997, p. 2). Rather, the creation of models in SSM requires direct engagement with the world, instead of being constructed based on some idealised norm. Because of this, it is only in relation to the particularities of a problem situation that a model can be thought of as more or less insightful, useful or valuable than any other (Ledington & Ledington, 1999, p. 63).

Reiterating the interpretivist perspective of the methodology, Conceptual Models are considered to be intellectual tools for structuring learning. Conceptual Models are not descriptions of the real world. They "... are constructed to express ideas that may be relevant to the situation of focus ..." (Champion & Stowell, 2002, pp. 277 – 8). They depict the set of activities described in the Root Definition (Checkland, 1981, p. 170) and "... enable coherent exploration of perceptions of the real world to take place" (Checkland, 1995, p. 10). Instead of attempting to describe the real world, it is acknowledged that the full complexity of real purposeful action will always exceed the complexity of any model that is created, regardless of the effort that is invested in their formulation (Checkland & Holwell, 1998a, p. 160). Models of the social world of human action will never be complete (Attwater, 1997, p. 19). They are used to highlight aspects of the situation as foci for debate, and thus do not need to approximate the full complexity of a situation (Midgley, Gu et al, 2000, p. 76).

### **Stage 5: Comparison**

Unlike the first four stages of the seven stage model of SSM, little is written about the final three stages. Unlike stages two, three and four, the final three stages contain no dedicated tools or techniques, and are instead left to the practitioner to manage. The final three stages have been found to be highly context dependant, and need to be defined in practice in relation to the needs of the context. As such, the later stages of an SSM intervention cannot be defined as clearly as the early stages. Checkland states that "... comments on the latter parts of SSM are bound to be generalizations from experience which are very diverse, those generalizations being themselves subject to change as the flux of experience moves on" (Checkland, 1999, p. A28). Much like the earlier stages, the purpose of the comparison stage is to generate and perpetuate debate. In this case, the present situation, elicited in stage two, is compared with representations of possible future systems of human activity, educed in stages three and four. This can lead to debate about possible changes that might be made within the problem situation as it is seen at the time, or to an understanding of the need for further exploration of the current situation or possible future systems of activity. "In practice, initial work on this stage frequently draws attention to inadequacies in the initial analysis or in root definitions, and further work is required there" (Checkland, 1981, p. 180). Ledington and Ledington (2000, p. 1) point out, however, that in their experience people new to

the methodology may find that "... the comparison stage is confusing and even seems to be meaningless."

### **Stages 6 & 7 – Defining changes and taking action**

Less still is written about the final two stages of the seven stage model. Stage six involves defining changes that participants consider to be improvements to a problem situation. Unlike the hard paradigm where identified changes should be seen be systemically feasible and culturally desirable, "... the two criteria for the changes sought by SSM are 'systemically desirable' and 'culturally feasible' ..." (Checkland & Scholes, 1990, p. 52 – 3). This reversal of emphasis signals an acknowledgement that it is the people in a problem situation who will be taking action to make changes, and that the success of such actions is likely to be more dependant upon the culture of the people involved than an alignment of proposed changes with an abstracted systems model. Choice between possibilities is then not one of feasibility or infeasibility, but rather one of the value placed upon them. In contrast to the perspective offered by the hard paradigm, SSM acknowledges that it is the culture of the participants that will limit what is actually possible within the situation. In stage seven, actions are taken to improve the problem situation. However, due to the complexity of the lived world, actions do not generally simply lead to the problem being 'solved', but rather to a new situation which may also be considered problematic, which can then be examined through continuing application of the methodology.

Checkland made considerable effort to describe the seven stage model as a continuous process of learning, in which practitioners could begin at any stage and move in any direction (Flood, 1999, p. 57). Despite this effort, the seven stage model is often understood as a simple procedure, instead of an outline of a general approach. Checkland and Scholes (1990, p. 27) note that the early representation of the seven stage model "... gives too much an impression that SSM is a seven-stage process to be followed in sequence." Whether this was addressed effectively in *Soft Systems Methodology in Action* (Checkland & Scholes, 1990) is debatable, as ten years later Midgley, Gu et al (2000, p. 75) still found that "... presenting SSM in the form of a series of seven stages encourages the reader to make the erroneous assumption that it is a simple set of techniques to be operationalized in a linear sequence ..." However, the



methodology need not be implemented as a linear sequence, as it is considered acceptable to depart from prescribed stages so long as the central principles of the methodology are respected (Midgley, Gu et al, 2000, p. 76).

### **Modes of use of SSM**

The different kinds of implementation of the methodology can be broadly categorised as Mode 1 and Mode 2, although "... the distinction is rather hazy" (Mingers, 2000a, p. 740). A Mode 1 implementation of SSM relies heavily on the structure of the methodology, as described in the seven stage model, tending to follow the stages in a clear and linear sequence. A Mode 2 implementation of SSM is much more fluid, using the epistemology of the methodology as a guide for action, instead of the structure presented in the seven stage model. Checkland summarises the difference between modes 1 and 2 thus:

| "Mode 1                   |        | Mode 2                          |
|---------------------------|--------|---------------------------------|
| Methodology-driven        | versus | situation-driven                |
| Intervention              | versus | interaction                     |
| Sometimes sequential      | versus | always iterative                |
| SSM as an external recipe | versus | SSM as an internalized process" |

(Checkland, 1999, p. A36)

Mode 1 SSM is the initial way that the practitioner comes to understand the methodology. In Mode 1 implementations, the methodology is understood as being a set of seven stages or four key activities to be followed in sequence, with little room allowed for variation of, or experimentation with, the methodology (Checkland & Holwell, 1998a, p. 164). Mode 1 interventions prescribe certain activities that are to be carried out, and the methodology can be seen as something which is externally applied "... and dominates proceedings" (Jackson, 2000a, pp. 257 - 8). Most of the commentary on SSM, in particular that from sources without much experiential knowledge of the methodology, assumes that Mode 1 is the only kind of SSM, inaccurately pigeon-holing it as a seven stage process (Checkland & Scholes, 1990, p. 282). This can then lead to the misunderstanding that the methodology is a formula for producing answers in ill-defined situations and that if one proceeds through the steps in the seven stage model

then an appropriate solution will appear at the end of the process. "Addiction to this misconception is particularly prevalent among those who don't like or who are wary of thinking, or who want quick answers without trying to make sense of a problem situation" (Checkland, 2000a, p. 813 – 4). It might be simpler to view the methodology as a strict sequence of seven stages or four key activities, but there is no implication that the methodology should be used rigidly. The structure in the methodology is there only to guide action in the face of ill-defined situations, not to constrain situations into predefined formats (Checkland & Scholes, 1990, p. 7).

As practitioner experience grows, reliance on the structure of the seven stage model tends to decrease, and the process becomes more internalised. Although describing the methodology as a series of seven stages may make the methodology more accessible, it "... is important to emphasize that Checkland's SSM need not be applied in a step-by-step manner. It is recommended that it be used as an adopted way of thinking that does not itself have to be thought about at all" (Sankaran & Tay, 2003, p. 10). In Mode 2, the methodology "... only occasionally breaks the surface of ongoing events" (Jackson, 2000a, pp. 257 - 8). Furthermore, "... novices will tend towards mode 1 - like uses, more experienced users towards mode 2" (Checkland & Holwell, 1998a, p. 164). Flood (1999, p. 59) regards Mode 2 SSM as a conceptual framework to be incorporated into one's everyday thinking. It is considered to simply be an organised version of what people do anyway when they think purposefully. "That is why, once the epistemology of SSM is grasped, using it seems so natural. That is why SSM can be internalized so easily, making 'Mode-2-like' uses of it seem the most natural thing in the world" (Checkland & Scholes, 1990, p. 300). Mode 2 uses of the methodology may also be more effective than Mode 1. Review of the experience of a variety of practitioners has shown that nearly all of the "... best applications of SSM occur when people are unaware that they are using it. This can either be because they have never been aware of it or because it has become so embedded in their thinking processes that they use it without realizing" (Checkland, 2000a, p. 813).

Mode 2 use of the methodology typically involves more focus on the problem situation and less focus on the methodology. "Experienced users of SSM are much more problem-oriented than are beginners" (Checkland & Holwell, 1998a, p. 163). Experienced practitioners do not start from an outline of the methodology and consider

how best it can be applied, but rather immerse themselves in the problem situation. It is difficult to generalise about Mode 2 implementations of SSM as they are highly dependant upon context. Checkland and Holwell (1988a, p. 164) were reluctant to spell out any prescriptive accounts of its use. At the extreme of Mode 2, SSM is an entirely internal intellectual process and "... is publicly untouchable by testing against Constitutive Rules of any kind" (Checkland & Scholes, 1990, p. 285). A Mode 2 application may involve practitioners simply trying to make sense of a problem situation (Jackson, 2000a, p. 257), or using SSM concepts in a non-standard way, such as "... the problem-solvers reflecting about their own intervention activities using SSM at a meta-level" (Mingers, 2000a, pp. 740 – 2). Flood (2000a, p. 7) emphasises that the main features of this kind of implementation are the recognition of the significance of the cultural stream and the logical stream of analysis, a model of SSM mentioned above. However, it should be noted that the two stream model was presented in *Soft Systems Methodology in Action* (Checkland & Scholes, 1990, p. 29) as an alternative to the seven stage model, not a description of Mode 2. No primary evidence has been found to indicate that this can be considered a defining characteristic of Mode 2, suggesting that Flood (2000a) makes an error in description.

The difference between Modes 1 and 2 can be further explored through reference to the concepts of Framework, Methodology and Action (FMA), introduced in Chapter 3 (See Figure 36). Fitting a Mode 1 use of SSM into the FMA concept is a simple task. An ideal Mode 1 use of SSM takes the set of systems ideas embodied in the methodology as the framework of ideas (F). The epistemology of SSM, systems ideas and interpretivism are the framework through which the world is understood. The methodology (M) is SSM as it is represented in the seven stage model, the two streams of analysis or the four key activities, with little room for variation or experimentation with the methodology. (A) is the actual action taken in some problem situation. A Mode 2 implementation is more internalised and the focus changes somewhat from simply taking action to learning about the problem situation and how methodology relates to it. Previous experience with SSM becomes the framework (F) through which the world is understood. The methodology (M) in Mode 2 can be thought of as conscious reflection on the action taken in the situation, and its relationship to the methodology and practitioners (Checkland & Scholes, 1990, p. 283). In a Mode 2 implementation, (M) is situation driven, not methodology driven. The action (A) in a Mode 2 implementation is

the act of learning on the part of participants, such as learning about the problem situation or learning about how the methodology can be used, rather than (A) being external actions taken in the problem situation.




|   | Mode 1   | Mode 2   |
|---|--|--|
|  | 1. Systems ideas   | 1. SSM as in Fig. 2.5 (7stages) or Fig. 2.6 (2 streams)  |
|  | 2. SSM as in Fig. 2.5 (7stages) or Fig. 2.6 (2 streams) (intervention)     | 2. Reflection upon the everyday flux of events and ideas, using SSM to make sense of it. (interaction) |
|  | 3. Some part of the real world eg. NHS, a company, the civil service, etc. | 3. The learning of whoever does 2. above   |

Figure 36: Mode 1 and Mode 2 use of SSM (Checkland & Scholes, 1990, p. 284)

### Combining SSM with other approaches

SSM has often been combined, in part and in whole, with other approaches, to meet a variety of ends in a variety of fields. Of all the different systems thinking approaches, SSM is arguably the methodology that is most frequently used in combination with other approaches. A study by Munro and Mingers (2002, p. 374) found that SSM "... appears to be the predominant methodology used as part of a multimethodology, in combination with other techniques." Relatively few of the respondents to their study reported combinations of hard and soft approaches, but those that did predominantly involved SSM (p. 374). SSM is often viewed as ... 'front-end' analysis ..." (Bond & Kirkham, 1999, p. 244), useful in defining goals and developing an understanding of the environment, before action is taken to deliver to goal specification, using a different approach.

Writing from a PM perspective, Morris (2004, pp. 15 – 5) has commented that there "... is not much direct evidence of the application of SSM in the management of projects to date." However, a survey by Mingers and Taylor (1992, pp. 326 – 7) into general SSM use found that 'Critical success factors' are listed as one of the techniques used in combination with SSM. This suggests that although it is not regularly documented in

the literature, combinations of SSM and commonly used PM techniques have been occurring for more than a decade. Indeed, PM is mentioned as one of the application areas of SSM (p. 325). SSM has been applied in combination with PM in a variety of contexts: for the development of a value management model (Liu & Leung, 2002, p. 343); as an aid to project management training and project risk management (Ramsay, Boardman et al, 1996, p. 36); for understanding the strategic planning of information systems (Yeo, 2002, p. 245); and is generally suggested as applicable to projects where the goals and methods for achieving goals are not well defined (Turner, 1999, p. 26).

Some authors engage with the whole methodology, while others only use parts of it. For instance, Lui and Leung (2002, p. 343) discuss using the Root Definition and Conceptual Model stages of the SSM seven stage model in a PM context. Stewart and Fortune (1995, p. 280) focus on Rich Pictures (p. 280), while Neal (1995) uses the seven stage model of SSM as an aid in systems definition, before traditional PM techniques are used. This approach has been found to have worth in a wide range of projects, "... across the entire spectrum of applications from civil engineering to a consultancy project considering maintenance problems in an urban transport system" (Neal, 1995, p. 7), allowing the practitioner to avoid problems associated with changing goal definition (p. 8). Other fields have also engaged with the possibility of combining approaches with SSM. For instance, debate in the information systems literature has waged for a while on the benefits of combining SSM with functionalist information systems approaches (Jackson, 1997b, p. 361). Lane and Oliva (1998) make a theoretical case for the combination of SSM and Systems Dynamics, another popular systems approach, by examining the methodologies' theoretical and methodological assumptions. Another case of note involved a combination of SSM and the Viable Systems Model (VSM) in "... an information systems strategy project with an English county police force. This project required rethinking the nature of the police force under review – the kind of 'system' it was – in order to facilitate information systems design ..." (Jackson, 1997a, 202). Ormerod (1995a; 1996; 1999) also provides a selection of case studies involving the combination of SSM with a variety of other approaches. Research articles in the various literatures make statements about the value of combining SSM with other approaches. However, few explore this in depth, examine different ways in which the approaches can be combined, or address the philosophical

consequences of combining approaches from different paradigms. These issues are discussed in Chapter 6.

### **Use of SSM in the project**

In this chapter I have reviewed the seven stage model of SSM, as this is the way that the methodology is most commonly referred to in the literature. Furthermore, the majority of research that examines the use of SSM in practice examines Mode 1 – seven stage implementations of the methodology. However, this research uses a Mode 2 implementation of the methodology in practice. Mode 2 implementations of SSM are, by definition, less structured than Mode 1 implementations, as action emerges through the process of interaction between researcher and the test site, instead of following a clearly defined plan or model for action. As such, it was considered necessary to identify the differences between modes of action, so that a Mode 2 application of SSM, such as this research, would not be evaluated based on an inappropriate comparison to Mode 1 applications of the methodology.

Given that the seven stage model was not directly applied in the project, it could be asked why the above review has addressed aspects of the seven stage model. Review of the seven stage model of SSM provides insight into how SSM is generally applied and perceived. Furthermore, consistent with a Mode 2 application, some of the techniques associated with stages of the seven stage model have been applied and adapted to the needs of the project environment. The epistemology of SSM has been addressed in this chapter as it the epistemology of SSM that is used to guide action in a Mode 2 implementation of the methodology. Furthermore, it is in light of the epistemology of SSM that interventions that claim to be based on SSM should be evaluated.

It has been identified above that when combined with other approaches SSM often plays the role of a 'front-end' goal definition and problem situation exploration process, before a different approach is used to address the delivery of goals. This is not how SSM has been used in the IT / CT Platform Project. Rather, Mode 2 SSM has been used throughout the intervention, as a continual learning process. PM and SSM have been used concurrently, with the different methodologies providing different perspectives and

foci on the project, and informing action in different ways. The way in which these different approaches have been combined is discussed in detail in Chapter 6.

## **Conclusion**

This chapter has provided a brief overview of those aspects of SSM relevant to an appreciation of how SSM can be combined with other approaches, such as PM. The developmental history, the purposes and the reported benefits of using SSM have been reviewed, as has the interpretive basis of the methodology, and how this influences the way in which human systems and organisations are perceived. A variety of tools and techniques associated with the methodology has been discussed, in the context of the seven stage model, arguably the most popular depiction of the methodology. The chapter has concluded with a review of the different modes of practice, and a brief introduction to my application of SSM in the IT / CT Platform Project.

It has been necessary to review SSM in order to identify which aspects of the methodology are relevant to understanding the way in which SSM has been combined with PM in the project. Furthermore, this review of SSM provides the reader with some insight into the influence of prejudices and emphases that I brought to the hermeneutic circle of interpretation, and how these prejudices may have influenced actions taken in the research project, and their subsequent analysis, even if this is only implicit in which aspects of the methodology I have chosen to emphasise.

A reflective use of SSM can provide learning not only about the nature of the problem situation but also about the use of the methodology itself. Users of SSM may "... be found using it simultaneously, in parallel, both to illuminate the process of carrying out an investigation of a problematical situation and to deal with the content of the situation itself" (Checkland & Holwell, 1998, p. 163). Learning is an integral part of SSM, learning both about the problem situation and the people involved, but also learning about the way that SSM is used. "Every use of it can be seen – if the users are sufficiently alert – as research into its use" (Checkland & Scholes, 1990, p. 275). In light of reflection on the actions taken in the project, in Chapter 8 I will discuss the following question:

- How appropriate was SSM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?



## **Chapter 5 – Project Management**

"The objects of our desires and aversions are not objects but relations. No one 'wants an apple'. He may want to eat it, sell it, paint it, admire it, conceivably even merely to possess it – a common type of continuing relation – in any case to establish or change some relation with it. The goals we seek are changes in our relations or our opportunities for relating; but the bulk of our activity consists in the 'relating' itself" (Vickers, 1965, p. 33).

### **Introduction**

In this chapter I examine aspects of the theory and practice of project management (PM). This chapter serves three purposes. First, the chapter clarifies aspects of PM relevant to an understanding of how PM has been applied in combination with SSM in the IT / CT Platform Project. Secondly, traditional PM is analysed in relation to the qualities of the hard and soft paradigms, something which has not yet been comprehensively done in the PM literature, and which also facilitates comparison of PM with SSM. Thirdly, this chapter provides some insight into the way in which my understanding of PM has affected both my interpretation and application of PM in the following project and the subsequent analysis.

This review of the practice of PM starts with some basic definitions, before the application area, current practice, and trends in the field are discussed. This is followed by discussion of the tension between fundamental uniqueness and standardisation that lies at the heart of the field of PM. I then address the project life cycle, the most frequently used model for managing projects. Discussion of the practice of traditional PM is concluded by examination of commonly used measures for project success.

Argument is then made that traditional PM is firmly grounded in the hard paradigm. The role of theory in PM is discussed, as are links between PM and methodologies from hard systems thinking. Links to the hard paradigm are further established by an examination of a variety of factors, including: the philosophical basis of PM; assumptions regarding goal definition and stability; planning and control; models of organisation; and communication and participation. Throughout this chapter, significant reference is made to the PMBOK® Guide (PMI, 2000) in establishing the traditional

position of PM as a field. It is acknowledged that a third edition of the PMBOK® Guide (PMI, 2004) was released prior to submission of this research. However, changes between the two editions do not significantly change the general way in which the field is portrayed, and the second edition of the PMBOK® Guide (PMI, 2000) remains broadly representative of traditional thought on PM practice.

A small but growing dissatisfaction with a theoretical basis grounded in the hard paradigm can be found in the literature on PM, and the concomitant increasing interpretive influence on the discipline is discussed. Some authors have been providing reinterpretations of traditional PM ideas, which can be broadly aligned with the soft paradigm. Examples of tendencies towards the soft paradigm are discussed in terms of the following: PM tools and techniques; goal definition; project planning; and continuous learning and evaluation throughout the life of a project. This analysis of the field suggests that although PM remains strongly influenced by the hard paradigm, undercurrents of the soft paradigm can be seen. This chapter concludes with a research question regarding the application of PM in practice, which is examined through reflection on the project in following chapters.

### **The definition of projects and project management**

Projects are undertaken to introduce change, because people and organisations realise that they cannot achieve particular objectives by continuing to carry on routine processes (Turner, 1999, p. 49; PMI, 2000, p. 4). PM is recognised as a beneficial strategic tool and in the implementation of organisational strategies (Cleland, 1994, p. 6; Hensman, Valenta et al, 2004, p. 17). Accomplishing objectives requires coordinated effort, sometimes of large numbers of people, and effort must be properly directed if objectives are to be reached (Cleland & King, 1968, p. 12). Project management provides a way of meeting some of these needs. In order to understand how PM is positioned in relation to the hard and soft paradigms, and how it can be combined with SSM, it is useful to explore the definitions of some relevant concepts, and an appropriate place to start is the definition of 'project', a term which is consistently defined in the literature. Pinto and Slevin (1998b, p. 68) provide a typical definition:

"... a project can be defined as possessing the following characteristics:

- A defined beginning and end (specified time to completion)
- A specific, preordained goal or set of goals
- A series of complex or interrelated activities
- A limited budget"

Other definitions may place slightly different emphases on the definition of 'project', but the concept remains predominantly the same. The objectives of the project are usually defined in terms of time, cost and quality specifications, often referred to as the 'Iron Triangle' or 'Triple Constraint'; an idea at the core of PM, as is evident from its consistent presence in literature. Other authors choose to also emphasise the unique or temporary aspects of projects. For instance, an "... undertaking is not a project unless it is something out of the ordinary, different from a normal, routine affair in the organization ..." (Cleland & King, 1968, p. 261) and "... the product or service is different in some distinguishing way from all other products or services" (PMI, 2000, p. 4). Projects are generally undertaken in a business context. However, unlike other business processes, the "... project is not a permanent entity but, rather, an activity whose purpose is to work itself into ultimate dissolution after the objectives of the project have been accomplished" (Cleland & King, 1968, p. 73).

Project management can then be thought of as "... the application of knowledge, skills, tools, and techniques to project activities to meet project requirements (PMI, 2000, p. 6) or the coordination of "... human, financial and material resources ... to achieve beneficial change defined by quantitative and qualitative objectives ..." (Turner, 1999, p. 3), which can be understood in terms of the relationships and various forces at play within the project environment (See Figure 37). The definitions of 'project' and 'project management' are very general. For instance, Cleland and King provide an inclusive definition: "If the effort requires for many functionally separated activities to be pulled together, and if these activities are so closely related that moving one affects the others, project techniques are clearly needed." Similarly, in the preface to their book, Stallworthy and Kharbanda (1983, p. xvii) wrote: "Any plan, scheme or task – including the writing of this book – can be and is referred to as a 'project'. Naturally, the management and accomplishment of that task is then termed 'project management'." However, in practice, 'project management' refers to a specific set of tools and

techniques, specific models of the life cycle of a project, and particular, if often implicit, perspectives on the world, which have been strongly influenced by the hard paradigm.

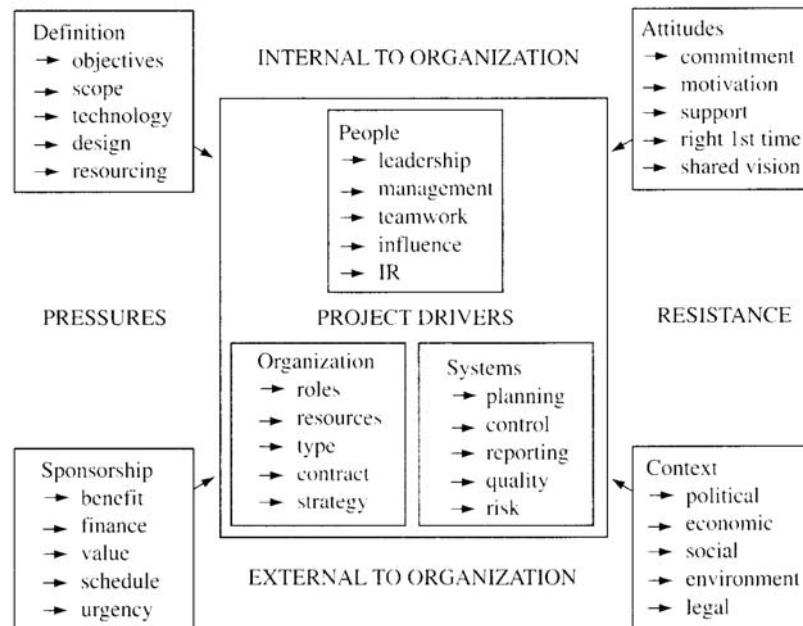


Figure 37: The seven forces model of project-based management (Turner, 1999, p. 70)

### The role of the project manager

At the heart of project management is the project manager. The project manager can be thought of as the focal point for coordinating different organisational elements (See Figure 38). "When this focal point is established, and an individual is designated to provide leadership, a new integrating role has been created" (Cleland & King, 1968, p. 73). Project managers are expected to be leaders and deciders, coordinating "... the various material, financial and human resources required to perform a task" (Fabi & Pettersen, 1992, p. 83). Project managers need to be skilled at the synthesis of the various forces at play in the project environment (Halman & Burger, 2002, p. 87) and maintain a balance "... between the technical and the managerial requirements of his task" (Wilemon & Cicero, 1970, p. 276).



Figure 38: A project management system (Cleland & King, 1968, p. 75)

In 1987 Posner (p. 51) published a snapshot of project manager attributes, finding that the "... typical project manager was a 37-year old male, had nine people reporting to him, and was responsible for a small to moderate size project within a matrix organization structure." Authors have tried to identify a requirements profile for project managers (Fabi & Pettersen, 1992, p. 83). However, it has been found that there is little agreement in the ways that the attributes of project managers should be analysed, with different authors variously focusing on different activities in the project life cycle, tasks, behaviour and roles. "The range of analysis frameworks is so wide that it is practically unthinkable to slot pieces that were never designed to fit together into a coherent picture" (p. 83).

### **Trends, current practice and application area**

In order to understand the field of project management as it currently exists, it can be useful to understand how it has changed over time. "Project management is an emerging profession" (PMI, 2000, p. 3); a profession which is developing in light of the needs of new practice environments and application areas. Most authors would identify the "... 1950s and 1960s as the birth era of the current approach to project management..."

(Shenhar & Dvir, 1996, p. 607), with strong contribution from the American Department of Defence (Urli & Urli, 2000, p. 33). During the 1950s and '60s popular PM techniques such as Program Evaluation and Review Technique (PERT) and Cost/Scheduling Control System Criteria (C/SCSC) were developed (Stretton, 1994a). This period also saw the establishment of the Project Management Institute (PMI), arguably the most influential of the many project management association existing today. The 1970s saw an increase in focus on project teams (Shenhar, 1996, p. 1), and the use of breakdown structures in project planning (Stretton, 1994b, p. 48). The 1980s involved focus on project organisation and risk (Shenhar, 1996, p. 1), and a change in emphasis from the implementation and execution phases of projects to the front end of projects (Stretton, 1994c, p. 67). However, change in the practice of project management does not continue at a steady pace. Urli and Urli (2000, p. 33) state that the "... field of project management has undergone very important developments during the last 10 years ..." including the extension of project management into new fields of practice.

A variety of surveys have been conducted into project size and industry sectors. Regarding project size, White and Fortune (2002, p. 4) found that 42% of respondents to their survey reported recent involvement in a project with less than 10 people, while 51% reported involvement in a project with between 10 and 99 people. Turner (1999, p. 2) notes that projects come in many guises, from major water, energy, transport and telecommunications projects involving large teams and multiple organisations, to smaller projects, such as construction, engineering, maintenance of facilities, implementation of computer systems and new technologies, research and development, product launches, and education and training. Reviewing the literature, Betts and Lansley (1995, p. 211) found that in project management "... by far the most frequently addressed industry was construction, followed by papers relating to the information and service sector and the process industries." A variety of other studies have also provided industry sector breakdowns based on survey results. Table 2 provides a summary percentages of industry sectors as provided by different authors. However, these studies may not provide insight into the 'true' or 'exact' breakdown of project managers amongst all industry sectors, as evidence of industry bias is provided by Evaristo and van Fenema (1999, p. 276), who state that "... the current knowledge base on the management of projects emanates from large capital construction projects responsible for only 10% of

the projects." Cooke-Davies and Arzymanow (2003) have found considerable variation in the maturity of project management practice in different industry sectors, and due to the apparent bias in the literature, there is an associated risk that research conclusions may be unable to be transferred between industry sectors with reliability.

| Study                                 | Industry sector    |                |          |                  |                     |
|---------------------------------------|--------------------|----------------|----------|------------------|---------------------|
| Evaristo & van Fenema (1999, p. 276)  | Construction (10%) | -              | -        | -                | -                   |
| White & Fortune (2002, p. 3)          | Construction (2%)  | -              | IT (25%) | Engineering (8%) | -                   |
| Pinto & Slevin (1988b, p. 70)         | Construction (44%) | -              | -        | -                | -                   |
| Themistocleous & Wearne (2000, p. 11) | Construction (46%) | Services (30%) | -        | -                | -                   |
| Zobel & Wearne (2000, p. 37)          | Construction (23%) | Services (41%) | -        | -                | Manufacturing (19%) |

Table 2: The distribution of project management over some industry sectors

Six studies stand out in an examination of recent trends of emphasis in the field of project management (Betts & Lansley, 1995; Themistocleous & Wearne, 2000; Zobel & Wearne, 2000; Morris, Patel & Wearne, 2000; Urli & Urli, 2000; Kloppenborg & Opfer, 2000). Although these studies examine different time periods, using different methods, comparison of the results provides insight into the focus of the field. I have combined the findings of these studies, and the most significant trends identified in each of these above six papers have been identified and categorised as being of interest or lack of interest to the sample, or of increasing or decreasing interest. What immediately stands out in an examination of Table 3 is the variation in themes identified as significant to PM over similar time periods. Reasons for differences in identified themes of significance might include variation between sample groups and differences in the analysis methods employed. Another conclusion is that project management is a varied field, that is currently being contributed to by a wide variety of practitioners and researchers, both with many interpretations of, and interests within, the field.

|                               | Themistocleous<br>& Weame (2000) | Zobel & Weame<br>(2000) | Urii & Urii<br>(2000) | Betts & Lansley<br>(1995) | Morris, Patel &<br>Weame (2000) | Kloppenborg &<br>Opfner (2000) |
|-------------------------------|----------------------------------|-------------------------|-----------------------|---------------------------|---------------------------------|--------------------------------|
| Dates covered by study        | 1984 -<br>1998                   | 1996 -<br>1998          | 1987 -<br>1996        | 1983 -<br>1992            | Pre<br>2000                     | 1960 -<br>1999                 |
| Communication                 |                                  |                         |                       |                           |                                 | ↑↑                             |
| Competency                    |                                  |                         |                       |                           |                                 | ↑↑                             |
| Context/environment           |                                  | ✓                       |                       | ✓                         |                                 |                                |
| Contracts                     | ✓                                |                         |                       |                           |                                 |                                |
| Cost                          |                                  |                         |                       |                           |                                 | ✓                              |
| Financial management          |                                  |                         |                       |                           | ✓                               |                                |
| Goals, objectives, strategies |                                  |                         |                       |                           | ×                               |                                |
| HR projects                   |                                  |                         | ↑↑                    |                           |                                 |                                |
| Human factors                 |                                  |                         |                       | ✓                         |                                 |                                |
| Industrial relations          |                                  |                         |                       |                           | ✓                               |                                |
| Information management        | ✓                                | ✓                       |                       | ↑↑                        |                                 |                                |
| Information systems           |                                  |                         | ✓                     |                           |                                 |                                |
| Innovation                    |                                  |                         |                       | ↑↑                        |                                 |                                |
| Integrative management        |                                  |                         |                       |                           | ×                               |                                |
| Leadership                    | ↑↑                               | ✓                       |                       |                           | ✓                               |                                |
| Legal awareness               |                                  |                         |                       |                           | ✓                               |                                |
| Life Cycles                   |                                  |                         |                       |                           | ✓                               |                                |
| Management by projects        |                                  |                         | ↑↑                    |                           |                                 |                                |
| Managers                      |                                  |                         | ✓                     |                           |                                 |                                |
| Matrix organisations          |                                  |                         |                       |                           |                                 |                                |
| Monitor and control           | ✓                                |                         |                       |                           |                                 | ✓                              |
| Operations research           |                                  |                         | ✓                     |                           |                                 |                                |
| Optimising                    |                                  |                         | ✓                     |                           |                                 |                                |
| Organisational change         |                                  |                         | ↑↑                    |                           |                                 |                                |
| Performance                   |                                  |                         |                       | ↑↑                        |                                 | ↑↑                             |
| PERT                          |                                  |                         | ↑↑                    |                           |                                 |                                |
| Planning                      | ✓                                |                         | ✓                     | ↓↓                        |                                 | ✓                              |
| Procurement/Purchasing        | ✓                                |                         |                       |                           | ✓                               |                                |
| Program management            |                                  | ✓                       |                       |                           |                                 |                                |
| Project close                 | ×                                | ×                       |                       |                           |                                 |                                |
| Project information           |                                  |                         |                       |                           |                                 |                                |
| Project initiation/start-up   | ×                                | ×                       |                       | ↑↑                        |                                 |                                |
| Project Organisation          |                                  | ✓                       |                       | ✓↓↓                       |                                 |                                |
| Quality                       |                                  |                         | ✓↑↑                   |                           |                                 | ✓                              |
| Requirements management       |                                  |                         |                       |                           | ×                               |                                |
| Risk                          | ✓                                | ✓                       |                       |                           | ✓                               |                                |
| Safety, health, environment   |                                  |                         |                       |                           | ✓                               |                                |
| Scheduling                    |                                  |                         | ✓↑↑                   |                           | ✓                               |                                |
| Software reviews              |                                  |                         |                       |                           |                                 |                                |
| Stakeholder management        |                                  |                         |                       |                           |                                 | ↑↑                             |
| Standards and certification   |                                  |                         |                       |                           |                                 | ↑↑                             |
| Stress                        | ↑↑                               |                         |                       |                           |                                 |                                |
| Success criteria              | ↑↑                               |                         |                       |                           | ×                               |                                |
| Systems management            |                                  |                         |                       |                           | ×                               |                                |
| Teamwork                      |                                  | ✓                       |                       |                           |                                 |                                |
| Time                          |                                  |                         |                       |                           |                                 | ✓                              |

#### Table Key

↓↓ - A decreasing interest in the topic area

↑↑ - An increasing interest in the topic area

✓ - A positive interest in the topic area

× - A lack of interest in the topic area

Table 3: Comparison of identified trends in project management

Comparison of the studies reveals some topics that are consistently regarded as significant. Topics that at least two studies identify as significant include:



- context / environment;
- information management;
- leadership;
- monitoring and controlling;
- performance;
- planning;
- procurement;
- project organisation;
- quality;
- risk; and,
- scheduling.

From this analysis it can be argued that these topics represent a sample of the core foci of project management. Some topics can also be identified as particularly lacking in interest to writers on project management. The only two topics thought not to be of significance by more than one paper were project finalisation / closeout and project initiation / start up. However, it is also interesting to note two topics identified by Morris, Patel and Wearne (2000, p. 158) as not considered of particular significance, given the contentious position of these topics, as discussed below. These topics are: goals, objectives and strategies; and, requirements management. The topics of monitoring and controlling, planning, project organisation, project initiation and project goals are examined in this chapter, in an effort to locate PM thinking and practice in relation to the hard and soft paradigms.

### **The paradox of project uniqueness**

At the heart of the field of project management is a basic tension between uniqueness and generality. Projects have been identified as fundamentally similar, while at the same time identified as unique by definition as different from all work that has previously been undertaken in an organisation. Other authors have previously raised this point. "Is there a paradox however in even attempting to define project management? Can a subject which deals with a unique, one-off complex task ... be defined?" (Atkinson, 1999, p. 338). "To what extent, one may ask, is it possible to think of a unitary

discipline and a standard body of knowledge if the output from a project is by definition 'unique'?" (Melgrati & Damiani, 2002, p. 372). Providing answers to this question is of relevance to this thesis in elucidating the variety of forms that PM can take. In addition, a logical extension of this thinking questions how a project, which does not fit the traditional expectations of what a project should be, can still be called a project and continue to be effectively informed by PM ideas.

Some authors argue for acceptance of the basic similarity of all projects. "The fundamental laws of project management just like the laws of physics means that no matter what type of project you are running ... the laws of the jungle are still the same" (Herbst, 2004, p. 18). Many publications on PM "... assume that all projects are fundamentally similar ..." (Shenhar & Dvir, 1996, p. 607). The majority of PM research assumes cultural uniformity, and does not discuss how fundamental cultural and economic factors might influence the choice of methods, tools and techniques, or even the larger question of the validity of the entire orthodoxy (Muriithi & Crawford, 2003, p. 314). Most practitioner books define PM as a set of standard activities (Shenhar, 1996, pp. 1 – 2). For instance, the PMBOK® Guide (PMI, 2000, p. 5) identifies the "... presence of repetitive elements ..." in project work, which allow the field to be discussed in terms of generalities. However, it is noted that "...there is relatively little commonality in the terms used" (p. 3), which the guide seeks to redress by providing a common language. The development of national competency standards, by implication, has also lent support to the notion of the 'generic' project. Evidence for this can be found in various standards for project management available worldwide (e.g., ECITB, 2002; ENAA, 2002; OSCEng, 1996; OSCEng, 1997; PMI, 2002; PMSGb, 2002; PSETA, 2000). Arguments for standardisation of the field tend to centre around the development of project management as a professional discipline (Dean, 1997). Furthermore, Kloppenborg and Opfner (2000, p. 55) found that the "... most frequently considered future trend was support for increased standardization ..." with the expectation that increased attention to standards was likely to contribute to the rate of project success. It has also been shown that there are "... work-related values and beliefs ..." across the PM professional community (Wang, 2001, p. 16), suggesting that there is a certain standardisation in the profession, and not just in projects. Additionally, it has been suggested that the idea of project uniqueness can be harmful to the profession, as

insistence on treating projects as unique has been linked to an inability to learn transferable PM lessons (Cooper, 1994, p. 12).

Projects are also regularly identified as unique endeavours (PMI, 2000, p. 5; Andersen, 1996, p. 89; Shenhar, 1996, pp. 1 – 2). Some authors argue that focusing on the similarities between projects "... 'marginalizes' the uniqueness and originality that should instead characterize the project" (Melgrati & Damiani, 2002, p. 373). In the majority of cases, the differences between projects outweigh the similarities between them (Shenhar & Dvir; 1996, p. 609). If PM was one, clearly defined activity, similarity could be expected in the ways that PM is portrayed in the various bodies of knowledge (BoK), and yet "... amazingly, the professional project management societies currently have quite different versions of the BoK" (Morris, Patel & Wearne, 2000, p. 156).

Evidence suggests that the differences between projects can be a result of the different areas in application, with different industries focusing on different parts of the bodies of knowledge (p. 160), and that the project management life cycle is domain specific (Stewart & Fortune, 1995, p. 279). A large number of studies have identified differences in how project management is practised in different countries (e.g., Al-Arjani, 1995; Munns, Aloquili et al., 2000; Andersen, Dyrhaug et al, 2002; Chan, Wong et al, 1999; Cheung & Chuah, 1999; Yang, Chuah et al, 1997; Crawford, 2001; Muriithi & Crawford, 2003). It is not surprising then that it has been found necessary to adapt PM processes to suit the needs of the context and the nature of each project (Kenny, 2003, p. 52; McElroy, 1996, p. 325; Shenhar, Dvir et al, 2002, p. 99). Projects "... exhibit considerable variation, and their specific management styles seem anything but universal" (Shenhar & Dvir, 1996, p. 607).

A wide variety of classification frameworks have been developed as aids to understanding the differences between projects. For each different category of project "... a whole different set of problems and potential project management techniques may apply" (Evaristo & van Fenema, 1999, p. 280). Examples of classification systems are based on: degree of definition of project goals and the methods to achieve them (Turner & Cochrane, 1993); deliverables (Youker, 2002); virtual or non-virtual projects (Evaristo & van Fenema, 1999, p. 275); the strategic system in place for managing risk (Florice & Miller, 2001); the degree of hardness or softness of projects (McElroy, 1996; Crawford & Pollack, 2004), as will be explored in greater detail below; and the

industry sector and application area (Bubshait & Selen, 1992), a classification system used in many surveys of PM practice (e.g. White & Fortune, 2000; Pinto and Slevin, 1988a; Zobel and Wearne, 2000). The South African Qualifications Authority (2001) differentiates between the processes for supervising teams engaged in technical, developmental and business projects, while Hassen (1997, pp. 279 - 81) distinguishes between technical and bureaucratic projects. Similarly, Turner (1999, p. 54) also differentiates between technical and cultural projects.

This seeming contradiction between the concept of project uniqueness and the assumption of fundamental similarity can be explained through three avenues: what it means to be unique; the needs of the field; and, changes to the field. 'Unique' is not an equivalent term to 'incomparable'. Rather, similarities exist between projects, without which the practice of PM would likely not exist. For instance, Work Breakdown Structures (WBS) are often reused, as many projects have similar life cycles and thus similar deliverables at different phases (PMI, 2000, p. 57). A particular project with similar objectives may be regularly undertaken in an organisation or industry sector. However, it is performed with new resources, and managed by a new team of people. Its progress represents 'unique' challenges while it may still share strong resemblance to other previous projects.

The tension between uniqueness and similarity can also be viewed in the light of changes to the field. Originally, PM was almost exclusively practised in the construction, aerospace and engineering industries. This has changed. Expansion into new practice environments has "... changed the scope of what is now termed a 'project'" (Stewart & Fortune, 1995, p. 279). Nevertheless, the "... wide deployment of projects in organizations today, has not been accompanied ... by a parallel development in project management theory" (Shenhar & Dvir, 1996, p. 607). It is possible that the uniqueness-similarity paradox represents the views of different groups: those who are applying project management in new application areas and experiencing the 'difference' of their projects from traditional practice; and, those who continue to apply project management in the original application areas and experience little pressure to change.

The divide between uniqueness and similarity can be examined in terms of the needs of the industry. It has been found that the PM industry "... would rather see students trained

as generalists rather than specialists, with industry providing the necessary detailed instruction with on-the-job training" (Fabi & Pettersen, 1992, p. 85). The divide here is based around what is required for a general education in project management and the education required for application of project management in a specific industry. The majority of guides to project management, the standards, and the bodies of knowledge, are written at a general level, with the understanding that they provide information that is "... applicable to most projects most of the time ..." (PMI, 2000, p. ix). Implicit in these documents is the assumption that projects are alike, or at least have enough similarity to justify a unified approach. As many of these represent the most influential documents available to the profession, it is only to be expected that this implicit view should permeate through to practitioners, who might continue to hold it, even after being initiated into the specifics of particular areas of application.

### **The project life cycle**

The project life cycle can be thought of as being comparable to the level of method in *The Schema*. The project life cycle is a theoretical construct which helps the project manager organise a project, based on the phases or stages through which a project may pass, from inception to completion. The phases then describe the tools and techniques that should be applied at different points in a project. Most authors agree that project management is involved in the total project life cycle, from front end definition to the back end evaluation and hand over (Morris, Patel & Wearne, 2000, p. 160). Some projects include a feasibility study or needs assessment, an exploration of options for implementing the project, development of a clear understanding of the issues involved and ranking of the options for moving forward (Turner, 1999, p. 272). In other projects a needs assessment may be thought of as a project in itself or work that is completed before the project is formally initiated (PMI, 2000, p. 53). Next, the project plan is created. Defined work is typically decomposed, using a WBS, after which activities are budgeted and project duration is estimated. Project schedules are created, which in conjunction with the project budget, are used as constraints for management of the project and as a reference against which delivery of the project output can be managed (Shenhav & Dvir, 1996, p. 619). The middle stages of the typical life cycle focus on execution and control. During these stages most of the expenditure is made and work to deliver the objectives is undertaken (Turner, 1999, p. 294). In later stages, as the project

nears completion, the project team must recall the originally intended business benefits behind the project, as it "...is very easy to complete the work within constraints, and think that is a successful project, while failing to use the facility delivered to obtain the expected benefits which justified the money spent on it" (p. 328).

As with the paradox of project uniqueness, the PM life cycle is viewed by different authors as both standard and highly varied. Representations of project life cycles can vary widely, with some described in a linear form, some as series of overlapping phases, some as feedback loops, or spirals, or ladders (Stretton, 2000, p. 4). Turner (1999, p. 14) identifies three different, but comparable, views of the life cycle, each focusing on a different aspect of the project management process (See Figure 39). By contrast, some authors state that all projects follow a similar life cycle (e.g., Morris, 2002, p. 32; Morris, 2004, p. 4; Herbst, 2004, p. 18). Some characteristics of the life cycle can be identified as common to most projects. The ability of stakeholders to influence the final project output decreases over time, while the probability of success increases with time. Cost and staffing levels tend to be lowest at the start of the project (See Figure 40), while risk and uncertainty is highest at the start of the project (PMI, 2000, p. 12). As the project moves through the life cycle, differing project needs have to be met with a changing mix of resources (See Figure 41). "This constantly changing picture of 'peaks and valleys' is the underlying structural rationale for project management" (Cleland & King, 1968, p. 248).

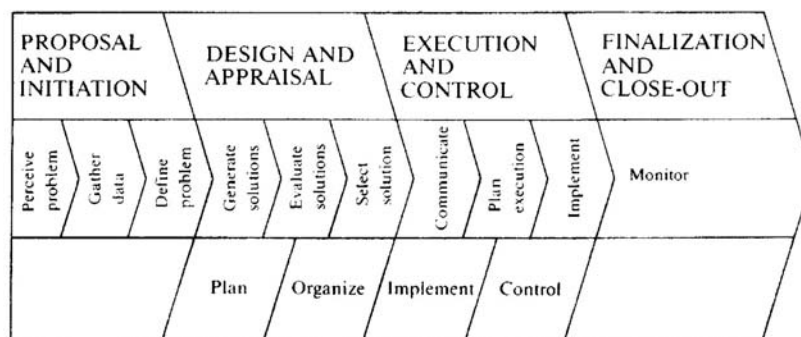


Figure 39: Relating the three views of the life cycle (Turner, 1999, p. 14)

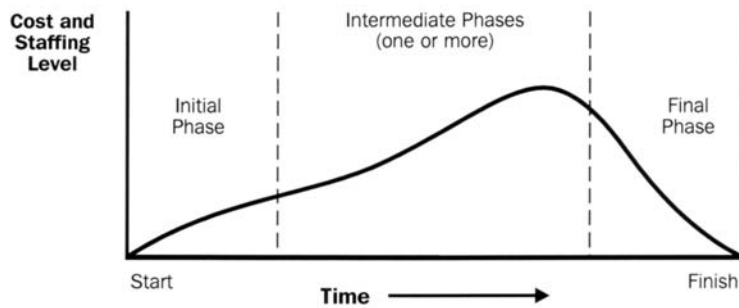


Figure 40: Sample Generic Life Cycle (PMI, 2000, p. 13)

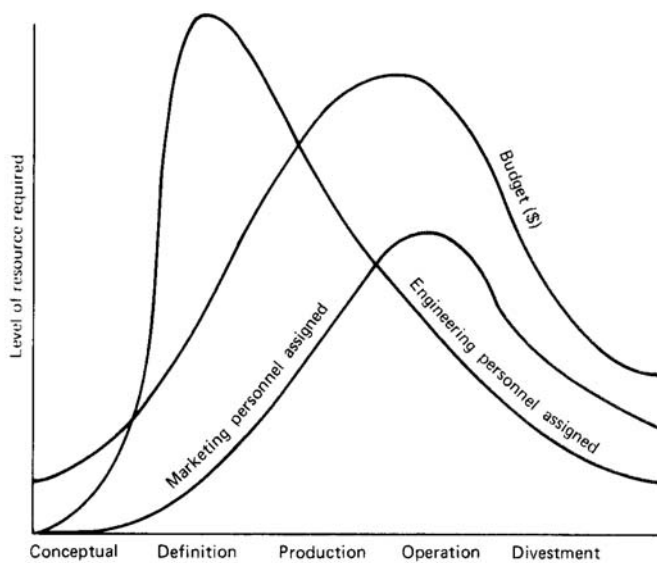


Figure 41: Changing resource requirements over the life cycle (Cleeland & King, 1968, p. 249)

Projects are commonly divided into several phases, with completion of each phase being marked by specifically defined deliverables (PMI, 2000, p. 11). The number of phases in a project life cycle is context dependant. Most projects have been found to have four or five phases (p. 13), but the "... number of phases can vary from three to over ten" (Stretton, 2000, p. 4). The life cycle model provided in the PMBOK® Guide (PMI, 2000) provides a typical example. Each phase of a project can be associated with performance criteria, and separate deliverables which mark the completion of the phase. Typically, phases are thought of in a linear fashion, with one phase being formally completed before the next is formally initiated, as one phase might provide deliverables which are necessary for the initiation of a subsequent phase (See Figure 42).

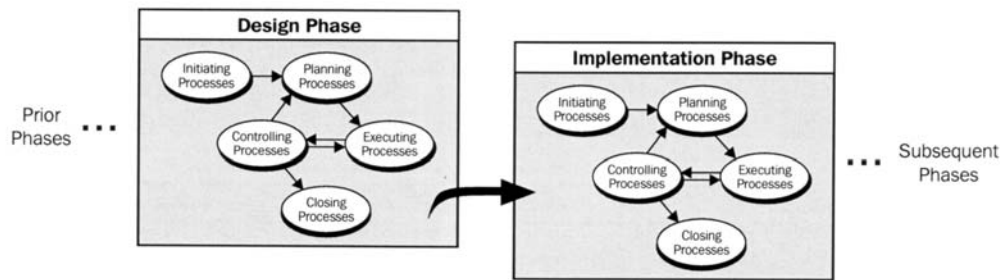


Figure 42: Interaction between Phases (PMI, 2000, p. 31)

The PMBOK® Guide (PMI, 2000, p. 30) identifies five different processes as aiding in the management of the phase: initiating processes; planning processes; executing processes; controlling processes; and closing processes. Just as phases in a project are linked through the deliverables of a phase contributing to the start of a subsequent phase, the different processes within a phase can be linked through their various inputs and outputs (p. 32). However, the links between different processes within a process group is more complex than the more linear relationships between project phases, as "... process groups are not discrete, one-time events; they are overlapping activities that occur at varying levels of intensity throughout each phase of the project" (p. 30). Different processes within a process group may run concurrently (See Figure 43).

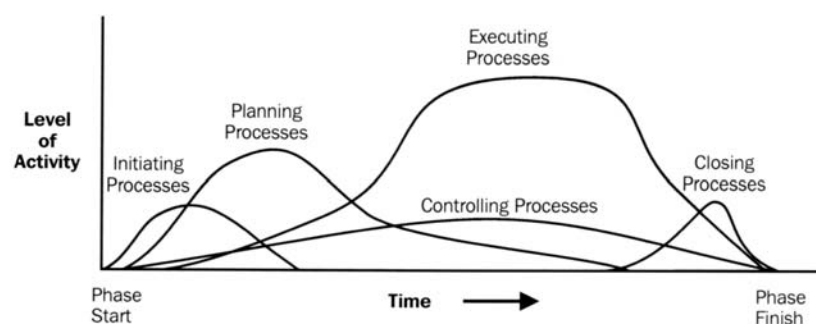


Figure 43: Overlap of Process Groups in a Phase (PMI, 2000, p. 31)

Traditionally, PM is viewed as a linear activity with a "... generally sequential logic ..." (PMI, 2000, p. 11). The process of inquiry in PM is understood to be completed in the early stages of the project, while strategies for delivery assume prominence in the later stages (Friend, Bryant et al, 1998, p. 8). Some alternatives to a purely linear view of the



life cycle are apparent in the PM literature. Projects may be thought of as iterative (PMI, 2000, p. 6; Cooper, 1994, p. 12), or as a cyclic process (Cleeland & King, 1968, p. 258), centring on deliverables or project work packages (see Figure 44). In this view, work is planned, organised, motivated, directed, controlled, and then planned again, in relation to new understanding; a model which bears some similarity to the process of Action Research. PM can also be seen as an evolutionary process, involving "... the repeated testing by each investigator of a repertoire of skills, theories, and values against an appreciation of the project context ..." (Friend, Bryant et al, 1998, p. 8).

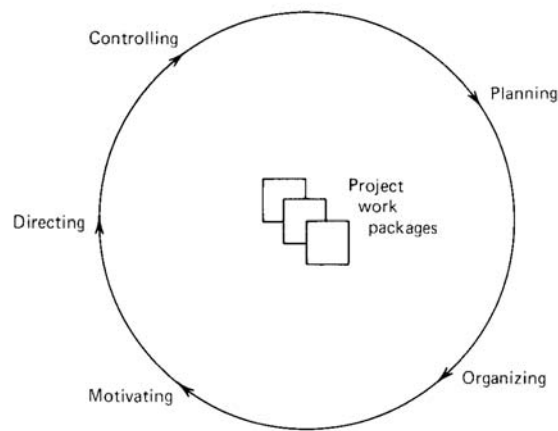


Figure 44: The project management process (Cleeland & King, 1968, p. 258)

Another alternative to the standard sequential life cycle is fast tracking (PMI, 2000, p. 12); a way of theoretically reducing project duration. This approach involves phases being begun prior to acceptance of a previous phase's deliverables. This approach is also referred to as 'rolling wave', and may involve work being started before the detailed design of the project deliverables have been completed (Turner, 1999, p. 294). This approach changes the way in which scheduling and planning of activities is conducted. "The detailing of later work packages is left until necessary, so that as much of the current information as possible is used to derive activities" (p. 114).

Starr (1990) suggests another alternative to the standard sequential model of the life cycle, called parallel staging, noted as suitable for fast response organisations, and of particular relevance to this thesis. Fast response organisations typically involve many team members working together, in an effort to reduce the delivery time. In such an

organisation, team assignments may be restructured, so that all participants know as much as possible about the entire project, allowing different project stages to be worked on at the same time. "For this case, milestone triggers are generally not heeded, and there are broad team responsibilities for coordinating project stages" (p. 89). In this model of the project life cycle, stages that are typically considered to be later in the life cycle are simultaneous with earlier stages. However, it should be noted that this approach may not be applicable to all situations, as the "... degree to which this can be accomplished is dependent upon the anticipatory characteristics of the specific cycles of the project" (p. 100). This model of the life cycle is contrasted with the traditional project management life cycle below (See Figures 45 and 46).

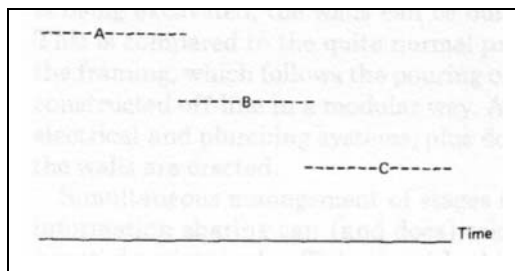


Figure 45: Traditional sign-off before start-up of project stages (Starr, 1990, p. 99)

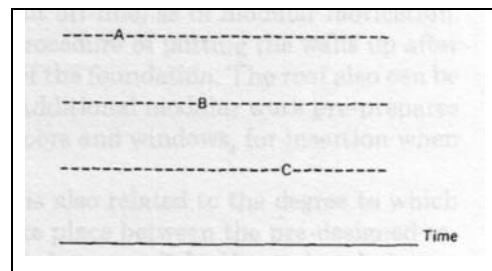


Figure 46: Using parallel staging to reduce project time (Starr, 1990, p. 99)

## Project success

In order to make any statement on the efficacy of the combination of SSM and PM in the IT / CT Platform Project, it is useful to develop an understanding of how projects are judged as successful. However, there are few topics in the project management literature that are discussed so frequently, yet agreed upon so irregularly, as project success (Pinto & Slevin, 1998a, p. 67). Project success is usually discussed in terms of success factors and success criteria. Success factors are considered to be those aspects of management that "... lead directly or indirectly to the success of the project ...", while success criteria are defined as "... the measures by which success or failure of a project or business will be judged ..." (Cooke-Davies, 2002, p. 185). Perhaps the simplest answer to the question of which factors contribute directly to project success is the ability to stay within the cost, time and performance specifications of the project (Lai, 1997, p. 174). However, this answer neither addresses the intricacies of the project

management environment, nor provides much assistance to the project manager seeking to deliver a successful project. Factors influencing success include: support from senior management and adequate funds (White & Fortune, 2002, p. 6); adequate resources (Posner, 1987, p. 52); and the importance of planning, monitoring and controlling, technical, commercial and external issues (Morris, Patel, Wearne, 2000 p. 156). Ashley, Lurie et al (1987, p. 77) examine the links between success criteria and success factors, finding a direct cause and effect relationship between some factors and criteria. The strongest of those relationships are summarized below (See Table 4).

| <b>Factor</b>                  | <b>Success criteria</b> |
|--------------------------------|-------------------------|
| Planning effort (construction) | Functionality           |
| PM technical capabilities      | End user satisfaction   |
| Technical uncertainty          | End user satisfaction   |
| PM administrative capabilities | Budget                  |
| Legal political environment    | Follow-on work          |

Table 4: The stronger relationships between critical success factors and success criteria (Adapted from Ashley, Lurie et al, 1987, p. 77)

What counts as a successful project depends on how that success is measured. It has been found that the traditional measures of success, time, cost and goal specifications, are the most cited in the PM literature and were used most regularly as practical judges to project success (White & Fortune, 2002, p. 1). There is a tendency to rely on time and cost as measures, "... because they are the easiest to measure (quantify) ..." (Pinto & Slevin, 1988a, p. 67). The majority of research into PM procurement has focused on evaluation by performance measures (Shoesmith, 1996, p. 95), and performance measures are generally seen in a positive light as "... they enable companies to express the results of a business process in quantitative, not qualitative, terms" (Leandri, 2001, p. 39). Remenyi and Sherwood-Smith (1999, p. 19) also discuss the tendency to rely on evaluation based on superficial financial numbers. Whether or not these measures are ideal in all cases is being questioned in the literature. Many project managers are forced by company policy or personal rules of thumb to use these simple measures for success (Pinto & Slevin, 1988a, p. 67). The continued popularity of such simple measures may not necessarily be an effective basis for judging their suitability. It appears "... as a

discipline, project management has not really changed or developed the success measurement criteria in almost 50 years" (Atkinson, 1999, p. 338), and the value of measures which are "... no more than two best guesses and a phenomenon ..." (p. 341) is being called into doubt.

Of the many different frameworks for evaluating project success in literature, some focus on the anticipated benefits (Cooke-Davies, 2002, p. 186), benchmarking across industry sectors (Fisher, Miertschin et al, 1995), and the evaluation of process (Avilla, 1997, p. 93). It can also be useful to distinguish between project management success and project success. The former involves managing to pre-determined goals, while the latter is more difficult to determine "... because it inevitably involves 'second order control' (both goals and methods liable to change) ..." (Cooke-Davies, 2002, p. 187). Ashley, Lurie et al (1987, p. 69) provide an interesting definition of success, noting the role of comparison to previous work in the process of judgement. "Success here is construed as results much better than expected or normally observed in terms of cost, schedule, quality, safety, and participant satisfaction." Shenhar (1996, p. 5) relates the importance of four success dimensions to the technological uncertainty inherent in the project (See Figure 47). One interesting aspect of this framework is that project efficiency, the ability to meet time and cost specifications, is only considered to be of high relevance in the most technologically certain projects. This suggests that measuring success against initial specifications may not be appropriate for all projects. "Time and costs become secondary criteria while the resultant product is the focus ... This takes the focus away from 'did they do it right', to, 'did they get it right', a measure only possible post implementation" (Atkinson, 1999, p. 339).

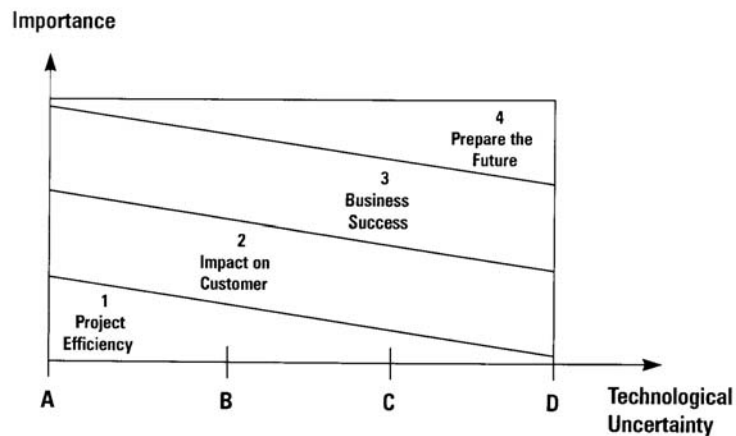


Figure 47: Relative importance of success dimensions is project dependant (Shenhav, 1996, p. 5)

Other authors emphasise the difference between success in a project and success for the organisation that undertakes it. Atkinson (1999) points out that the two can not necessarily be linked and rely on different success criteria. The fit between an organisation and a project, and the consequences for business are suggested as success criteria (White & Fortune, 2002, p. 4), as are links between program and project objectives in project evaluation (Friend, Bryant et al, 1998). One may assume that these are inherently linked, but it is possible for the initiators of a project to become distanced from the development process, while the developers lose sight of the primary business objectives that the project was supposed to serve (Remenyi & Sherwood-Smith, 1999, p. 16). Morris (2002, p. 31) also comments that PM is often insufficiently connected to business success.

The timing of the evaluation of a project is also a contentious issue. Project success should be judged on a long term basis (Avilla, 1997, p. 94), as the practice of evaluating immediately upon delivery "... may be lauding or damning our projects too early, before the project's impact on the client can be accurately determined" (Pinto & Slevin, 1998b, p. 69). Evaluating by time, cost and quality criteria "... seems to overarch the chance of other criteria, post implementation from being included" (Atkinson, 1999, p. 339). If a project is to be assessed according to the benefits it provides to an organisation, sufficient time must have passed for these benefits to have become apparent. However, evaluating success by project benefits can be ambiguous, as other organisational factors

may influence the environment "... to the point where we are unable to determine the relative impact of our project on the client's operations" (Pinto & Slevin, 1998a, p. 70). Furthermore, "... the passage of time may alter the content of responses as longer-term influences become more clear - or, conversely, as recollections of the course of a project become more blurred" (Friend, Bryant et al, 1998, p. 14). Problems of causality are also of issue in complex environments. For instance, it has been found that in planning projects there are few obvious measures of effectiveness (Cleland & King, 1968, p. 51).

The evaluation of project success is obviously a complex issue. In evaluating a project, such as the planning project in the IT / CT Platform Project, a balance must be found between evaluating against the defined goals of the project, and the benefit that the project provides to the organisation. Measures of time, cost and quality are not enough. These measures must be supplemented by an assessment of how well the products of the project align with the organisation and long term benefits resulting from the project, which can only be assessed after project completion.

### **The place of theory in project management**

Having reviewed the practice of traditional PM, I now examine the theoretical foundation which informs this practice and argue that traditional PM is informed by the hard paradigm. Review of the literature on PM indicates a strong emphasis on:

- Links to hard systems thinking;
- A philosophical basis informed by positivism, realism, functionalism and reductionism;
- An assumption of predefined and stable goals;
- An emphasis on planning and control;
- A machine centred, structure oriented view on organisations and project organisation;
- Structured communication and low levels of participation.

The characteristics of the hard and soft paradigms have been discussed in detail in Chapter 2. Reference to the four sets of polarities (See Figures 8 to 11 – Chapter 2) for the examination of hard and soft approaches suggests that the above characteristics

clearly align traditional PM with the hard paradigm, even if this alignment is rarely explicitly discussed.

PM has been created by pragmatists (Cleland & King, 1968, p. 17). It is a practical discipline (Morris, 2002, p. 31); one which has been led by practitioners (Cooke-Davies, 2000, p. 31) and led by practice rather than theory (Betts & Lansley, 1995, p. 210). PM "... will be viewed by the researcher as a field of application ..." (Urli & Urli, 2000, p. 42). Betts and Lansley (1995) found that the majority of research papers on project management provide insight into the PM process (p. 210) and "... describe new techniques, but few have contributed to the more formal aspects of the development of the discipline of project management by building and testing models and theories" (p. 207). This aligns with industry views uncovered by Fabi and Pettersen (1992, p. 85): "Course work should be constructed to provide emphasis on tools and their application, not theory." Applied disciplines, such as PM, often use theory from other disciplines, applying it to solve practical problems, instead of developing their own theoretical base (Moody, & Bruist, 1999). Drawing on multiple disciplines, "... project management has been more often compared to a heterogenous toolbox than to a body of knowledge in elaboration" (Urli & Urli, 2000, P. 33).

Theory in project management has hereto mainly been implicit (Koskela & Howell, 2002, p. 293). Very few authors in the PM literature are explicit about the philosophical basis of their work, with many simply assuming that there is little philosophical or theoretical basis to PM (Cooke-Davies, 2000, p. 17). Remington and Crawford (2004, p. 1), however, take a different perspective, arguing that PM practice "... is indeed underpinned by a rich theoretical basis, which has been informed by prevailing trends in philosophy. Nevertheless the philosophical underpinnings remain unacknowledged by a profession which is focussed on practice." Koskela and Howell (2002, p. 294) posit that through analysis of the work of leading scholars and documentation, it is possible to deduce the theories that project management is implicitly based upon.

### **Links to hard systems thinking**

The influence of systems thinking on the early development of project management has been so pervasive that in 1968 Cleland and King (p. 17) commented that project

management is also referred to as 'systems management'. In the past three decades, PM research has been biased towards "... the hard systems approach, and it has heavily emphasised quantitative techniques in project planning, scheduling and control" (Yeo, 1993, p. 115). Project management has specifically been influenced in its development by two forms of hard systems thinking: Systems Engineering and Systems Analysis (Yeo, 1993, p. 111; Morris, 2004, p. 13), which correspond with the two main phases of the PM lifecycle. Systems Analysis corresponds to pre-project analysis, is an outgrowth of the traditional, positivist scientific method, "... and since measurement in science is ideally quantitative in nature, systems analysis itself has come to be viewed as quantitative" (Cleland & King, 1968, p. 97). Systems Engineering corresponds to the later stages of a project, focusing on project engineering and management (Yeo, 1993, p. 111). Turner (1999, p. 245) also identifies the influence of Systems Dynamics, noting that influence diagrams, used in risk analysis, are directly derived from Systems Dynamics. The influence of the thermostat model, the assumption of measurement to, and correction based on, performance standards, is also noted (Koskela & Howell, 2002, p. 295). This model bears strong resemblance to the feedback control model in Cybernetics. Urli and Urli (2000, p. 33) confirm that the general framework of project management is based on the Cybernetic model. Both Systems Dynamics and Cybernetics have been associated with the hard paradigm.

Some authors argue for the increased use of systems concepts. The "... emphasis on the systemic should begin when a project is first conceived and continue until the final lessons have been learnt after completion" (Stewart & Fortune, 1995, pp. 285 - 6). A systems perspective has also been identified as beneficial in project planning. A systems model, describing the organisation as a subsystem of a larger system "... is necessary if one is to perform comprehensive planning" (Cleland & King, 1968, p. 34). However, an understanding of the benefits of a systems perspective may not be widely spread within the PM community. "Attention to the systems field is declining within the journal literature on project management" (Crawford & England, 2004, p. 12). In a series of role descriptions published by the UK OGC (2004, p. 5), systems thinking and project management are listed as separate roles. Furthermore, in a recent study of possible revisions to the APM body of knowledge, Morris, Patel et al (2000, p. 162) found that respondents to their survey felt that systems management should be dropped from the BoK, as it was not sufficiently understood or relevant. Lack of understanding of the



relevance of systems thinking can be linked to a general lack of awareness of developments within the systems community in the last few decades, as "... there has been little recognition of these developments outside the systems community" (Barton, Emery et al, 2004, p. 8). By and large, the PM community apparently still associates systems thinking with the hard systems thinking that influenced its development.

### **Philosophical basis of PM**

PM is an essentially purposeful activity. Effort is coordinated to reach a particular goal or perform some specific function. The field demonstrates "... a means-end paradigm with a strong emphasis on discipline, goal seeking and end-item accomplishment" (Yeo, 1993, p. 113). In terms of Burrell and Morgan's (1979, p. 22) four paradigms of social theory (See Figure 16 – Chapter 2), PM can be classified functionalist.

An emphasis in PM can also be seen on performance measures which focus on objectivity, instead of an acceptance of subjectivity (Leandri, 2001, p. 39). Popular techniques are predominantly those which allow the project manager to "... obtain and use objective data, as opposed to relying on subjective judgement" (Cleland & King, 1968, p. 6). Use of language in the PM literature supports this. For instance, Gray (2001, p. 108) positively refers to 'hard organisational benefit', with the implication that 'hard' refers to real or objective benefit, while Cooke-Davies (2002, p. 189) refers to 'hard data' and 'softer evidence', reinforcing the association of the hard paradigm with an objective reality, and the soft paradigm with a subjective interpretation. A desire for objective data implies the assumption that an objective world exists; an assumption which permeates PM modelling techniques, which allow the project manager to then deal "... with representations of reality rather than with reality itself" (Cleland & King, 1968, p. 44). This assumption of a stable and equally accessible reality aligns with realist philosophies. Indeed, most "... writers seem to imply that some form of empirical realism is possible. Some describe project management as a science or suggest that it uses 'scientific' techniques ..." (Cooke-Davies, 2000, p. 17). Further philosophical links to the hard paradigm are apparent in the literature, with different authors linking the PMBOK® Guide (Nissen & Snider, 2002, p. 90), and PM as a whole (Bredillet, 2004, p. 1), to a positivist philosophical grounding.

A reductionist perspective also informs project management thought. "Another deep-seated influence on project management thinking holds that the nature of complex things can always be reduced or explained by simpler, more fundamental things" (Remington & Crawford, 2004, p. 3). This perspective is apparent in the prevalence of breakdown structures and project definition hierarchies. For instance, there "... is often a hierarchy of strategic plan, program, project and subproject, in which a program consisting of several associated projects will contribute to the achievement of a strategic plan" (PMI, 2000, p. 10). This structure allows the goals of strategic plans to be successively reduced to a series of subproject deliverables. Breakdown structures, such as the WBS, are common PM tools. These models allow practitioners to symbolically reduce complex relationships (Cleland & King, 1968, p. 19). Breakdown structures can be used to provide "... a basis for the planning and control of the project" (p. 389). However, it has been noted that they are only an effective tool for ensuring accountability as long as the imposed structure is not violated in the process of the project work (Luby, Peel et al, 1995, p. 39), requiring a certain stability in the way that the project is defined.

### **The definition and stability of goals**

The "... thrust of the project management profession to date has been the design and delivery of a solution to a predetermined problem" (Hobbs & Miller, 2002, p. 42), and the profession "... tends to assume the existence of a pre-established business plan, in which the objectives and constraints are clearly defined" (p. 42). It is generally expected that clear customer requirements are already defined at the start of a project, and that the goals and the required work can be decomposed (Koskela & Howell, 2002, p. 296), assumptions inherited from the field of Systems Analysis (Yeo, 1993, p. 112). Goals have widely been associated with project success in terms of their clarity (White & Fortune, 2002, p. 6; Pinto & Slevin, 1988a, p. 72; Blockmar, 2004, p. 29; Posner, 1987, p. 52), their level of definition (White & Fortune, 2002, p. 6; Dumont, Gibson et. al., 1997, p. 55), how well they are understood (Couillard, 1995, p. 6), the way they are established (Morris, Patel et al, 2000 p. 156), and in terms of early and explicit agreement as to how they will be measured (Turner, 1999, p. 71). The level of definition required for different kinds of projects varies (Neal, 1995, p. 5). However, it is generally accepted that more goal definition is better. Clear goals have also been found to directly

influence the efficiency of project planning (Posner, 1987, p. 52), and to be necessary for the use of some project management tools and techniques. For instance, Vickers (1968, p. 138) comments that tools such as critical path analysis are fine only "... if you know whither your path is leading and exclude every desire except the desire to reach its end." Similarly, in situations where neither the goals nor methods for a project can be readily defined "... it is not possible to express the plan in terms of a sequence of activities ..." (Turner & Cochrane, 1993, p. 98) rendering a variety of PM planning tools ineffective.

Quickly reducing ambiguity in favour of certainty is an emphasis in most project management methods and techniques (e.g., Turner & Cochrane, 1993, p. 101), where uncertainty is reframed "... in an unambiguous and familiar way; consequently ambiguity is transformed to distinctness and the unknown to the known" (Thomas & Tjader, 2000, p. 2). 'Design-freeze' is the point in a project life cycle when the design is considered to be agreed. The project managers should "... aim to achieve a progressive design freeze as soon as possible" (Turner, 1999, p. 83). The "... transition from pre- to post-design-freeze was characterized by an abrupt change in the project managers' attitude towards incorporating changes in the product's design" (Shenhar & Dvir, 1996, p. 616). One of the major assumptions in project management is that change to established goals is avoided and that "... goals are only changed if a significant external actor, e.g. a customer, requires changes to be made; the changes might be made, albeit reluctantly. The members of a project never introduce changes" (Thomas & Tjader, 2000, p. 5). The PM attitude towards goals can then be seen to align with the hard paradigm in that goals are assumed to be either predefined or unproblematic, and that changes to goals are rare and to be avoided.

### **Planning and control**

Planning processes focus on defining and coordinating the most efficient way to reach predefined goals. Once a plan for reaching the project goals has been created, the plan can be executed, and "... the vast majority of the project's budget will be expended in performing this process" (PMI, 2000, p. 46). Planning processes predominate in the contents of the PMBOK® Guide (Koskela & Howell, 2002, p. 295). There is wide acceptance of the benefit of a "... focus on planning processes, broken down and

analyzed ..." (Melgrati & Damiani, 2002, p. 371), and although much of the PM literature already focuses on planning, an increasing trend has been found "... towards planning and control ...", as these activities were thought to help manage the complexities of projects (Kloppenborg & Opfer, 2000, p. 54). Formal planning and control has been found to have significant influence on project success (Couillard, 1995, p. 7), while it has also been found that poor planning has been regularly specifically mentioned by project managers as causing problems in project management, with particular effects in terms of resource allocation (Posner, 1987, p. 52). Project managers have been found to consistently spend too little time planning in the early stages of a project (Turner, 1999, p. 69). The pressure of tight schedules can be related to a lack of planning in some cases (Dumont, 1997, p. 54), with project managers becoming "... preoccupied with getting on with something and hope that this amounts to progress, rather than thinking through the job and how best to do it" (Ramsay, Boardman et al, 1996, p. 31). Although published in 1968, the following quote could easily have been written in regards to current planning techniques.

"... planning may be viewed as a logically consistent method of reducing a large part of a complex problem to a simple output which can be used by decision makers in conjunction with other considerations in arriving at a best decision" (Cleland & King, 1968, p. 19).

Note should be taken of the use of the terms 'best' and 'reducing' in the above quote, both of which are indicative of an approach informed by the hard paradigm. The use of 'best' could indicate a tendency towards optimisation, the assumption that a single, best solution exists, to which planning is directed. Although Cleland and King admit that in situations of great uncertainty, an optimal solution can not meaningfully be sought, in most cases the "... formal solution of a decision problem involves the determination of the best available solution. The process of seeking the best is called *optimization*; i.e., best alternatives are optimum alternatives" (p. 99).

A desire for control has been linked to the hard paradigm. It "... is intimately linked with the idea that a stable geometrical model of the universe is not only desirable but also possible" (Remington & Crawford, 2004, p. 3). Control in PM is the process of ensuring that the results of activities conform to plans or coordinating effort according to the plan established for reaching the project objective (Cleland & King, 1968, p. 13). The level

of detail in plans can be related to the degree of control possible in a project. "The lower the level at which the deliverables are specified the tighter the control" (Turner, 1999, p. 154). Control mechanisms within the project allow for corrective actions to be taken when "... the inevitable deviations of actual performance from planned performance occur ..." (Cleland & King, 1968, p. 369). An assumption that human destiny is controllable pervades the PM profession (Melgrati & Damiani, 2002, p. 371), with many PM principles focusing less on learning and more on creating the idea of control (Thomas & Tjader, 2000, p. 6).

The PM profession sees the setting of "... control mechanisms as one of the most important ingredients in successful project management" (Yeo, 1993, p. 113). The frequency of controlling activities has also been linked to success (Couillard, 1995, p. 3), with early control identified as most beneficial. "The earlier action is taken the better, because it is then cheaper to recover the project or to abort it should it have proved non-viable" (Turner, 1999, p. 320). For example, the cost of error correction can be related to the point in the life cycle when corrective action is taken (See Figure 48). Indeed, the structure of the common project life cycle can be related to the desire for control. Dividing a project into different phases can improve project control (PMI, 2000, p. 11), as the progress of the project can be formally checked at pre-established intervals, to confirm that the project is proceeding to plan.

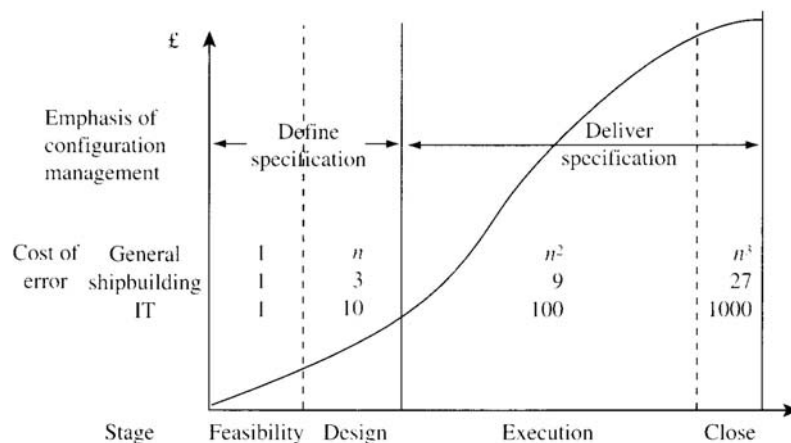


Figure 48: Configuration management and the life cycle (Turner, 1999, p. 166)

## **Organisations and project organisation**

The PM literature tends to adopt a perspective on organisation and governance which is functional and mechanistic, focusing on the structure of organisation and its centralised control, aligning with the hard paradigm. It is generally assumed that there is "... a strong causal connection between the actions of management and the outcomes of the organization" (Koskela & Howell, 2002, p. 295). Orders are dispatched by management, which are then carried out by lower levels of the organisation, in the assumption that tasks are fully understood by those creating the orders, and that tasks are started and completed according to the plan (p. 256). The organisational model can then be thought of as a functional one. Organisations are directed towards achieving some shared and understood goal (Cleland & King, 1968, p. 271). In small organisations, one person may perform many roles, blurring the distinctions between levels. By comparison, in large organisations there is often a greater degree of segregation between activities. "Complex organizations are characterized by a high degree of task specialization" (Shoesmith, 1996, p. 96). In such cases, distinctions between levels are often formally expressed in terms of organisational structures, usually illustrated by two dimensional diagrams or charts. However, these diagrams do not account for the rich informal organisation that exists within most formal organisational structures. Both formal and informal aspects of organisations influence project behaviour. Plans, policies and procedures formally prescribe "... how the elements are to relate. On the human side, the informal organization prescribes how the people want to relate" (Cleland & King, 1968, p. 271). The structure of the organisation is viewed as something that can be managed, so as to achieve greater efficiency for project delivery. The question regarding organisation in the PM literature is often then how best to design and control the organisational structure to deliver maximum benefit.

The PM literature often discusses organisations as systems, with hierarchies of authority, emergent properties, lines of communication and control, and as comprised of systems and sub-systems which overlap with the general environment (See Figure 49). From a systems perspective, the manager must then not only understand the specific requirements of the job, but must also understand the relationships between the parts of the system (Cleland & King, 1968, pp. 273-4). This perspective on organisations is predominantly mechanistic, viewing organisations as made up of interconnected

components, to be arranged for maximum efficiency in achieving objectives. This emphasis on measurement and centralised control has contributed to a mechanistic view of the world in project management, where projects are seen as machines (Thomas & Tjader, 2000, p. 2), which further aligns with a functionalist perspective on organisation.

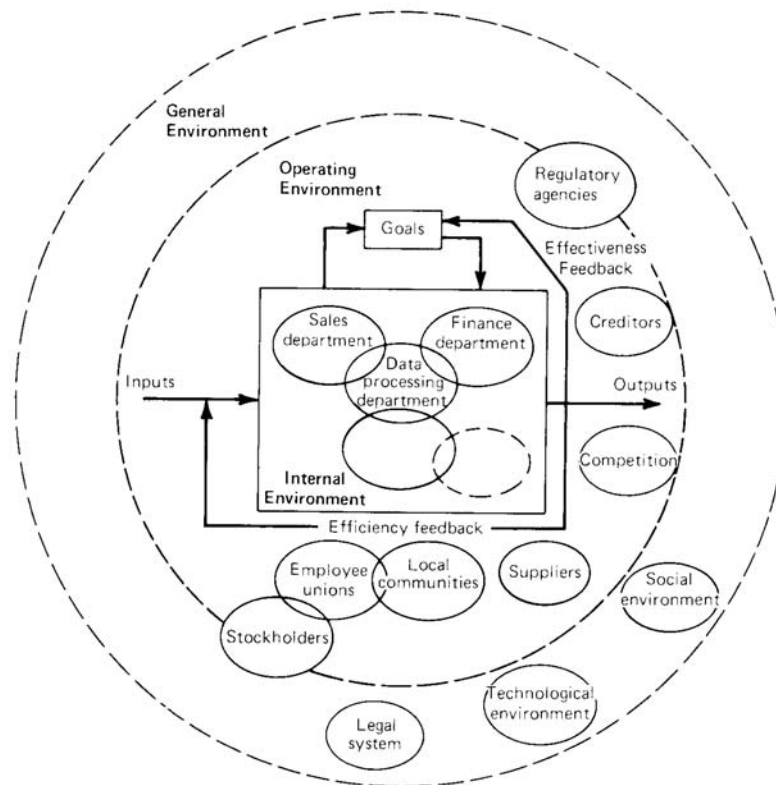


Figure 49: Complex systems model of the organisation (Cleland & King, 1968, p. 23)

In the 1950s and '60s project management forms which did not fit into the traditional patterns of organization started to appear, and the focus on controlling and designing organisations to efficiently meet predetermined ends shifted to a focus on organisational structure (Cleland & King, 1968, p. 271). For instance, Cleland and King (1968, p. 5) focus on PM in terms of those aspects that are "... reflected in the structure of organizations ...". Focusing on ways to design the structure of organisation was a development on classical management theory, which had viewed the organisation as a collection of components: production; accounting; finance; marketing; and human relations, all of which were thought of as essentially unrelated (p. 273). In the classical model, the ability to complete projects was considered to be an engineering

responsibility, "... not an organizational ability (i.e., by having people work together in new ways" (Starr, 1990, p. 96).

New organisational forms have developed as a result of the increasing focus on organisational design. Now, instead "... we have a spectrum of endeavours ranging from the routine to the unique, novel and transient" (Turner, 1999, p. 3). Turner (p. 130) and the PMBOK® Guide (PMI, 2000, p. 19) both identify five different kinds of organisation, ranging from the functional hierarchy (functional) to the project hierarchy (projectised) (See Figures 50 and 51). These different organisational forms typically entail different levels of authority for the project manager, with and different percentages of the organisation devoted to project work.

| Project Characteristics   | Organization Structure | Functional                             | Matrix                                 |                                     |                                     | Projectized                         |
|---|------------------------|--|--|-------------------------------------|-------------------------------------|-------------------------------------|
|   |                        |  | Weak Matrix                            | Balanced Matrix                     | Strong Matrix                       |                                     |
| Project Manager's Authority   |                        | Little or None                         | Limited                                | Low to Moderate                     | Moderate to High                    | High to Almost Total                |
| Percent of Performing Organization's Personnel Assigned Full Time to Project Work |                        | Virtually None                         | 0 – 25%                                | 15 – 60%                            | 50 – 95%                            | 85 – 100%                           |
| Project Manager's Role  |                        | Part-time                              | Part-time                              | Full-time                           | Full-time                           | Full-time                           |
| Common Titles for Project Manager's Role  |                        | Project Coordinator/<br>Project Leader | Project Coordinator/<br>Project Leader | Project Manager/<br>Project Officer | Project Manager/<br>Program Manager | Project Manager/<br>Program Manager |
| Project Management Administrative Staff   |                        | Part-time                              | Part-time                              | Part-time                           | Full-time                           | Full-time                           |

Figure 50: Organizational Structure Influences on Projects (PMI, 2000, p. 19)



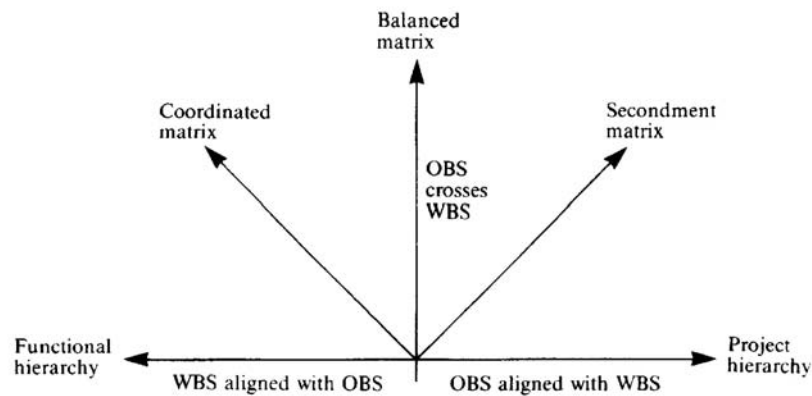


Figure 51: Range of matrix structures (Turner, 1999, p. 130)

The functional organisation is probably the most common (Cleland & King, 1968, p. 275), with most organisations engaged in routine work being based on the functional hierarchy. However, a "... bureaucratic organization generally does not provide the environment essential for project success" (p. 230), being efficient for routine tasks, but inflexible. Project managers tend to adopt more flexible structures, such as matrix organisation (Turner, 1999, p. 60). The functional organisation is an integral part of the matrix organisation, which involves a network of intersections between project teams and functional elements (Cleland & King, 1968, pp. 275 – 6), resulting in "... dual lines of reporting to functional and (transient) task managers ..." (Turner, 1999, p. 60). At the other end of the continuum is the project hierarchy, where all organisational work is project based. However, Turner (1999, p. 63) suggests that a median between the extremes may be optimum, allowing resources to be shared between tasks, while providing management systems and a career structure, which can be lacking in an exclusively task focused organisation.

### Communication and participation

The process of managing communication formally includes the "... processes required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposal of project information" (PMI, 2000, p. 117). The importance of communication management is being confirmed by a number of research studies (Muller & Turner, 2002, p. 387), with the establishment of clear lines of communication being seen as "... vital to ongoing prosperity" (Barry & Pascale, 1999, p. 8). Turner

(1999, p. 125) identifies that it is in the project manager's interest to ensure cooperation and communication with and between the parties which make up the project's owner, even though it usually goes beyond the project manager's responsibility. Pinto and Slevin (1988b, p. 72) note that communication with the client is an important success factor in each phase of a project, while Starr (1990, p. 99) notes that teamwork "... based on a policy of as complete communication as possible is the key to reducing the total time for completion."

However, the traditional PM literature doesn't tend to offer much insight past that on the formal aspects of communication. Lai (2000, pp. 206 - 8) identifies six gaps in communication that need to be closed in order to achieve project success:

1. The cognition gap: a gap between what clients need and what they think they need;
2. The comprehension gap: a difference between what the clients need and what developers think the clients need;
3. The expression gap: the difference between what the developers think the clients need and their translation into requirements specifications;
4. The delivery gap: the difference between specifications and the project product;
5. The utility gap: the difference between how the delivered product is used by the client and how it was designed to be used;
6. The expectation-perception gap: the difference between expected delivery and perception of the delivered product. This gap is a function of the previous five gaps.

All of these communication gaps can be thought of as gaps in interpretation, and from a hermeneutic perspective, although the gaps can never be completely closed, through careful management of communication interpretation can come to approximate another's meaning. However, it is interesting to note that the PM literature only directly addresses closure of the delivery gap, which is concerned with delivering to specifications (Lai, 2000, p. 207). This leads to the observation that although a project might be considered to fail through not closing one of these communication gaps, traditional PM only addresses a small number of the possible reasons for this failure.

Other authors also note the adverse consequences of poor communication in PM practice. Many "... projects often lack good communication beyond the boundaries of the project team ..." (Muller & Turner, 2002, p. 387). However, a greater emphasis on the formal communication described in the traditional PM literature may not be the answer, as a strong emphasis on reporting can have a negative impact on the project duration. "Spending time gathering information on the project and writing technical or schedule reports means less time to be spent on the project, thus causing more delays" (Couillard, 1995, p. 6).

The emphasis in the PM literature tends to be on the formal aspects of planning and controlling communication. However, relevant communications issues may be grounded at a more dynamic, interpersonal level. It has been found that many success factors centre on human relationships (Couillard, 1995, p. 3), and that many developmental problems are grounded at the cultural level (Butterfield & Pendegraft, 1996, p. 14). Yeo (2002, p. 243) identifies "... technology focus over human relations ..." and "... technical fix for a management problem ..." as key factors that influence failure, while Posner (1987, p. 52) has found that less than one percent of project managers surveyed mentioned technical difficulties as the cause of problems in their projects, which "... underscores the claim that the primary problems of project managers are not technical, but human" (p. 54). Lack of participation has also been identified as contributing to project failure (Hall, Holt et al, 2003, p. 500).

Given the influence that participation, culture and human relationships have on project success, it would be expected that there are many PM specific approaches to Human Resource Management (HRM). "Astonishingly, this does not seem to be the case: a review of the literature reveals that the application of HRM practices in PM is in fact rather elementary" (Fabi & Pettersen, 1992, p. 86). Instead, the PMBOK® Guide (PMI, 2000, p. 107) recommends that the project manager should be familiar with the extensive external HRM literature. Furthermore, the "... traditional thinking behind a PRM [project risk management] framework is essentially centrist, authoritarian. It ... assumes that the central project manager knows 'best'" (Williams, 1997, p. 221 – contents of brackets added). Williams discusses the "...the risk of empowerment..." (p. 219), arguing that the common assumption that employee empowerment reduces risk is neither supported by evidence, nor convincingly argued (p. 220). Increased participation

and empowerment is seen as reducing possible project control, and thus is a threat. Complexity in projects implies the need for greater centralisation and control, since individuals cannot understand "... the project-wide implications of their decisions, and thus can take a fully informed decision less often" (Williams, 1997, p. 220). This emphasis on an expert based perspective, and controlled communication in the traditional PM literature further aligns PM with the hard paradigm.

### **Project management and the hard paradigm**

The above analysis demonstrates the strong links between PM and the hard paradigm, in terms of links to hard systems thinking; the philosophical basis of PM; the definition and stability of goals; planning and control; organisations and project organisation; communication and participation. When this analysis is used to inform an interpretation of PM in terms of The System of Systems Methodologies (SOSM) (introduced in Chapter 2), PM can be seen to lie in the Simple-Unitary category (See Table 5). In this category, it is assumed that "... key issues are easily appreciated, and general agreement is perceived between those defined as involved or affected" (Midgley, 1997a, p. 253).

|                | UNITARY  | PLURALIST   | COERCIVE  |
|----------------|--|---|---|
| <b>SIMPLE</b>  | <ul style="list-style-type: none"> <li>• Operational research</li> <li>• Systems analysis</li> <li>• Systems engineering</li> <li>• <b>Project management</b></li> </ul> | <ul style="list-style-type: none"> <li>• Social systems design</li> <li>• Strategic assumption surfacing and testing</li> </ul> | <ul style="list-style-type: none"> <li>• Critical systems heuristics</li> </ul> |
| <b>COMPLEX</b> | <ul style="list-style-type: none"> <li>• Cybernetics</li> <li>• GST</li> <li>• Socio-tech</li> <li>• Contingency theory</li> </ul>                                       | <ul style="list-style-type: none"> <li>• <b>Soft systems methodology</b></li> <li>• Interactive planning</li> </ul>             |   |

Table 5: Project management in the System of Systems Methodologies (Extended from Flood & Jackson, 1991a, p. 327)

PM can also be interpreted through Mingers' (2003a) framework for mapping methodologies (introduced in Chapter 4), providing the possibility for further comparison with SSM and development of an understanding of the different emphases that the two approaches bring to problem situations. Based on the approach to classification described by Mingers, I have classified PM in terms of its various foci (See Figure 52). In this classification system, a darker shading indicates stronger emphasis on a particular foci. Furthermore, where cells are left blank, it means that the approach "... does not have a particular activity for it" (Mingers, 2003a, p. 565). My classification of PM shows sole emphasis on the material, rather than the social or personal, aspects of a problem situation. The strongest emphases are on taking action to select and implement best alternatives, and assessment of alternative physical and structural arrangements. Emphasis was also found on the appreciation of physical circumstances, and a lesser degree of emphasis on the analysis of underlying causal structures. This analysis presents PM in a significantly different light to that of SSM, which Mingers (2003a, p. 566) categorises as predominantly focusing on the personal aspects of a problem situation (See Figure 32 – Chapter 4).

|          | Appreciation<br>of                                | Analysis<br>of                                       | Assessment<br>of  | Action<br>to                                    |
|----------|---|--|---|---|
| Social   | Social practices,<br>power relations              | Distortions,<br>conflicts<br>interests               | Ways of<br>altering<br>existing<br>structures             | Generate<br>empowerment<br>and<br>enlightenment |
| Personal | Individual's<br>beliefs,<br>meanings,<br>emotions | Differing<br>perceptions,<br>personal<br>rationality | Alternative<br>perspectives<br>and<br>constructions       | Generate<br>accommodations<br>and consensus     |
| Material | Physical<br>circumstances                         | Underlying<br>causal<br>structure                    | Alternative<br>physical and<br>structural<br>arrangements | Select and<br>implement<br>best<br>alternatives |

Figure 52: Classification of PM (Extended from Mingers, 2003a)

### The theoretical disquiet in PM

The hard paradigmatic and theoretical basis of PM is generally implicit, not explicit and consciously developed. However, reliance on the theoretical has been identified as an essential aspect of a profession, and some argue that the development of an "... explicit theory is the crucial and single most important issue for the future of the project management profession" (Koskela & Howell, 2002, p. 293). Dean (1997) also isolates a theoretical grasp of a field's phenomena as a distinguishing attribute of a profession. And yet many authors point to the lack of theory in PM. "The literature on project management was found to reveal an unbalanced worldview that lacked coherent underlying theory" (Cooke-Davies, 2000, p. 2). PM is not seen as a fertile field of new research problems, and researchers "... do not see a field in project management that is bubbling with new ideas" (Urli & Urli, 2000, p. 42). Rather, the field is seen as one where "... additional development of theory is needed" (Shenhar, 1996, p. 5). A lack of theory development has been linked to the desire for efficient delivery, as one is expected to apply the theories of PM, not take up time questioning them that could better be spent on delivering results (Thomas & Tjader, 2000, p. 2). Perhaps it is because of this lack of unifying, explicit theory that the field of "... project management remains in 'chaos' ..." (Yeo, 2002, p. 246). Testament to the slow development of theory in PM can be found in the fact while the field has arguably existed in recognisable form since the 1950s, the first research conference on project management was IRNOP in 1992, while the first research conference organised by the PMI wasn't until 2000.

A divide between theory and practice is also apparent within the field of PM. "Too frequently researchers become overly esoteric in their pursuit of 'Pure' research ... and practitioners become too pragmatic in their desire for 'useful' theory" (Meredith, 2002, p. 47). Many call for further development of the theoretical basis of PM and greater links to practice. The basis of PM is "... becoming increasingly questioned in practice in terms of its underlying theories and principles and its breadth and nature of application" (Betts & Lansley, 1995, p. 207). The theoretical basis for PM is described as 'narrow' and 'obsolete', and "... has to be substituted by a wider and more powerful theoretical foundation" (Koskela & Howell, 2002, p. 293). Positivism has been found to have not fulfilled the promise of greater control and predictability in management (Nissen & Snider, 2002, p. 90). Reductionist decomposition approaches have been found to be inadequate for addressing systemic effects (Rodrigues & Williams, 1998, p. 3), while the appropriateness of the general foundations of PM are questioned in their ability to deal with complex problems (Bredillet, 2004, p. 1). The tendency to focus on control in PM restricts the approach "... to managing relatively simple projects in relatively stable environments" (Thomas & Tjader, 2000, p. 6), while generally, amongst those who examine the theoretical basis of PM, it is being found that the "... conceptual framework is inadequate to the job it should be addressing" (Morris, 2002, p. 31), and "... that a paradigm change, long overdue, has to be realized" (Koskela & Howell, 2002, p. 298).

### **A growing interpretive influence**

It appears that acceptance of ideas associated with the soft paradigm is slowly increasing in the field of PM. Evidence for this can be found in a variety of sources. Ignoring soft aspects of projects can lead to underestimation of risks (Chapman, 2004, p. 19), while successful analysis of project risks often involves attempts to address human issues, that are harder to understand and quantify (Hall, Holt et al, 2003, p. 501). It is becoming recognised that traditional PM may not be suitable for all environments (See Figure 52). "Applying project management principles in soft project environments often requires a different approach to the use of project management tools and techniques ..." (Hassen, 1997, p. 285). Nissen and Snider (2002, p. 90) argue for a rejection of positivism as the basis for PM, in favour of pragmatist philosophies, based on the work of Dewey. Detailed case studies which apply research methodologies that

can be associated with the soft paradigm are also starting to appear in the PM literature. For instance, Friend, Bryant et al (1998) and Cooke-Davies (2000) provide case studies involving Action Research in a PM context, while Melgrati and Damiani (2002) provide a good socio-constructive case study. Furthermore, Remington and Crawford (2004, p. 11) note that soft and critical systems thinking are both being tested in complex project environments.

The differences between the hard and soft paradigms is being discussed in the PM literature, although this is far from mainstream. For instance, McElroy (1996) provides a simple system for classifying projects as either hard or soft, based on output tangibility. "The term soft project is used to describe any complex task which aims to achieve an intangible result ... In contrast, a hard project produces some kind of facility or other physical change ..." (p. 326). He also notes that in soft projects, costs are more difficult to estimate, logical relationships are often ambiguous, success is heavily dependent upon the people involved, interaction between project and organisation is high, performance is not easily measured, and objectives and scope are not precisely known at the start of the project (pp. 326 – 8). Stretton (2000) also provides insight into the hardness or softness of projects, by overlaying observations made by Yeo (1993) and Turner and Cochrane (1993), finding correlation between the degree of definition of objectives in a project and a project's hardness or softness. These ideas are developed further by Crawford and Pollack (2004), who provide a framework for analysing the influence of the hard and soft paradigms, based on a system of seven polarities (See Figure 11 – Chapter 2).

Some authors discuss the process of communication, instead of the typical PM dialogue on tools for controlling communication (e.g. Barry & Pascale, 1999, p. 7; Newcombe, 1996, p. 77). Constant communication between team members has been found to reduce conflict (Wilemon & Cicero, 1970, p. 273). The role of culture and values in the interpretation of information is also acknowledged (Lai, 2000, p. 207). The meanings and opinions of individuals are shaped by the individual's position in an organisation (Muller & Turner, 2002, p. 389), and so for communication to be effective, it must be aligned with the task at hand and the recipients of that communication (p. 387). It has also been noted that communication barriers often exist between developers and the users of project products due to differences in their languages, concerns and



backgrounds (Lai, 200, p. 207), and that managers need to speak and understand the same language as those who will use project products (Patton, 1996). Communication needs have also been linked to the degree of goal definition, with rich media, such as face to face meetings, been suited to projects with unclear goals, while projects with clear goals can rely on lean media, such as written communication (Muller & Turner, 2002, p. 387).

Fulfilling the clients', users' or stakeholders' needs is regularly cited as significant to project success (Lai, 2000, p. 205; Pinto & Slevin, 1998b, p. 71; Cooke-Davies, 2002, p. 186). The typical life cycle diagrams in project management text books assume a client's role to be confined to the specifying requirements at the start, then approving the product at the end (Rodrigues & Williams, 1998, p. 2), and emphasise objective measures of success. However the subjectivity of success is being increasingly discussed. "The concept of success is a complex one. It implies criteria by which success is to be judged, criteria which are cultural, sometimes wholly individual, as well as biological" (Vickers, 2003, p. 212). It is acknowledged that different stakeholders may have different, even contradictory, ideas of success. "Success is a slippery concept to measure – and that it has different definitions depending on who you are and what your role in the project is (and when you attempt to measure it)" (Morris, 2002, p. 32). Individuals judge success based on their individual objectives, and these "... may not be the same as the stated, overt, objectives, and the time, cost and quality constraints imposed" (Turner, 1999, p. 52). The success of projects, as judged by the people involved, may in fact have little to do with the formal specifications, suggesting that a sole focus on time, cost and quality specifications may be giving misleading results.

### **Re-interpretation of PM tools and techniques**

The traditional use of a variety of PM tools and techniques is also coming into question, the majority of which require as prerequisites a specified objective, actions to complete objectives that can be determined in advance, and a desired sequence for performing the activities (Cleland & King, 1968, p. 387). The "... classical techniques are seen as being most appropriate to the simplest form of problem context ..." (Daniel, 1990, p. 80), as unable to deal with "... the stochastic nature of project developments" (Starr, 1990, p. 96), and inadequate for complex projects or the difficulties involved in modelling the

real world (White & Fortune, 2002, p. 9). For instance, network analysis is identified as unable to cope with processes that cannot be defined clearly (Remington & Crawford, 2004, p. 7), while PERT and the WBS are identified as "... inadequate for analyzing and managing modern complex, integrated projects" (Rodrigues & Williams, 1998, p. 2). PERT is also identified as potentially stifling creativity in political environments, where picking the right time is more important than speediest delivery (Hassen, 1997, pp. 279 – 81). Furthermore, a reliance on quantitative techniques may be reducing in popularity. "What is now suggested is to apply the concepts qualitatively rather than quantitatively" (Turner, 1999, p. 240).

It is not necessarily that PM tools and techniques are deficient, but rather that they are suited to specific circumstances, and must be applied with discretion. The capabilities of modern tools and software packages can give the project manager a false sense of security. "They can be useless, even detrimental, to a project if not applied by people skilled both in project management ..." (Katzel, 1999, p. 54), as "... techniques do not manage projects, people do. Tools can only speed up some mechanical activities of the job" (Lai, 1997, p. 175). In contrast to some earlier tools, milestone planning is gaining increasing recognition. Milestone planning involves description of the order of specific points in a project, demonstrating their precedence relationships, without necessarily making detailed plans of activities (Andersen, 1996). Project managers "... dealing with complex processes ... have no option but to use milestone planning in which broad goals are the only checkpoints that can be defined and scheduled" (Remington & Crawford, 2004, p. 7). When the goals of a project can not be clearly defined, milestone planning can be useful, with the milestones becoming "... decision points where the definition of the goals is refined and rebaselined" (Turner & Cochrane, 1993, p. 98).

### **Re-interpretation of goal definition**

The basic assumption that clear goals can be established near the start of a project and maintained throughout the project life cycle is also coming under question. For instance, a survey by Halman and Burger (2002, p. 87) revealed that after project start up workshops, 52% of project managers did not yet have a full understanding of their project's purpose or scope. This may not be due to any inability on the part of respondent project managers, but rather because some application areas, such as cultural

organisational change projects, generally have to rely on abstract descriptions of goals (Turner, 1999, p. 53). However, hard approaches do not generally address goal definition, and find situations with a lack of firm definition to be essentially unmanageable.

The start of projects can sometimes be poorly defined, typified by unclear objectives and potentially conflicting aims. When project goals are ill-defined, it is sometimes suggested that the project manager try to define the goals as soon as possible, so that traditional PM techniques can be used (Turner & Cochrane, 1993, p. 101). Morris (2004, p. 14) suggests an approach such as SSM for these situations. SSM could then be used to clarify goals at the start of a project, before traditional PM is applied. This model of combining SSM and PM is referred to as 'Grafting' and is described in greater detail in the next chapter. Unfortunately, danger exists in the early simplification of goals, as this can foreclose on options that should, at the time, be kept open (Daniel, 1990, p. 80). Furthermore, goals can change during the life of a project. Remenyi and Sherwood-Smith (1999, p. 20) note the "... possibility of substantial alterations to the project requirements between the time it is originally specified and when it is ultimately delivered ...", while Neal (1995, p. 8) comments that goals can often change in rapidly changing environments, despite requirements having apparently been finalised. Stakeholder understanding may change, and their understanding of their requirements with it. Differences in perception and understanding between stakeholder groups can hamper project progress and create resistance to project delivery (Butterfield & Pendegraft, 1996, p. 15), an issue which suggests the need to track customer requirements, so that solutions are understood by, and acceptable to, stakeholders (Neal, 1995, p. 6). A satisfactory definition of project goals "... may need several iterations to unravel" (Bentley, 2004, p. 9). This implies a need to continually review and redefine goals, instead of assuming that predefined goals remain stable throughout the project.

### **Rethinking project planning**

A project plan of some sort is generally considered necessary, as it provides a framework within which to coordinate the delivery of resources and people's actions (Turner, 1999, p. 5). Detailed plans allow for greater control, and the assumption may be that greater the detail the better. However, it takes an increasing amount of effort to

add successive layers of detail to plans, effort which may exceed any expected benefit from extra planning (Turner, 1999, pp. 175 & 229). Highly detailed or rigid plans have also been identified as potentially limiting freedom to make decisions (Hall, Holt et al, 2003, p. 499) being confusing, and encouraging an attitude where low level products become ends in themselves, instead of contributing to a greater goal (Turner, 1999, p. 154). A preoccupation with planning has also been linked to project failure (Yeo, 2002, p. 243), potentially diverting effort from where it may better be applied, as "... the empirical evidence supports the theoretical argument of the impossibility of maintaining a complete, up-to-date plan" (Koskela & Howell, 2002, p. 297). The traditional PM planning processes tend to be reductionist, breaking goals and activities down into their constituent parts and optimising them. However, it has been found that optimisation of one subsystem in the project, while ignoring the effects on other aspects of the project "... easily degenerates into system sub-optimisation if the part is not examined in the light of a full understanding of the whole" (Liu & Leung, 2002, p. 341). Some authors argue for a less reductionist approach to project planning (Andersen, 1996, p. 89). The value of activity planning is also generally taken as self evident in the PM literature, yet Andersen (1996, p. 89) holds that it is impossible to know which activities will need to be taken throughout the life of a project when at the initial planning stage, as "... the kinds of activities that should be undertaken depend on the results, the successes or misfortunes, of earlier activities." Indeed, formal planning may be less significant to the practice of PM than the literature suggests. Two studies of critical success factors question the strong emphasis on planning in the PM literature. White and Fortune (2002, p. 7) found that only 37% of respondents to their survey considered the provision of planning and control systems to be a critical success factor, while Pinto and Slevin (1988b, p. 72) found that scheduling, as an aspect of planning, was only considered to be of relevance to one or four project phases, and even then was only the third most important success factor.

Yeo (2002) proposes an interesting model for PM planning in the context of information systems development (see Figure 53), based on the *Processes for Organisation Meanings* model (See Figure 34 – Chapter 4). This model comprises three sets of planning processes: the strategic planning and delivery system; the organisational context; and, the formalised and technology enabled information system (p. 241). It should be noted that this system could be transferred to other contexts through replacing

the information systems aspects of the model with a system which examines the context of a different application area. Traditional PM tends to focus on the technical and work content aspects of project management (p. 245). Yeo brings emphasis to the organisational context in which the project is set, and to strategic planning which provides the greater organisational justification for the project. Planning, then, needs to be suited to the needs of the project and its context. Organisational contexts and changing strategic directions can force the need to change project plans, and it is better to examine these explicitly than be caught unawares. Turner (1999, p. 5) notes that the one thing that you can guarantee about a plan is that it will be wrong, and that one must be willing and ready to change the plan as the project progresses. This suggests the need for dynamic planning processes, throughout the life of the project.

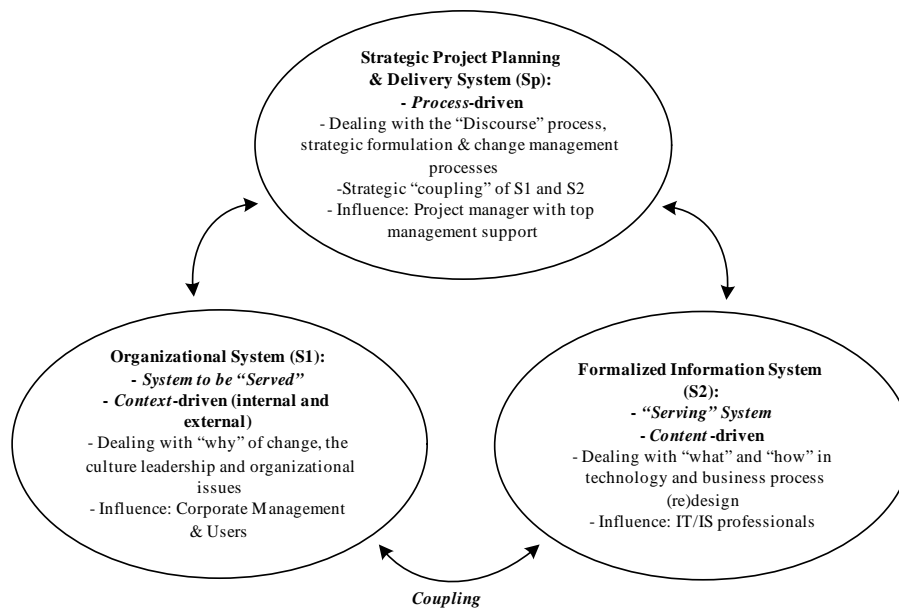


Figure 53: The triple-S framework for IS planning (Yeo, 2002, p. 244)

### Continuous definition and evaluation

Despite the assumptions on which traditional PM is based, project goals have the habit of changing. This happens even "... after the requirements have apparently been finalised" (Neal, 1995, p. 8). Indeed, throughout the life of a project, goal definition is often an iterative process, involving cycles of improving definition (Turner & Cochrane, 1993, p. 97). Change can occur as an unsolicited result of project work, as "... the mere act of undertaking a project can have an impact" (Turner, 1999, p. 49). Furthermore,

change is identified as common in some project environments. Change can be frequent in bureaucratic environments (Hassen, 1997, p. 281), where no sooner "... is a plan agreed and documented than it is made obsolete by the next round of changing ideas and personal preferences" (p. 279). Organisational strategy development projects are also rife with change, being influenced by many events outside project control. "Many of these events cannot be predicted, controlled, or measured, so flexibility is needed to deal with them as they arise and to modify plans accordingly" (Kenny, 2003, p. 46).

Regular changes in project direction can cause problems if one is wont to maintain control of a project according to predefined goals and plans. An "... emerging discomfort with notions of control through pre-determined outcomes ..." (Remington & Crawford, 2004, p. 2) can be seen in the PM literature. Indeed, a study into PM practice has revealed that project teams spend more time defining and redefining their projects than on controlling or planning them, reversing the traditional PM expectation of task importance (Melgrati & Damiani, 2002, p. 378). The uncertainty inherent in some projects must then be embraced, "... rather than linearised and ignored ..." (Richardson, Tait et al, 2000, p. 3). Similarly, in complex environments, it is recommended that the project manager use a 'shaping' approach, instead of one based on planning and control (Hobbs & Miller, 2002, p. 43).

Instead, a growing acceptance of the need to continuously redefine goals and plans is growing in the PM literature. Without clear goals the project manager is forced to take on the role of a continuous planner (Neal, 1995, p. 5). Project managers must continuously review time, cost and quality aspects of the project (Baccarini, 2004, p. 31) and redefine the project scope and definition of their mandate (Melgrati & Damiani, 2002, p. 378). Therefore, plans need to be flexible enough to allow for the incorporation of new ideas, new developments and changes in direction (Kenny, 2003, p. 52).

It may also be necessary to redefine and discover who the stakeholders of a project are during the project (Neal, 1995, p. 6). This process may require a certain degree of stakeholder participation and "... interaction with stakeholders to explore possible common ground" (Hobbs & Miller, 2002, p. 43). Indeed, managing stakeholders may be a more significant aspect of the management of projects than the traditional literature suggests, as it has been found that project managers have to constantly reconcile

conflicting views and perceptions of situations (Melgrati & Damiani, 2002, p. 378). The traditional PM literature tends to limit the role of the client to the start and end of the project life cycle (Rodrigues & Williams, 1998, p. 2), as mentioned above, but constant interaction with the client can provide significant benefits, as successful project managers are those who deliver what the customer needs when delivery is made, not simply goods meeting old specifications. "Courts may well find in favour of the latter, but the former will be given the future business!" (Neal, 1995, p. 5).

Redefinition of scope and goals requires learning on the part of stakeholders and the project team. Yeo (1993, p. 116) identifies that the secret of success in PM is learning, and that this is especially true in ill structured or ambiguous situations. Organisational strategy development is a prime example of a context where ongoing learning can be vital (Kenny, 2003, p. 52). The call for an increased focus of learning during the project is generally supported by a study by White and Fortune (2002, p. 5), which found that almost half of their respondents reported unexpected side effects resulting from their projects, 70% of which could be linked to lack of awareness of the project environment. During the course of a project, learning can then be on the part of the clients or users, and the project team. If learning is a participative process, then in learning together, clients and project team members can come to an agreed and mutually understood definition of goals as the project progresses (See Figure 54).

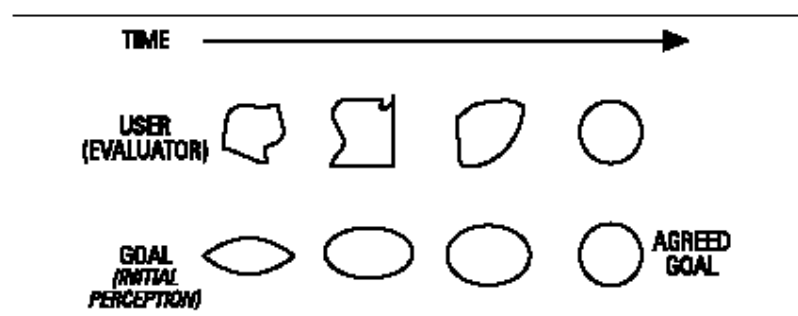


Figure 54: A formative evaluation process (Remenyi & Sherwood-Smith, 1999, p. 24)

Remenyi and Sherwood-Smith (1999) describe a different approach to learning and evaluation to the traditional model. Although developed in the context of information systems development, this model applies equally well to learning, evaluation, planning and control in PM. The traditional model (See Figure 55) involves evaluation at

predetermined intervals in the project. These intervals may be the changes between project phases, described above. This evaluation is summative, usually quantitative, and against criteria which are determined during the initial stages of the project. This model does not take into account changes to goals and objectives, or the possibility for learning which uncovers the need for significant variation to the project plan.

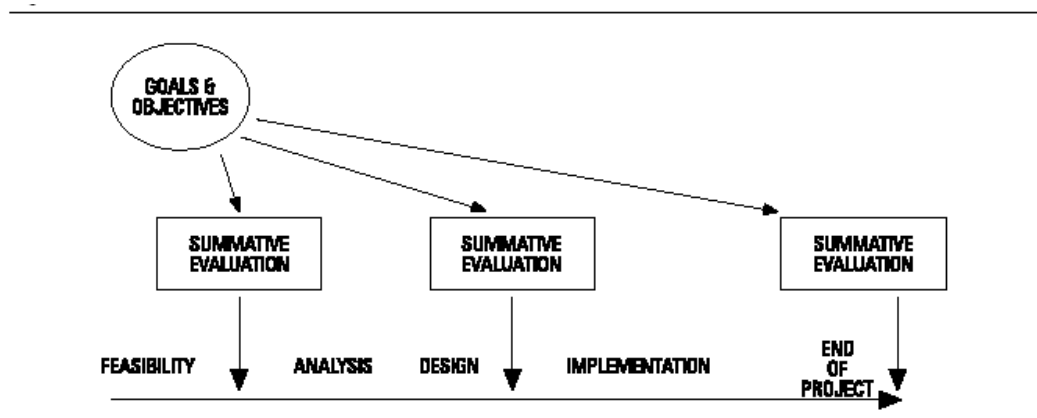


Figure 55: The traditional evaluation cycle (Remenyi & Sherwood-Smith, 1999, p. 19)

They propose a model with an emphasis on continuous participative evaluation, focused on learning throughout the life of the project (See Figure 56). This model is "... aimed at the learning process so that what is 'learned' at each step in the process can be carried forward into the overall development process" (p. 19). In this model, the boundaries between evaluation for success, planning and control processes start to blur. They are not separate processes, carried out at different intervals during the project. Rather, through constant participation, goals are successively shaped in relation to stakeholder needs and changes in the environment. This model bears some similarity to Embedding, the model for combining PM and SSM that has been applied in the IT / CT Platform Project. Embedding is examined in greater detail in the following chapter.



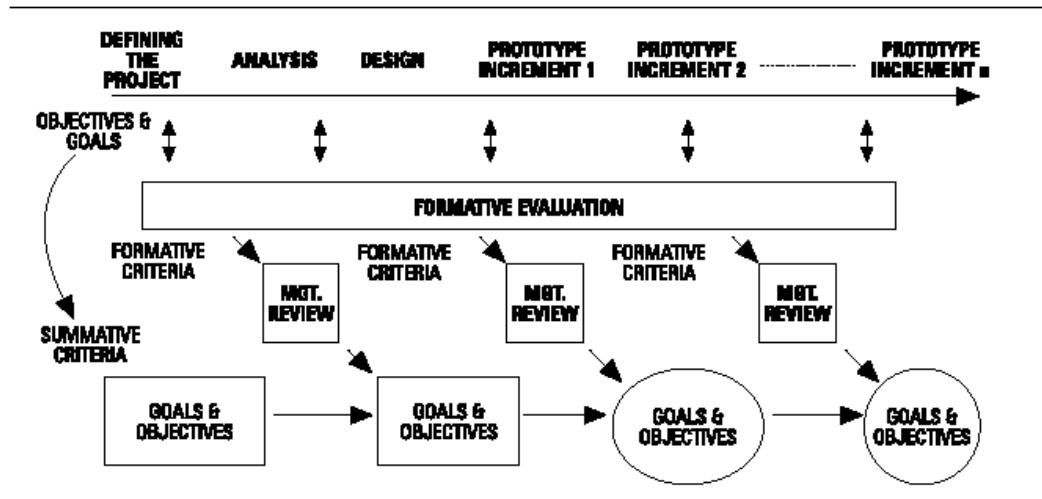


Figure 56: The proposed evaluation cycle (Remenyi & Sherwood-Smith, 1999, p. 20)

## Conclusion

This chapter has provided a review of aspects of PM relevant to understanding how the approach has been applied in this research and how it has been combined with SSM. Current practice has been reviewed, including an examination of the traditional PM life cycle, and how the success of projects is measured. I have then argued that traditional PM is strongly influenced by the hard paradigm. I have argued this through reference to the philosophical foundation of PM, and examination of the assumptions that the field makes regarding: goal definition and stability; planning and control; models of organisation; and communication and participation.

Despite the firm grounding of PM in the hard paradigm, undercurrents can be seen in the PM literature which suggest dissatisfaction with the traditional theories and the potential for further development of the soft paradigm in PM. Aspects of PM where ideas reminiscent of the soft paradigm can be found include: PM tools and techniques; goal definition; project planning; and continuous learning and evaluation throughout the life of a project. Not all projects meet the criteria that approaches based in the hard paradigm require. The following chapter reviews how the ideas of soft systems thinking may be combined with PM, providing the option of using a soft epistemology and soft processes in the project management of situations where the assumptions of the hard paradigm are not appropriate. Some learning resulting from this research relates to the

application of PM in practice. In light of reflection on the actions taken in the IT / CT Platform Project, in Chapter 8 I will discuss the following question:

- How appropriate was PM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?

## Chapter 6 – Pluralism and Critical Systems Thinking

"The external conditions, which are set for [the scientist] by the facts of experience do not permit him to let himself be too much restricted, in the construction of his conceptual world, by the adherence to an epistemological system. He therefore, must appear to the systemic epistemologist as a type of unscrupulous opportunist ..." (Einstein, 1951, p. 683).

### Introduction

The purpose of this chapter is to offer insight into pluralism, the combination of approaches in practice. In so doing, this provides an intellectual context for the subsequent practical exploration of the combination of PM and SSM, based on the Embedding model, which is examined in the following chapters. In the previous two chapters I have examined the literature on the standard practice of PM and SSM, examples of methodologies from the hard and soft paradigms, respectively. Now I examine how approaches such as these can be combined. However, Miles (1988, p. 55) has commented that "... to combine both perspectives into some kind of 'hard-soft' methodological framework of practical utility and consistency is certainly not a straightforward matter." This chapter examines why this is the case, what difficulties may be encountered, and how these have been addressed by previous researchers and practitioners. This will be achieved predominantly through reference to the Critical Systems Thinking (CST) literature, a branch of systems thinking in which models for pluralist practice have been developed.

General perspectives on the combination of approaches in other fields are briefly discussed, followed by an examination of the barriers to the adoption of pluralist practice. This leads to discussion of responses in the systems thinking community to the problem of paradigmatic incommensurability. Various strategies for circumventing or disarming the problem are explored, including approaches informed by Habermas' theories. The tendency towards the level of metaparadigms and metamethodology as a way of managing the paradigm gap is also discussed. Finally, drawing insight from a selection of frameworks for the practical combination of approaches, I outline the model of pluralism that has been practically explored in the IT / CT Platform Project, a variation on Miles (1988) model for Embedding the hard and soft paradigms.

Having established the existence of a critical mass of literature and practice which is in the process of developing pluralist approaches, following chapters will examine the combination of traditional PM and SSM, for the development of an IS / IT strategic plan within the NSW public sector. This intervention is presented in two different ways. In Chapter 7 the intervention is discussed as narrative, recounting the order of events. In Chapter 8 aspects of the intervention are focused upon, in order to discuss identified research themes.

### **Perspectives on pluralist thought and action**

Pluralism, the practice of combining different approaches in practice, is widely reported to provide benefits that reliance on a single approach cannot. Using only a single approach to a situation entails a necessarily limited view of a situation (Mingers, 1997a, p. 9), does not reflect the "... richness, diversity and interdependence ..." (Skyrme, 1997, p. 219) of real life, and "... also produce silences around certain issues and themes" (Brocklesby, 1997, p. 198), as particular approaches are suited to use in particular settings and focus practitioner attention on particular aspects of a problem situation. It is possible that the complexity inherent in problem situations may best be dealt with by adopting a pluralist approach (Lai, 2000, p. 226; Murthy, 2000, p. 31). Use of multiple approaches allows the practitioner to enter a "... problem situation with fewer preconceived ideas ..." (Brocklesby, 1997, p. 190), increasing choice and flexibility (Skyrme, 1997, p. 217). Such an approach also provides the opportunity of "... exploiting the creative tensions among differentiated methods" (Zhu, 2000, p. 187). "By thinking systemically and using a range of tools to enable us to hold in mind more than one ideology, discipline, or framework at the same time ..." (McIntyre, 2002, p. 9) sustainable practice becomes more possible. Combining "... methodologies expressing different theoretical rationalities ..." (Jackson, 1997a, p. 214) can allow practitioners to get the most out of pluralist practice. Furthermore, blending approaches, such as qualitative and quantitative techniques, can allow the practitioner to reach a wider audience than would otherwise be available (Wolstenholme, 1999, p. 422), while simultaneously increasing both rigor and relevance (p. 424). Pluralist practice also provides benefit to fields as a whole, not just the individual practitioner, allowing for traditional approaches to be buttressed with new, or different, ideas (Jackson, 1999, p.

13). Bennett (1985, p. 661) identifies three different end products to the process of linking approaches: comparison, identifying similarities and differences; enrichment, adding elements from one approach to another; and integration, where approaches are combined to form something new.

Evidence for pluralist practice can be seen in a variety of fields, taking a variety of forms, and this practice seems to be increasing (Mingers & Brocklesby, 1997, p. 495; Munro & Mingers, 2002, p. 378). Jackson (1999, p. 13) also notes that the intellectual climate shows a general eagerness for pluralist endeavours, which can be related to the current fashion for relativism and postmodernism (Jackson, 1997b, p. 365), while other authors state the need for a further increase in pluralist practice (e.g. Muller-Merbach, 1994, p. 16). Pluralism is already prevalent in a variety of fields, including: systems thinking; operational research; organisational theory; evaluation research; information systems; management consultancy (Jackson, 1999, p. 12; Jackson, 1997b, p. 347); and philosophy (Mingers, 1997a, p. 3). Of these fields, this research focuses upon Miles (1988) model of Embedding, developed for the combination of SSM and information systems methods. This research primarily draws upon pluralist insight from the systems field in order to develop an intellectual context for the discussion of pluralism and Embedding. The systems field is considered appropriate for this due to the wide ranging influence of the systems field (Muller-Merbach, 1994, p. 16), the systems thinking emphasis on the relationship between the different levels identified in *The Schema*, and the common links to the field of systems thinking apparent in both PM and SSM. Systems thinking was also "... one of the first applied disciplines to go through a period of crisis when different conceptualisations of the field fought one another for hegemony ..." (Jackson, 1997b, p. 366). Furthermore, "... the discussion concerning pluralism in systems thinking and practice encompasses and goes beyond those in the other disciplines" (p. 366).

Pluralism has also been explored within the field of information systems development (e.g., Avison & Wood-Harper, 1990). However, it has been noted that the information systems literature is primarily pragmatic, not dwelling on philosophical complications (Spaul, 1997, p. 323), and that the combination of approaches has generally progressed under the hegemony of a single paradigm, instead of engaging with multiparadigm pluralism (Jackson, 1997b, p. 363). The fields of social, educational and evaluation

research have seen more extensive engagement with pluralism, and developments in the systems field have moved along a comparable path to those found in the field of evaluation (Gregory, 1996, p. 295). For instance, in the field of evaluation, Denzin's (1970) principle of triangulation has had considerable impact. For Denzin (pp. 26 – 7), the concept of triangulation proposes that multiple methods must be used in all investigations, as no single method can reveal all the relevant features of a situation. Ianni and Orr (1979, p. 94) summarise Denzin's work, listing four sources of triangulation: data, including time, space, and person; theoretical, using multiple perspectives on a single set of objectives; investigator, using several investigators for the same research; and methodological. Triangulation as an approach is reported to allow the researcher to flow between inductive and deductive processes (Patton, 1990, p. 46), to "... cover all bases ..." (Pulley, 1994, p. 6), and avoid "... potential analytical errors and omissions" (Kaplan & Duchon, 1988, p. 582). Disagreements about the nature and appropriateness of triangulation have persisted for decades in these fields, more so than is apparently indicated by cursory perusal of the literature, as there "... is, indeed, a disagreement over whether or not there is a disagreement" (Reichardt & Cook, 1979, p. 8). In the fields of social, educational and evaluation research, however, practice has developed faster than the theory (Mingers, 1997a, pp. 3 - 4) and 'triangulation' can be assumed to be at the levels of method and technique in *The Schema*, being concerned with the combination of qualitative and quantitative data or data collection techniques (Patton, 1990) or "... two method-types ..." (Reichardt & Cook, 1979, p. 9).

Evidence suggests that the practice of methodological or theoretical pluralism is not yet well developed within the project management literature. In May 2004 I conducted a search of the full-text electronic copies of the International Journal of Project Management (IJPM), with the intention of establishing the penetration of pluralist thought in the PM literature. Terms indicative of pluralism were searched for. No articles were found to contain instances of the following terms: 'multimethodology'; 'pluralism'; 'pluralist'; 'complementarism'; 'complementarist'; or 'incommensurability'. 'Incommensurable' occurred once in one article, where reference is made to two paradigms for IT in project management being "... largely incommensurable ..." (Clarke, 1997, p. 252). A similar search was conducted of the electronic copies of the Project Management Journal (PMJ) in June 2004. No instances of any of these search terms

were found. Evidence from these searches of the two most widely distributed PM journals strongly suggests that there is currently virtually no research into pluralism in the PM literature at the theoretical, paradigmatic or methodological levels. It would be reasonable to infer that there is correspondingly little conscious recognition of pluralism as a theoretical influence on PM practice.

In contrast, combining methods, tools and techniques within project management appears to be well established in practice. An additional search was conducted for the term 'triangulation'. The term did not appear in PMJ, but eight articles in IJPM mentioned triangulation (Makilouko, 2004; Thiry, 2004; Arnaboldi, Azzone et al, 2004; Burgess, Byrne et al, 2003; Farr-Wharton, 2003; Huang & Newell, 2003; Love, Holt et al, 2002; Busby & Payne, 1999), the majority of which referred to 'triangulation' in the sense of using either multiple sources of data or multiple data collection techniques. It should also be noted that these instances of references to 'triangulation' are all particularly recent, demonstrating that the practice of triangulating data is only now penetrating the field of project management. As previously discussed, PM has been compared to a 'heterogeneous toolbox', with the tendency for PM research to focus at the level of tools, techniques and methods, not methodologies or paradigms. Given this, it is not surprising that of all the search terms used, 'triangulation' was the most popular. For instance, while Gelbard, Pliskin et al (2002) examine the combination of information systems analysis techniques and common PM techniques, they do so solely at the level of tools and techniques. Furthermore, the techniques they combine arguably both come from a positivist tradition, obviating any need for an examination of the philosophical difficulties of combining approaches from different paradigms.

### **Barriers to adoption of pluralism by practitioners**

Pluralist research within the systems field is still undergoing a process of development, and in 1998 it was noted that "... we are only just beginning to see attempts at mixing methods ..." (Lane & Oliva, 1988, p. 215), and that "... little methodologically pluralist research has been published ..." (Fitzgerald & Howcroft, 1998, p. 322). Five years later, the situation had not significantly changed, with Mingers (2003b, p. 233) finding that pluralist research averaged "... only 13% of empirical papers." Surveys into pluralism reveal that it is rare for more than two methods to be combined in research (Mingers,

2003b, p. 242) or three in practice (Munro & Mingers, 2002, p. 374). Although the integration of methodologies is possible across the divide between the hard and soft paradigms (Rosenhead, 1997, p. xiv), most combinations of approaches do not cross this divide (Munro & Mingers, 2002, p. 378; Burrell & Morgan, 1979, p. 24). When the divide is crossed, it is usually done by the practitioners, not the theorists (Brocklesby, 1997, p. 191).

Given the amount of academic support for the idea of, and expected benefits from, pluralist practice which also crosses paradigms, it is relevant to ask why such practice is not more prevalent. A number of barriers to combining approaches across paradigms can be identified in the literature. Philosophically, multiparadigm pluralism faces the problem of paradigmatic incommensurability, which single paradigm pluralism avoids (Mingers, 1997a, p. 6). Culturally, it has been noted that disciplines tend to split into subcultures around paradigms and practices, and it can be more difficult to 'sell' pluralist research to funding bodies (Mingers, 2003b, p. 246), while academics might also be concerned about becoming a 'jack of all trades, but master of none' (Brocklesby, 1997, p. 202).

Psychologically, barriers to adoption relate, in various ways, to the "... problems of an individual agent moving easily from one paradigm to another" (Mingers, 1997a, p. 13). The adoption of pluralist practice is heavily influenced by a practitioner's previous experience (Brocklesby, 1997, p. 203; Mingers & Brocklesby, 1997, p. 507; Munro & Mingers, 2002, p. 369), and their beliefs and values (Mingers & Brocklesby, 1997, p. 499). Correspondences have also been identified between personality types and the approaches developed within the different paradigms (Mingers & Brocklesby, 1997, p. 500; Mingers, 2003b, p. 246). For instance, it has been identified that "... those towards the quantitative end of the spectrum are often considered more introverted ..." (Wolstenholme, 1999, p. 423), and that some analysts based in the hard paradigm may feel uncomfortable, if not threatened, by a soft approach (Daniel, 1990, pp. 80 - 1). However, by contrast Ormerod (1997a, p. 53) found that no inherent paradigmatic conflict was experienced by participants when moving between states commonly associated with the hard and soft paradigms. "Participants happily moved from thinking about and debating different points of view to discussing the 'facts' and designing good (hopefully the best) strategies."



Pluralist practice is also dependant upon the specific abilities of the practitioner (Mingers, 1997b, p. 416), and requires "... comfort with several styles of engagement" (Mingers, 2003b, p. 246). A practitioner may be required to assume different roles or guises, associated with different paradigms (White & Taket, 1997, p. 392) and it is a basic requirement of multiparadigm pluralism that the practitioner can "... perform effectively ..." in a particular paradigm (Brocklesby, 1997, p. 197). For instance, hard methods tend to require mathematical, analytical and computing skills, while soft methods tend to require facilitation and people skills (Munro & Mingers, 2002, p. 369). This need for skill diversity has been identified as a major feasibility issue for pluralist practice (p. 371), as "... few practitioners ... are well versed in more than one approach" (Ormerod, 1997b, p. 419). Interestingly, Ormerod sees a positive side to this, stating that designing an intervention is a far from trivial activity, but becomes somewhat simpler "... if the consultant has a limited choice of approaches dictated by personal competence" (p. 424), resulting in a reduction in the number of possible combinations of approaches.

Other barriers to multiparadigm pluralism are more fundamental, being based in individuals' beliefs about the world. Individual's world views may cause obstacles to operating within certain paradigms (Mingers & Brocklesby, 1997, p. 499). Working from within a new paradigm involves more than utilising a new set of linguistic tools (Brocklesby, 1997, p. 205), as paradigms can influence the fundamental way that meaning is attached to words. For instance, Kaplan and Duchon (1988, p. 581) found that researchers trained in different approaches regularly understood the same words differently, and that persistent effort was required to understand and uncover these differences. Insights cannot necessarily be transferred easily between approaches from different paradigms (Wolstenholme, 1999, p. 424). New rules for what is considered to be knowledge have to be incorporated into practice (Brocklesby, 1997, p. 205), learning the explicit premises of a paradigm is not enough. The beliefs of a lifetime can create a certain inertia of conceptualisation, which require considerable effort to change. Knowing and operating within a paradigm requires that the practitioner becomes bodily involved in the paradigm through experience and practice (Mingers & Brocklesby, 1997, p. 501), a process which "... may be said to require both a learning and an *unlearning*" (Brocklesby, 1997, p. 209 – original italics). Changing the basic

assumptions of what one considers to be knowledge and how one constructs premises concerning the status of reality is no simple feat, something which, "... although manifestly possible, is not often achieved in practice" (Burrell & Morgan, 1979, pp. 24 - 5).

### **Systems thinking and the problem of paradigmatic incommensurability**

Paradigmatic incommensurability, as identified in Chapter 2, is a significant issue to many authors when considering of the viability of pluralism. The general response in the systems field has been to regard incommensurability as a problem to be resolved; "... a hard nut to crack ..." (Jackson, 1997a, p. 215). Midgley (1997a, p. 256) notes that some aim towards "... a 'unification' of paradigms ..." through rational analysis, while it is also a common tactic in the systems field to examine "... how it is possible to stand above the paradigms and work with them in this manner" (Jackson, 2003, p. 82). To this end, a number of 'metamethodological' and 'metaparadigmatic' frameworks have been developed. It seems that if practitioners wish to mix approaches "... or bring them together in a framework, we have to justify this at the level of philosophy" (Midgley, 1997a, p. 256). Alternative philosophical frameworks have been considered within the CST literature. For instance, Flood and Romm (1997, p. 293) use a combination of modernism and postmodernism in the creation of "... a post-critical position that we put forward as an essential argument which any coherent approach to 'multimethodology' must, indeed will, reflect." White and Taket (1997, p. 389) instead embrace relativism, rejecting the valuelessness that is often associated with the position, instead emphasising it as a perspective of possibility and responsibility. Links are sometimes made between the relativist and postmodern perspectives (Jackson, 1997b, p. 365), which can be used by practitioners as justification for cleaving closely to the immediate needs of the problem situation. "The weaknesses, however, far outweigh this strength and are all those associated with pragmatism" (p. 372). Difficulties associated with a pragmatist approach to pluralism are discussed below.

However, the majority of theoretical support for CST has been drawn from the work of Habermas (Gao, Li et al, 2003, p. 4). In 1991, Jackson named the theory of Knowledge Constitutive Interests (KCI), drawn predominantly from Habermas' (1971) *Knowledge and human interests*, as the preferred vehicle for supporting pluralism at the theoretical

level (Jackson, 2003, pp. 82 - 3). Pluralism at the theoretical level in CST was said to rest "... upon its acceptance of Habermas' arguments ..." (p. 88). Habermas' theory of KCI involves the idea that all knowledge is directed towards serving human interests: technical; practical; and emancipatory interests. The technical interest was aligned with hard systems thinking, the practical interest with soft systems thinking and the emancipatory interest with critical systems thinking, providing a theoretical bridge between the different schools of systems thinking. Indeed, at "... a high level of abstraction, critical theory provides a congenial model for anyone with a specific disciplinary project of bringing together diverse theoretical spheres into a coherent body of thought" (Spaul, 1997, p. 328).

Despite the widespread appeal to Habermas' theory of KCI, some authors have questioned its efficacy as a solution to the paradigm problem (e.g. Mingers, 1997b, p. 417; Mingers & Brocklesby, 1997, p. 498). Jackson (1999, p. 18) later stated that it "... is no longer tenable to believe ... that paradigm incommensurability can be solved by reference to some meta-theory such as Habermas' ..." theory of KCI. Midgley (2003c, p. 113) disagreed with the appeals to Habermas' KCI on the grounds that it seemed to perpetuate the myth of human domination over nature. Mingers and Brocklesby (1997, p. 498)) reject KCI as not "... capable of subsuming the incommensurable ontological assumptions of the original paradigms ..." Spaul (1997) also identified problems associated with the general appeal to KCI. Paradigmatic incommensurability was seen as a significant problem to be surmounted in the CST community. "Problems of mythic proportions require solutions with the same status" (p. 328). However, Spaul (p. 324) finds the way in which KCI was used in the CST literature at substantial variance with development in the Frankfurt School of critical theory. Furthermore, Spaul (p. 329) finds little epistemological integration of the imported aspects of critical theory for the systems practitioner. "Flood and Jackson use KCI at the level of a motif ... but provide no detailed linkage between its themes and practical management interventions" (p. 333). The importation of critical theory as a solution to the problem of paradigmatic incommensurability is seen by Spaul as "... an incoherent move occasioned by hubris ..." (p. 324). The field of CST has not yet found a stable, adequate and consensually agreed theoretical basis. At the moment the field appears to be an approach to practice in search of a theory.

Just as there is the tendency in the CST literature to search for a comprehensive philosophical position for the field, a tendency can also be seen to create approaches to govern choice between approaches. These can be aligned with a tendency to look for justification at higher levels of abstraction and the prevalence of the prefix 'meta' in the CST literature, e.g. metaphilosophy (Gao, Li et al, 2003, p. 18), metatheory (Midgley, 2003c, p. 108), metamethodology (Jackson, 1999, p. 19), and metaparadigm (Jackson, 1997b, p.370). Metamethodology is viewed as a way to protect paradigm diversity, manage the relationship between the paradigms (Jackson, 1997b, p. 372) and address the heterogeneity and complexity of problem situations (Jackson, 1999, p. 19). Due to evaluation problems inherent in the incommensurability between the paradigms, there was a perceived "... need to establish a base for judgements, so that interventionists do not enter an anything goes romp" (Flood & Romm, 1997, p. 310). Some authors, however, choose to point out the irony of the will towards metamethodology as a way to govern pluralism, in that their response then actually involves "... a will to a singular truth..." (White & Taket, 1997, p. 382). This synthesis of the paradigms at a higher level could actually then be problematic as "... it excludes heterogeneity by (artificially) imposing singularity at a meta-level (p. 384). The relationship between a metaparadigm and two paradigms is illustrated by reference to *The Schema* (See Figure 57).

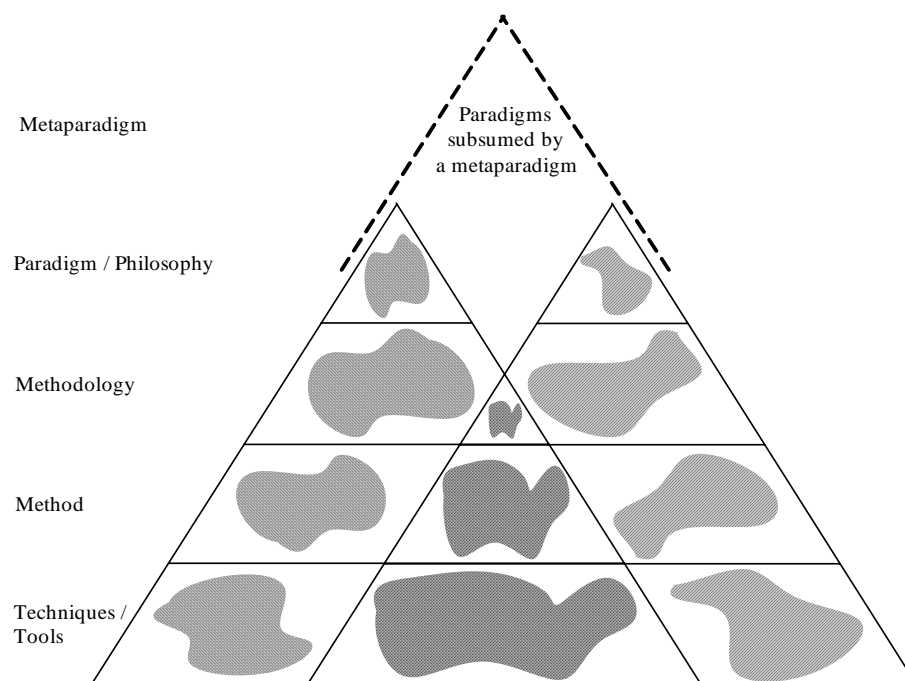


Figure 57: A metaparadigm subsuming other paradigms

To some authors CST is "... a new paradigm of its own – one that subsumes within it the other – sub-paradigms" (Mingers, 1997b, p. 411). This perspective accepts the plurality of approaches and perspectives, but the will to a singular truth mentioned above is still apparent as it "... aims in the long run to integrate them together" (Mingers & Brocklesby, 1997, p. 507). Others disagree with the push towards subsuming the systems paradigms within a single paradigm. "One paradigm pluralism is simply not pluralism" (Jackson, 1999, p. 18). Jackson (2003, p. 85) resists the possibility that any one paradigm, "... whether functionalist, structuralist, interpretive or emancipatory ..." should absorb all others. Midgley (2003c, pp. 112 – 3) doesn't think that CST can actually be metaparadigmatic. "Far from being metaparadigmatic, CST embodies its own unique assumptions, meaning that its proponents are trying to establish the foundations of a new paradigm." CST embodies sets of assumptions which are incommensurable with the assumptions of other systems paradigms. Midgley rejects the possibility of transcending the paradigm debate, as each attempt to transcend it will involve making new assumptions, inevitably resulting in the researcher taking a different paradigmatic position (Midgley, 1997a, p. 269). Because of this, "... most authors ... now recognise that there is no neutral space outside the paradigm debate from which to argue for methodological pluralism" (p. 280).

White and Taket (1997, p. 385) point out that when discussing CST, pluralism and the paradigm problem, many systems writers seem to be influenced by a hierarchical perspective, such as the meta-level depicted in Figure 57, above. Such a rendition gives the impression that adding a meta-level to sit above the paradigms preserves the structure of the paradigms. However, upon closer examination it becomes clear that a fundamental difference at a conceptual level can be seen between the hard and soft paradigms, and CST. While systems approaches from the hard and soft paradigms tend to focus on taking action in a problem situation, many of the approaches developed under the banner of CST focus not on taking action directly, but instead on the approaches from the hard and soft paradigms: how to combine hard and soft approaches; or in which circumstances certain approaches should be used. CST makes reference to the hard and soft paradigms. However, this does not mean that it must sit above, or subsume, both paradigms (See Figure 58). Instead of subsuming the hard and soft paradigms, CST can be viewed as a step to the side, making reference to the

existing paradigms, without facing the conceptually difficult task of encompassing them.

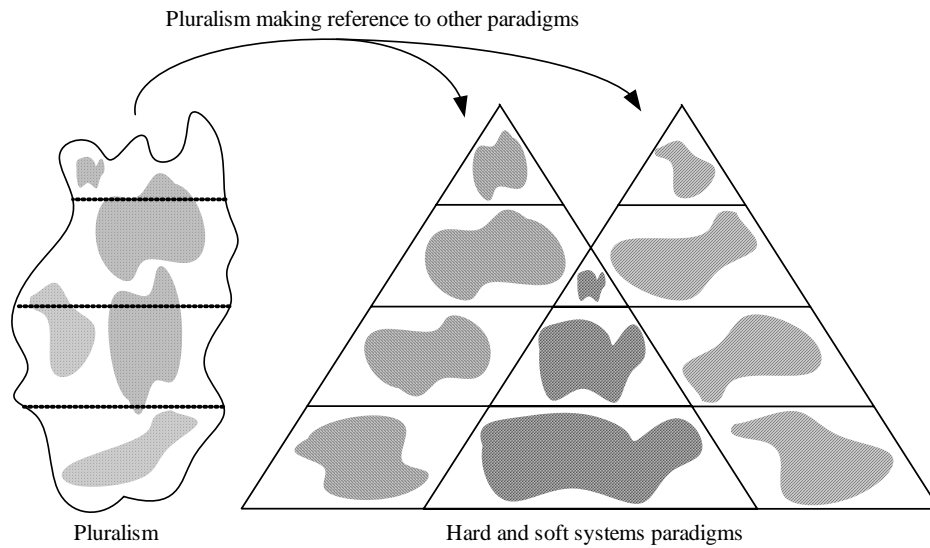


Figure 58: Pluralism makes reference to, not subsumes, the other paradigms

This perspective may satisfy those who see CST as a paradigm of its own and those who suggest that pluralism resist the possibility of any one paradigm absorbing the others (e.g. Jackson, 2003, p. 85). Nevertheless, such a perspective would be in direct conflict with those who suggest that CST already subsumes the other systems thinking paradigms (e.g. Mingers, 1997b, p. 411). Such a perspective on pluralism would also not necessarily resolve problems of combining approaches from different paradigms, a need identified by Jackson (1997b, p. 371). Neither would the need identified by Flood and Romm (1997, p. 310) for a common standard for judgement be legitimately satisfied according to this perspective due to persistent incommensurability between the paradigms.

Some authors question whether paradigmatic incommensurability, the lack of comparability between the paradigms, is actually a problem for pluralist practice. Yeo (1993, p. 116) views the hard and soft paradigms as complimentary and inseparable, emphasising their mutual compatibility rather than their difference, as does Weber (2004). The paradoxes between the different paradigms do not have to be fought, but can be accepted, understanding that both sides of the contradiction have merit (Morgan,

1990, p. 293 – 4). White and Taket (1997, p. 389) note that pluralism is only a problem from a positivist perspective. From a postmodern or poststructuralist perspective, paradigmatic incommensurability is "... not of concern, not least because the question of how to accord precedence to any set of ontological/epistemological assumptions is regarded as unanswerable." It seems then that whether the incommensurability of the paradigms is viewed as problematic depends upon the paradigm from which one is operating at a particular time. To Mingers (1995, p. 45) the philosophical incompatibility "... does not seem to be a very significant problem. All design starts as concepts and ideas which are debated and developed, but there must be a path towards greater correctness." Although actors can only operate from within one paradigm at a time (Mingers & Brocklesby, 1997, p. 497), they "... can operate in different paradigms sequentially over time ..." (Burrell & Morgan, 1979, p. 25), assuming, of course, that they can overcome personal barriers to such practice. I do not think that a single 'resolution' of the paradigm debate can actually be found. In contrast to other philosophical debates, such as the conflict between the General Theory of Relativity and Quantum Theory, at the moment there exists no equivalent of String Theory to help resolve paradigm debate. It is likely that the differences between the paradigms must be accepted and worked with at the level of practice. Pluralists "... must learn to live with and manage a degree of paradigm incompatibility" (Jackson, 1997b, p. 367).

### **Pluralism in the systems field**

Developments in the systems field can be thought of as the development of distinct Kuhnian scientific paradigms each with their own assumptions and specialised discourses (Spaul, 1997, p. 326). Perception that the different paradigms were in competition for the same territory led to the systems movement being regarded as in the throes of a 'Kuhnian crisis' (Jackson, 1987, p. 150). During the 1980's, a confrontational posture was common between the different schools of the systems movement, which itself was seen as being in the throes of a paradigmatic bind (Spaul, 1997, p. 326). The different systems schools were seen as incommensurable (Schwaninger, 1997, p. 148), and a belief pervaded the field that a practitioner "... simply had to make a choice between the paradigms ..." (Brocklesby, 1997, p. 189).

The majority of work on pluralism and paradigmatic incommensurability in the systems field "... has been carried out under the banner of critical systems thinking (CST) at Hull/Humberside ..." (Mingers, 1997b, p. 407). However, pluralist research is, as yet, a diverse field, with the literature providing many different perspectives on the subject (Midgley, 2003c, p. 108). "Pluralism, to use an illustrative simile drawn from Wittgenstein ... is like a spun thread of rope, which gains its strength, not from a continuous strand that runs its length, but from the overlapping and entwining of many separate fibres" (White & Taket, 1997, p. 388). CST, instead of being an homogeneous whole, can instead be seen as "... an evolving debate around a set of themes that are considered important by a significant number of systems practitioners" (Midgley, 2003c, p. 108).

Midgley (1997a, p. 252) and Mingers (1997a, p. 5) note that the first real contribution to the developments of a theoretical framework for addressing pluralism in systems thinking was the Jackson and Keys' (2003) System of Systems Methodologies (SOSM), introduced in Chapter 2. Prior to the development of SOSM it had appeared as if the systems field was undergoing a 'Kuhnian crisis' as hard systems thinking encountered increasing numbers of situations to which it was not suited, and was increasingly challenged by other approaches (Jackson, 2003, p. 79). Most combinations of approaches in the systems field were then from the perspective of a single paradigm (Jackson, 1997b, p. 348; Jackson, 1999, p. 14). SOSM changed this by categorising practice environments and illustrating that different approaches were suited to different applications (Jackson & Keys, 2003, p. 70). Once "... it became obvious that all systems approaches had their limitations, pursuing pluralism started to look attractive" (Jackson, 1999, p. 12). SOSM legitimised the existence of methodologies from different paradigms by aligning different paradigms with different areas of concern (p. 15), and represented a shift in the systems field from "... the isolationism of earlier periods to the mechanical complementarism stage" (Gregory, 1996, p. 298). Nevertheless, SOSM focuses on choice between approaches, not ways of combining them, and does not distinguish between the different levels in *The Schema* (Jackson, 1997b, p. 350; Jackson, 1999, p. 15). Midgley (1997a, p. 254), however, does suggest that SOSM can be used to gain insight into ways of combining approaches.



However, it is arguable whether the development of guidelines for the combination of methods has "... scarcely got beyond first base" (Jackson, 1997a, p. 218). The challenge for pluralist practice involves the problem of how to combine the most appropriate parts of different approaches and how to do this in some sort of philosophically cohesive manner (Skyrme, 1997, p. 220). So far, the main focus in pluralist development in CST, with SOSM setting the example, has been on the selection between whole approaches, rather than the development of guidelines for their combination (Mingers & Gill, 1997, p. xv; Mingers, 1997b, pp. 407 – 8). Little general advice is provided for practitioners on how to actually combine approaches (Fitzgerald & Howcroft, 1998, p. 322; Mingers, 1997b, p. 414), with most work being descriptive demonstrations of how one particular combination could be made to meet particular objectives (Mingers & Brocklesby, 1997, pp. 495 - 6).

Gregory (2003, p. 128) notes that there are a number of forms of pluralism, all being referred to using the same umbrella term. Amongst the variety of different takes on, and approaches to, pluralism include: complementarism (Jackson, 1997a, p. 207; 1997b, p. 353); pragmatic pluralism (White & Taket, 1997, p. 386); discordant pluralism (Gregory, 2003, p. 124); and multimethodology (Mingers & Brocklesby, 1997; Munro & Mingers, 2002). Despite the variation, general consistencies can be seen within the field of CST. The CST perspective can be seen as based on the "... argument that we live in a complex world and that we cannot try to impose neat categories without accepting the complexities..." and that "... the challenges of everyday life can be confined to neat parameters" (McIntyre, 2004, pp. 40 - 1). The central commitments of CST are often cited as being critical awareness, emancipation, and methodological pluralism (Midgley, 2003c, p. 108; Cao, Clarke et al, 1999, p. 209; Flood & Jackson, 1991c, p. 2). Expanded lists include critical awareness, social awareness, methodological pluralism, theoretical pluralism, and a dedication to human emancipation (Mingers, 1997a, p. 5; Jackson, 2003, pp. 77 – 8). Even though this particular research is predominantly concerned with theoretical and methodological pluralism, it is worthwhile pausing briefly to examine the CST perspectives on critical awareness and emancipation, as a way of contextualising developments within CST.

## **Critical Awareness**

Critical awareness can be defined as the process of examining the assumptions that we take for granted and the conditions that produce them (Midgley, 2003c, p. 108; Midgley, Munlo et al, 1998, p. 467). It involves thinking critically at both the theoretical and practical levels (Gao, Li et al, 2003, p. 4), and reflecting on the relationships between "... organisational and societal interests and the dominance of different systems theories and methodologies" (Flood & Jackson, 1991c, p. 2). In the context of pluralism, critical awareness involves understanding the strengths, weaknesses and theoretical basis of approaches (Jackson, 1997a, p. 213), something which can be likened to the "... practice of critically exploring boundaries ..." (Midgley, 1997a, p. 284). Such awareness is not regularly achieved, as many people do not actively articulate or reflect upon the methodological decisions they make (Munro & Mingers, 2002, p. 378). One of the major advantages is that active critical awareness can stop a practitioner from becoming "... trapped within a limited range of conceptual possibilities" (Brocklesby, 1997, p. 192). A degree of cognitive closure is expected in choosing to work with certain assumptions and not others. "In itself, the cognitive closure of a paradigm is not necessarily a major issue. It is only when the agent fails to recognise this closure that it becomes a matter of concern" (p. 198). To Gregory (2003, pp. 125 – 6), one way of developing a critical awareness is by juxtaposing the perspectives of differing approaches, allowing for learning to occur through the continued distinctiveness of the different approaches. In this research, critical reflection upon the use of different approaches, and my influence as a practitioner and researcher on findings and results is managed through explicit awareness of the hermeneutic circle of interpretation, as discussed in Chapter 3.

## **Emancipation**

The commitment to emancipation in the CST literature often emphasises awareness of the influence of power in problem situations (Flood & Jackson, 1991c, p. 2), "... raising the quality of work and life ..." for participants (Jackson, 2003, p. 85) and "... 'liberating' individuals from subjugation" (Jackson, 1997a, p. 212). This can also simply be taken as a commitment to improvements in a problem situation, defined temporally and locally, taking issues of power into account (Midgley, 1997a, p. 249; Midgley, Munlo et al,

1998, p. 467; Midgley, 2003c, p. 108). The early commitment to emancipation in CST found support in Ulrich's (1983) Critical Systems Heuristics (CSH) and Habermas' (1971) theory of Knowledge Constitutive Interests (KCI), both of which can "... be identified with the need to buttress pluralism" (Jackson, 1997b, p. 359). "Emancipation is one of the three cognitive interests in Habermas's theory" (Gao, Li et al, 2003, p. 4). Reliance on these of Habermas' theories brought with it a sense that operating within a CST framework "... was intrinsically linked to an emancipatory orientation" (Spaul, 1997, p. 324).

However, the significance of the emancipatory commitment is somewhat in dispute, with some authors taking issue with the "... rhetoric about equalizing the balance of power in a situation and removing structures of domination ..." (Checkland, 2002, p. 104) present in some of the CST literature. Flood and Jackson, early contributors to CST, "... only make very general comments on the commitment to emancipation ..." (Midgley, 2003c, p. 113). "Sensible statements about what is meant by this commitment are, however, few and far between" (Jackson, 1997a, p. 215). Other authors sidestep engagement with the issue of emancipation, acknowledging the importance of the social and political context, but provide discussion that "... does not presuppose a particular stance on it" (Mingers & Brocklesby, 1997, p. 508). Mingers (1997b, p. 415) goes so far as to question whether all critical systems thinkers have to be committed to emancipation in order to be considered as critical systems thinkers. According to Jackson (1999, p. 18) emancipation and pluralism do not have to be linked. "I have every sympathy with those who wish to maintain the emancipatory option by privileging radical paradigms, but this is not the job of pluralism."

In so far as this research has used Action Research to seek local and temporal improvement using Embedding as the basis for the combination of PM and SSM in the project, this research can be said to align with the CST commitment to emancipation. Nevertheless, this research primarily draws upon the CST literature for insight into pluralist strategies for the combination of different approaches in practice.

## **Strategies and frameworks for combining approaches**

Awareness that no single approach is appropriate for all contexts has led to the development of strategies and frameworks for combining approaches (Nicholls, et al, 2001, p. xiii), a variety of which have been developed in the CST literature. For instance, Mingers and Brocklesby (1997, p. 489) provide a "... framework that can attend to the relative strengths of different methodologies and provide a basis for constructing multimethodology designs." White and Taket (1997) suggest a mix and match strategy called 'pragmatic pluralism', based on a process of "... continuous critical reflection on the part of the multimethodologist" (p. 401). Midgley (1997a, p. 261) also takes an emergent perspective on methodology combination, focusing on the 'creative design of methods', a process which "... involves understanding the problem situation in terms of a series of systemically interrelated research questions, each of which might need to be addressed using a different method, or part of a method." Schwaninger (1997) provides an approach for the integration of objectivist and subjectivist frameworks. Multiview (Avison & Wood-Harper, 1990), an information systems methodology which combines hard and soft ideas, is also worthy of note. Jackson (1999, p. 13) identifies Multiview as the "... longest running attempt to bring together soft and hard approaches to information systems development." However, it is not the place of this thesis to review all contributions to pluralism in the CST literature in detail. Concepts and alternative frameworks for pluralism that have influenced action taken in this research and the subsequent analysis will be discussed, before the specific model for combining approaches used in this research is examined.

### **Reed's four strategies**

Reed (1985, p. 174) developed four strategies for combining approaches in the context of organisational studies: isolationism; pragmatism; imperialism; and pluralism. These concepts have since been adopted by the CST literature as possible tactics for its development (Jackson, 1999), or as strategies for resolving the debate between the hard and soft camps (Fitzgerald and Howcroft, 1998, p. 313). These concepts are examined as aids to discussing the implications of different models to combining approaches.

An isolationist approach involves operating from within a single paradigm, opting for paradigm closure by ignoring the possibilities inherent in other paradigms (Fitzgerald & Howcroft, 1998, p. 321). Isolationists see their own approaches to problems as self sufficient, believing that there is little, or nothing, to learn from the other paradigms, which may not appear to them as useful or even sensible (Jackson, 1999, p. 13). It has been found that isolationism is common (Cao, Clarke et al, 1999, p. 205), with isolationism being particularly popular in organisational cybernetics and traditional management science (Jackson, 1997b, p. 351). However, "... isolationism undermines one of the central tenets of systems thinking: that it is possible to transcend the fragmentation of disciplinary boundaries" (Midgley, 1996, p. 26).

The isolationist strategy can be linked to the belief that the different paradigms are irretrievably incommensurable (Flood & Romm, 1996, p. 87). "The isolationist argument has perhaps been advanced most notably by Burrell and Morgan (1979) ..." in their portrayal of different research approaches as mutually exclusive and characterised by disinterested hostility (Fitzgerald & Howcroft, 1998, p. 321). Thus, Burrell and Morgan's (1979, p. 22) framework of four paradigms for the analysis of social theory (See Figure 16 - Chapter 2), although useful as an explanatory framework, should be understood as identifying the differences between paradigms, emphasising their incommensurability, instead of addressing possibilities for reconciliation or cooperation between paradigms. SSM is an example of a methodology that has been identified as having an "... isolationist stance" (Mingers, 2000a, p. 747). Despite its apparent popularity in practice, isolationism offers little by the way of insight into tactics for mixing methods and methodologies and therefore this discussion shall move on to pragmatism.

Amongst those who actively mix approaches, pragmatism is possibly the most prevalent of the four identified strategies. The pragmatist approach is to bring together the most effective parts of different approaches based solely on what works in practice, without worrying about "... 'artificial' theoretical distinctions ..." (Jackson, 1999, p. 14). In many cases, consultants and management scientists would prefer to focus on the pragmatic concerns of a situation (Brocklesby, 1997, p. 192), claiming that multiparadigm issues can be effectively dealt with "... in an ad hoc or intuitive manner ..." (p. 203), instead of being distracted by "... theoretical niceties ..." (Jackson, 1999, p. 13). Due to this

unawareness of, or lack of concern for, paradigmatic grounding, consultants often "... happily mix methods with apparently conflicting philosophical underpinnings ..." (Ormerod, 1997b, p. 416). An academic's luxury of reflection on paradigms and methodological preferences is not necessarily available to practitioners, who have to be methodologically versatile (Brocklesby, 1997, p. 203). In addition, few practitioners feel at home with theoretical considerations (Ormerod, 1997b, p. 421), making pragmatism a popular, if tacit, choice.

The attitude to the combination of approaches within the PM literature could best be described as pragmatist, demonstrated by an emphasis on practical efficacy and general lack of emphasis on paradigmatic or theoretical grounding. However, the pragmatist position is not popular within the systems community. Combining methods together without regard for theory has been called "... superficial and perilous" (Lane & Oliva, 1998, p. 216). "Pragmatism appears as a form of philistinism which disavows any explanation for action other than the most direct terms of the problem at hand ..." (Spaul, 1997, p. 327). Furthermore, pragmatism does not support the development of systems thinking as a field (Jackson, 1997b, p. 352), as theory is necessary in developing an understanding of why particular methods work in some situations and not in others (Jackson, 1999, p. 14; Midgley, 1997a, p. 251). Furthermore, theory provides a common language which can bridge disciplines and application areas, without which it can be difficult to pass on learning and experience to others (Midgley, 1997a, p. 251). This sentiment can be related to the sentiment expressed by Checkland and Holwell (1998a, p. 23) regarding the role of intellectual frameworks in methodological learning, as discussed in Chapter 3.

Much like pragmatists, imperialists are willing to combine approaches from apparently conflicting paradigms. However, unlike pragmatism, which demonstrates no commitment to any particular paradigm, imperialism represents a fundamental commitment to one particular paradigm, but a willingness to incorporate methods and techniques from other paradigms, if they can be of benefit to the favoured paradigm (Gregory, 2003, p. 125; Jackson, 1997b, p. 351), and do not directly contradict the central assumptions of the favoured paradigm (Jackson, 1999, p. 14). Imperialism provides scope for the development of the capability of particular paradigms, and Gregory (2003, p. 131) identifies that SOSM has encouraged an imperialist perspective

in the systems community. However, imperialism has critics within the CST literature. Imperialism is identified as ultimately failing because of the lack of a general translation scheme for the reduction of arbitrary discourses (Spaul, 1997, p. 327), and as denaturing approaches that are coopted to a different paradigm, thus preventing realisation of the approaches' full potential (Jackson, 1999, p. 13; Jackson, 1997b, p. 352). However, in passing, I question whether approaches used in such a way aren't *renatured*, instead of *denatured*, perhaps delivering a different, but nevertheless effective potential.

Imperialists can also explain the very existence of other approaches in terms of their own. Strong tendencies for imperialism have been identified in organisational cybernetics, critical systems thinking and soft systems thinking (Jackson, 1997b, pp. 351 - 2). SSM has also been used as an example of an imperialist approach, with Checkland regarding "... the hard approach simply as a special case of the soft" (Jackson, 1999, p. 14). This kind of belief is apparent in the following quote from *Soft Systems Methodology in Action*:

"SSM is a systemic process of enquiry which also happens to make use of systems models. It thus subsumes the hard approach, which is a special case of it, one arising when there is a logical agreement on some system to be engineered." (Checkland & Scholes, 1990, p. 25).

Of Reed's (1985) four strategies, pluralism is the favoured strategy within the CST literature, and "... there are several forms of extant pluralism ..." (Gregory, 1996, p. 58) within the CST literature. As briefly discussed above, pluralism is the "... use of different methodologies, methods and/or techniques in combination..." (Jackson, 1997b, p. 347). However, a pluralist approach is then differentiated from an imperialist approach in that no one paradigm is assumed to be granted hegemony over an intervention. Like pragmatism, pluralism allows for "... a contingent toolbox approach where different methods with complementary strengths could be used ..." (Fitzgerald & Howcroft, 1998, p. 321) to suit the needs of an intervention. Similarly, Ragsdell (1998, p. 510) comments that complementarity "...suggests that no particular strategy is superior, but more or less appropriate for the situation at hand." Approaches are combined in such a way that they can be adapted to the variety of management problems that arise (Fitzgerald & Howcroft, 1998, p. 352; Jackson, 1999, p. 14). However, this does not mean that 'anything goes', that pluralism is atheoretical

(Midgley, 1996, p. 25), or that approaches are purely picked pragmatically to suit the situation, while "... compromising the idiosyncratic observations and principles" (Gao, Li et al, 2003, p. 5). Instead, pluralists view different approaches and paradigms as complementary, and make explicit use of theory to identify the strengths and weaknesses of different approaches, and the questions to which they are suited (Midgley, 1996, p. 25). Pluralism can then be thought of as extending through theory to practice: in epistemology, by acknowledging different ways of knowing the world; in ontology, by recognising different types of objects and relations; and in axiology, in recognising different ways of guiding action (Mingers, 2003a, p. 561). In Figure 59, below, Midgley (2000, p. 172) depicts the relationship between isolationist and pluralist methodologies, showing how the isolationist methodologies can be used to inform the pluralist methodology, giving access to greater variety of approaches.

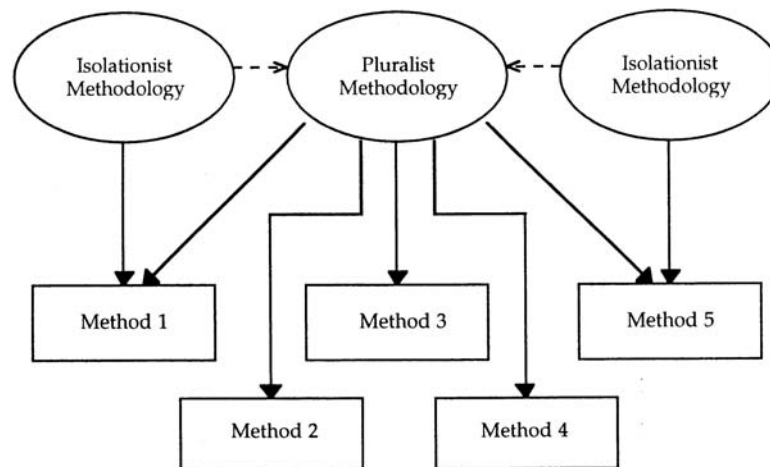


Figure 59: The relationship of a pluralist methodology to isolationist methodologies and a variety of methods (Midgley, 2000, p. 172)

### **The oblique use of methods**

As discussed above, the connection between paradigm or methodology and the "... methods, tools and techniques usually associated with it, need not be a close one" (Jackson, 1999, p. 17). Furthermore "... there are no compelling reasons why an agent should not apply techniques and tools in the service of different philosophical principles or in isolation of the theories that spawned them" (Brocklesby, 1997, p. 193).



Approaches can be detached from their original paradigms and used, critically and consciously, to support different forms of logic (Midgley, 1997a, p. 272; Mingers & Brocklesby, 1997, p. 498; Mingers, 1997a, p. 14). Flood and Romm (1997) refer to this practice as the 'oblique use' of a method.

One approach to using methods and techniques divorced from their parent methodology is by first formally decomposing the methodology (See Figure 60). Mingers (1997b, p. 434) suggests a systematic approach to decomposition, based on the distinctions "... between philosophical principles (why), methodological stages (what), and techniques (how) ..." for the purposes of identifying detachable elements, their functions and their purposes. Ormerod (1997b) emphasises combining approaches based on the transformational potential of methodological stages, methods, tools and techniques. He argues that "... the transformational potential of a method is more important than its theoretical underpinnings, that the practical constraints are more important than issues of incommensurability ..." (p. 433).

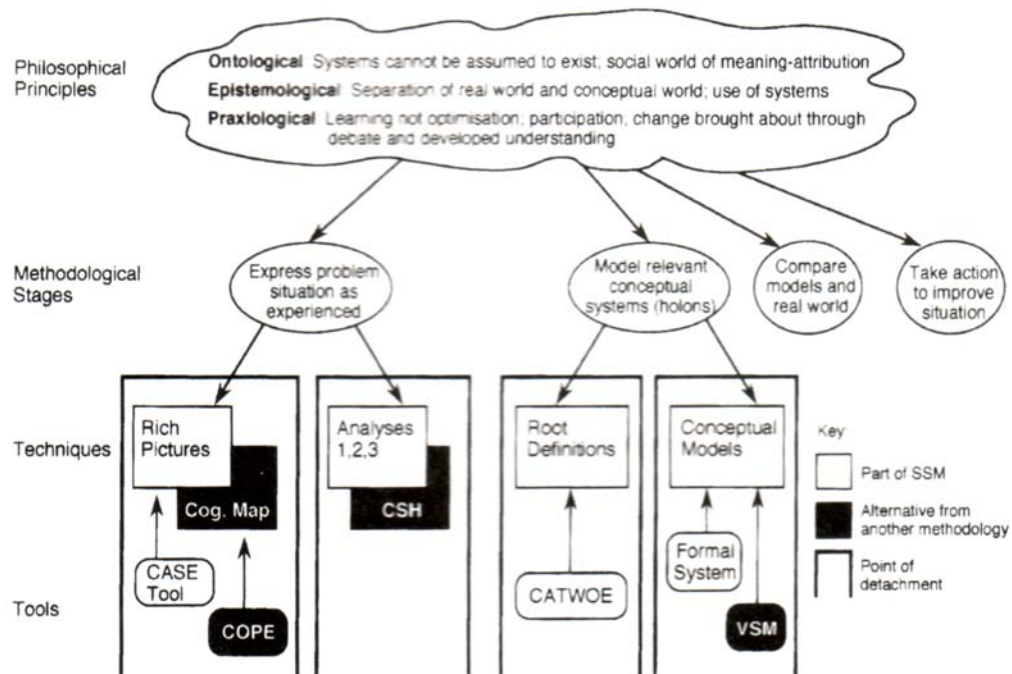


Figure 60: Decomposition of SSM to show possible disconnection of techniques (Mingers, 1997b, p. 435)

Techniques or whole methodological stages are often detached from a methodology (Mingers & Brocklesby, 1997, p. 505), usually then being put to the service of a different methodology from the same paradigm (p. 499). However, crossing paradigm borders is also possible, for instance a positivist tool might be incorporated into an interpretivist study (McQuinn, 2002, p. 385). Otherwise, an interpretivist technique could be used in a non-participative manner, with the assumption that it describes the real world. Callo and Packham (1999, p. 314) note that it is possible to use aspects of SSM "... underpinned by 'multiple paradigms' ...", while Mingers and Brocklesby (1997, p. 505) identify that the SSM technique of creating Root Definitions could be used as the basis for a positivist approach to designing real-world systems, while in a survey by Mingers and Taylor (1992, pp. 326 – 7) it was found that practitioners regularly added techniques to SSM, most commonly at the Rich Picture stage, for developing an in depth understanding of a problem situation.

The main problem with oblique practice has to do with legitimacy (Mingers, 1997a, p. 8) due to resulting changes in context and interpretation when a technique is moved between methodologies or paradigms (Mingers, 1997b, p. 434), requiring a new understanding of the inputs and outputs of an approach used obliquely (Mingers & Brocklesby, 1997, p. 505), and the new epistemological ramifications which may be associated with any paradigm change. Oblique use does not guarantee failure. However, "... it signals the loss of the intellectual coherence which was originally offered by the separate approaches and which one might well prize ..." (Lane & Oliva, 1998, p. 216).

### **Total Systems Intervention**

Another significant development from the systems field which has informed the way that that action taken in this research project has been analysed is Total Systems Intervention (TSI), a methodology originally developed by Flood and Jackson (1991a; 1991b) to govern pluralist practice. SOSM is at the heart of TSI (Gregory, 1996, p. 299). The development of TSI partly abated the search for an all encompassing systems methodology (Flood, 2000a, p. 10), and served to legitimate the practice of "... using methodologies adhering to different paradigms in the same intervention on the same problem situation" (Jackson, 1997b, p. 354), a significant development on that provided by SOSM. Facilitated by the incorporation of SOSM and metaphors based around

Morgan's (1986) *Images of Organization*, the process of using TSI can be summarised as iterative cycle between three stages: creativity; choice; and implementation (See Figure 61). To Midgley (1997a, p. 270), a significant contribution of TSI can be seen in its recursive nature, emphasising the need to assess and reassess both the situation and one's approach to it.

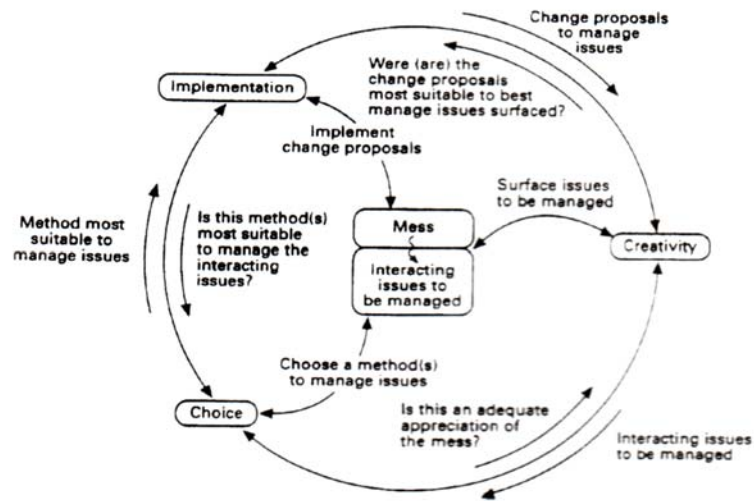


Figure 61: The process of TSI (Midgley, 1997a, p.271)

Although I have not significantly drawn upon the methodology or process of TSI, the way in which imperialism and obliqueness are addressed in TSI has proved particularly illuminating. TSI still focuses on the "... use of 'whole' methodologies ..." (Jackson, 1997b, p. 355), instead of using parts of methodologies, but does provide a process by which methodologies can be used obliquely. Imperialism becomes something that is consciously chosen, instead of following on from unquestioned assumptions. "One methodology, encapsulating the presuppositions of a particular paradigm, is granted 'imperialistic' status – but only temporarily; its dominance is kept under continual review" (Jackson, 1999, p. 16). Other approaches are given a secondary status and operated under the guidance of the temporarily dominant paradigm. The imperialist status of the dominant methodology is regularly reviewed in relation to the needs of the intervention at that particular time. If the needs of the intervention change, then a different set of assumptions may be seen as more appropriate to the situation. In this case, the approach that is given imperialist status, and the dominant paradigm, can change, thus providing a new epistemological framework for the intervention. The

imperialist status and the dominant / secondary relationship between approaches changes in relation to which paradigm is held as dominant at a particular time. Imperialist status, oblique use, and the dominant / secondary relationship become aspects of an intervention that can be changed on a regular basis to meet different needs.

Regarding the initial paradigmatic dominance, Jackson (1997b, p. 374) has found that interventions tend to proceed most smoothly when an interpretive methodology, instead of a functionalist or critical methodology, is chosen as the dominant methodology at the start of an intervention. Interpretive methodologies involve participants, provide a sense of ownership of the intervention, and "... ensure implementation in a wider range of cases than expert-driven approaches resting on functionalism." Through practice, Ormerod (1999, p. 19) has found something similar, that "... adopting an overall 'soft' approach may be more important than the particular techniques used." Mingers (1995, p. 45) has found that "SSM has important advantages over hard methodologies for controlling the entire project process." For Checkland and Holwell (1998a, p. 158), using SSM allows the practitioner to adopt a more "... roomy intellectual stance ...", allowing the more confining assumptions of hard approaches to be applied and adopted when appropriate. There is, then, a strong case for always choosing an interpretive approach, such as SSM, as the initial dominant methodology (Jackson, 1999, p. 20).

### **Grafting and Embedding**

Developed within in the field of information systems development, Miles (1988) presents two different ways that SSM and information system approaches can be combined: Grafting; and Embedding. These are "... two distinctly different methodological arrangements through which 'hard' and 'soft' systems principles ..." (Miles, 1988, p. 55) can be combined. The difference between these two approaches emphasised in this research is on a serial versus a parallel combination of approaches, respectively. Grafting and Embedding offer the potential to be applicable to the combination of other hard and soft methodologies in other contexts, and have been recognised by a variety of authors (e.g. Rose & Meldrum, 1999, p. 3; Mathiassen & Nielsen, 2000, p. 244; Zhu, 2000, p. 187; Holwell, 2000, p. 790; Rose, 2002, p. 250; Avison, Eardley et al, 1998 p. 455; Calway, 2000, p. 123; Champion & Stowell, 2002, p. 273; Stowell & Champion, 2003, p. 6; Oura & Kijima, 2002, p. 79). However,

despite the recognition that these authors give to the value of the distinction between Grafting and Embedding, or Miles' work in general, few make more than passing mention to these different forms of pluralist practice.

## Grafting

Grafting involves attaching a soft approach onto a more traditional, hard practice, allowing for a process of transforming a situation typified by social complexity into a simpler problem to which hard approaches can be applied (Miles, 1988, p. 56), a way of combining approaches which is also called 'front-ending' (Rose, 1997, p. 264). Grafting can be a way of adding a soft feasibility study to an otherwise hard practice (See Figure 62). Grafting involves using an approach such as SSM to clarify a situation, before it gives way to a hard methodology, which can then be used to realise the defined system (Gammack, 1995, p. 162). Grafting can then be thought of as a sequential, or serial, way to combine approaches, where a soft approach is used for goal definition before a hard approach is used to deliver to the now defined goals.

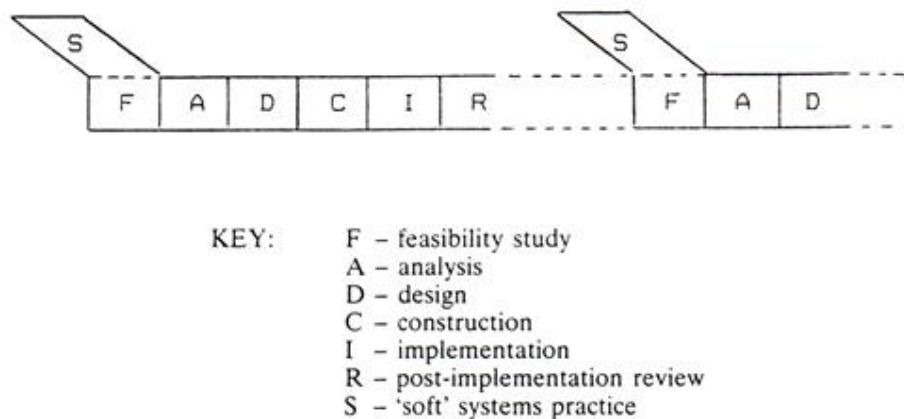


Figure 62: The Grafting approach in outline (Miles, 1998, p. 56)

Although not always referred to as 'Grafting', a variety of authors acknowledge the potential for a sequential movement from soft to hard approaches in an intervention (e.g. Zhu, 2000, p. 199; Midgley, Gu et al, 2000, p.72). Patton (1990, p. 46) identifies a similar tendency for a flow in research from inductive approaches to deductive hypothesis testing, while Kaplan and Duchon (1988, pp. 574 – 5) note a tendency for research to flow from qualitative to quantitative techniques. Fitzgerald and Howcroft

(1998, p. 322) identify much the same tendency, with the caution that this is "... a bit simplistic as it precludes the possibility of research endeavours which are both 'hard' and exploratory or 'soft' and confirmatory." Grafting and the general tendency for the reduction of soft to hard problems also occurs within the project management literature. In the case of projects where neither the goals nor the methods to achieve them are well defined, Turner and Cochrane (1993) suggest the use of appropriate implementation techniques to reduce ambiguity before implementation of the solution commences.

A number of issues regarding the use of Grafting have been identified. To Page (1998, p. 5), Grafting constrains the use of SSM, while to Jackson (1997a, p. 219) Grafting may distort both the soft and hard approaches used, as the soft approaches will be used in the expectation that they will supply one particular kind of result, while the hard approaches "... are operating in an hermeneutic climate and are front-ended by a soft logic." Zhu (2000, p. 199) notes that many criticisms of a movement from soft to hard approaches in a single intervention concern "... the feasibility and practicality of the perceived 'paradigm shift' ..." For instance, Ormerod (1997a, p. 52) questions whether a single person could do justice to, and effectively switch between, both the hard and soft paradigms in a Grafting intervention, or how learning could be transferred between the front and end sections of a Grafting intervention if the different sections are managed by experts in the different paradigms. Miles (1988, p. 56) also notes that Grafting is "... systematic by nature and, therefore, it falls short of a paradigm shift to 'soft' systems thinking ...", which, in other words, would make Grafting an imperialist approach, governed by the hard paradigm.

When Grafting is viewed as a general serial combination of hard and soft approaches, rather than the specific combination of SSM and IS approaches, a variety of examples can be found in the literature (e.g. Neal, 1995; Lai, 2000). Multiview (Avison & Wood-Harper, 1990) could be classified as a Grafting as approach to combining hard and soft ideas. McLucas (2001) uses AR to explore an approach to combining qualitative and quantitative Systems Dynamics techniques for 'wicked' problems that is similar to Grafting. Ormerod's (1997a) Transformational approach to mixing methods also bears similarities to Grafting, in that different methods are pieced together in a linear sequence, with each stage designed to take a specific input and supply a specific output to an intervention as a whole. Ormerod (1995a; 1996; 1999) provides an illustrative

selection of cases which are similar to Grafting. In Ormerod (1995a) different approaches were used in different phases of the project to carry out different kinds of tasks in a sequential manner. Combining approaches, but leaving them in different project phases, allowed for the approaches to be "... interfaced without the need for a more demanding integration ... there were practical but not theoretical links" (p. 289). Similar approaches were used in the other two case studies (1996; 1999). However, the insight regarding Grafting and Embedding that can be gleaned from Ormerod's case studies is limited by Ormerod mainly combining approaches from within the soft paradigm. "Many of the theories and principles underlying the different approaches were similar" (Ormerod, 1995a, p. 289). In these cases Ormerod does not combine approaches from other paradigms in more than a supplementary way, at the level of enriching tools or techniques.

### **Embedding**

Unlike grafting, where different approaches are used sequentially within an intervention, as if they were separate stages in a single method, Embedding involves using hard and soft approaches in parallel (Taylor, Moynihan et al, 1998, p. 432). This approach involves "... two interrelated levels of methodological operation; 'hard' methods are deployed at one level, but in a subordinated manner to operations at a metalevel ..." (Miles, 1988, p. 57), where iterations of a soft approach can take place (See Figure 63). Hard systems practice becomes embedded in a soft systemic framework (Miles, 1988, p. 59). The central shift between Grafting and Embedding is in the paradigm that guides the intervention. In Grafting, a soft approach is used in order to change the situation to one that allows a hard approach to be used. By contrast, the "... main thrust of the embedding approach is to seek improvements ... using a soft systems approach" (Miles, 1992, p. 62). The soft approach provides the philosophical framework for the intervention, with other tools and techniques embedded in it, or subsumed by it (Miles, 1988, p. 98; Gammack, 1995, p. 162; Ormerod, 1995b, p. 88). This can be seen as a change in imperialist status. This change in imperialist status illustrates how operating from within a different paradigm can produce models for action which are not simply structurally, but qualitatively, different, illustrated by comparison of Figures 62 and 63. In Grafting, an ill structured problem is reduced to a hard one, with the former being treated as a special case of the latter. In Embedding, the hard approach becomes a

special case of the soft (Miles, 1988, p. 56). Hard approaches are then applied when they are considered appropriate (Mingers, 1995, p. 29), such as when goals momentarily clarify or significant measurable variables are identified. Understanding grafting and embedding in this way clarifies and develops Checkland and Scholes' (1990, p. 25) argument that the hard is a special case of the soft.

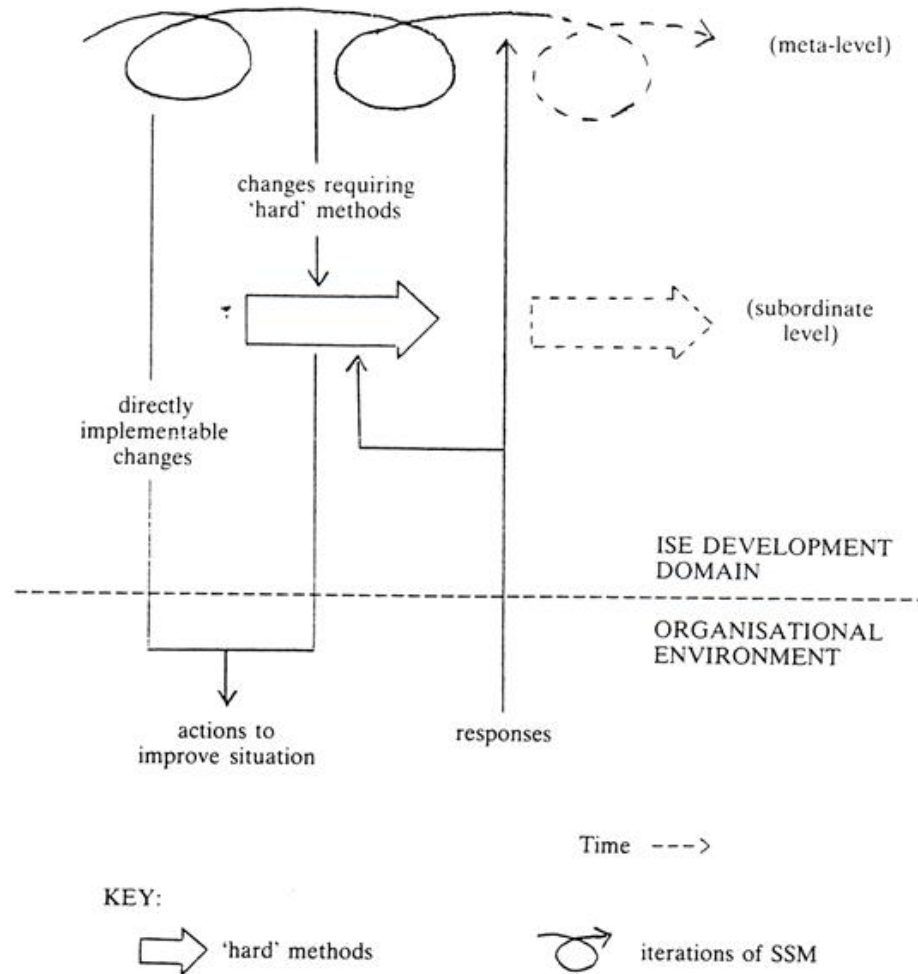


Figure 63: An outline of the Embedding approach (Miles, 1998, p. 58)

An Embedding approach acknowledges that it can be beneficial to continue to explore and learn about a problem situation throughout an intervention, instead of solely in a feasibility study or post implementation review. In Embedding, a soft approach, such as SSM, is used to continuously explore and learn about the problem situation (Miles, 1988, p. 57), while a hard approach, such as PM as in this research, or an information systems development method as in Miles' example, is used to facilitate implementation



of the improvements to the situation or delivery of the product. Embedding provides important advantages, such as engendering "... a sustained collaborative relationship ..." between participants and enabling "... the investigative thrust of a 'soft' systems approach to be operated whenever and for as long as its users deem it profitable to do so ..." (Miles, 1988, p. 59). Unlike the grafting approach, embedding is conducive to sustained collaboration (pp. 58 - 9), instead of ending the focus on collaboration with the transfer from soft to hard approaches. Ormerod (1997a, p. 50) also notes the potential for Embedding to promote learning in the latter stages of a project. Concerns such as the practitioner's ability to swap between paradigms and transfer knowledge between paradigms "... seem to be better addressed when hard analysis or models are embedded in a soft approach" (p. 52). In the context of strategic management, Olsen and Haslett (2002, p. 449) challenge the efficacy of approaches which are a 'one-off' or discrete, in favour of a one "... which links strategic planning, implementation, and measurement in a continuous cyclic process." This position can be seen as potentially supporting use of the Embedding model where SSM is used continuously within the intervention, instead of the Grafting model, where SSM is used for definition purposes only at the start of the intervention.

Most cases of pluralism that I identified in the CST literature involving approaches from the hard and soft paradigms could be classified as examples of Grafting, involving a sequential combination of approaches and a movement from soft to hard. With the notable exception of Ormerod (1995b) who reviews one case of Embedding, there are very few cases that can be identified as examples of Embedding. However, Oura and Kijima (2002, p. 80) do provide an example which bears some similarities to Embedding. One reason for the lack of examination of practical applications of Embedding is that Grafting has been identified as the simpler model for combining hard and soft approaches (Miles, 1988, p. 59; Taylor, Moynihan et al, 1998, p. 432). Mingers (1995, p. 44) also questions whether Embedding is really a viable model, "... given the preponderance of hard methods already in use ..." and the tendency for most analysts to have a background in, or bias towards, technology and technical issues. It has been predicted that in time, because of the benefits that Embedding can provide that Grafting cannot, "... grafting is likely to give way to embedding ..." (Ormerod, 1995b, p. 98). However, there has been little evidence in the literature over the last decade to indicate that this is becoming the case.

Authors in the systems and information systems fields that refer to Miles' work tend to refer to one of two articles, one published in 1988, and the other in 1992. A difference in emphasis can be seen between these articles. Miles (1988) predominantly focuses at a general methodological level, providing broad models for Grafting and Embedding. Miles (1992) develops the concepts of Grafting and Embedding further, with an increased emphasis at the levels of method, technique and on ways of combining specific stages of the SSM seven stage model with stages of an information systems development life cycle, with particular focus on information systems modelling techniques.

Although there was some emphasis in Miles (1988) on the relationship between SSM and information system modelling (Beroggi, 2001, p. 339), the focus shifts, and the transformation of SSM conceptual models into information systems models such as Data Flow Diagrams (DFD) becomes an "... issue central to the current debate ..." (Miles, 1992, p. 62). The distinction between Grafting and Embedding in Miles (1992) is the treatment of data in conceptual models (Ormerod, 1995b, p. 98). In Grafting, an activity model is used as the output of SSM, which is used as the basis for traditional information systems methods (Mingers, 1995, p. 29), while in Embedding, two new kinds of model, conceptual flow and data models, are added to the SSM conceptual modelling stage (see Figure 64). "Miles does not explain in any detail how these are produced" (p. 36). To Miles (1992, p. 64) the epistemological differences between the paradigms can lead directly to a clash of model types. However, the problems in using models based in different paradigms is apparently only an issue for the Grafting approach, while it "... is a matter that simply does not arise in the embedding approach" (p. 62), perhaps because of the two new modelling stages present in Miles (1992). This point is not further clarified by Miles. However, this seems to change the focus of Embedding from the earlier conception, making Embedding more like an information systems extension to SSM, than a model for running hard and soft approaches in parallel.

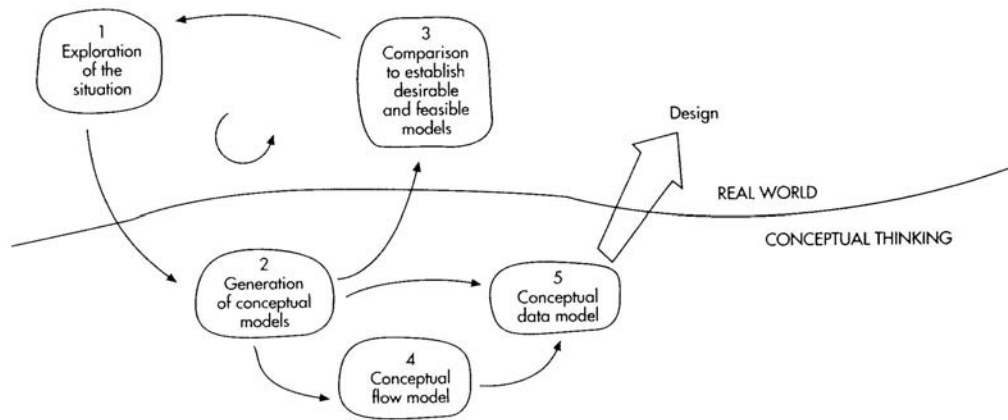


Figure 64: Miles' 1992 Embedding model (Mingers, 1995, p. 35)

Miles (1988) emphasises different models for combining hard and soft approaches and what may be referred to as a shift in imperialism. Miles (1992) makes the models for Grafting and Embedding more information systems development specific, emphasising the implications for data modelling. By contrast, in the brief case study of Embedding provided by Ormerod (1995b, p. 98) SSM is applied in combination with other techniques in a way which is identified as Embedding, but where data modelling was not of central concern, especially when compared to issues such as business objectives, operational feasibility and delivery of benefits. "The availability and cost of data were important considerations, of course, but relatively simple compared to the management issues." In this case, the epistemology of SSM was used to guide the intervention. The focus in the intervention seems to have been less on a meticulous use of techniques, and more on their select application to "... draw out the benefits of potential functions of the system" (p. 98). Ormerod's application of Embedding is more reminiscent of a reading of Miles (1988) than Miles (1992). Following Ormerod (1995b) and Miles (1988) my research emphasises the difference between the serial and parallel natures of Grafting and Embedding, instead of the implications for the epistemological legitimacy of modelling techniques.

Miles' 1988 conceptualisation of Grafting and Embedding, being at a more general methodological level and less information systems specific is also more transferable to the combination of other hard and soft approaches, such as PM and SSM. Strong similarities can be seen between a project management life cycle and the information systems development life cycle that Miles (1988, p. 56) uses as in his Grafting example (See Figure 39 – Chapter 5). This also supports the suggestion that Embedding could be appropriate for a combination of PM and SSM. Some evidence of the need to change between parallel levels of analysis, such as a learning and exploration focus or a task or goal focus, can already be seen in the PM literature. For instance, Embedding can be related to a perspective that Turner (1999, p. 269) discusses in regard to projects where neither the goals nor the methods to achieve them are well defined:

"The project manager must now take the role of an eagle. He or she must be able to hover above the project and see how it fits into the overall context of the organization, but also be able to identify small problems (a mouse) and go down and deal with them. They must then be able to rise back above the project again, before going down to deal with another mouse."

In this quote it can be seen that this approach to changing levels, between far-sighted exploration and learning, and pragmatic functionalism, formalised by Miles (1988) as Embedding, is already recognised within the PM literature, even if it is not regularly identified as a legitimate approach to PM. Checkland and Scholes (1990, p. 312) also note that "... the 'project' approach needs to be complemented by a process for continuous rethinking of organizational tasks and processes, together with the rethinking of the enabling information flows." This suggests that an Embedding approach may have benefit to the management of projects in environments where goals and environmental influences can not be stably defined early in the project.

### **The model for pluralism in this research**

Mingers (1997a, p. 7) provides a summary of the different ways in which methodologies and parts of methodologies can be combined, based on the number of methodologies and paradigms involved, on whether the methods are used in the same or different interventions, on whether whole or parts of methodologies are used, and on whether the intervention is governed by one imperialist paradigm or not (See Table 6).

| Name                                  | One/more methodologies | One/more paradigms | Same/different intervention | Whole/part methodology | Imperialist or mixed |
|---------------------------------------|------------------------|--------------------|-----------------------------|------------------------|----------------------|
| Methodological isolationism           | One                    | One                | -                           | -                      | -                    |
| Paradigmatic isolationism             | More                   | One                | Different                   | Whole                  | -                    |
| Methodology combination               | More                   | One                | Same                        | Whole                  | -                    |
| Methodology enhancement               | More                   | One                | Same                        | Part                   | Imperialist          |
| Single paradigm multimethodology      | More                   | One                | Same                        | Part                   | Mixed                |
| Methodology selection                 | More                   | More               | Different                   | Whole                  | -                    |
| Whole methodology management          | More                   | More               | Same                        | Whole                  | -                    |
| Multiparadigm methodology enhancement | More                   | More               | Same                        | Part                   | Imperialist          |
| Multiparadigm multimethodology        | More                   | More               | Same                        | Part                   | Mixed                |

Table 6: Different possibilities for combining methodologies (based on Mingers, 1997a, p. 7)

Using the categorisation system above, the pluralist practice in this research is an example of multiparadigm multimethodology. More than one paradigm and more than one methodology are used in a single intervention. The methodologies, PM and SSM, are not treated as unified wholes, but are instead decomposed, with methods, tools and techniques decomposed from the original methodology, occasionally used obliquely, and recombined to suit pragmatic ends. Neither PM nor SSM is granted sole imperialist status, but rather the imperialist status of the hard and soft paradigms changes to suit the needs of the situation.

PM and SSM are understood to be suited to answering different kinds of questions and meeting different kinds of needs. Similarly, they are based in different paradigms, both of which have the potential to be of benefit to the problem situation. For instance PM is "... typically aimed at addressing the 'How' side ... However, as much of the time projects get stalled because of a factor on the 'What' side ..." (Maranhao, 2002, p. 1). By contrast, root definitions and conceptual models in SSM "... ought to represent 'whats'

rather than 'hows' ..." (Checkland & Tsouvalis, 1997, p. 4). However, the differences in these emphases can be an asset, as in combination PM and SSM should theoretically be able to address the majority of different aspects of a problem situation. I illustrate this by overlaying Figures 32 (Chapter 4) and 52 (Chapter 5), producing a categorisation of the emphases that a combination of PM and SSM could potentially place on a problem situation, based on Mingers (2003a) categorisation system (See Figure 65).

|          | Appreciation<br>of                       | Analysis<br>of                              | Assessment<br>of                                 | Action<br>to                           |
|----------|--|---|--|--|
| Social   | Social practices, power relations        | Distortions, conflicts interests            | Ways of altering existing structures             | Generate empowerment and enlightenment |
| Personal | Individual's beliefs, meanings, emotions | Differing perceptions, personal rationality | Alternative perspectives and constructions       | Generate accommodations and consensus  |
| Material | Physical circumstances                   | Underlying causal structure                 | Alternative physical and structural arrangements | Select and implement best alternatives |

Figure 65: Potential coverage of PM and SSM combined (Extended from Mingers, 2003a)

In the project, the Embedding assumption that the soft paradigm will rule the intervention was not adopted. Rather, I have developed upon the serial versus parallel distinction between Grafting and Embedding, as highlighted earlier in this chapter. Drawing upon insight from the TSI literature, the dominant paradigm has been allowed to change in relation to the needs of the intervention. A model has been adopted where both the hard and soft paradigms have guided the intervention, or provided the overarching intellectual framework for the intervention, at different stages during the project. Both PM and SSM have used simultaneously and continuously, with the obliqueness of PM or SSM being determined by which paradigm was dominant at a particular time (See Figure 66).

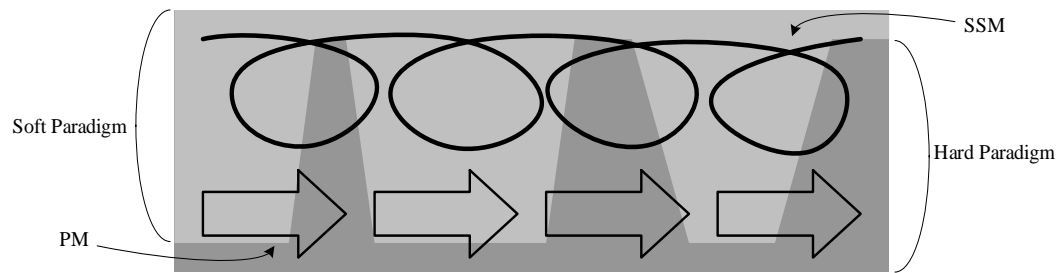


Figure 66: The variant on Embedding used in this research

Building upon the research questions identified in the previous chapters, three more research questions have been identified, which are explored through action taken in the IT / CT Platform Project and reflection on the literature. These questions follow.

- Were difficulties encountered in using tools and techniques obliquely, operated under a paradigm other than that for which they were originally developed?
- Were practical or philosophical problems encountered in combining PM and SSM in such a way that equal emphasis was placed on the hard and soft paradigms in the IT / CT Platform Project?<sup>1</sup>
- Was Embedding effective as a model for combining PM and SSM in the IT / CT Platform Project?

## Conclusion

This chapter reviewed developments in research into pluralism, the practical combination of different approaches, in order to provide an intellectual context for discussion of the specific form of pluralism explored in this research, a variant on Miles (1988) model for Embedding hard and soft methodologies. Starting with an examination of the current popularity of pluralist practice in a variety of fields, it was established that in the PM literature pluralist practice is rarely discussed within the literature at above the level of the application of tools or techniques. Discussion of the personal influence

<sup>1</sup> The possibility of combining paradigms in an equal way may appear naive or impractical to an educated reader, due to inherent issues related to establishing equality, and the assumption that an equal distribution between paradigms would be more beneficial than an unequal balance. Nonetheless, at the start of the project it was my intention to pursue an equal balance between the hard and soft paradigms.

of the practitioner in shaping a pluralist intervention followed, with emphasis on the need for a diverse range of skills and the difficulties faced by practitioners in swapping between the mental frameworks associated with different paradigms.

Paradigmatic incommensurability was identified as a barrier to pluralism that a variety of different fields are attempting to address. Systems responses to this problem were examined, including the adoption of Habermas' theories by some practitioners, and the tendency to try to resolve paradigmatic problems by resorting to a 'meta-level'. This section concluded with the observation that a ready resolution to the paradigm problem may not be available, and that practitioners may have to live with the tension between paradigms if they are to combine them in practice.

It was noted that within the systems field the emphasis was towards creating approaches to manage choice between approaches, with significantly less discussion on the practicalities of combining approaches. Strategies and frameworks for understanding pluralism and combining approaches were then investigated, including Reed's four strategies, TSI, the oblique use of methods and the differences between Grafting and Embedding. Finally, drawing insight from a selection of frameworks for the practical combination of approaches, I have outlined the model for the combination of methodologies from the hard and soft paradigms that has been practically explored in the research project, a variation on Miles (1988) model for Embedding the hard and soft paradigms.



## Part D

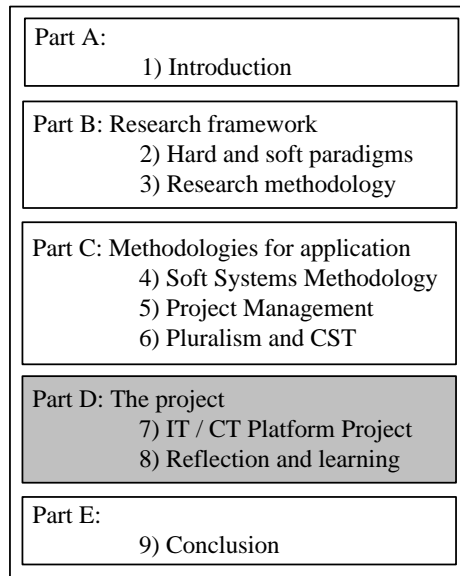


Figure 67: Part D: The project

Part D examines the practical application of the approaches discussed in Part C, and the learning that has been elicited from the project through the research methodology, in relation to the research framework. In Chapter 7 I discuss the IT / CT Platform Project, an IS / IT strategy development project, managed through a combination of SSM and PM, based on the Embedding model for methodological pluralism.

In Chapter 8, I reflect upon actions taken in the IT / CT Platform Project, in relation to the literature. Five research questions have previously been identified as being of relevance to exploration of the research focus. These five questions are used to structure discussion of the project, and twelve learning outcomes are identified.

## **Chapter 7 – The IT / CT Platform Project**

"Successful project management requires that both the elements of SSM and project management strategies are tailored to the work and the people in the host organization" (Checkland, 2000a, p. 803).

### **Introduction**

In this chapter I examine the IT / CT Platform Project, a project that I managed through a combination of PM and SSM, undertaken in an agency within the NSW public sector, the Health Professionals Registration Boards (HPRB). The project was undertaken in response to a general Government emphasis on IS / IT planning and development. Considerable uncertainty existed in the project environment, with the potential to interfere with the objectives of the project and the processes maintained by the organisation as a whole. Changes and risks to the project are examined in this chapter, and I report on the evaluation of the project. In the following chapter, I discuss the learning in relation to PM and SSM that resulted from reflection on the project in relation to the various literatures.

As the researcher is, in effect, the research instrument in interpretive research, a useful place to start discussion of the intervention is with my background. In Chapter 3 I examined the various intellectual frameworks that have contributed to the development of my understanding of this research. These included: hermeneutics; the debate on the hard and soft paradigms; systems concepts; personal biases (See Figure 25 – Chapter 3); and particular interpretations of PM, SSM and pluralism (See Chapters 4, 5 & 6). A brief description of my background will help the reader come to an understanding of my personal biases, and how these have influenced the actions taken in the intervention and their subsequent interpretation.

Prior to the start of this research, I had been working within an ongoing program of research at UTS, contributing to an examination of ways in which PM can be extended through the combination of other, predominantly systems, approaches for the purposes of organisational change (e.g. Crawford & Costello, 2000). Since then, I have contributed to a number of publications (e.g. Costello, Crawford et al, 2002a; Costello,

Crawford et al, 2002b; Crawford, Costello et al, 2003; Crawford & Pollack, 2004) and have received both the New South Wales and National 2003 Australian Institute for Project Management Student Medals for PM research. As such, biases towards certain approaches may be seen, given my previous exposure to management and problem solving approaches, and my desire to build on previous work done at UTS by associated researchers.

### **Organisational and Government context**

The project that I was to manage at the Health Professionals Registration Boards (HPRB) became known as the IT / CT Platform Project, the overall objective of which was: "To provide a strategic framework / operational plan for progressive improvement of HPRB IT / CT" (HPRB, 2002). However, neither the name of the project, nor its objectives, were defined as clearly as this at the start of the intervention. This project formed part of the IS / IT Strategic Development Portfolio: a portfolio of interconnected projects concerned with developing possibilities for further interconnections with other Government initiatives, and a developing variety of options for improving IS / IT support for administrative processes and service delivery. All of these projects initially involved only abstractly defined goals, and a high level of internal and external influences.

HPRB is constituted under the Health Administration Corporation Act 1982. At the time of writing, HPRB was an organisation of approximately 53 full-time equivalent staff, which provides professional, policy, administrative and financial support for nine independent statutory health professionals Boards, which in turn enables the Boards to provide a variety of services associated with the registration of health professionals in New South Wales. HPRB maintained a register of approximately 118,000 registered health professionals within NSW. At the time of this research, the majority of the registration and renewal fees charged by the Boards administered by HPRB were the lowest of any other comparable bodies in Australia, and I understood that the management of the organisation wanted to maintain that record. The Boards themselves provide a service to: people in NSW who require the professional services of a variety of health practitioners; the registrants; Board members and other Committee members; and the Minister for Health and the Department of Health. Thus, a wide range of

stakeholders can be seen to be influenced by any changes to the operation of HPRB and the services that it provides.

At the start of the project, a strong emphasis could be seen on IS / IT development in the NSW Government (e.g., Office of Information Technology, 1997a; Office of Information Technology 1997b; Office of Information Technology, 1997c; NSW Government, 1998; NSW Premier's Department, 2000; NSW Audit Office, 2001a; NSW Audit Office, 2001b; NSW Health, 1999; NSW Health, 2000a; NSW Health, 2001a; NSW Health, 2001b). Strategies were being developed that were to "... position New South Wales Government as a global leader in the use of information technology" (NSW Government, 1998, p. 2). In 1997 it was identified that the NSW public sector was spending "... about \$600 million each year on IM&T [Information Management and Technology]" (Office of Information Technology, 1997a, p. 3 – contents of brackets added). This was apparently increasing, as it was estimated that \$750 million would be spent on IT within NSW in 1999 – 2000 (NSW Audit Office, 2001b, p. 58). There was also a strong emphasis on IS / IT investment as a way of saving money through shared provision of services, including IS / IT services (e.g., NSW Premier's Department, 2001a; 2002a; NSW Premier's Department, 2002b; Office of Information Technology, 2002a). This emphasis on the use of shared services increased throughout the life of the project.

The need to effectively plan IS and IT development was consistently recognised across Government. It was recommended that agencies enhance directions, accountability and and "... articulate a clear and comprehensive plan" (NSW Audit Office, 2001b, p. 11). NSW Health identified the need to develop strategic plans for IS and technology infrastructure (NSW Health, 2001a, p. 1), while in 2002 the need for agencies to plan IS / IT development at the strategic level was formalised by the NSW Premier's Department, stating that agencies "... are required to update and review their Information Management and Technology Strategic directions ..." (NSW Premier's Department, 2002, p. 1). Adequate plans were to take appropriate account of project and risk management, as "... experience suggests a possible wasteland of future e-government failures unless steps are taken to improve project and risk management in agencies" (NSW Audit Office, 2001b, p. 36). Various guidelines were also available

regarding both project and risk management (Office of Information Technology, 1998; 2002b).

### **Permissions and ethical considerations**

During the course of this research I was employed as a Computer Systems Officer, on a part-time basis within HPRB, engaged for two days a week. In this position I was responsible for providing support, advice and systems management for HPRB information systems, which also involved managing the project which forms the focus of this research. Permission for research to be conducted within HPRB was sought and received from the Director of HPRB at the commencement of my work within the organisation, in accordance with directions outlined by the University of Technology, Sydney (UTS) Human Research Ethics Committee. It has been noted in the literature that some researchers have found it difficult to "... get permission to use action research from senior management in their organisations who feared that such research might lead to academic outcomes that cannot be put into practice" (Sankaran & Tay, 2003, p. 6). However, no such difficulties were encountered in gaining permission to conduct AR within HPRB.

Prior to the project's commencement, I had no contact with HPRB. I had previously worked on research projects with Kerry Costello, a fellow PhD student from UTS, who was also currently employed at HPRB, and performing independent research within HPRB. Kerry was employed within HPRB in the role of Special Projects Officer: Strategic Business Processes, and was responsible for developing a change strategy for key HPRB processes, progressively building a technical infrastructure capable of supporting continuous improvement, and promoting the capability of HPRB to sustain change processes through growing PM maturity.

Consent had been previously obtained from the director of HPRB for the trial of a project management methodology and associated software within HPRB, for the mutual benefit of supporting the growth of PM capability within HPRB and research at UTS. At the start of my employment within the organisation, consent was obtained from the director of HPRB that research notes and personal observations taken on the premises of HPRB, on the combination of PM and SSM, for the purposes of the management of the

development of an Information Systems and Information Technology Strategic Plan, could be used for research purposes. At the same time, an information sheet was supplied, should interested parties have further enquiries.

Through consultation with the director of HPRB and the UTS Human Research and Ethics Committee, it was agreed that focus of this research was such that the individual consent of each person involved in the project work would not be required, the consent of the director of HPRB being sufficient for this research. Observations relevant to this research predominantly focus upon combining the methodologies, not the behaviour of individuals within the organisation. The findings of this research relate to the methodological approaches and how they were combined to reach the goals of the organisation, not on specifics of the involvement or reactions of participants. It was agreed that the process of gaining consent from each and every member of the organisation might create the incorrect assumption that research was being conducted on the people in the organisation, not use of methodologies, thus hampering both the research and project work by erecting an unnecessary barrier between myself and those within the research context.

In the context of AR into information systems, Baskerville & Wood-Harper (1998, pp. 92 - 3) identify three kinds of ethical dilemmas relevant to this research: goal, role, and value dilemmas. Goal and value dilemmas relate to conflict between the goals and values of the researcher and those of the organisation. Role dilemmas involve differences in perception of the role that the researcher is to play in the organisation. During the intervention I found it useful to consciously distinguish between the roles of practitioner and researcher, as the modes of thinking associated with these two roles often became indistinct in practice. Readers interested in an examination of the links between these roles are referred to Jarvis (1999). It was necessary to maintain a conscious awareness of the different objectives of this research and those of HPRB and the project I managed. However, little conflict of interest was apparent to me between my role as researcher and the goals and standards of the organisation. Acting as a researcher within the organisation did not have any appreciable negative effect on my performance as a member of the organisation. Data collection, through note taking and personal logs, was predominantly unobtrusive. Only those people who would typically be involved in such a project were involved in the project work, and participation in the

research involved nothing on the part of participants that could be considered outside the scope of work required to complete the IT / CT Platform Project. My role was explicitly negotiated, and as it was my intention to combine the approaches under inquiry as effectively as possible in the delivery of project goals, no conflict between the organisation's and my goals and values was apparent. Although no ethical conflict was apparent between HPRB and myself, my employment within the organisation can be seen to have placed some bias on the research. For instance, I was employed to fulfil a specific role within the organisation, and as such, this research was limited by the scope of my employment within the organisation, and the actions required to fulfil my specific role as defined by the organisation.

Walker and Haslett (2002, p. 523) also identify ethical dilemmas relating to anonymity and confidentiality in long-term AR studies. During the course of the research, log books and notes were securely stored, so that risk of loss and subsequent discovery was minimal. Reference to participants in this thesis is anonymous and adequately general that description of the person or situation will not allow identification of those involved. The central risk to the organisation is one of embarrassment at the content of the research findings. However, this risk has been mitigated through consultation with members of senior management during the process of writing up this research. Diagrams developed within the organisation and presented in this research are used with permission from the organisation.

## **The project**

At the time of the intervention, HPRB was situated in premises near Central Railway station in Sydney. As I was taken around the organisation's two levels on my first day, I received a variety of impressions. To the majority of people in the organisation I was introduced as "... the new IT guy ...", in a temporary planning position. Some people took the opportunity to relate anecdotes to me about previous experiences with IS and IT, emphasising both lack of consultation in development and blocks to accessibility posed by unfamiliar terminology. One member of management commented: "You seem reasonably normal for an IT guy" (Research notes – Book 1, p. 1). Generally, the impression I received was that the staff were more concerned with meeting the pressures of their daily work load than with the possibilities for IS / IT development.

However, it became clear that IT skills were perceived as valuable, due to associations with higher grade positions, and therefore increased remuneration. Furthermore, based on staff reactions, it became obvious that access to IT hardware was a signifier of status and commodity of power within the organisation. One staff member made repeated "... comments on how nice my new PC is, how it is better than hers, etc. It is a status symbol" (Research notes – Book 1, p. 4). However, this view only seemed to hold with people in the mid and lower graded positions within the organisation, as some senior managers were quite content with some of the oldest computers in the organisation. This was consistent with management's position that money should be spent on IT development only when it clearly provided an improvement in service provision. It should not be an end in itself.

A general trend in the public sector has been reported where the focus is on profitability, such as return on investment and personal gain. "This is at odds with the traditional civil service culture, which has traditionally been characterized by an ethos of equity and a concern for the public good ..." (Hall, Holt et al, 2003, p. 495). However, this trend did not appear to hold for HPRB, where the emphasis remained on equality and an ethical approach to work. Early on in the intervention, one member of staff commented: "It is a very ethical place to work, much more so than many other areas of public service ..." (Research notes – Book 1, p. 8).

The start of the project was typified by the awareness of a variety of drivers for change, and the knowledge that something needed to be done, but it was not clear what this 'something' was. Equivalent agencies in other Australian States were also under similar Government pressure regarding IS / IT capability development and had made varying degrees of progress, which HPRB was hoping to match. For instance, agencies in Queensland and Western Australia had developed the capability for web-based searches of their registers of health professionals, while South Australian, Victorian and Tasmanian agencies had all made recent upgrades to their registration systems. Significant agency resources were already being devoted to developing the capability to interface with the developing Government Licensing System, while recent changes to some of the health professionals' Acts were expected to result in the need for a significant increase in number of documents annually processed by HPRB.



In terms of the System of Systems Methodologies, introduced in Chapter 2, HPRB could be classified as a complex, pluralist context (See Figure 68), in that key issues were difficult to appreciate, and there were a wide variety of different perspectives on what was relevant to the problem situation. The project was also analysed in terms of seven dimensions of hardness and softness in projects (Crawford & Pollack, 2004, See Figure 11 – Chapter 2). In the graph below (See Figure 69), higher scores (towards the edges of the graph) indicate a greater tendency towards the soft paradigm. At the start of this project, goals were not clear, but it was assumed that the objectives of the project would result in both tangible and intangible results. The project boundary was highly permeable to risks outside project control. Many solution options were being pursued in a highly participative way. Measures for project success were qualitative, and the expectations of participants for actions taken in the project environment generally lent towards the soft paradigm.

|        |         | Relationship between participants  |   |   |
|--------|---------|--|---|---|
|        |         | Unitary  | Pluralist   | Coercive  |
| System | Simple  | Simple-Unitary: key issues are easily appreciated, and general agreement is perceived between those defined as involved or affected.       | Simple-Pluralist: Key issues are easily appreciated, but disagreement is perceived between those defined as involved or affected.       | Simple-Coercive: key issues are easily appreciated, but suppressed disagreements are perceived between those defined as involved or affected.       |
|        | Complex | Complex-Unitary: key issues are difficult to appreciate, but general agreement is perceived between those defined as involved or affected. | Complex-Pluralist: key issues are difficult to appreciate, and disagreement is perceived between those defined as involved or affected. | Complex-Coercive: key issues are difficult to appreciate, and suppressed disagreements are perceived between those defined as involved or affected. |

Figure 68: The IT / CT Platform Project and SOSM (Adapted from Midgley, 1997a, p. 253)

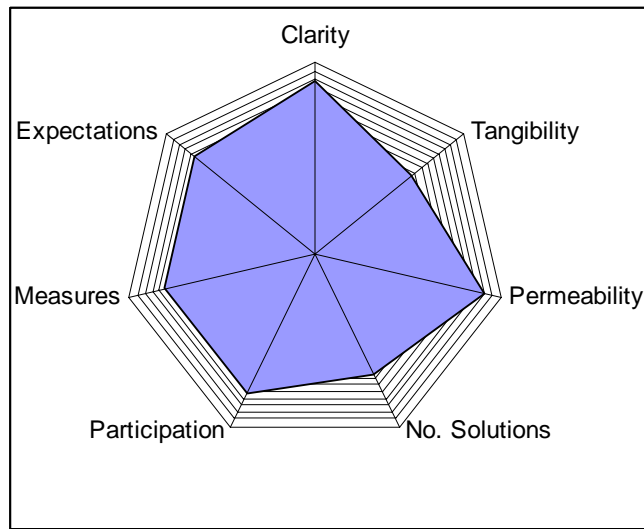


Figure 69: Hard and soft dimensions of the IT / CT Platform Project – near project initiation (Based on Crawford & Pollack, 2004, p. 650)

My initial approach to using SSM and PM in the project had been to attempt to combine the methodologies in a way that gave equal emphasis to both the methodologies and both the hard and soft paradigms. It has previously been identified that SSM predominantly focuses on the personal and social aspects of problem situations (See Figure 32 – Chapter 4), that PM focuses on the material aspects of a problem situation (See Figure 52 – Chapter 5), and that the combination of the approaches had the potential to address the majority of potential needs in a problem situation (See Figure 65 – Chapter 6). I had adopted a variant on the Embedding model as a way of combining the methodologies, with the intention of using a Mode 2 version of SSM to structure thinking about the situation, while PM was used to manage the implementation of project plans. Although I had considered the benefit of giving an equal weighting to each of the paradigms, and although I had adopted a specific model for combining the methodologies, I did not adopt any explicit model for managing alternation between the paradigms.

Initially, I had few reservations about the appropriateness of SSM for the project, given the wide variety of SSM case studies in the literature from the UK Health Service and in IS planning. However, I did question the appropriateness of PM, when the uncertainty in the environment, and the lack of clear measures, became apparent. "Is PM appropriate for public service, when it can't be directly linked to budget, and where

benefits must be used instead?" (Research notes – Book 4, p. 2). Nevertheless, a methodology is dependent upon interpretation, and although the aspects of PM that relied on clear goals and a stable environment did not seem applicable, the terminology of PM did provide an effective way to communicate, and a useful way of structuring work.

HPRB was predominantly a process based organisation, with project work taking a firm second place to the pressures of maintaining the smooth operation of the registration process. I was engaged in a variety of different tasks associated with the ongoing development of IS / IT capability within the organisation, outside of the project work. My initial project mandate was to map the data flows in the organisation and investigate options for developments, while working with existing legacy systems. Potential areas of interest to the organisation included: the possibility of developing internet access to the registers; email storage; document management; case management; financial software; increases in linkages between functional areas; new functionality options; and possibilities for maintaining existing links with NSW Health infrastructure, including the email system and register databases, in light of potential structural changes within NSW Health. Many options for development existed, and I initially spent a great deal of time listening to participants, letting them express what they thought were the significant aspects of the situation, instead of leading them in specific directions. "I've been saying very little, letting others do the talking, letting them tell me what they think is important" (Research notes – Book 1, p. 14). I was developing a Rich Picture of the environment, letting the important aspects of the situation emerge. However, this was not an immediate process. A wide variety of aspects were being brought to my attention by different people. I had started the intervention relatively unfamiliar with the public sector. I began by immersing myself in a wide variety of policy documents, but it was initially unclear which aspects of policy provided the strongest drivers for action. I reflected on my state near the start of the intervention: "Describe the process that I'm going through in detail. Confusion" (Research notes – Book 1, p. 12). It is possible that my conscious unfamiliarity with the public sector aided the development of an appreciation of the situation, as I was aware of how little I knew about the context, and so entered the situation with few preconceptions.

White (2000, p. 174) notes that "... managing change in a turbulent environment public sector organisation requires ... the adoption of a more systemic process which is iterative, experimental and allows for emergence." I used such an approach within HPRB. "We are using an opportunistic approach, being driven by a few factors, but staying open throughout the exploration and process to how benefits might be realised in unexpected areas" (Research notes – Book 1, p. 15). This was the approach adopted not only within my project, but for the IS / IT Strategic Development Portfolio. Different projects were being progressed, even though it was clear that some projects represented different approaches to meeting similar ends, and that potential contextual and environmental changes would likely change the relative importance of the projects. It was expected that some projects would be forced either to redefine their scope or be brought to a premature close, due to potential environmental changes. Staying open to changes in the environment allowed for opportunities for development to be seized when they eventuated.

Ormerod (1995a, p. 278) identifies two different approaches to IS strategy development: a focus on comprehensive description of the IS architecture and build sequences; and a decision oriented approach, where the aim is to identify the most important decisions and understand how these can be supported by IS investment. This intervention was of the latter kind. Furthermore, early in the intervention, it was agreed that a facilitative and participative approach would be used, rather than one which was expert driven and control oriented. The emphasis was to be on options for development, rather than cost-cutting or down-sizing the organisation through replacing personnel with technology.

It has been noted that the "... personality of the researcher-facilitator will certainly have a strong bearing on how well participation can be achieved" (Callo & Packham, 1999, p. 35). Furthermore, "... system interventionists who attempt to ensure a lack of bias by selecting as many world-views as possible to be included in a solution, will (often unconsciously) define the boundary of a system by their very choice of participants" (Hutchinson, 1997, p. 225). My approach was to stay open to ideas of who should participate during the project, neither predetermining who should participate, nor trying to be all-inclusive. Rather, participant involvement was typically informal, but frequent, including project team members, those working on related projects, the project sponsor, members of management, and staff members involved in the various organisational

processes which might be impacted upon by options for development. Participation changed during the project, in relation to the needs of the situation. Clayton and Gregory (2000, p. 147) have noted that practitioners may find resistance to participation, in situations where change has previously been imposed from outside participants' sphere of control. However, no such resistance was apparent in this research, which can potentially be linked to participation generally being informal. Formal communication was usually only relied upon in the delivery of project products and in engagement with other institutions. For instance, options for collaborative development were explored with equivalent agencies in other Australian states. Broad participation also involved engagement with other agencies who may be affected by developments within HPRB, such as other NSW health professional Boards, who were not supported by HPRB, but would likely be influenced in their IS / IT development, based on the options progressed within HPRB.

The need for broad participation became apparent as soon as I started investigating different perceptions of the existing HPRB IS / IT architecture, and relationships with related agencies. The nine Boards that were supported by HPRB shared a central register of health professionals, but each Board had a separate set of staff, administrative processes, and supporting information systems, compounding the complexity in the organisation. It was becoming clear that the organisation did not have a single and consistent view of the IS / IT infrastructure. "No one knows exactly what the company has in terms of IT architecture" (Research notes – Book 1, p. 69). A variety of HPRB personnel had previous exposure to aspects of the existing systems, but knowledge of one aspect of IS / IT did not necessitate knowledge of other areas, with each person's knowledge being coloured by their previous engagement. Participants were often unaware of, or occasionally mistaken about, aspects of the existing systems with which they had not directly engaged. For instance, one participant knew about the network internal protocols, another about our network connections with external bodies, one knew about the history of the development of the organisation's IS / IT, while another was knowledgeable regarding possible future industry developments. Discussion also included contractors that HPRB had engaged to address specific aspects of past development, and personnel from other NSW Health agencies that supplied IS / IT services to HPRB. On many occasions it required ongoing engagement with

participants to establish exactly what the organisation owned, and which services were provided by bodies outside the organisation.

A Project Management Information System, previously developed by researchers at UTS, and refined through previous interventions into a variety of NSW public sector agencies (Crawford & Costello, 2000; Costello et al., 2002a; Costello et al. 2002b; Crawford et al, 2003) was used to structure project activities within HPRB. It was used to scope and define the projects that were being undertaken within HPRB. This application was used as a basis for facilitation, which project sponsors could use to define goals, objectives and measures with the project manager. Unlike some project management information systems which take a reductionist approach and focus on PM tools such as PERT and Gantt charts, this information system was used as an aid to defining project objectives and milestones, giving participants a series of tasks to achieve and providing multiple options for development, but allowing definitions to retain existing ambiguity when uncertainties could not be clarified. In discussing Wilson's contribution to SSM, Gregory (1993, p. 337) distinguishes between "... what is to be done and how it is to be done. The how can be expanded in two ways: by showing greater detail (in effect, more necessary conditions) or by showing different possibilities." Planning through multiple possible avenues for development was found to suit the needs of a changing project environment, as it both allowed planning to continue at a level above that at which environmental changes were occurring, and allowed planning to account for multiple options which could meet different environmental needs. The emphasis in using the Project Management Information System was to make the process of managing projects easier for project managers, rather than providing a basis for efficiency and control. Previous use of this application had emphasised the need to align the expression of project management concepts to existing language usage, and considerable portions of my time at the start of my employment were devoted to adapting the application to the HPRB context.

The importance of effective communication was rapidly becoming apparent. Language could clearly act as a barrier to understanding and effective action. Having come to be recognised in the organisation as someone with some understanding of IT development, some of the most common questions asked of me related to nomenclature. During discussion, it regularly became apparent that different participants were using the same

terms, but with different meanings. For example, at one point, the term 'SQL' was being used to refer to a programming language by one participant, while being used to refer to a specific application by another, while other participants, less comfortable with the terminology, struggled to make sense of what was actually being discussed. "One of the problems with [the language of IS / IT] is that it's technical but not consistent, e.g.: architecture / system / configuration are basically interchangeable; the difference between software and application is not clear to many" (Research notes – Book 1, p. 106 – contents of brackets added). One member of management was having success using an 'Ikea kitchen' metaphor, which helped him to establish what potential suppliers were actually offering. For instance, was he being sold a kitchen, or only being told what kind of kitchen he would need? Do you have to assemble it yourself with an allen key, or do they send someone around to assemble it for you? Are the instructions in English or Swedish? Attention to language use was also necessary in formal communication. For instance: "We are putting our technical questions into the language used on the Health intranet strategic documents, as an aid to legitimacy and communication" (Research notes – Book 1, p. 60). My role as project manager seemed to involve significant emphasis on the process of translation between different stakeholder groups.

Indeed, it also became apparent that I was not fluent with the 'Government' mode of expression, and the development of a mode of expression appropriate to a Government context was a conscious effort on my part. It became clear that two distinct languages were of relevance to the IT / CT Platform Project, one being the language of Government and NSW Health, the other being the specialised vocabulary of the IS / IT professional. In light of the significant role that language was playing in the project, my research focus shifted to take this into account. I examined a variety of different ways in which data on language use could be collected and analysed within the project setting. I settled, for a number of months, on the possibility of using Corpus Linguistics techniques (e.g., Cermak, 2002; Kilgarriff, 2001; Scott, 1997; Shaikevich, 2001) in the analysis of publicly available documents that could be representative of the different Government and IS / IT language groups that I was having to negotiate between in the course of the project. However, it became clear that analysis of language use and exploration of the combination of hard and soft approaches constituted different

research questions, and the focus of the research eventually shifted back to the original exclusive inquiry into how PM and SSM could be applied in combination, in practice.

The influences on HPRB, and the areas of inquiry relevant to the project continued to change, and awareness of this change was facilitated by the use of SSM as a continuous cycle of reflection and learning, while PM was used to progress project goals at times when the environment momentarily stabilised. Strategic restructuring within NSW Health meant that different service delivery options were being considered. Some would result in HPRB needing the capability to significantly increase the in-house provision of IS / IT services. The possibility of the organisation relocating to new premises also now had to be taken into account, with a strong possibility that the organisation would relocate during the life of my project. My project expanded to take into account options for development based on potential relocations in the short and long term. It was expected that significant changes to the Nurses Act would soon be passed through Parliament, which brought further uncertainty, and was expected to affect the services that HPRB was required to provide to the Nurses Registration Board, one of the organisation's most influential stakeholders. It seemed that the more I inquired into the environment, the more changes I found. This made the creation of a definitive set of options for the development of HPRB IS / IT problematic, and I noted that "... it is hard to find a single appreciative setting, as the parts keep being reshuffled ..." (Research notes – Book 1, p. 95).

A variety of technologies were also being investigated for the different benefits that they may provide to the organisation. For instance, negotiations were continuing with equivalent agencies in other Australian States that had collaborated in developments to their registration systems, and which could theoretically provide considerable benefit within HPRB. The relevance of Checkland's oft repeated focus on cultural feasibility and technical desirability, instead of technical feasibility and cultural desirability (e.g. Checkland & Holwell, 1998a, p. 160) became clear during the negotiation process, as at one point in negotiation I was focusing on establishing the technical specifications of their developments. However, technical discussion was repeatedly frustrated by other parties focusing on their previous history of interaction between the agencies and the future stakeholder management consequences of potential allegiances between the States. Hindsight allows me to see that negotiating the relationship between agencies



was a necessary precursor to technical discussion, but it did not seem so at the time. A focus on technical, rather than cultural, feasibility could be an indicator of me operating from within the hard paradigm at that time. Investigation of the possibilities of implementing this system were later abandoned, when it became clear that there was conflict between the other agencies and the contractors they had engaged.

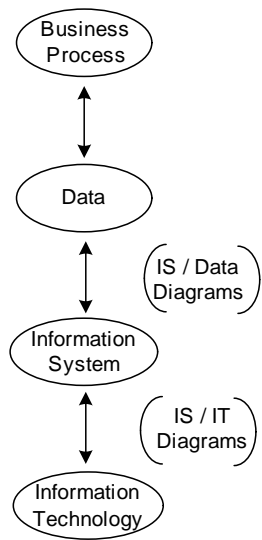
## **Modelling HPRB**

Four months into my employment at HPRB I had developed sufficient understanding of the current operational environment for my work on the IT / CT Platform Project to progress to the preliminary outlining of the system requirements for the various strategies for development. However, as time passed the number of options being investigated continued to increase, with the emphasis in some of the remaining options continuing to shift. I was starting to think that change was a constant in the environment, and the strategies for development would never clearly be defined. "The soft parts, the strategy, will never really be resolved clearly. It sets our constraints, but not specifically, or in a way that can ever be unambiguously defined. People will always interpret that differently ..." (Research notes – Book 3, p. 8).

The process of drawing diagrams rapidly became an important feature of the IT / CT Platform Project, both in terms of facilitating discussion with participants and as a part of the deliverables for the project, the strategic plan. It had been negotiated with management that the strategic plan was not to be a prescription for action or detailed specification for development, but instead the basis for the facilitation of future discussion between IS / IT developers and end users. "The purpose of the diagrams is to act as a lingua franca, something that both sets of people can understand: the tech; and the not to tech" (Research notes – Book 1, p. 120). It was necessary then to find a way to communicate the different strategies in a way that was accessible to both groups. It has been found by other researchers that a diagram "... is more user-friendly than the text alone as it is able to show all of the key relationships at a glance" (Ramsay, Boardman et al, 1996, p. 34). As such, the strategic plan was to be communicated through a combination of text and diagrams.

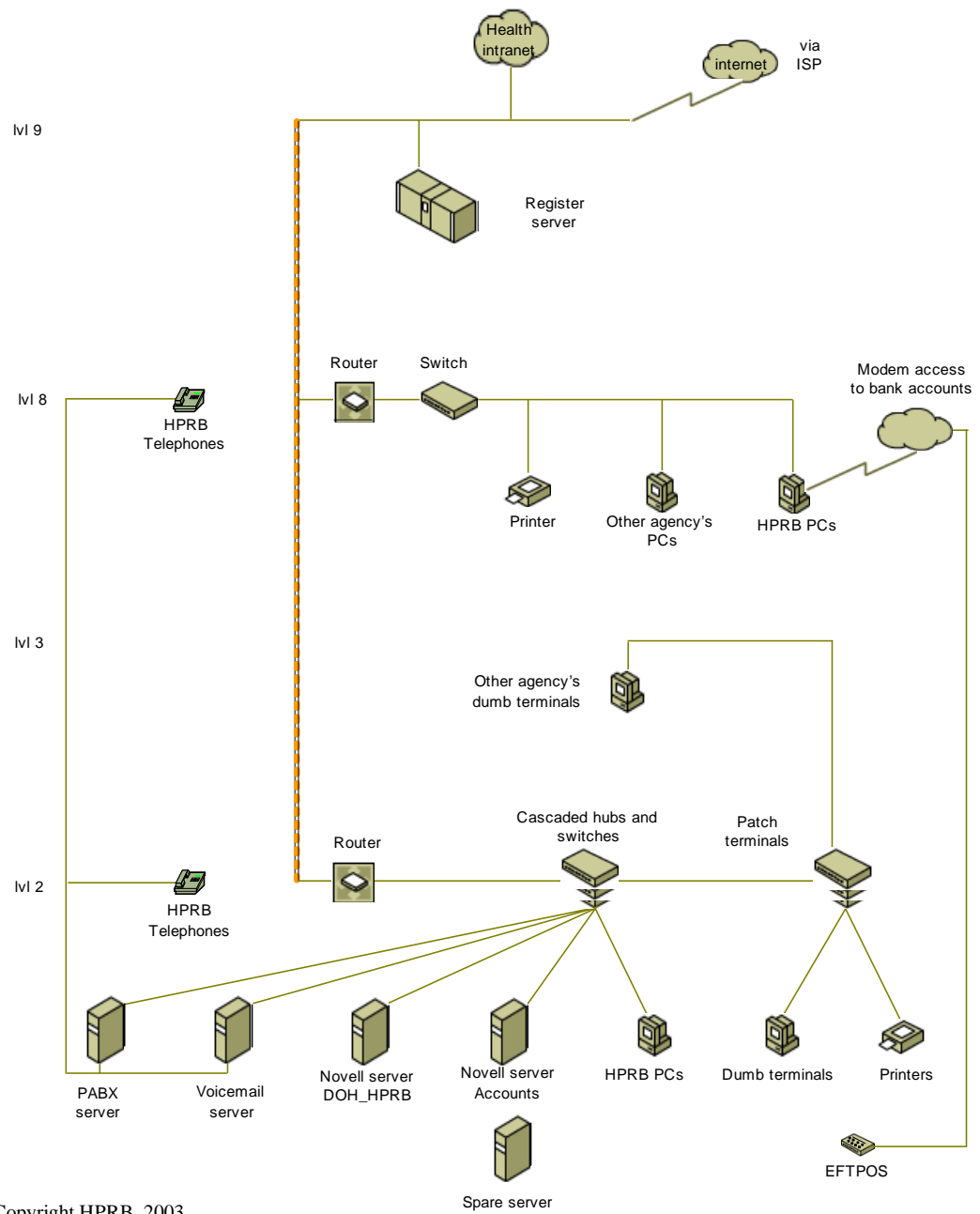
Examination of the literature suggested a wide variety of modelling techniques that may be appropriate, including: Conceptual Models; IT architecture models; Data Flow Diagrams (DFD); Entity Relationship diagrams; Object Oriented diagrams; models of organisational structure and work process; mind maps; and previously developed adaptations of the Processes for Organisational Meanings model (Crawford & Costello, 2000). However, modelling HPRB was not a simple task, as HPRB provided services to nine different Boards, each of which had similar, but different administrative processes. Many members of the organisation performed a variety of roles, making clear delineation between roles problematic. Examination of the different options for modelling also facilitated discussion of which ways of portraying the situation were relevant to different participants, as each different modelling technique entailed a different focus. A balance was sought between a technique for modelling that would allow sufficient simplification of the situation to allow effective communication, without reducing the situation to level of abstraction past which relevant relationships could be seen.

In modelling the various strategies, I found that it was easy to become short-sighted, and to only focus on changes to the hardware and software, ignoring the people in the organisation and the data and information that they needed to make decisions on a daily basis. Reflection upon the epistemology of SSM reminded me that it is the people in the organisation deciding and taking action who actually constitute the information system, with hardware and software only supporting this process. Because of this, it was decided that models of options for development needed to take the interactions between these different elements into account. It was eventually negotiated that the IS / IT strategic plans for HPRB would be communicated through three levels of diagrams, each with a different focus: IT architecture; the relationship between IS and IT; and the relationship between data flows and IS, based on Data Flow Diagrams (De Marco, 1980) and SSM Conceptual Models (See Figures 70 to 73). This is a similar three level system to that described by Avison and Shah (1997, p. 21).



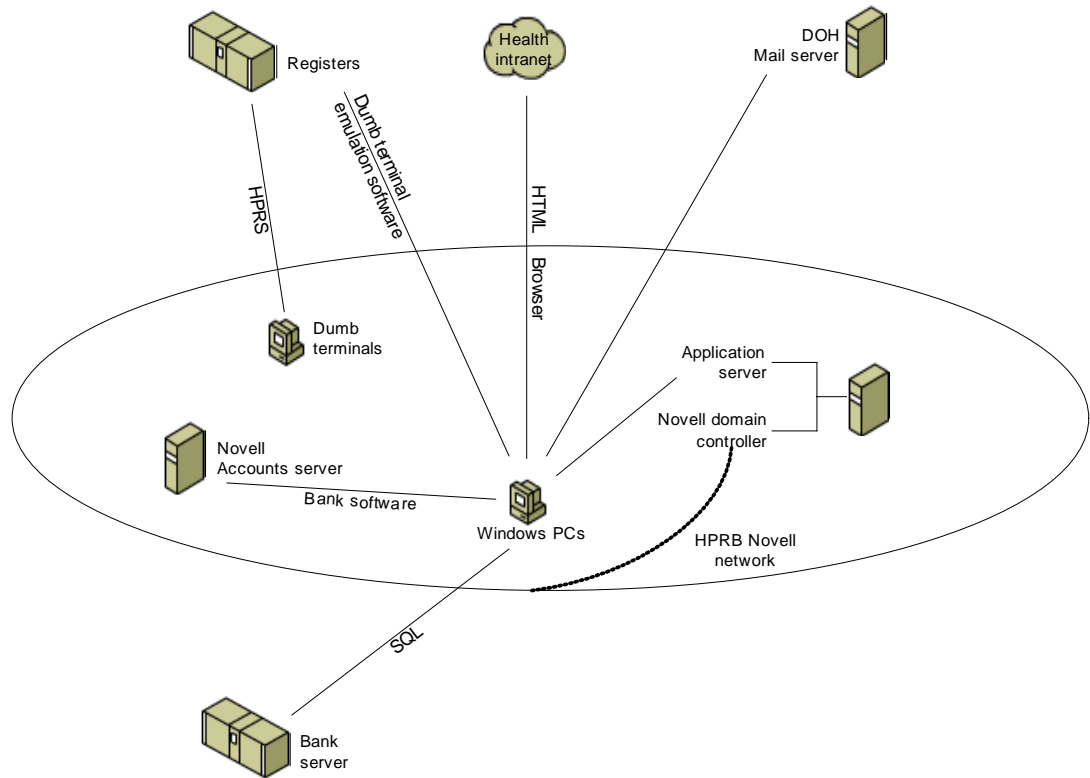
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Figure 70: Levels of diagrams (HPRB, 2003, p. 15 – used with permission)



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Figure 71: HPRB IT architecture (HPRB, 2003, p. 19 – used with permission)



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Figure 72: HPRB Initial IS / IT design (HPRB, 2003, p. 21 – used with permission)

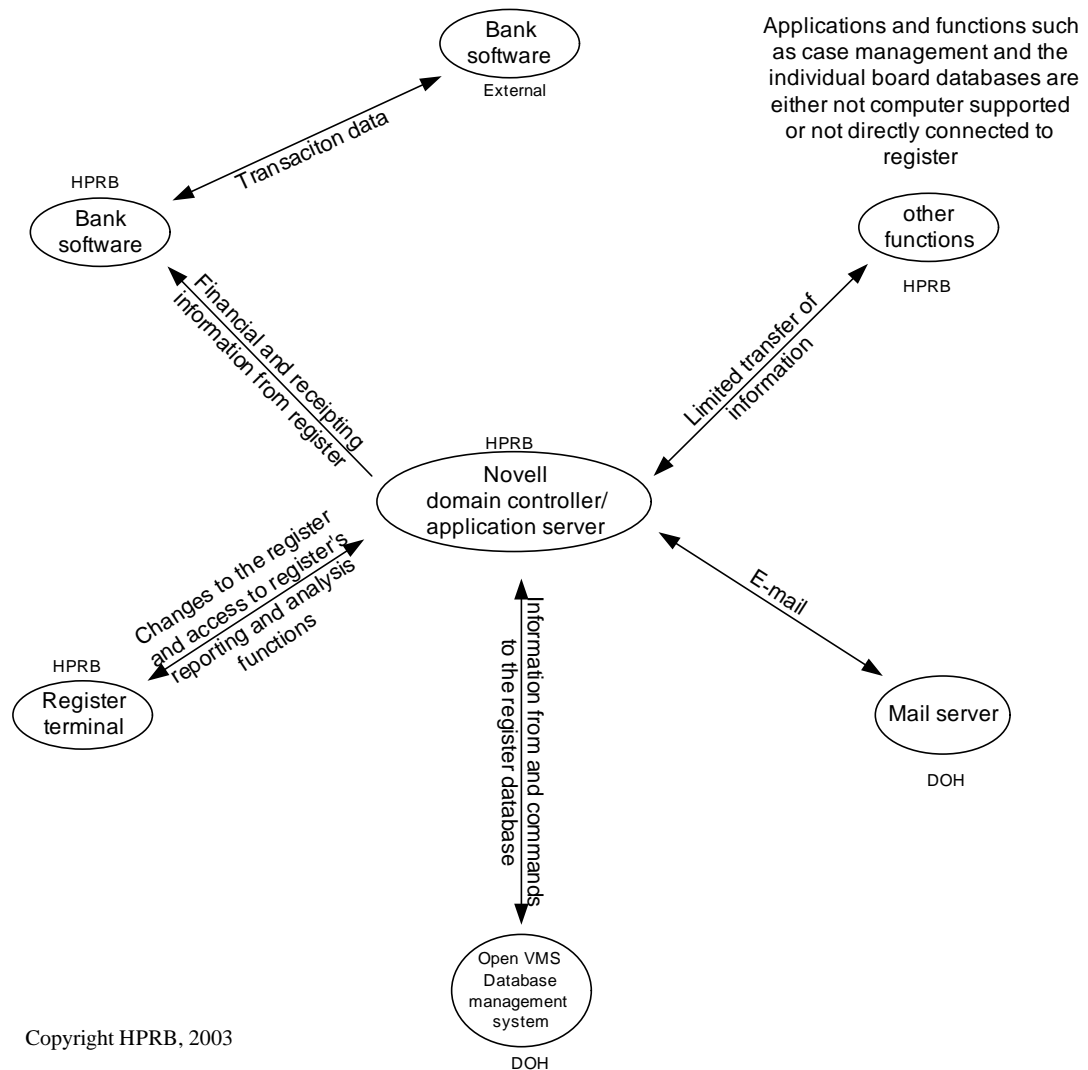


Figure 73: HPRB Initial IS / Data design (HPRB, 2003, p. 22 – used with permission)

Due to the different foci at different levels of modelling, the central difficulty in this process was maintaining strict consistency in what was being modelled in which diagram. The following quote from my notes from the intervention illustrates this:

"The problem of using a selection from within the massive range of options for modelling, or even systems methodologies, or PM methods, is not whether they are compatible or not, but rather staying clear about what the different methods are for and being able to communicate this effectively. For instance, to the uninitiated, the differences between work process, procedure, data flow, document flow, entities and objects is far from clear. Modelling techniques are everywhere, each with their minor variations on the established themes. This relates back to the point that I think Checkland was trying to make about Weltanschauung, although I prefer 'paradigm' or

'perspective'. No one model or kind of model is necessarily better than any other. However, it is necessary to state your perspective, so that the model can be assessed on its own qualities and assumptions. For instance, it is just as nonsensical to judge a car on its ripeness, an action movie on its empathy, or an ER diagram on its depiction of process. This is the point about incommensurability between hard and soft. It is not so much that they are incompatible, but that they involve different assumptions, and these assumptions must be acknowledged ... This, however, is not an easy task, for it is not a simple oscillation between two camps, as the dichotomy of hard/soft implies, for within each camp are as many differences as similarities. It, rather, involves constant questioning of assumptions" (Expanded notes – 18-6-02, p. 1).

It was necessary to create clear outlines of what was being communicated in different models, and in which ways this was being communicated. In combining a variety of modelling techniques, or even methodologies, I found that the practical problems in combining the approaches did not so much involve matters of the possibility for their comparison, or their incommensurability, but related to the difficulties in staying consistent in what the different approaches were for and being able to communicate this distinction clearly. No one model or kind of modelling technique or approach to problem solving is necessarily better than any other. The same was essentially true for swapping paradigms, as for alternating between modelling techniques, if more complex. While the processes and symbols in different modelling techniques are relatively user independent, the hard and soft paradigms involve multiple assumptions about reality that are open to interpretation, based on an individual's emphases. Changing between paradigms in a consistent way required conscious and explicit decisions regarding how the world was to be seen, what was to be achieved, and how it was to be communicated.

The decision to model the organisation in this particular way was not based on the assumption that this was a 'better' way to model, but rather because it was developed with participants in the organisation, and seemed accessible to them. My intention in modelling was to facilitate debate, while any rigour in the process was to maintain consistency in how ideas were being communicated in one particular context, not necessarily in relation to established modelling techniques in the literature. Maintaining rigour while working with participants to model aspects of the organisation was a time consuming, and at times frustrating, process, with relatively minor conceptual changes concerning mode of communication often resulting in the need for changes to a wide variety of already created models. This process was further hampered by my learning

new aspects of the situation which were of relevance to the various strategies I was outlining, resulting in further changes.

Similarities between modelling techniques based in different paradigms were also becoming apparent. Data Flow Diagrams (DFD) were arguably developed for use in the hard paradigms, for mapping the flows of data that exist within the real world, while SSM's Conceptual Models were developed within the soft paradigm, as aids to discussion and debate. However, stripped of paradigm for the moment, both modelling techniques can be seen to depict similar things. "High level DFDs could be equivalent to Conceptual Models, showing what should be, but not how" (Research notes – Book 4, p. 3). This was particularly true when the different modelling techniques were used at the same level of abstraction, as links between level of abstraction of analysis and the hard and soft paradigms were also becoming apparent. "What, how and why are relative. The more you bring the models to lower levels, the greater the tendency to get stuck in the now-how, instead of the possible-what" (Research notes – Book 1, p. 100). Furthermore, personal experience led to the observation that when I focused on increasing levels of detail in the modelling process, it encouraged me to focus on the 'realities' of the situation, instead of viewing the models as epistemological devices. The more I reduced my focus to a fine level of detail, the more I would find myself exclusively adopting the hard paradigm, while it was easier to maintain a frame of mind approximating the soft paradigm when modelling at a higher level of abstraction. These links are discussed in greater detail in the following chapter.

This similarity between DFDs and Conceptual Models has also been noted by Mingers (1995, p. 27): "There are indeed quite strong resemblances between a conceptual model and a DFD: the conceptual model shows activities and the logical links between them while the DFD shows data flows and the activities that transform one into another." Data Flow Diagrams depict processes (verbs) which must be carried out in order to achieve some objective, and the relationships between these processes. Conceptual Models depict actions (verbs again) that must be taken in order to achieve some transformation, and the relationships between these actions. The main differences then seemed to be threefold: the appearance of the diagrams; the area of application; and the epistemologies which inform how they are applied. Because of these similarities, it was possible to model in a way that was informed by an interpretive concern for differences



in perspective and the use of models for the facilitation of learning and debate, but to create them in such a way that they looked like DFDs, making them both more familiar to IT professionals and more appropriate to the stakeholder expectations in the situation.

The indistinctness between the hard and soft paradigms was also becoming apparent through the process of creating models. At the same time, models were being created that could be classified as belonging to different paradigms. Although all models were being created through a process of participation and consultation, often involving lengthy discussion and 'whiteboard sessions', the IT diagrams were being created as detailed descriptions of the reality of the current layout of HPRB IT infrastructure, indicating a realist perspective. The IS / IT diagrams and the IS / data diagrams, on the other hand, were being created as the basis for future debate on development possibilities, suggesting a perspective based in the soft paradigm. Diagrams were being created with a clear goal in mind, which may suggest the hard paradigm, but I also acknowledged that choosing particular modelling approaches over others brought a particular interpretation to the situation, which is more indicative of the soft paradigm. At times, it was difficult to clearly discern which paradigm was informing action taken at different times.

I became aware that as the project progressed my daily practice had developed throughout the course of the intervention. At the start of the intervention, I would communicate almost predominantly through dialogue, using diagrams as the focus of discussion or used to guide discussion. However, my practice changed later in the intervention. "I'm communicating by drawing pictures more" (Research notes – Book 1, p. 132). My process of communication came to more frequently involve actively drawing during discussion, creating diagrams with participants, as a way of mutually developing understanding, suggesting that my practice may have developed. "A characteristic of fluent users of SSM is that they will be observed throughout the work drawing pictures and diagrams as well as taking notes and writing prose" (Checkland & Scholes, 1990, p. 45).

Reflection on this led to an understanding of two different views on the soft modelling process, both of which facilitate debate. One view involves perceiving diagrams as surpassing problems inherent in language use and the intersubjectivity with which

meaning is attached to wording, by representing a perspective in less ambiguous fashion. Here, diagrams are an aid to debate and discussion. In the second perspective, discussion can be focused on the drawing process, debating the situation as you draw. Debate and the modelling process become intertwined and simultaneous. Here, diagrams are a product of a communication process based around the combination of debate and modelling.

### **Levels, uncertainty and the methodologies**

It has been identified that often "... a push exists to dive straight into implementation, i.e., to be seen to be doing something, as opposed to working with a client group to define projects in terms of strategic objectives and to scope and shape the inquiry" (Olsen & Haslett, 2002, p. 460). Thankfully, stakeholders in this project were comfortable with a lengthy process of exploration, but I was not always so comfortable with it at the start of the project. Although I was prepared for a lengthy period of exploration and learning, which the literature suggests is needed in a soft project, at times I wondered when we would actually start doing something. Exploration early in the project was unsatisfying, and I was longing for the sense of accomplishment associated with clear progress towards an already defined goal and a stable context in which to achieve it.

However, the constant change in the environment had left me feeling occasionally overwhelmed by the apparent size and complexity of the work involved. Frequently stepping back to a higher level of abstraction, governed by SSM enquiry, alleviated this problem and was useful for maintaining a broad perspective on the environment. However, it was not possible to simultaneously hold both the full complexity of the situation and the detail necessary for dealing with specific issues in mind at once. Observing the situation from an abstracted level was useful for scoping project work, but would leave me wondering where to begin. PM, by contrast, acted as an anchor to the needs of implementation, against which learning gleaned at a high level of abstraction could be related. Both abstracted analysis and management of the fine detail were important and there was a need to be able to "... shift between levels in complex systems, in order to link them" (Research notes – Book 1, p. 14).

Changing levels of analysis, through alternating between SSM and PM, helped me to link the objectives of the project to the objectives of the program and organisation. It has been noted that sometimes "... the initiators of a project become distanced from the development process and as a result the developers can lose sight of the primary or business objectives ... " (Remenyi & Sherwood-Smith, 1999, p. 16). Consciously swapping between methodologies helped maintain a link between the implementation and the reasons for implementation.

My attitude towards uncertainty and the need for defined goals changed during the life of the project. Later in the project I noted: "At times, it's best not to reduce the complexity of the situation. This is one of the benefits of our PM system. It allows it all to stay complex, but within a framework, unlike scheduling systems which demand simplification" (Research notes – Book 1, p. 104). I had become used to, and even expected, the lack of certainty in the project context. My awareness of the wide range of different possible influences on the project had grown, and change had become something to work with, not avoid. On entering the building, one of my first phrases of greeting to the program manager had become "What's changed?", in effect, expecting that the risks to the project had changed.

At different times during the intervention I also questioned the legitimacy of my use of PM and SSM. Both approaches had been adapted to the situation, and in combining the approaches, both had been changed. I was now more comfortable with the legitimacy of my use of PM, as PM terminology was being explicitly used in the project. SSM, however, was predominantly being used as an internalised process, in Mode 2, and rarely explicitly discussed with participants. By contrast, the majority of descriptions of SSM refer to the seven stage model. "Does using SSM mean using all the tools or only some? 7 stages, 4 key activities, etc." (Research notes – Book 1, p. 36). The concepts of SSM were, however, very useful in structuring both the process of my work and the overall framework of the final product of the project. It is interesting to note that my reservations about my use of PM and SSM had reversed during the course of the project. Towards the start of the project, I had more reservations about the legitimacy of my use of PM. Towards the end of the project, I had more reservations about the legitimacy of my use of SSM. This change can be related to the difference in the 'visibility' of the two approaches during the project.

## **The project stabilises**

By the final few months, the project goals had stabilised, and participants and I developed a greater understanding of what was possible and appropriate for the needs of the organisation. "The goals have hardened somewhat" (Research notes – Book 1, p. 128). Risks to the project and the organisation as a whole had also been delayed or abated. For instance, changes to the Nurses Act were not passed through Parliament at that time. The implementation for the Government Licensing System was pushed back until 2004, reducing the immediate pressure to develop interconnections with it, and it was decided that HPRB would not be relocating in the short term. The balance of my work shifted towards delivery, with a reduced emphasis on exploration and learning.

The project was assessed again using seven dimensions of hardness and softness in projects (See Figure 74). The clarity with which project goals were defined had increased significantly, and only a limited number of options for the final project deliverables were being developed. The range of factors affecting the project, but outside project control, had also significantly reduced. However, it was still understood that project objectives and deliverables were a mix of the tangible and the intangible, as although a tangible strategic plan was being produced, the benefits to the organisation would come through how it was used after acceptance of tangible deliverables. The project remained highly participative, with qualitative measures, and participants remained comfortable with a soft approach to managing the project.

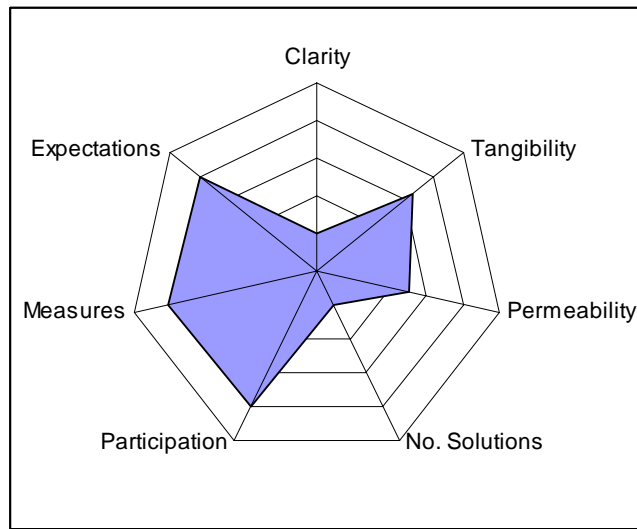


Figure 74: Hard and soft dimensions of the IT / CT Platform Project – the final months (Based on Crawford & Pollack, 2004, p. 650)

The final Strategic Plan detailed eight interconnected strategies for the development of HPRB IS / IT service delivery capability, addressing the possibility for development in a wide variety of existing and potential organisational functions. The structure, content and presentation of deliverables was reviewed against a variety of Guidelines and benchmark documents (e.g., Office of Information Technology, 2002c; NSW Health Information & Asset Services Division, 1996; HSW Health Information & Asset Services Division, 1997; NSW Health, 2000b; NSW Rural Fire Service, 2001). The Health Professionals Registration Boards Information Systems and Information Technology Strategic Plan (HPRB, 2003) draws upon both PM and SSM concepts. For example, risks associated with the strategies are examined using PM techniques for communicating risk (OGC, 2001). Each strategy was described using a structure based on the PQR (What / Why / How) structure of SSM root definitions (Checkland, 1999, pp. A22 – 3). "The plans are being rewritten in a what-how-why framework, but called deliverable-objective-implementation ..." (Research notes – Book 1, p. 134), a mode of expression that was more accessible in a PM context. Each strategy was also described through text and models, similar to the Root Definition / Conceptual Model pairing in SSM. SSM and project management were then combined, not only in the way that the project was managed, but also in the product that was produced.

Although the HPRB IS / IT Strategic Plan wasn't submitted and accepted until the 20<sup>th</sup> of February 2003, the content of the plan had stabilised, with the last few months spent on finalising appearance of the content of the document, in accordance with stakeholder expectations. "Even though we're calling what I'm doing a 'project', its more, by common definition, the start-up or initiation of a few projects, which are interconnected" (Research notes – Book 2, p. 1). Delivery of the project was delayed by increasing amounts of my time being devoted to initiating and progressing some of the projects which were to result from the strategies outlined within the plan. Indeed, other than relying on the date of acceptance of the major deliverable for the project, it would be difficult to say where the IT / CT Platform Project ended and the next few projects began, with strategy definition flowing seamlessly into IS / IT implementation and development, in a way which was reminiscent of the continuous cycles of learning possible through SSM and AR.

### **Evaluating the project**

In conducting Action Research into the combination of PM and SSM in practice, it is useful to know whether the combination was successful. Indeed, practical benefit is sometimes cited as a requirement for AR (e.g. Champion & Stowell, 2003, p.24). In evaluating the project success, it is first useful to distinguish between two forms of evaluation: summative; and formative. Summative evaluation results in statements about the success or failure of a project, while formative evaluation looks at past experience with the intention of deriving lessons and guidance for the future (Rose & Haynes, 1999, p. 7), and requires detailed information on the inner workings of project processes (Greene & McClintock, 1991, p. 5). When taken as a whole, this research can then be considered formative evaluation of the HPRB IT / CT Platform Project, being based on an interpretive framework, and focused on developing lessons from action taken in the project. This section, however, addresses the summative evaluation of the project, and the assessment of its success or failure.

The most basic measures of project success are against cost, time and quality specifications, as discussed in Chapter 5. However, in this project the immediate costs involved were related solely to my employment, and thus linearly related to time. Furthermore, HPRB was not emphasising return on investment, but service delivery.

The final deliverable of the project was accepted almost two months after the initial expected completion date, however it was unclear at the time of completion whether this would affect the perception of project success. It was possible to assess the quality of the deliverables of the project against similar examples of strategic plans, however it was felt that this would not be indicative of the benefit that the project provided to the organisation.

Evaluating the effectiveness of the project at project completion was problematic. In planning projects it has been found that there are few obvious measures of effectiveness (Cleland & King, 1968, p. 51). Similarly, the evaluation of policy advice poses "... insurmountable problems of definition (that is, what to evaluate against which criteria?)" (Di Francesco, 2000, p. 37). Problems of causality have been identified in clearly establishing links between effort and outcome in complex environments (e.g. Ho, 1999, p. 423; Rose & Haynes, 1999, p. 6; Farbey, Land et al, 1999, pp. 238 – 9; Van der Meer, 1999, p. 393 – 4). Clear associations between output and outcome are often "... at best, indirect and, more significantly, affected by a host of intervening factors ..." (Di Francesco, 2000, p. 40), requiring linkages which are often "... ambiguous and highly interpretive, especially in complex business environments" (Pulley, 1994, p. 20). This difficulty in finding direct links between output and outcomes "... means that the effectiveness of any policy advice output is often reduced to quality; that is, quality often becomes a proxy measure for effectiveness" (Di Francesco, 1999, p. 429).

Evaluation of benefits is clearest after project implementation (Farbey, Land et al, 1999, p. 239). Due to the delay between project initiation and the time at which the existence of benefits can be established, "... the circumstances in which benefits management takes place are not necessarily the same as those ruling when the project was initiated – a number of years earlier" (p. 247). These problems of the evaluation of benefits are acknowledged by the *NSW Health Information Policy* (NSW Health, 2001b, p. 20), which states that benefits often do not occur as planned, and that evaluation of benefits is "... a long term process." It was decided that evaluation would be conducted after enough time had passed for the organisation to glean some benefits from the project. This aligns with some authors' views on the evaluation of projects on a long term basis,

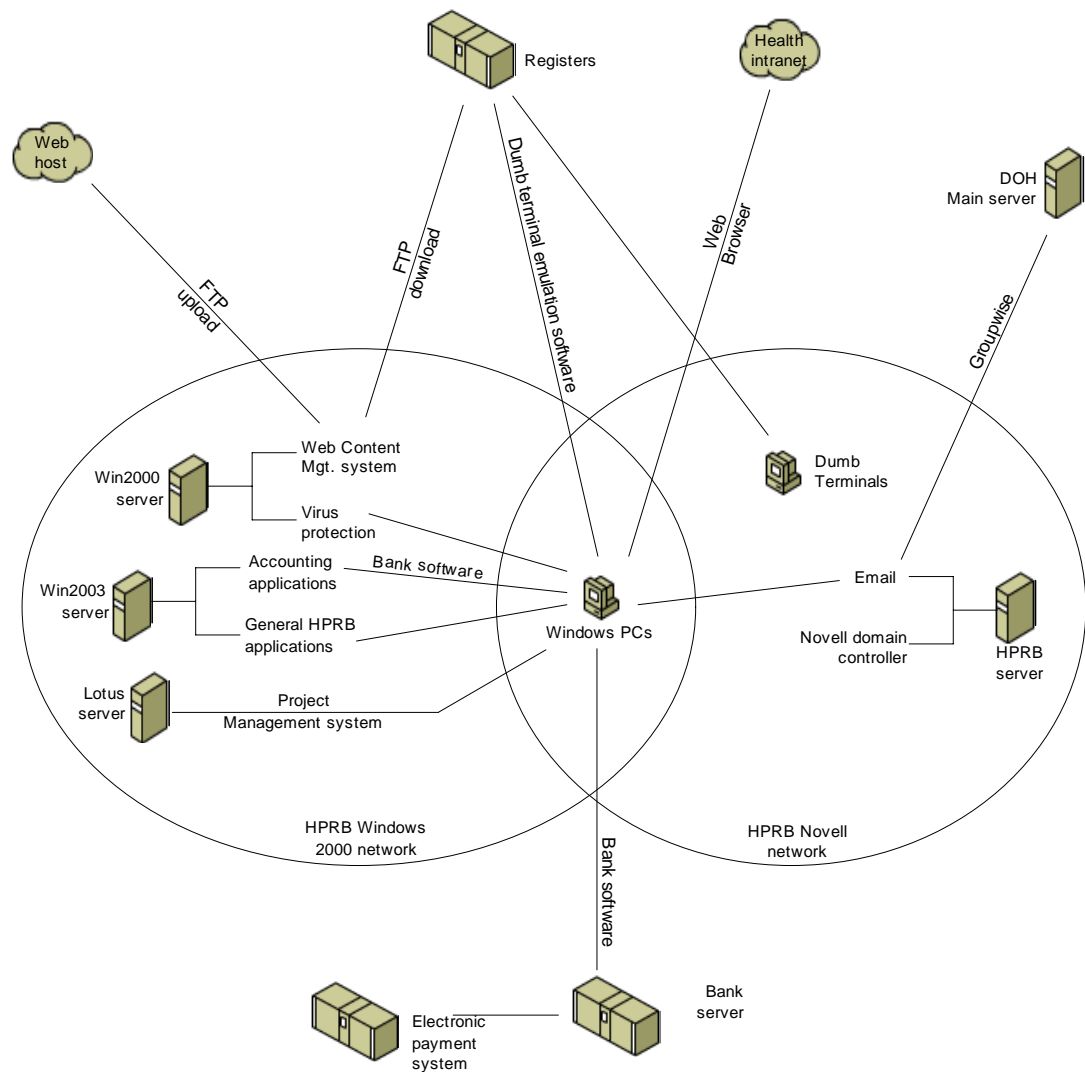
when the impact on clients can be determined (e.g. Avilla, 1997, p. 94; Pinto & Slevin, 1998a, p. 69).

Evaluation of the project was conducted one year after formal acceptance of project deliverables. From an Action Research perspective, of the many iterations between reflection and action throughout the course of this research, the evaluation of the project can be seen as the last iteration of the AR cycles which directly involved participants. Evaluation in AR includes determining if the intended effects of actions were realised, whether these effects relieved the problems, and whether the actions were the sole cause of the effects (Baskerville, 1999, p. 10). I conducted the evaluation of the project through a process of semi-structured interviews with the Director of HPRB and the program manager, two of the central stakeholders to the project, both of whom were involved in the project, and were in a position to assess resultant systemic changes to the organisation. This aligns with statements by Stringer (1999, p. 160) who identifies that evaluations in Action Research should be conducted by those involved in the process, to enable "... those who have been engaged in the research project to learn from their own experience."

The environmental turbulence may have momentarily settled towards the end of the project. However, one year after the acceptance of project deliverables, the organisation was again facing an environment of considerable uncertainty. Despite the introduction of changes to the Nurses Act, major changes to the registers of health professionals being undertaken from outside the organisation, and the potential relocation of the organisation coming back on the agenda, positive change was evident within the organisation, which can be related to the IT / CT Platform Project. At the time of interview, only one year after completion of the five year plan for IS / IT development, three of the eight strategies detailed in the strategic plan had been successfully completed, including: Strategies 1 a and b (introduction of the spare server and development of a progressive upgrade plan); 2 (a database management capability); and 5 (an electronic payment capability). Strategy 3 (a web based register capability) was then being progressed, with the other strategies reserved as options for development at a later date. Considerable evidence of IS / IT development could be seen within the organisation (See Figure 75 & 76). Within one year of project completion, a Windows domain had been introduced into the organisation, providing an expanded capability for



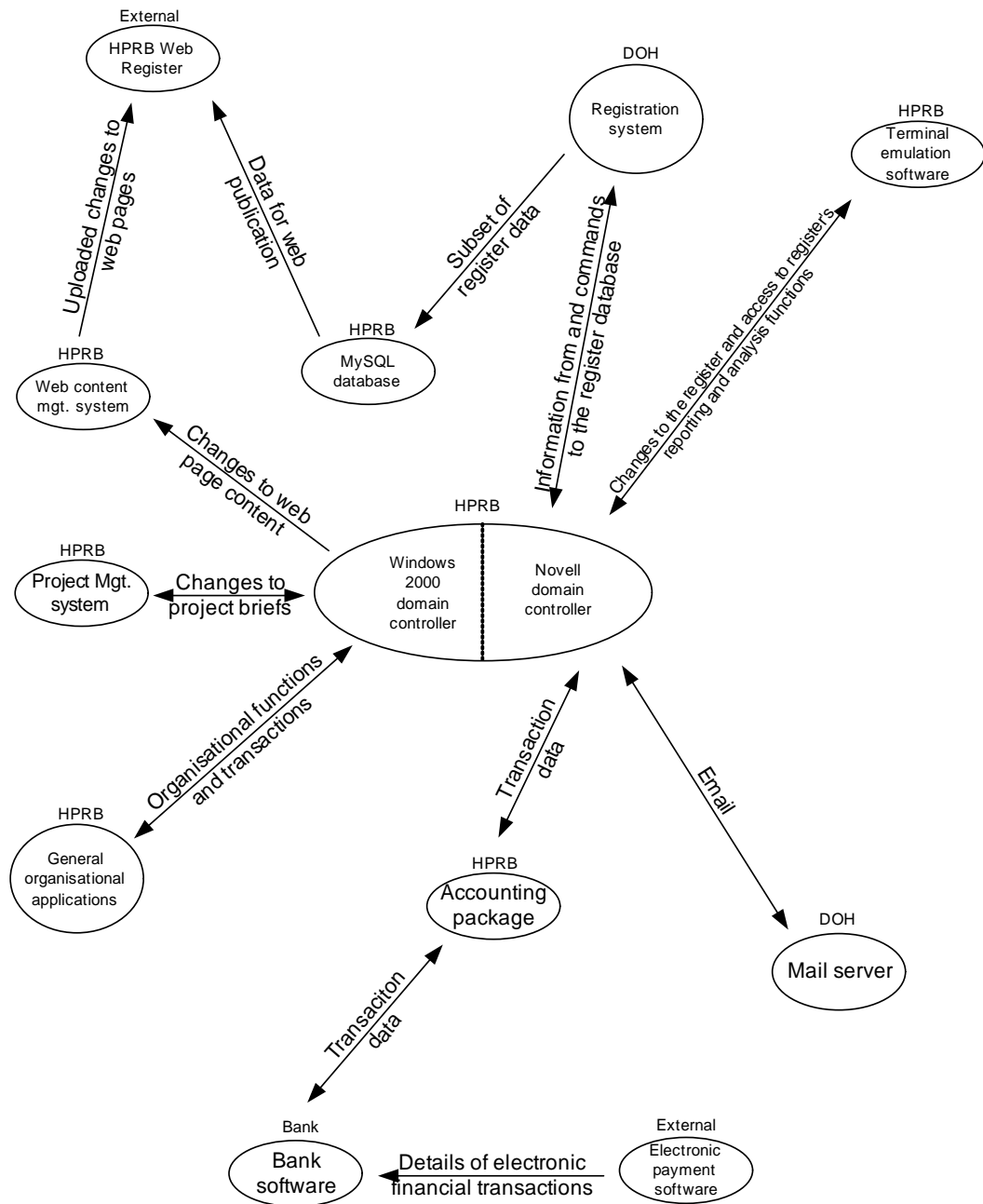
development. An electronic payment capability had been developed within the organisation, providing further service options for customers. Three new servers had also been introduced into the organisation. One of these was used as the basis for reconciling the variety of virus software conflicts that had been present in HPRB. It was also being used as the basis for the development of a web based register of health professionals, and the continuing improvement of internal database management capabilities. Another server was being used to host a PM system, which was being used to facilitate the development of PM capability within the organisation, while work was progressing towards a transfer old server hosting to a new Windows 2003 data server.



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3/2/2004

Figure 75: HPRB IS / IT – one year after project completion (HPRB, 2004a – used with permission)



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Figure 76: HPRB Data / IS – one year after project completion (HPRB, 2004b – used with permission)

The interviews revealed that neither interviewee perceived the late delivery of the project as affecting its success. Both interviewees reported that the project had provided ongoing benefit to the organisation, communicating the ideas involved effectively, and that the HPRB IS / IT Strategic Plan was still appropriate to the organisation one year after delivery. One interviewee identified evidence of an increased capacity to manage the organisation's own IT infrastructure since project completion, while the other stated that it provided a basis for articulating and arguing the organisation's IS / IT needs. With regard to the way that the strategies were communicated, both interviewees commented to the effect that the strategies were clearly expressed. One interviewee expressed that the way that diagrams and text were combined in expressing the strategic plan was helpful, as participants tended to identify with either the text or diagrams in the document, and thus the plan was accessible to a variety of people. Both interviewees identified that the deliverables were appropriate to the organisation's culture and took appropriate account of relevant existing organisational objectives and strategies. Although the project did not deliver to all of the objectives identified at project inception, the interviewees did not consider this to be to the detriment of the project as a whole, as the necessity of meeting uncompleted objectives had been delayed due to influences outside project control, and thus were moved out of the scope of this project. Overall, the project was considered to be a success by both the Director of HPRB and the program Manager.

## **Conclusion**

In this chapter I have examined the IT / CT Platform Project, a project that I managed through a combination of PM and SSM, based on the Embedding model, undertaken in the Health Professionals Registration Boards in response to a general Government emphasis on IS / IT planning and development. The use of PM and SSM has been described, in relation to the management of the uncertainties inherent in the project context, and the delivery of project objectives. I have also reported on the evaluation of the project, which was identified as successful by key stakeholders. Following project completion, considerable changes to the HPRB IS / IT architecture were identified, changes which were in line with changes outlined in the strategic plan. This suggests that the project provided clear and demonstrable benefit to the organisation within one year.

In the following chapter I reflect upon the project and the use of PM and SSM, as combined through a variant of the Embedding model of pluralism. Learning is elicited through reflection on the relationship between the literatures on PM, SSM and pluralism and experiences in the project. Learning is structured around five research questions that have been identified in previous chapters, and a selection of learning outcomes are discussed, that inform an understanding of the research focus.

## **Chapter 8 – Reflection and learning**

"... in studying projects and trying to ask what are the most effective policies for reducing time and cost overruns, you could collect mountains of data over many projects, or you could 'play' with policies in one project in a microworld. The world of methodologies and their relationships is largely unexplored" (Barton, Emery et al, 2004, p. 25).

### **Introduction**

This chapter focuses on learning that has emerged through reflection on the actions taken in managing the IT / CT Platform Project, in relation to the literature previously examined in this thesis. Learning has occurred at both an implicit and explicit level. Learning has been made explicit through a process facilitated by deliberate iterations through cycles of Action Research, both during the intervention in HPRB, and during the process of writing this thesis. As discussed in Chapter 3, thesis writing can be considered an Action Research cycle in itself, one involving different kinds of action and reflection than those involved during the intervention. This chapter can then be considered as the last AR cycle of this research (See Figure 28 – Chapter 3), where previous actions are reflected upon, in relation to intended outcomes and the results of action. Learning is elicited through reflection on the links between models and frameworks applied in practice and their correspondence, or lack of correspondence, to models and frameworks in the various literatures.

To remind the reader, the research focus is:

An examination of the pluralist combination of PM and SSM, based on the Embedding model for the combination of methodologies from the hard and soft paradigms, studied in the context of an IS / IT strategy development project in the NSW public sector.

Examination of this research focus and discussion of learning that has resulted from this research is structured around five questions that have been developed through reflection on the literature, as previously introduced in Chapters 4 – 6, and one emergent area of learning that was of particular significance in the project.

- The emergent area of learning relates to the value of changing levels of analysis.

The five questions are:

- How appropriate was SSM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?
- How appropriate was PM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?
- Were difficulties encountered in using tools and techniques obliquely, operated under a paradigm other than that for which they were originally developed?
- Were practical or philosophical problems encountered in combining PM and SSM in such a way that equal emphasis was placed on the hard and soft paradigms in the IT / CT Platform Project?
- Was Embedding effective as a model for combining PM and SSM in the IT / CT Platform Project?

**How appropriate was SSM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?**

Use of SSM in this research contributed a variety of emphases that were of particular significance to the success of the intervention, including: a focus on the process of communication; a focus on human organisation; and a learning and goal definition focus. I found SSM to be particularly suited to informing action taken in a situation where it was assumed that no single best solution existed to defining the direction for the development of HPRB's IS / IT. The position on communication adopted during the project clearly aligns with the emphases in the central texts on SSM. For example:

“It is the debate within which what would count as ‘improvements’ is defined for a particular group of people in a particular situation with their unique history and culture, including their politics. It is also the debate which must define what ‘action to improve’ is culturally feasible as

well as arguably desirable; and it is debate which must find its way to the accommodations between individuals and/or groups with different views and interests, which would enable action to be taken in the situation" (Checkland & Holwell, 1998a, p. 160).

A similar focus can also be seen in the work of Geoffrey Vickers, a writer who influenced Checkland's development of SSM, and who emphasised the importance of ongoing communication in policy development and implementation, areas of application comparable with strategy development. "The making of policy, especially in times of rapid change, involves continuing dialogue, based on readiness to question familiar assumptions and to consider restructuring of problems" (Vickers, 1968, p. 105). In the IT / CT Platform Project I made use of a process of ongoing dialogue as part of the process of creating the IS / IT Strategic Plan (HPRB, 2003). However, to provide benefit, it was understood that the Strategic Plan would have to facilitate future discussion. In the case of strategic change, "... the major agency of such change can only be the plan itself, regarded as communication" (Vickers, 1965, p. 93). Understanding the Strategic Plan as the basis of communication encouraged a focus on how the ideas involved in the Strategic Plan could be transferred effectively, and is arguably one of the reasons that the project was successful.

Differences between the languages being used by different stakeholder groups became obvious at an early stage of the project. It was clear that suppliers tended to rely heavily on industry specific terminology, terminology with which major internal stakeholders were neither comfortable nor fluent. The IT industry often uses "... a language dominated by 'hard', technology-oriented metaphor ..." (Day, 2000, p. 349), which can result in the business community becoming disempowered, with IT analogies and metaphors unnecessarily dominating discussion (p. 356). Morton, Ackerman et al (2001) have previously identified two different schools of thought relevant to group decision support, each of which has a different set of metaphors and vocabularies. "If the project manager is to maintain smooth interface with his technical experts, his strategy for handling this type of situation may require acute human relations skills ..." including an understanding of the participants' different professional backgrounds (Wilemon & Cicero, 1970, p. 272).

As mentioned in the previous chapter, my role in the IT / CT Platform Project frequently felt like that of a translator, consciously negotiating meaning between participants in an effort to avoid misunderstanding.

"This need constantly to restructure problems makes novel demands on communication. For policy-making is a collective activity and the first condition of the communication which makes it possible is that the participants should be talking about the same thing, or at least know when this is not so. Most of the discussion which goes into policy making is directed to reaching agreement on how the situation can most usefully be regarded; in other words what is the complex of relationships most significantly involved. Policy-making is vastly complicated when this cannot be taken for granted but must constantly be reviewed" (Vickers, 1968, p. 99).

The interpretive basis for SSM, and the various techniques associated with SSM, when adapted to the culture of the IT / CT Platform Project, were found to be effective in bringing awareness to, and facilitating, this the constant review of meaning.

However, the language of SSM and associated systems terminology was not considered appropriate to the project context. Through discussion with key stakeholders, it was decided that it would be more effective to work with the languages already existing in the project context, instead of introducing a new language to the situation. Other researchers have found similar results regarding the terminology and concepts associated with SSM, which are "... couched in a language not entirely familiar to its readers, cannot be readily assimilated into an already busy working environment" (Beeson & Davies, 2000, p. 187). However, once SSM concepts were expressed in a form that was appropriate to the situation and structured in terms of the language of project management and the NSW Government, SSM concepts were an effective basis for guiding action, and were readily assimilated by participants. This aligns with observations in the SSM literature that use of SSM does not have to be explicit if it is to be effective (Checkland, 2000a, p. 807 – 8).

The emphasis that SSM places on human organisation was also of benefit to the project process. A structured and reductionist idea of organisation based on hierarchies of command and control and the reduction of organisational objectives into manageable work packages, may be applicable in stable environments where goals can be broken down clearly and task differentiation is clear. However, in the project context, a more



fluid approach which focused on continuing interaction between different functional units and different levels in the organisation was useful in ensuring that the changing needs of different stakeholders were met. The idea of 'organisation' presented within SSM, as an ongoing social process of meaning and value negotiation, seemed to facilitate effective action, as it led me to expect the persistent need to redefine both the project goals and acknowledge the relevance of previously completed work. Adopting a more structured model of human organisation may have encouraged the expectation of a stability that did not exist, or reliance on formalised routes for communication, which may not have addressed the need for a changing response to participation throughout the project.

It is impossible to determine how the intervention would have proceeded if either SSM or PM had not been used. The influence of the researcher, the participants and the problem situation cannot be isolated from the way that the methodology was interpreted, or which actions might have been taken if SSM had not been applied in the project context. However, several tendencies for emphasis have been identified above, which are present in the SSM literature and were effective within the IT / CT Platform Project. This suggests that SSM was well suited to the needs of the project. However, this is not surprising, given both the development of SSM being influenced by Checkland's work in the UK National Health Service, and an emphasis in the later work on SSM on the needs of IS development.

### **How appropriate was PM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?**

Although PM was used in managing the IT / CT Platform Project successfully, considerable adaptations were made in its use, and substantial differences can be seen between the world views suggested by the literature on traditional PM and those used within the project. The field of PM generally tends to focus on the project specific aspects of the field, emphasising what makes PM different from other professions. This is a tactic which could arguably be related to an effort to differentiate the profession from other forms of management, delineating professional boundaries. However, a side effect of this is that activities that are shared with other aspects of management are deemphasised in favour of PM activities. Some aspects of PM regularly identified as

contributing to project success (See Chapter 5), such as the management of the people and communication, which are of particular importance in soft projects, are given low priority in the traditional PM literature. For instance, the PMBOK® Guide (PMI, 2000) devotes an equal lowest number of page numbers to HR management and Communication management. Communication is addressed in terms of PM specific areas, such as the planning of information distribution, performance reporting and administrative closure (pp. 117 – 26), factors which were not found to be of particular relevance in managing the IT / CT Platform Project. Some techniques are also offered for project specific HR management, but instead of addressing the topic in detail, the prospective project manager is referred to the "... substantial body of literature about dealing with people in an operational, ongoing context" (p. 107).

The PM literature tends to place a different emphasis on communication to the SSM literature. In the PM literature, communication is often portrayed as a skill, or area of knowledge, that can be applied in order to reach project goals. Attaining the goals is the focus of project management, while by contrast, facilitating communication can be seen as one of the goals of SSM. Actively managing communication, as opposed to planning communication and then following the communications plan, was of particular importance to this project, due to the inherent uncertainty involved. However, the irony in this situation is that of SSM and PM, while PM placed the less efficacious emphasis on language and communication, it was the terminology of PM that was considered most appropriate to the situation. PM provided a vocabulary which was appropriate to the project context, due to previous penetration of project management concepts and terminology into the NSW Government (e.g. Office of Information Technology, 2002b; Office of Information Technology, 2002c; NSW Health Information & Asset Services Division, 1996).

As previously discussed, the goals of this project could not be clearly defined at project inception. It may be the case that in some application areas clear and stable goals are rarely available, despite the assumptions of the hard paradigm. "Usually business plans and goals are not available formally. If they are, they may be ill-defined or difficult to express in terms which are easily translated ..." (Avison & Shah, 1997, p. 15). Indeed, the IT / CT Platform Project is a prime example of a project where the definition and expression of the project goals was as much a part of reaching project success as

delivering the final product. The lack of clear and stable goals invalidated a wide variety of the traditional PM tools and techniques which require that the assumption of clear goals be met. A further assumption associated with many of the PM tools and techniques is that efficiency of delivery is of prime importance. This assumption can be linked to associations with a private sector focus on return on investment and the time that it takes to deliver a new product to market. However, this project was set in a context which focused on service delivery, not profit. Unlike the general emphasis suggested by the PM literature, effectiveness, rather than efficiency, was the overarching goal of the PM process in the IT / CT Platform Project.

The explicit combination of PM and systems thinking also proved to be very effective in the IT / CT Platform Project. The links between systems thinking and project management have been discussed in Chapter 5, and are clear in the works of some early and influential project management texts, such as *Systems Analysis and Project Management* (Cleland & King, 1968). However, the links between systems thinking and project management have been declining (Crawford & England, 2004), and deliberately reduced in some instances (Morris, Patel et al, 2000). This decline is despite some researchers' declaration of the need to strengthen the relationship between the fields, such as Yeo's 1993 article: *Systems thinking and project management - time to reunite*. An emphasis on systems thinking was found to be useful in developing an understanding of the influences both of and to the project, an understanding which was vital in a project which was subject to near constant contextual change. This suggests that there could be benefit in reversing the trend of a diminishing influence of systems thinking on PM.

Learning emerging from this research also related to two different reconceptualisations of the PM life cycle: one in terms of its scope; the other in terms of its structure. Although a variety of different views of the project life cycle exist, the traditional project life cycle starts at some point after goals have been defined, and ends when the product of the project is formally handed over to clients, or when project evaluation is completed after hand-over. Even those life cycle models that include aspects of goal definition tend to attribute the majority of resource expenditure to the implementation phases of the project. However, reflection on this project suggests that a greater

proportion of time and energy were devoted to goal definition and negotiation than implementation.

In Chapter 5 project success was differentiated from project management success, the former necessarily being the harder of the two, as it addresses the changing needs of the situation, instead of simply meeting predetermined goals (Cooke-Davies, 2002, p. 187). It was also noted that traditional PM only directly addresses one of six possible gaps which can cause projects to fail (Lai, 2000, pp. 206 – 8). In order to deliver project, not project management, success and address these potential failure points, it was necessary to go beyond the traditional project life cycle, directly attending to the process of defining project goals with, and for, the organisation and maintaining contact with the organisation after product hand-over to ensure the organisation reaped benefits from the project. I continued to work with HPRB after formal acceptance of deliverables, in order to make certain that project benefits were realised.

It should be noted that the boundary between project and program management is a permeable one in some instances. While the IT / CT Platform Project can be seen as a project in its own right, it can also be viewed as the initiation and goal definition stage of a subsequent program of IS / IT development within the organisation. When viewed in the latter light, it becomes clear that for HPRB to have benefited from the project, it was necessary to ensure a seamless transition from the creation of strategies for IS / IT development, to the actual implementation of those strategies. For this reason, although product hand-over was officially considered to be the end of the project, it would be difficult to clearly isolate when work associated with the project completed and work on the implementation of the first few strategies for IS / IT development began.

Reflection on this led to a key point of learning for this research. It is easy to focus on the deliverables of a project, and to assume that delivering a quality product will lead to project success. However, I found it useful to separate the ideas of acceptance of deliverables and the realisation of benefits. Deliverables may contribute to organisational benefits, but they do not equate to organisational benefits, and it is the desired benefits that provide the original rationale behind projects. Separating the ideas of deliverables and benefits allowed me to focus on the deliverables being a step

towards providing particular benefits to the organisation, instead of deliverables being an end in themselves.

- Learning Outcome: The project doesn't necessarily end when production of deliverables is complete. Deliverables and objectives are separate concepts. It is easy to focus on the deliverables, but it is more important to focus on the benefits to the organisation. Deliverables certainly don't equate to benefits, and it's benefits that provide the rationale behind projects.

The second adaptation to the traditional model of the project life cycle was structural and involved the way that work was managed. Traditionally, projects are managed in a linear fashion, with clear separation between the different stages of a project (See Figure 39 – Chapter 5). The project phase and process group model presented in the PMBOK® Guide (PMI, 2000) is a typical example of this (See Figure 42 – Chapter 5), with different phases of the project delineated by clear processes for initiating and closing. Learning in relation to the structure of the life cycle emerged while writing the narrative description of the IT / CT Platform Project. For the purposes of clear description, considerable effort was made to describe the various project activities in terms of process groups and phases. However, it rapidly became clear that not only was the project not managed in terms of processes groups and phases, but to attempt to describe activities taken in managing the project in these terms was both inappropriate and misleading. Indeed, I could not identify *any* phases that had clearly been initiated or closed during the project.

The actual project life cycle was similar to a life cycle model developed by Starr (1990) for use within fast response organisations, where speed of delivery, not efficiency of resource use is the prime determinant of success (See Figure 46 - Chapter 5). However, parallel staging was not used to increase delivery speed, but to accommodate the changing goals and environmental influences on the project. This model allowed for work to continue on different processes or milestones when circumstances permitted, while avoiding premature lock-in to a single, untested solution. Although an approximation, the timeline below (See Figure 77) shows the main processes involved throughout the course of the project. Through reflection it became apparent that this model is comparable to the model of the overlap of process groups within a phase (See

Figure 43 – Chapter 5), suggesting that the IT / CT Platform Project could be considered a project with one phase.

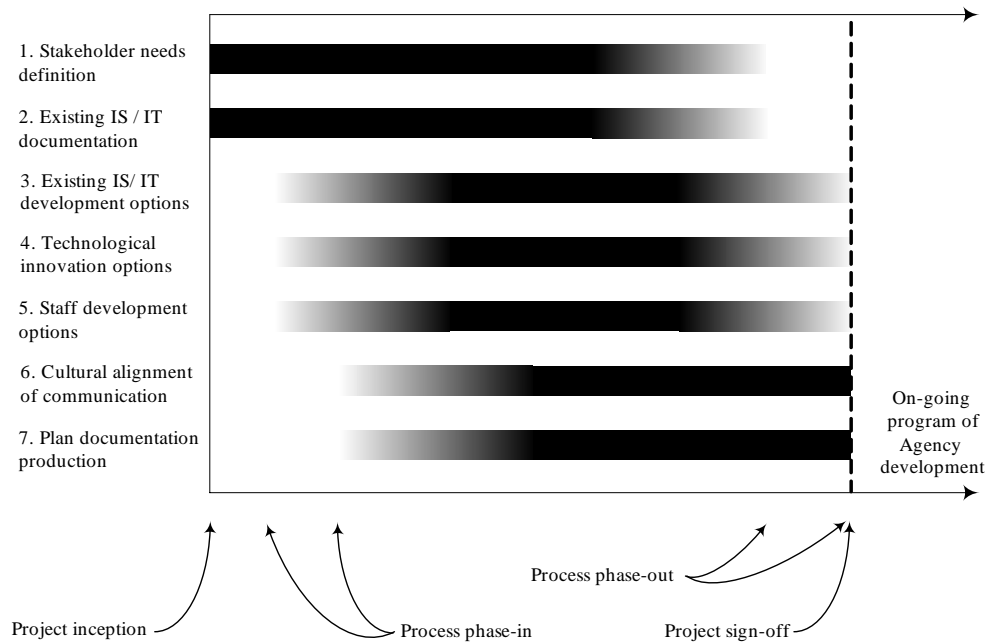


Figure 77: IT / CT Platform Project timeline

The majority of project processes ran simultaneously for the life of the project. Some, such as processes 1 and 2 declined in significance towards the end of the project, as the project focus shifted more towards delivery, and yet the process of defining the goals for the project could not be said to have stopped at any point during the life of the project. Processes 6 and 7, which dealt directly with the production of deliverables, started when enough exploratory work had been completed that the vague shape of the deliverables was understood. A milestone approach to planning and managing the project was used, but this did not involve a linear sequence of milestones to be met, along a critical path to the final objective. Instead, milestones were viewed as a selection of criteria that must be met at some point in the development process; as guidelines for defining those work packages that would contribute to delivery of final objectives.

Three aspects of the project context can be identified which may have contributed to the efficacy of a parallel staged life cycle model in this project: the use of the Embedding model for methodological and paradigmatic pluralism, discussed below; the

bureaucratic context; and the project being ill defined, with changing goals. As noted in Chapter 5, Hassen (1997, pp. 279 – 81) distinguishes between technical and bureaucratic projects, noting that bureaucratic projects are apt to change, and tend to be typified by continuing processes rather than by discrete tasks. Bureaucratic projects involve a collection of processes, managed in a political environment. In these projects, traditional PM techniques, such as PERT and Gantt Charts, which assume the existence of clear goals and definable tasks are of "... doubtful usefulness" (p. 281). The need for continual reworking of multiple aspects of the project, in light of emergent risks and continuing goal definition, resulted in a need for different aspects of the project to be developed iteratively and simultaneously. In this way, gradual progression towards the completion of different aspects of the project could be developed at once, ensuring that all aspects of the project met stakeholder and contextual needs, instead of some aspects of the project being finalised early on in the project life cycle, which would close off options for development which might later become necessary in ensuring project success.

- Learning Outcome: A parallel stage life cycle model for PM may be more appropriate than a linear life cycle in dynamic and changing or bureaucratic environments.

**Were difficulties encountered in using tools and techniques obliquely, operated under a paradigm other than that for which they were originally developed?**

The oblique use of a technique, or methodology part, involves using it governed by a paradigm other than that which it was originally designed for or within, as discussed in Chapter 6. A variety of examples of the oblique use of techniques are discussed in this section. However, the clearest example of the oblique use of an aspect of a methodology in the project, is also potentially the most contentious. This is the oblique use, not of a technique, but of a vocabulary. As discussed above, the terminology of PM was readily accessible to those in the project context, but many of the assumptions associated with the hard paradigm regarding goals, environmental stability and the role of the project manager were not considered appropriate in the project, due to the inherent turbulence in the environment. However, the interpretive assumptions on which SSM is based did address significant aspects of the IT / CT Platform Project, and acted as a effective basis

for informing action. In effect, PM terms were used to express ideas based on SSM concepts and the soft paradigm. Thus, the terminology of PM was used obliquely. For example, in the IT / CT Platform Project, PM terminology was used as the basis for defining project briefs, performing much the same function that SSM root definitions would. The project briefs could be considered equivalent to Root Definitions expressed through PM terminology. This combination of approaches is an example of an imperialist use of SSM, where, in the terms used in discussion of TSI (See Chapter 6), SSM was the dominant methodology and PM the secondary methodology, its epistemology and approach to action being temporarily replaced by that of SSM. The combination of Root Definitions and project briefs was based on previous research conducted at UTS (Crawford & Costello, 2000; Costello, Crawford, et. al., 2002; Costello, Crawford, et. al., 2002).

Previous research has demonstrated that the concept of root definitions can be used effectively without dogmatically following the process defined in the SSM literature. For instance, Gregory and Midgley (2000, p. 283) used the CATWOE mnemonic to great effect, without engaging with the "... precise wording of root definitions." In this research, the elements of the CATWOE mnemonic were rephrased. Customers become stakeholders; Actors, the project manager and team members. The Transformation is expressed through definitions of project vision, objectives and deliverables. Weltanschauung is noted through fields in the project briefing system which record who created and last updated the brief. The Owners are recorded as the Portfolio Co-ordinator and Portfolio Sponsor, while the Environmental influences are recorded in terms of project alignment with Government strategies and priorities, risk assessments and linkages to other projects. The PQR (what / how / why) structure of Root Definitions was also used both within the project briefs and in the content of product of the project. In the project briefs, 'what' was discussed in terms of the project's objectives, 'how' in terms of project deliverables, milestones and sub-projects, while 'why' was discussed in terms of the project vision, contribution to Government objectives and strategies and alignment to organisational and program objectives. As discussed in the previous chapter, this structure was also used in expressing the various strategies in the HPRB IS / IT Strategic Plan. With regard to the formulation of Root Definitions, Checkland (1981, p. 176) asks:



"Is the measure of performance in this model explicit, and what would constitute 'good' and 'bad' performance according to it?; What are the sub-systems in this model and are the influences on them of their environments taken into account in the activities of the system?; Are the system boundaries well defined?"

These questions were all explicitly addressed through the process of creating briefs for the various ongoing projects in HPRB, and accessibly expressed through PM terminology.

- Learning Outcome: Just as techniques can be used obliquely, so too can the terminology associated with a particular methodology be used obliquely.

In the case of the other examples of the oblique use of techniques in this project, clear definition of the dominant and secondary paradigms is more problematic. For instance, as discussed in the previous chapter, SSM Conceptual Models were combined with Data Flow Diagrams (DFD), a predominantly hard technique, to facilitate the communication of aspects of the Strategic Plan. Although the two modelling techniques produce diagrams that are aesthetically different, similarities can be seen between the way that DFDs and Conceptual Models are structured. In fact, Rose (1997, p. 260) identifies the main difference between the two modelling techniques as being their respective epistemologies. "Thus SSM models are clearly distinguished from more conventional systems models such as data flow diagrams (descriptive or normative accounts of 'systems' which are assumed really to exist in the world)." Previous studies have combined DFDs with other aspects of SSM. McQuinn (2002, p. 385) made use of a combination of DFDs and SSM Rich Pictures, for the purposes of helping clients express differences in world views, finding that "... what may be considered to be a 'positivist' tool may be incorporated into an interpretivist study." Lai (2000) has also had similar success with a use of Object Oriented diagramming as the basis of communication and to elicit user requirements.

In this project, the combination of DFDs and Conceptual Models resulted in a hybrid, that was strictly neither DFD nor Conceptual Model, and it would be difficult to clearly state which paradigm the hybrid belonged to, as at different points in the project the hybrid technique was used in a way that would suggest its use governed by different

paradigms. No significant problems were encountered in using this hybrid technique governed by different paradigms. There was little variation needed in the process of actually creating the diagrams when used under different paradigms. The main variation in operating from within a different paradigm was not the content of the diagrams, but the context and purposes for which they were used. When used under the hard paradigm, the diagrams were used as descriptions of reality, as statements about what exists in the world, which were expected to be uncontentious points from which further work could be developed. When used under the soft paradigm, the diagrams were not used as descriptions of reality, but as the focus of discussion. Because of this, diagrams were more likely to be thrown out, drawn over, or constantly reworked, instead of being used as stable definitions, and then successively broken down through a series of lower level diagrams. When used under the soft paradigm, diagrams formed the basis of and focus for continuing debate and negotiation, which would result in a persistently reformatting collection of perspectives on a situation, rather than a basis for a reductionist perspective and the associated expectation of control.

- Learning Outcome: The main variation in using techniques obliquely may not be the content of the technique, but the use to which they are put. The intentions and values of the governing paradigm will determine the context in which the technique is put to use, and the ends it serves.

**Were practical or philosophical problems encountered in combining PM and SSM in such a way that equal emphasis was placed on the hard and soft paradigms in the IT / CT Platform Project?**

Many of the differences between the stances adopted by traditional PM and SSM can be summarised by the differences between the hard and soft paradigms, as discussed throughout this thesis. Analysis of the literature suggests several possible tensions that may have emerged during the process of combining PM and SSM. These tensions include the tendencies towards emergent learning and exploration versus control; participation and facilitation versus the assumption of role separation and expert status; and a continuously unfolding chain of events and ideas versus a defined beginning and end.

As a practitioner, when aware of the paradigm that was informing action, I consistently felt as if I was operating from one paradigm or the other, not both simultaneously. Consistent with what the mutually contradictory nature of the premises of the hard and soft paradigms suggests, from experience it felt as if it would not be possible to operate from within both the hard and soft paradigms at the same time. This confirms the theoretical proposition that the paradigms are incommensurable. For instance, focus on participation and stakeholder involvement precluded taking the role of an expert, and dictating to stakeholders what should be done. Focus on the never ending process of learning associated with the soft paradigm contradicted the goal focus and assumption of finite project duration associated with the hard paradigm, as did the reverse. Similarly, competing influences appear to be at work in the desires for learning and the desire for control, as discussed in Chapter 5 in relation to Thomas and Tjader's (2000, p. 6) statement that an emphasis on learning in PM had been supplanted by with the idea of control. Learning involves staying open to what a situation presents, accepting the ambiguity inherent in a complex situation and perhaps even allowing previously held assumptions come apart and reform in light of new knowledge. A desire for control and certainty instead involves a practitioner working with a particular a framework, benchmark or model, or working with the environment to ensure that results conform to a standard. In the soft paradigm, the mental model is reformed in relation to what is uncovered in the external world. In the hard paradigm, the external world is reformed in relation to a particular mental model.

However, focusing on the differences between approaches can lead to overestimation of the influence of their differences, and to the assumption that the approaches are irretrievably irreconcilable. Despite the differences between the PM and SSM, similarities can also be seen. For instance, both approaches share a common root in hard systems thinking. Both SSM and project management share the central concept of 'transformation'. In SSM, the centrality of the transformation of inputs to outputs is explicitly expressed in the 'T' of the CATWOE mnemonic. Similarly, it has been identified that PM "... rests on the transformation theory (or view) of production ..." (Koskela & Howell, 2002, p. 294). However, as identified above, differences in the underpinning paradigm can lead to terms being interpreted in different ways. For traditional PM, transformation of inputs to outputs occurs through hierarchical breakdown of products and work and the efficient allocation of resources, while for

SSM transformation occurs through systems of human activity, negotiated through discussion and debate.

The contradictions, inconsistencies and mutual exclusions between the hard and soft paradigms ensured that I, as a practitioner, was operating from one paradigm or the other, and not both at once. However, these differences did not restrict me from operating in different paradigms at different times. Changing paradigms might be considered inconsistent to researchers intent on philosophical purity, as it involved using different perspectives on reality at different times, perspectives which entailed different values and ways of constructing knowledge. However, philosophical purity was not the goal of the IT / CT Platform Project. Practical efficacy was more important, and the paradigm that I operated from was changed in relation to the needs of the situation, with different world views aligning with the needs of the project at some points more than others.

- Learning Outcome: The philosophical and theoretical differences between the hard and soft paradigms do not necessarily translate into difficulties in pluralist practice.

In entering the project, it was my intention to use the hard and soft paradigms to an equal degree, so that maximum benefit could be gleaned from the different perspectives. However, answering whether the paradigms were used to an equal degree is somewhat problematic, but can be informed by an examination of whether the project can be considered an example of imperialism or pluralism. As discussed in Chapter 6, a pluralist approach can be differentiated from an imperialist approach in that for pluralism, no one paradigm is assumed to be granted hegemony over the practitioner's understanding or management of an intervention. However, assessment of whether the project was pluralist or imperialist must rely on a subjective assessment of the influence that the hard and soft paradigms had on my thought and action during the project.

It may be a simple task for the researcher to state which paradigm they intend to operate from, but it is a more complex ask to state which paradigm a researcher actually did operate from, especially when different paradigms are explicitly used in an intervention.

The difficulties involved in making the implicit aspects of our actions explicit are conveyed by Brocklesby (1997, p. 207):

"As (self) observers we become aware of some of our action patterns, but because only highly abstracted and selected aspects of our operations are ever languaged, much of what we do remains unnoticed in the background. The basics may be simply so obvious that we do not see them. Even if we do notice, we are subject to our structural determinism, so whereas the actual experience of doing something is spontaneous, thinking about and then articulating it is a reformulated activity that occurs post-event within this constraint. The same logic applies when we ask experienced practitioners what worked for them. They do not know; they only know the story of what worked for them."

While at some times I was clearly operating from one paradigm or the other, at others the separation between the paradigms was indistinct. On reflection, in some situations, it was not clear which paradigm I was operating from within, neither in terms of the actions taken, nor in my experience of the situation. It was identified in Chapter 6 that some practitioners find the transfer between paradigms traumatic. However, even though the hard and soft paradigms may provide different ways of viewing the world, they do not demand a permanent and exclusive allegiance from the practitioner.

"We accept the fact that the subject presents different aspects of itself at different times or from different standpoints. We accept the fact that these aspects do not simply cancel each other out as research proceeds, but are like mutually exclusive conditions that exist by themselves and combine only in us." (Gadamer, 1996, p. 284)

The different perspectives that the paradigms provide on the world can be readily reconciled internally, presuming that the value of the different perspectives is understood. At some points in the project I would operate from an undefined mental space that did not make particular reference to the defining premises of either of the paradigms, and which could not readily be associated with one paradigm or the other. At other times I would slip from one paradigm to the other without conscious awareness, only becoming aware of the change in paradigm upon reflection. No trauma and little difficulty in changing paradigms was experienced on my part. It simply involved awareness of the consequences of adopting a different perspective.

- Learning Outcome: Contrary to the suggestions of some authors in the CST literature, changing paradigm does not have to be a difficult or traumatic process.

I reflected on the notes taken during the IT / CT Platform Project, in an effort to find a clear indicator as to which paradigm supported action taken at different points during the project. A variety of dichotomies have been identified throughout this thesis which can be used to distinguish between the hard and soft paradigms, many of which relate to the philosophical position taken by the paradigms, while others relate to the models and frameworks which are used to interpret reality, or to the roles that are taken by the practitioner. In reflecting upon the project, I found one dichotomy to be both accessible to personal reflection and particularly useful as a guideline to identifying points at which either paradigm was clearly informing action and thought. This was the dichotomy of an emphasis on learning as opposed to a desire for control. Experience of the desire for control and certainty was readily differentiable from desire for learning and acceptance of ambiguity. This dichotomy was found to be a substantially clearer indicator of the paradigm from which I operated at different points during the intervention than the other dichotomies, such as those at the philosophical or axiological levels. Despite the ease with which the paradigms were differentiated using this dichotomy, and the centrality of this dichotomy identified by Checkland in 1985 (Checkland, 2003), of the four sets of hard and soft dichotomies introduced in Chapter 2, this dichotomy only explicitly appears once, as identified by Fitzgerald and Howcroft (1998, p. 319).

- Learning Outcome: The dichotomy of learning versus control was found to be a readily accessible basis for distinguishing between the hard and soft paradigms through personal reflection.

Having come to an understanding of how the different paradigms can be differentiated through personal reflection on practice, we return to discussion of whether the intervention should be classified as imperialist or pluralist. If the intervention was pluralist, then it is possible that an equal distribution of the hard and soft paradigms occurred during the intervention, with no paradigm taking clear hegemony. However, if the intervention was imperialist, then one paradigm would have clearly dominated over

the other. The TSI literature discusses the possibility of swapping imperialist status during an intervention, with different methodologies taking dominant and secondary roles at different times in an intervention. If imperialist status can be swapped during an intervention, then it is theoretically possible for a paradigm to hold hegemony over just a section of an intervention, instead of informing an intervention in its entirety. A project, such as this one, could then be considered as a series of little, changing imperialist hegemonies, but still considered to be pluralist. As no single paradigm exclusively dominated the way in which action was informed in the project, the IT / CT Platform Project should be considered an example of pluralism, or multiparadigm multimethodology (See Table 6 – Chapter 7).

However, review of notes taken during the project reveals that despite my intention to use the hard and soft paradigms to an equal degree in managing the IT / CT Platform Project, this was not accomplished. The soft paradigm informed action for more of the project than the hard paradigm. My failure to place equal emphasis on both paradigms can be related to three different influencing factors: the interpretive research paradigm; my personal preferences; and the contextual needs of the project. Direct links of influence between the way in which action was reflected upon as part of the research process and actions taken in the project are difficult to isolate. However, it is reasonable to suggest that using a particular paradigm to reflect upon actions may actually influence the practitioner towards future actions which show a greater alignment with that paradigm than with a different paradigm with contradictory premises. I may have brought bias to my combination of the hard and soft paradigms, through governing my reflection on the process of combining with the soft paradigm.

As we move up *The Schema* through methods, and methodologies, to paradigms, there is an increasing degree of personal interpretation that takes place in applying the approach to practice. Having applied both PM and SSM, and having operated from both the hard and soft paradigms during the project, I was consistently more comfortable when operating from within the soft paradigm than within the hard paradigm. Although I was not aware of this at the start of this research, it is now apparent that the propositions of the soft paradigm and the world view which is developed from those propositions felt more appropriate and more closely aligned with my natural perspective than did the world view of the hard paradigm. This understanding of a general

alignment between my personality and the soft paradigm has been developed through reflection on the intervention. Previously, I had assumed that it was possible to work from a neutral space between the paradigms, and that in understanding the value of both paradigms I should be able to move between paradigms with equal ease. However, this did not prove to be the case, with my personal inclinations naturally drawing me more towards the soft paradigm than hard paradigm, and influencing the way the two paradigms were applied in the project.

- Learning Outcome: The way that paradigms are used to inform the interpretation and application of approaches in practice will be strongly influenced by the prejudices and biases that the practitioner brings to the project.

That the soft paradigm informed action in the project more often than the hard paradigm can also be understood in relation to the implications of either deliberately choosing paradigms or letting the paradigm change to suit the situation. At some points one paradigm or the other was consciously chosen as the basis for action. For instance, during periods where I was explicitly working towards defining the project goals, or during periods of focused stakeholder consultation, the assumptions of the soft paradigm were adopted. In other instances, such as when the emphasis in the project shifted more towards final production than goal definition, or periods of modelling the real world IT network configuration, the assumptions of the hard paradigm were adopted. At some points, I noticed that I had been focused on product delivery and had not taken note of any environmental changes recently, and would consciously shift from the hard to the soft paradigm, in order to learn whether my existing understanding of project goal remained appropriate, or in which ways they needed to change. An adequate understanding of the hard and soft paradigms allows for conscious change between them. With particular mental discipline, it should then theoretically have been possible to work towards spending equal time operating from both the hard and soft paradigms.

However, at other points the paradigm emerged in relation to the needs of the situation, and was not a matter of conscious choice. As SOSM established, different paradigms are appropriate for different circumstances, and at some points in the intervention, I noticed that my operating paradigm unconsciously changed in relation to the specific



needs of the problem situation. As identified in the previous chapter, the project could be considered to be more soft than hard, due to the changing environmental influences, the ill-defined goals, the emphasis on debate and the desire for continuous learning on the part of key stakeholders. Thiry (2002, p. 222) also identifies that the realm of strategic management is softer than the immediate practicalities of hard implementation. Although I originally considered that an equal emphasis on the paradigms would allow for maximum benefit to be gleaned from the combination, it is doubtful that a stronger emphasis on the hard paradigm would have been appropriate. To have stubbornly insisted in an equal spread between paradigms would have involved being wilfully blind to the changing needs of the problem situation, and therefore both unethical and impractical. It is now clear that an equal weighting of the different paradigms is not necessarily best. The needs of the intervention will determine the balance between paradigms that is appropriate.

- Learning Outcome: Let the needs of the immediate circumstances determine the most appropriate paradigm to adopt. The situation will, and should, determine the balance between paradigms that is appropriate.

### **Was Embedding effective as a model for combining PM and SSM in the IT / CT Platform Project?**

Most of the combinations of PM and SSM that can be found in the literature are instances of Grafting. Indeed, the vast majority of instances of multiparadigm pluralism can be classified as Grafting. Nonetheless, Embedding is identified in the literature as a potentially more effective approach. It is arguable whether the action taken in the project could be called a traditional application of Embedding as Miles (1988) intends. A strict reading of the way Miles describes Embedding suggests that it involves an imperialist approach, where the soft paradigm informs the application of hard tools and techniques. The specific combination of approaches in this project could more accurately be described as a pluralist approach to alternating imperialist status between the hard and soft paradigms, with methodologies from both paradigms run concurrently. My application strongly draws on Miles' earlier (1988) depiction of Embedding, while incorporating aspects of other life cycle models discussed in Chapter 5, such as those produced by Remenyi and Sherwood-Smith (1999, p. 20) for continuous participative

evaluation (See Figure 56 – Chapter 5) and Starr (1990, p. 99) for fast response organisations (See Figure 46 – Chapter 5). Despite the differences between Miles' description of Embedding and my application, the distinction between serial and parallel life cycles in the Grafting and Embedding models has been useful in describing how this project differs from many other examples of pluralism in the literature. Thus, I refer to the combination of SSM and PM in the project as an example of Embedding.

From an interpretive perspective, models and frameworks are aids to understanding, much like lenses through which the world can be viewed and interpreted, instead of direct representations of reality. Different frameworks allow experiences to be portrayed in different ways. Review of the IT / CT Platform Project in terms Grafting and Embedding is a prime example of this. When the IT / CT Platform Project is viewed from the perspective of the IS / IT Strategic Development Portfolio as a whole, the project could be considered to be the first stage in an example of Grafting. The IT / CT Platform Project was predominantly informed by the soft paradigm, and acted as precedent for the work of actual IS / IT development, which was later to be predominantly informed by the hard paradigm. However, when the project is examined on its own, instead of being treated as phase in a program, the project can be viewed as an example of Embedding. The relationship between these different perspectives on the project is represented below (See Figure 78).

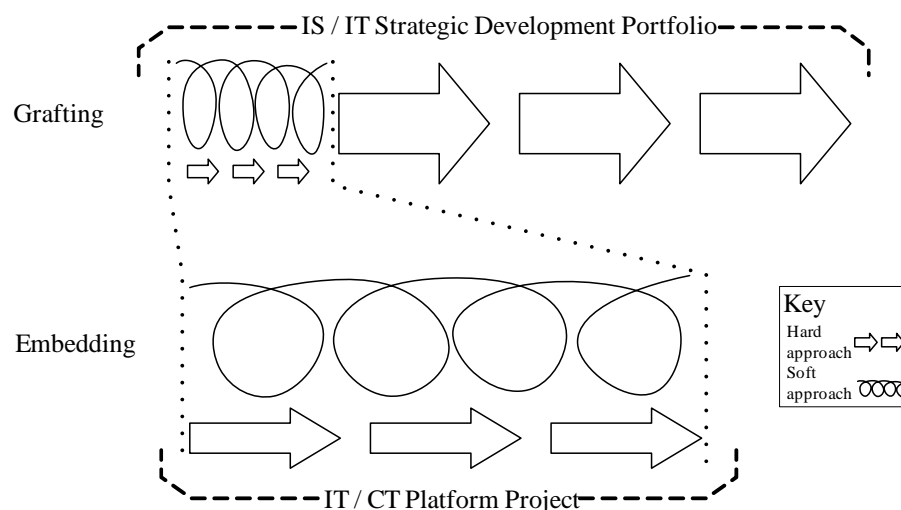


Figure 78: The project as an example of Grafting or Embedding

That an Embedding approach could be used effectively in the IT / CT Platform Project can be linked to learning elicited above in relation to the project life cycle. A phased approach to managing the project was found to be inappropriate to the needs of the problem situation, while an approach featuring multiple parallel, or simultaneous, streams of action was found to closely align with situational needs. Grafting entails employing a linear, reductionist approach to pluralism, where the needs of a project are reduced to categories for actions to be used in sequence. This mindset can be seen in the way a Grafting life cycle is depicted (See Figure 62 – Chapter 6), and is similar in structure to the traditional PM life cycle (See Figure 39 – Chapter 5). These similarities between the general approach to Grafting and traditional PM suggests that Grafting might be more appropriate to situations dominated by the hard paradigm, as Miles (1988, p. 56) suggests. Furthermore, Grafting appears to be suited to relatively stable situations where, despite initial confusion regarding goals, once clearly defined, goals are expected to remain valid and fixed throughout the life of the project.

By contrast, an Embedding approach may be more appropriate in situations where it is not possible to make clear distinctions between the stages of a project. Instead, one can alternate between perspectives as the situation requires, adopting the hard paradigm when the situation stabilises, and adopting the soft paradigm in times of uncertainty. This approach allows for a dynamic combination of the hard and soft paradigms and their associated methodologies, and is suitable to a situation that can not be clearly planned prior to the intervention, or situations typified by ongoing processes, such as bureaucratic environments (Hassen, 1997, pp. 279 – 81). Planning and evaluation, instead of being separate stages at the start and the end of the project respectively, instead become continuous activities, with the distinction between planning, implementation and evaluation dissolving. In such situations, an emphasis on social processes and meaning negotiation may be necessary. This link between interventions where phases are not clearly defined and the role of continuing social interaction is identified by Rosenhead (1997, pp. xiii – xiv):

"Mediated as they are by intervening social interactions, the need for precise transmission of the outputs of one phase of analysis as inputs to the succeeding phase is removed. Instead the outputs of the former are fed to a social process whose purpose is to reshape a shared understanding; this in turn may motivate a revised view of what form of analysis could be usefully be employed next."

- Learning Outcome: Grafting may be applicable in relatively stable situations, where goals, once defined, are expected to remain constant. Embedding may be more appropriate for dynamic and changing environments, where no clear separation of stages is possible.

The most significant benefit that Embedding provided to the IT / CT Platform Project, that would not have so readily been possible if a Grafting approach had been used, was the maintenance of a feeling of tension between the hard and soft paradigms. As Yeo (1993) points out, the hard and soft paradigms, instead of being thought of as mutually contradictory, can be used in a complementary fashion, with each paradigm strengthening the weaknesses of the other. This is also clear in SOSM, and in the previous classifications of the purposes of PM and SSM (See Figure 32 – Chapter 4 and Figure 52 – Chapter 5). When combined, PM and SSM address the aspects of the problem situation not covered by the other, providing the opportunity to address the majority of the aspects of a problem situation (See Figure 65 – Chapter 6).

The different paradigms can be thought of as pulling the attention of the practitioner in particular directions. For instance, in using one paradigm or the other the practitioner's perception is pulled in a particular direction, such as towards holism instead of reductionism or towards focus on the social structure instead of social processes. In using both paradigms, a tension between the different perspectives was created, in effect testing the efficacy of one perspective against the insight gained through another. This is somewhat similar to triangulation or to a dialectic process, with alternation between the hard and soft paradigms creating a continuing tension between different perspectives on a situation, and with ideas based on one perspective continually tested under the light of a different way of viewing the world. In contrast, a Grafting approach only involves one transition between paradigms, when the intervention changes from a focus to learning to implementation, and so the feeling of tension created by continually having to reconcile your own personal, but different, perspectives on a situation would not have been as pronounced.

- Learning Outcome: Embedding can create a beneficial feeling of tension between the hard and soft paradigms, providing the opportunity to regularly check learning developed through one paradigm against the insight of another.

### **Emergent Learning: The importance of changing between levels of analysis**

Traditional PM tends towards reductionism. This is evident in the variety of PM tools that focus on breaking a problem down into constituent parts, for the benefit of increased planning and control. Inherent in this approach is the assumption that more detail is better, an assumption which can lead to loss of awareness of a broader perspective of the situation, if it is sacrificed to the minutiae of a situation. A balance between a low level of analysis and a broad perspective is needed, and can be found by changing the level of enquiry. Some recognition of the benefit of changing levels of analysis can be seen in Turner's (1999, p. 268) discussion of projects where neither the goals nor the methods are well defined. Turner and Cochrane (1993, p. 97) express this, using metaphor: "... consider an eagle ... The project manager must be able to soar above the project, and to see it in its context (purpose), but be able to move down into the project to solve problems as they occur." However, explicit recognition of the need to change between levels of analysis is far from mainstream, with the PM literature predominantly emphasising a reductionist progression towards greater detail, and implicitly, control.

The possibility for adopting a reductionist approach to analysis is also apparent in SSM. Conceptual Models and Root Definitions can be broken down through successive layers of definition, where each activity implied by a Root Definition "... can itself become the source of a root definition to be expanded at the next resolution level" (Checkland & Scholes, 1990, p. 83). However, this is tempered by emphases which reveal the methodology to be more holistic than reductionist in application, such as foci on open-ended learning, systemic effects and the conscious choice of system boundaries. Furthermore, SSM encourages an awareness of the level at which one perceives a situation at any one time. "The idea of levels, or layers ... is absolutely fundamental to systems thinking" (Checkland, 1999, p. A23). Although Root Definitions and Conceptual Models can be broken down through successive layers, this is not necessary in their use. What is more important is an awareness of the level at which they are

created. For instance, Checkland (1999, p. A23) notes that "... there are in principle always a number of levels available, and it is necessary to decide for each root definition which level will be that of 'the system', the level at which will sit the T of CATWOE." These tendencies towards reductionism and holism in PM and SSM respectively can also be understood in relation to *The Schema*. The traditional PM literature tends to focus on the level of tools and techniques, the fine details of how the methodology is applied. The SSM literature, on the other hand, has a much greater emphasis on the more abstracted end of *The Schema*, the levels of paradigm, philosophy and methodology.

However, a reading of SSM's emphasis on awareness of the level of focus could be taken to imply that the practitioner is to critically choose a level that is appropriate to the needs of the intervention and then remain at that level of inquiry. The benefit in awareness of the level of focus in the project came not simply from awareness of other possible levels of analysis or a critical choice of level, but in changing between levels of analysis. There are always many possible levels of analysis that may be of relevance to a problem situation, each associated with different levels of meaning. In complex environments, to "... bring about changes, a multisemic approach is needed. This means taking into account multiple meanings and holding these in mind at one moment. The challenge is always to keep in mind more than one set of meanings any one time" (McIntyre, 2002, p. 11). Using PM and SSM in combination acted as an aid to changing between different levels of meaning and creating links between them. Using different approaches for the different levels of analysis facilitated the process of moving between levels of analysis, by naturally allowing the reductionist tendencies of PM, or the holist tendencies of SSM, to draw the focus of the intervention to different levels of analysis as required. The tension created by two approaches 'pulling' in different directions aided the process of changing levels of analysis, providing continuing contextualisation for the project output production, and provided benefits to communication, such as meeting the need identified by Pulley (1994, p. 6) to frame communication in terms of the audiences' concerns.

- Learning Outcome: Using multiple approaches, with different levels of focus, can help the practitioner to change between levels of analysis.

The Embedding model (See Figure 63 – Chapter 6) of combining approaches was found to be an accurate description of the movement between levels of enquiry experienced in the project and of the feeling of tension present in the interrelationships between the approaches. Links between Embedding and the movement between levels of analysis are clear in the Embedding model. An Embedding approach to pluralism was also found to be compatible with the idea of the hermeneutic circle. An understanding of a problem situation is not created through a single step. Instead, the researcher engages in a series of oscillations between observation of the whole, and observation of the minutiae of an area of inquiry. This approach was found to be useful in an ill-defined project environment, where it was necessary to continually shift between levels of abstraction. Learning regarding changes in the environment and the context of the problem situation needed to be tempered by the specifics of potential solution options, which would then have to be recontextualised, in order to check on their continued relevance to the needs of participants.

### **The context dependence of learning**

As this is interpretive research, which develops learning based on personal reflection on one project, the context dependence of this research must be acknowledged. Mingers (1997b, pp. 419 – 20) differentiates between three aspects of context relevant to pluralist practice: the problem content; the intellectual resources available, including those frameworks, theories techniques and methodologies that may be relevant; and the particular agents engaged with the problem situation (See Figure 79). The context dependence of interventions can also be seen through reference to Ormerod's (1995, 1996, 1999) three cases mentioned earlier. All three of Ormerod's cases involve IS strategy development, managed by a pluralist use of systems approaches, where one of the approaches is SSM. The cases all involve organisations who are seeking to work with their existing IS / IT infrastructure, instead of replacing it completely, and take a decision, rather than a data, oriented approach. The interventions were all managed with the intention of encouraging participation and ownership of the problem through user led design. The Sainsbury's (1995) case even involved the development of five year plan, as in the IT / CT Platform Project. At this level of description, the similarities between these cases and my project are considerable. However, a detailed reading of these cases reveals considerable variation between Ormerod's cases and this one,

suggesting that the operational context and the people involved have considerable influence on any resultant learning.

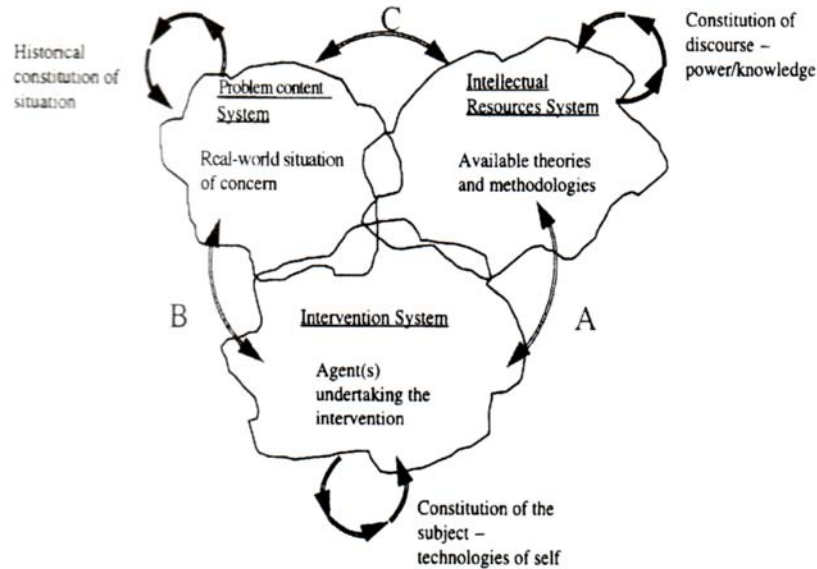


Figure 79: The multimethodology context (Mingers, 1997b, p. 420)

With regard to testing the suitability of the tools, techniques and models of PM and SSM to this particular project environment, it was found that all approaches that I used needed to be adapted to, and were interpreted in light of, the needs of the particular project context. It is impossible to say what an unaffected interpretation or use of a particular tools, technique or model might be, as interpretation is always influenced by personal biases and prejudices, and not only can ostensibly the same approach be discussed differently by different authors, but also by the same author at different times. I cannot then claim that the project would not have turned out differently if managed by someone else, or with different participants.

It would have been interesting to have been able to apply a greater variety of techniques within the project, giving the opportunity to examine the need for adaptation of other techniques. However, not all of the approaches associated with either SSM or PM could be tested in the project environment. The choice of approaches should at least partly depend upon the demands of the particular situation (Bentham, 1997, p. 103; Reichardt & Cook, 1979, p. 16; Wolstenholme, 1999, p. 422). To test approaches in the project context solely because of curiosity, instead of based on their efficacy in the situation



would have represented a conflict of interest between the roles of researcher and an employee of HPRB. As an employee of HPRB, I had an ethical imperative to manage the project to the best of my ability, making use of only those approaches that I considered to be most appropriate to the situation. However, the literature on TSI was only cursorily examined prior to the project, with a more thorough examination of the literature only occurring after project completion. Aspects of TSI have been found to be useful as a framework for discussion of the project, but TSI was not used in managing the project or the combination of PM and SSM. In retrospect, use of TSI during the project may have provided benefit that was not otherwise gained.

## **Conclusion**

This chapter has discussed learning that has emerged through the last Action Research cycle of this research; reflection on action taken during the IT / CT Platform Project, in relation to the various literatures on PM, SSM, CST and the hard and soft paradigms. In the process of writing up this research, learning has been elicited through reflection on the links between models and frameworks applied in practice and their correspondence, or lack of correspondence, to models and frameworks in the various literatures.

Learning has addressed aspects of the research focus:

An examination of the practical pluralist combination of PM and SSM, based on the Embedding model for combining methodologies from the hard and soft paradigms, studied in the context of the development of an IS / IT strategic plan in the NSW public sector.

Throughout this chapter, twelve learning outcomes have been identified, that have contributed to an understanding of the research focus. Of the learning outcomes identified, two related to the PM life cycle, and two to the oblique use of approaches. Five learning outcomes addressed the hard and soft paradigms, in terms of differentiating between them and the process of changing between them. Two other learning outcomes related to the Grafting and Embedding models for methodological pluralism, while another focused on the benefit of changing levels of analysis. In the following chapter I summarise this research, identify contributions to knowledge and make some concluding remarks.

## Part E

|                                       |  |
|---------------------------------------|--|
| Part A:                               | 1) Introduction  |
| Part B: Research framework            | 2) Hard and soft paradigms<br>3) Research methodology                        |
| Part C: Methodologies for application | 4) Soft Systems Methodology<br>5) Project Management<br>6) Pluralism and CST |
| Part D: The project                   | 7) IT / CT Platform Project<br>8) Reflection and learning                    |
| Part E:                               | 9) Conclusion  |

Figure 80: Part E: Conclusion

Part E concludes this research. The thesis is summarised, highlighting key aspects of the literature that have been discussed in previous chapters. The twelve learning outcomes identified in Chapter 8 are reviewed. Contributions to knowledge resulting from this research are also identified, before some possibilities for future research are discussed.

## **Chapter 9 - Conclusion**

"Thus if a reader tells the author 'I have used your methodology and it works', the author will have to reply 'How do you know that better results might not have been obtained by an ad hoc approach?' If the assertion is: 'The methodology does not work', the author may reply, ungraciously but with logic, 'How do you know the poor results were not due simply to your incompetence in using the methodology?'" (Checkland, 1972, pp. 114 – 5)

### **Introduction**

In this chapter I reflect on the thesis as a whole, drawing together the different strands of argument that have been previously developed through reflection on the literatures on the hard and soft paradigms, the various forms of Action Research (AR), Soft Systems Methodology (SSM), Project Management (PM), pluralism, and through reflection on actions taken in managing the IT / CT Platform Project. Following this, key learning outcomes that have resulted from this research are summarised. The contribution to knowledge provided by this research is then clarified, and possibilities for future research resulting from this research are discussed.

### **Thesis summary**

This is multidisciplinary, practice-based research, in which I have conducted an in-depth exploration of the combination of methodologies, combined in the management of an IS / IT strategy development project in the NSW public sector, referred to as the IT / CT Platform Project. This research draws upon a variety of different fields, including: PM; SSM; pluralist and Critical Systems Thinking (CST); AR; Hermeneutics; and the general literature on the hard and soft paradigms. This thesis started by identifying these different fields as being of relevance to this research, and identifying the relationship between them.

Two broad approaches to research and practice have been identified, referred to in this research as the hard and soft paradigms. The distinction between these paradigms has been identified as of relevance in the literatures of a variety of fields, including: systems thinking; evaluation and social research; and IS / IT development. Different frameworks

for classifying the differences between the paradigms have been identified. Some researchers, in discussing the hard and soft paradigms, focus on the philosophical aspects of the paradigms, others on the consequences for research or practice. However, despite these differences in foci, broad and consistent tendencies of definition for the hard and soft paradigms are apparent in the literature.

The differences between the paradigms are examined in light of the hierarchical relationship between paradigms, methodologies, methods, tools and techniques, referred to in this thesis as *The Schema*. From a perspective based at the philosophical level of abstracted propositions about the nature of reality and knowledge, it is often assumed that the hard and soft paradigms are incommensurable, and therefore incompatible, due to the contradictory and mutually exclusive propositions that they make. However, an assumption of the general incommensurability of the paradigms is coming under question, with some authors (e.g. Weber, 2004; Reichardt & Cook, 1979) questioning whether the paradigms actually are incommensurable, and others (e.g. Mingers & Brocklesby, 1997) suggesting that the assumption of incommensurability is actually a cultural phenomenon, involving entrenched boundaries of professional and personal practice. At the lower levels of *The Schema*, levels of methodology, method, tool and technique, there is an increasing indistinctness between the paradigms, with approaches drawing upon, and occasionally being operated under, a paradigm other than that which they were originally created for. This observation has led to a reconceptualisation of the relationship between the hard and soft paradigms, not as separate silos, but as overlapping pyramids.

PM and SSM, the two approaches that are combined in practice, and form part of the focus of this research, have been influenced by the hard and soft paradigms in different ways. Traditional PM has been predominantly influenced by the hard paradigm. As such, it focuses on the efficient delivery to predetermined goals, through a reductionist approach to planning and control. SSM has been influenced by the soft paradigm, and instead focuses on learning and exploration, through the facilitation of debate and the social negotiation of meaning. These two methodologies bring considerably different foci to problem situations. This research has investigated how these different approaches can be combined, in light of their paradigmatic differences.

This research has been conducted using AR, and for the sake of clarity, it was found to be necessary to distinguish between the approaches that have been used in practice, to provide benefit within one particular practice environment, and the way in which research into that practice has been conducted. While PM and SSM are used in practice, and are the subject of this research, AR has been used to actually conduct the research, and guide reflection on the practice. The need was also identified for clarity concerning the intellectual framework through which learning is developed. This research draws upon Gadamer's hermeneutics, in the interpretation of actions taken in the IT / CT Platform Project and how these relate to the various models and frameworks in the literature.

Before discussing the action taken in the project, I examined the literatures on the different approaches that had been studied through application in practice. The history of the development of SSM was discussed, as were the philosophical underpinnings and conceptualisation of organisations and systems that are apparent in the methodology. Two different classifications of the purpose and application areas of SSM were discussed. Flood and Jackson (1991b, p. 327) use the System of Systems Methodologies (SOSM) to classify SSM as being appropriate for complex-pluralist situations; those where key issues are difficult to appreciate and there is disagreement between stakeholders. Mingers (2003a, p. 563) classified the purpose of SSM as predominantly focusing on the personal aspects of a problem situation, with the greatest emphasis on developing appreciation of a situation, and taking action to improve it. The seven stage model of SSM was then discussed, and my use of SSM in the IT / CT Platform Project was identified as a Mode 2 implementation, one which does not directly follow the seven stage model, but instead adapts actions based on the immediate needs of a problem situation.

PM was identified as a pragmatic and diffuse field of practice, in the process of expanding from its original basis in the construction and engineering industries, to new fields of practice such as IS / IT development and organisational change. Different trends in the field were discussed, with the intention of establishing the current foci in the field. Theory was identified as being traditionally of low importance to the field of PM, which tends to place greater emphasis on practical application. However, through reference to the PM literature, strong tendencies have been isolated which demonstrate a

clear, if usually implicit, connection between traditional PM practice and the hard paradigm. PM was then categorised using two of the frameworks employed in the analysis of SSM. Using SOSM, PM was classified as appropriate for simple-unitary situations, where issues are easily appreciated and there is general agreement between stakeholders. Using Mingers (2003a) system for analysing the purpose of methodologies, PM was classified as exclusively focusing on the material aspects of a project, with particular emphasis on the assessment of alternative options and coordinating action to bring about change. I then identified undercurrents in the PM literature, which suggest that there is a growing disquiet with regard to the adequacy of the hard paradigm to inform all project work, and a growing recognition of the potential value of incorporating the ideas of the soft paradigm into PM practice.

Following this, I examined the literature on pluralism, for insight into how different approaches can be combined. Review of approaches to methodological pluralism drew on the CST literature, but also made reference to developments in the evaluation, social science, organisational change and IS / IT literatures. Various benefits of pluralist practice were identified, as was a growing trend towards pluralist practice, although it was also identified as a practice that is still yet to reach maturity. Barriers to the adoption of pluralist practice were identified, including issues related to paradigmatic incommensurability, psychological and cultural barriers, and the need for the practitioner to possess the requisite variety of skills.

Systems responses to the problem of paradigmatic incommensurability were then discussed, including the tendency towards the creation of metaparadigms and metamethodologies. These tendencies were related back to *The Schema*, as a way of examining the different positions that have been taken in the CST literature towards managing the divergent perspectives between hard and soft paradigms. Different concepts relevant to an examination of pluralist practice were then discussed, including Reed's (1985) four strategies, the oblique use of methods, and Total Systems Intervention. In light of these different concepts, I distinguished between Miles (1988) models for Grafting and Embedding, and then discussed the variation of Embedding that was applied in the IT / CT Platform Project to manage the pluralist combination of PM and SSM.

I then examined how PM and SSM were combined in the IT / CT Platform Project, and the way in which this was informed by a variant on the Embedding model. The project involved managing the development of a five year IS / IT strategic plan for the Health Professionals Registration Boards (HPRB), a part of the NSW public sector. The project started with only the most abstractly defined goals, in an uncertain context, which was typified by changing stakeholder imperatives and environmental influences. Through a highly participative combination of PM and SSM, and a process of continuous debate and meaning negotiation, project objectives and deliverables were iteratively defined and produced, and the various approaches associated with the two methodologies were adapted to the needs of the problem situation. This ultimately resulted in the completion of a project that was judged to be successful by key stakeholders, and that has been demonstrated to have provided clear and lasting long-term benefit to the organisation.

The final Action Research cycle of this research involved reflecting on my experiences in the IT / CT Platform Project, in relation to the literature previously identified as being of relevance to this research. Discussion of the learning resulting from this research was structured around five research questions, that had previously been identified as being of relevance to developing an understanding of the use of a variant on the Embedding model to manage the combination of PM and SSM, and the consequences inherent in combining methodologies from different paradigms in a single project. These research questions were:

- How appropriate was SSM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?
- How appropriate was PM to the needs of the IT / CT Platform Project, and how was it adapted to meet these needs?
- Were difficulties encountered in using tools and techniques obliquely, operated under a paradigm other than that for which they were originally developed?

- Were practical or philosophical problems encountered in combining PM and SSM in such a way that equal emphasis was placed on the hard and soft paradigms in the IT / CT Platform Project?
- Was Embedding effective as a model for combining PM and SSM in the IT / CT Platform Project?

Each of these questions was discussed in relation to the literature and my experiences in managing the project. Reflection on the IT / CT Platform Project also led to one area of emergent learning, that was deemed to have been of particular importance to the success of the project.

- The emergent area of learning related to the value of changing between levels of analysis in a complex and dynamic project, and the way that this can be facilitated by alternating between methodologies with different foci and different paradigmatic bases.

### **Learning outcomes**

Reflection on this research has led to twelve different learning outcomes. These learning outcomes extend on the literatures of PM, SSM and CST. Some learning outcomes develop the various literatures, by extension into areas that I have not been able to identify the literatures as directly addressing. Other learning outcomes provide emphasis to areas of the different literatures that have been identified as present, but are undercurrents in the literatures, despite their significance to this research. Some learning outcomes provide evidence which contradicts identified findings in the literatures. It should be noted that the learning outcomes are summaries and should be read in light of the context in which they were developed, not taken as universal generalisations.

The twelve learning outcomes resulting from this are:

- The project doesn't necessarily end when production of deliverables is complete. Deliverables and objectives are separate concepts. It is easy to focus on the



deliverables, but it is more important to focus on the benefits to the organisation. Deliverables certainly don't equate to benefits, and its benefits that provide the rationale behind projects.

- A parallel stage life cycle model for PM may be more appropriate than a linear life cycle in dynamic and changing or bureaucratic environments.
- Just as techniques can be used obliquely, so too can the terminology associated with a particular methodology be used obliquely.
- The main variation in using techniques obliquely may not be the content of the technique, but the use to which they are put. The intentions and values of the governing paradigm will determine the context in which the technique is put to use, and the ends it serves.
- The philosophical and theoretical differences between the hard and soft paradigms do not necessarily translate into difficulties in pluralist practice.
- Contrary to suggestions by some authors in the CST literature, changing paradigm does not have to be a difficult or traumatic process.
- The dichotomy of learning versus control was found to be a readily accessible basis for distinguishing between the hard and soft paradigms through personal reflection.
- The way that paradigms are used to inform the interpretation and application of approaches in practice will be strongly influenced by the prejudices and biases that the practitioner brings to the project.
- Let the needs of the immediate circumstances determine the most appropriate paradigm to adopt. The situation will, and should, determine the balance between paradigms that is appropriate.

- Grafting may be applicable in relatively stable situations, where goals, once defined, are expected to remain constant. Embedding may be more appropriate for dynamic and changing environments, where no clear separation of stages is possible.
- Embedding can create a beneficial feeling of tension between the hard and soft paradigms, providing the opportunity to regularly check learning developed through one paradigm against the insight of another.
- Using multiple approaches, with different levels of focus, can help the practitioner to change between levels of analysis.

### **Contribution to knowledge**

This research can be identified as resulting in a variety of different contributions to knowledge. Some contributions to knowledge resulting from this research develop knowledge in relation to the field of PM, through the development and testing of a new life cycle model, and the development of an explicit understanding of the generally implicit theoretical basis of PM through analysis of the field in relation to the hard and soft paradigms. Contributions to the field of CST include development of an understanding of the relationship between the paradigms, the oblique use of techniques, and exploration of Embedding, a model for pluralist practice that has rarely previously been examined in the literature.

As discussed in Chapter 5, the theoretical and philosophical basis of the field of PM and research into PM has generally been implicit (Koskela & Howell, 2002, p. 293; Cooke-Davies, 2000, p. 17). However, reliance on the theoretical has been identified as essential in the development of professions (Koskela & Howell, 2002, p. 293; Dean, 1997). This research contributes to an understanding of the existing theoretical basis of PM, through a thorough examination of the paradigmatic position of writing on, and research into, the position of PM in relation to the hard and soft paradigms. Furthermore, it has been identified that additional theory development is needed in the field (Shenhar, 1996, p. 5), and that in the literature there is both a growing disquiet with the assumptions on which PM is based and evidence of a growing interpretive

influence. In Chapter 1 it was identified that a variety of comparable fields have clearly been influenced by the soft paradigm, but that PM remains predominantly influenced by the hard paradigm. Through an examination of how PM and SSM can be combined in practice, this research helps to further the professional development of PM, by strengthening links between the field of PM and practice informed by both the hard and soft paradigms.

Another contribution to knowledge resulting from this research relates to the PM life cycle. Some authors suggest that all projects follow essentially the same life cycle (e.g. Morris, 2002, p. 32; Morris, 2004, p. 4; Herbst, 2004, p. 18). Typical life cycles are linear and reductionist, breaking a project into a number of predefined phases, with the intention that these can be used as the basis for project planning and control. However, it was found that this model of the life cycle was inappropriate to the IT / CT Platform Project. A life cycle involving multiple parallel processes was instead found to be an effective description of the way in which work was managed. It was suggested that the inappropriateness of the traditional life cycle, and the appropriateness of a parallel process life cycle could be related to the bureaucratic context, and constantly changing goal specifications and environmental influences on the project.

A reconceptualisation of the relationship between the hard and soft paradigms has also resulted from this research. Traditionally, the hard and soft paradigms have been viewed as incommensurable and incompatible, resulting in a tendency to represent the paradigms as separate silos of influence from the realms of philosophy, through methodology, to methods, tools and techniques. However, a growing body of literature is identifying the possibility of mixing approaches commonly associated with different paradigms. This research presents a different model of the relationship between the paradigms, not as separate silos, but as overlapping pyramids, a model which more clearly communicates the levels at which the paradigms are clearly incompatible, and the areas in which the boundaries between the paradigms starts to blur and provide opportunities for fruitful combination.

This research has also contributed to research into pluralist practice. A variety of examples can be found of the oblique use of methods and techniques in the CST literature. However, my review of the literature, although necessarily not all-inclusive,

has revealed no instances of explicit reference to the oblique use of the terminology associated with a methodology, suggesting that this research may involve the first reference to this form of pluralist practice.

Reflection on the process of swapping between the hard and soft paradigms in the IT / CT Platform Project has also led to the identification of one dichotomy that was particularly accessible as an indicator of the paradigm that I was operating from within at different times during the project. This was the dichotomy of a desire for control and certainty versus a desire for learning and acceptance of uncertainty. This indicator may be of benefit to future researchers engaged in reflective research into multiparadigm pluralism.

A contribution to knowledge has also been made through my combination of PM and SSM, based on an interpretation of Embedding. When the concepts of Grafting and Embedding are used to analyse the variety of case studies in the CST literature, many can be identified as examples that bear strong resemblances to Grafting, while very few can be classified as examples of Embedding. Nonetheless, some authors (e.g. Miles, 1988; Mingers, 1995, p. 45; Ormerod, 1997, pp. 50 – 2) suggest that Embedding may provide benefits that Grafting cannot. This research provides one of the few examples of multiparadigm pluralism that examine the use of Embedding in practice, and at the time of writing, the only example of a combination of PM and SSM based on Embedding that I could identify in the literature.

### **Future research**

Possibilities for future research can be related to inherent limitations in this research. This has been interpretive research, analysing one particular project, based on the insight of one particular researcher. This approach to research provides the opportunity to study one project in depth, but it is necessarily limited, both in terms of context and perspective. However, the limitations of this research provide a variety of opportunities for future research. Learning outcomes resulting from this research could be tested and explored in a variety of different ways. For instance, a similar approach could be used by a different researcher in a different context, or I could apply the same approach in a different context, in an effort to explore the context dependence of research findings.

Similarly, it would also be interesting to use the same variant on the Embedding model, but combining a different selection of approaches, to explore the ways in which Embedding is transferable to the combination of other hard and soft approaches.

It would also be possible to explore specific learning outcomes. For instance, it is possible that Embedding is a model for pluralism that is more appropriate to turbulent situations, while Grafting is more appropriate in undefined, but relatively stable contexts. This could be tested through a variety of means, such as interpretive inquiry into a variety of cases, or through surveys of a large number of projects, looking for characteristics that could be considered characteristic of either Grafting or Embedding. A similar approach could be used to explore the applicability and distribution of parallel versus serial project life cycles.

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