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and consequences of their work, while those primarily engaged with theory have tried to bear in mind the practical implications of their work. Some authors, such as White and Taket, have written chapters that combine both theory and practice. Second, that between systems and OR. Practical problems in the real world do not split themselves up along disciplinary boundaries, and neither should we in seeking to deal with them. We have therefore deliberately sought a range of contributors from both areas, as well as those who, like us, do not draw a distinction between the two. Third, that between academics and practitioners. Many of the contributors are themselves both academics and practitioners, but in terms of the readership we have tried to make the book accessible to all. However, believing in the old adage "there's nothing so practical as a good theory" we have not watered down or popularized the theory sections but given them due weight. We recognize that some practitioners may find that the costs of some chapters outweigh the benefits but believe that the case study chapters will be worthwhile in their own right.

We would like to thank all the authors for the time and trouble they have taken to make this book what it is.

JOHN MINGERS  
TONY GILL  
1997

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## Chapter 1

# Multi-paradigm Multimethodology

JOHN MINGERS

## INTRODUCTION

This book concerns the use of *methodologies* in organizational problem solving and intervention. Such methodologies have mainly been developed within the domains of operational research (OR), systems thinking, and information systems (IS) (although there are differences in the premises and areas of application of these subjects from a methodological viewpoint they can be treated together as "Management Science"). The term methodology means a structured set of guidelines for activities to undertake to improve the effectiveness of an intervention. A good example of a methodology is soft systems methodology (SSM) developed by Peter Checkland (Checkland and Scholes, 1990) at Lancaster. Other examples are Eden's (1994) cognitive mapping and SODA; Beer's (Espejo and Harnden, 1989) Viable System Model (VSM); systems dynamics; and OR with its various techniques such as mathematical programming (the distinctions between paradigm, methodology, method, and technique are defined in Chapter 15). Such methodologies are based, implicitly or explicitly, on particular philosophical assumptions concerning the nature of the organizational world and the appropriateness of various forms of action. These sets of assumptions form a particular view of the world that is sometimes called a *paradigm*. Typically reference is made to three different paradigms that can be crudely characterized as *hard* (positivist), treating the organizational world as objective, essentially the same as the natural world;

*soft* (interpretivist), treating human organizations as fundamentally different, based on subjective meaning and interpretation; and *critical*, accepting the place of both hard and soft but emphasizing the oppressing and inequitable nature of social systems. These paradigms, and the methodologies that embody them, are often said to be *incommensurable* because their underlying assumptions are believed to be irreconcilable.

More specifically, this book is about the idea of *multimethodology*. That is, combining together more than one methodology (in whole or part) within a particular intervention. Thus it is not the name of a single methodology, or even of a *specific* way of combining methodologies together. Rather it refers to the whole area of utilizing a plurality of methodologies or techniques within the practice of taking action in problematic situations. As Mingers and Brocklesby (1996) show, there are a whole range of logical possibilities depending on factors such as: whether the methodologies are mixed in the same intervention or across different interventions; whether they come from different paradigms; or whether parts of (rather than whole) methodologies may be combined. Some of these possibilities are conceptually and practically straightforward, for example using different methodologies from the same paradigm in separate interventions. Others pose difficult problems, for example mixing parts of methodologies (sometimes referred to as "partitioning" (Midgley, 1989a, 1990)) from different paradigms, within the same intervention. Some options have been extensively explored, for example choosing between methodologies for an intervention via the system of systems methodologies (Jackson and Keys, 1984; Jackson, 1989, 1990), or managing the diversity of methodologies within an intervention (Flood and Jackson, 1991; Flood, 1995); others, particularly the case of multi-paradigm partitioning mentioned above, have not been. Multimethodology can be seen as a particular form of *methodological pluralism*.

The purpose of this book is to explore the possibilities of multimethodology, particularly in its multi-paradigm form, but the first thing that we should note is that Management Science is not alone in currently considering this problem of methodological pluralism. Indeed, it turns out that it is a relatively late starter, for other disciplines such as philosophy, social theory, and organizational studies have already started the debate. The first section of this chapter surveys these pluralist debates within other disciplines to see what can be learnt from them. The second section provides a brief history of methodology management within Management Science. This turns out to be largely a history of *critical systems thinking* (CST) because this is where most of the work has been carried out. The third section aims to show, however, that multimethodology is not identical with the critical systems perspective or, even more narrowly, with the particular version of CST called total systems intervention (TSI). It does this by exploring the range of logical possibilities and showing that critical systems/TSI do not exhaust them. The final two

sections of the chapter present arguments as to why multimethodology is desirable, and the extent to which it is actually feasible, particularly the multi-paradigm version espoused by the editors.

## GENERAL HISTORY OF PLURALISM

Since the beginning of the twentieth century the enormous success of natural science led to its methods (generally denoted as *positivism*: a belief in universal laws, empirical verification through induction, and observer- and value-freedom) being seen as the most reliable way of generating knowledge, not just in the natural sciences but in the social sciences as well. However, chinks in positivism's armour were apparent within physics itself, with the unavoidable appearance of the observer in Heisenberg's "uncertainty principle". The body blows were provided by philosophers such as Hanson (1958), Kuhn (1970), and Popper (1972) who, in various ways, demonstrated fatal flaws in the cornerstones of induction, and theory- and observer-independent observation. Although this did not have a significant effect on the practice of natural science, it did on social science where it legitimated the rise of various schools of interpretivism such as phenomenology, ethnomethodology, and hermeneutics. During the 1970s and early 1980s similar situations emerged in organizational studies, and in OR/systems with the development of soft OR and soft systems methodology (SSM).

Each discipline came to be characterized by a small set of competing and supposedly incommensurable paradigms based around splits between hard, soft and critical approaches. Practical work within the disciplines, whether it be social research or organizational intervention, was expected to occur within a single paradigm, and individual researchers had to ally themselves with one paradigm or another. Burrell and Morgan's (1979) *Sociological Paradigms and Organisational Analysis* epitomized this situation with its emphasis on the separateness of its four paradigms and the development of theory and research in isolation. However, this artificial situation could not endure as researchers and practitioners found that no one paradigm could capture the richness of real-world situations. In all the disciplines, the acceptance of paradigm isolation and incommensurability began to break down and, in the last decade, the debate has turned to various forms of pluralism, in both methodological and philosophical terms.

In philosophy the debate has centred around *perspectivism* and *methodological pluralism*. Roth's (1987) book *Meaning and Method in the Social Sciences: A Case for Methodological Pluralism* sparked considerable discussion (Fuller, 1990; Rouse, 1991), and a special issue of *Monist* was devoted to the subject (Ford, 1990). In social and education research, methodological pluralism grew up in practice probably before theory, based around the idea

of *triangulation* originally proposed by Denzin (1970). It would now seem to be the established norm (Bulmer, 1984; Bryman, 1992). In organizational studies there has been an active debate about incommensurability, particularly with regard to Burrell and Morgan's work (Gioia and Pitre, 1990; Hassard, 1991; Lee, 1991; Jackson and Carter, 1993; Willmott, 1993); while in OR/systems, critical systems thinking and TSI have held centre stage, in recent years, in terms of orchestrating the use of different methodologies. It is to the latter that we now turn.

### HISTORY OF PLURALISM IN MANAGEMENT SCIENCE

It is in some ways ironic that the idea of utilizing knowledge from a variety of disciplines was a central tenet of the early days of OR (Mingers, 1992). From the beginning, practical problems were seen not to fit into neat disciplinary boundaries, and as OR became established in organizations, interdisciplinary teams, to include mathematicians, psychologists, sociologists and so on, were the order of the day. However, over the years the interdisciplinary teams were broken up, new recruits into OR tended to come from mathematical and science backgrounds, and academically OR became increasingly focused into mathematical models and algorithms. OR (and systems from its roots in engineering) was locked into a hard, technical shell. It was not until the early 1980s that this situation was challenged by the arrival of "soft" methodologies such as SSM and SODA. Soon, the pendulum swung the other way with a plethora of new soft and critical approaches, and the problem became one of methodology choice. How should a practitioner know which approach to use and when? It was against this background that critical systems thinking (CST) developed, in part as an approach to managing the diversity of methodologies.

Critical systems thinking, or critical management science, became established as a coherent domain during the 1980s. There were sporadic contributions of a critical or Marxist nature during the 1970s (see Mingers (1992) and Jackson (1991a: 138) for details); Mingers (1980) explicitly brought in the critical theory of Jürgen Habermas, comparing it with soft systems methodology; and Ulrich developed, during the late 1970s, his major synthesis of Churchman and Habermas although this was not published until 1983. However, the largest contribution has come from the work of Jackson and Flood. Jackson (1985) was probably the first to clearly articulate the need for critical methodologies, as opposed to those stemming from hard and soft traditions, basing his claims on Habermas's (1978) version of critical social theory:

It is argued therefore that Habermas' suggested approach is more appropriate for a certain class of social system than hard or soft systems methodologies . . .

These social systems are characterised by inequalities of power and resources among the participants and by conflict and contradiction. (Jackson, 1985: 149)

At about the same time, Jackson and Keys (1984) developed the first meta-theoretical framework—the system of systems methodologies (SOSM). This was a typology classifying the different assumptions made by methodologies. There were two dimensions, one of complexity (from simple to complex) and one concerning the relations between participants (unitary, pluralist, and coercive) that mapped the hard, soft and critical perspectives. Alternative approaches could now be:

presented as being appropriate to the different types of situation in which management scientists are required to act. Each approach will be useful in certain defined areas and should only be used in appropriate circumstances. (Jackson, 1991b: 199)

Jackson (1987) also identified pluralism as the desired way forward for systems thinking although tended in later work to use the term "complementarism". Up to this point critical systems was seen as an adjunct to hard and soft, based on Habermas's knowledge-constitutive interest in enlightenment and emancipation. However, a shift in thinking occurred that led to a distinction being drawn between "critical systems thinking" and "emancipatory systems thinking" (Jackson, 1991b: 184). The latter still concerned methodologies for coercive social situations, but critical systems thinking was seen as a wider approach to management science as a whole that was based on five "commitments"—critical awareness, social awareness, methodological complementarism, theoretical complementarism, and human emancipation (Jackson, 1991b).

The next development was that this framework was augmented by a methodology (or rather meta-methodology) to assist in the choice of appropriate methodology(ies) in particular situations—total systems intervention (TSI) (Flood and Jackson, 1991; Flood, 1995). In its latest guise Flood describes it as:

The problem solving system TSI has been developed to provide managers with a practical and useful systems-based approach to problem solving. It offers procedures to integrate all methods for problem-solving in a process which ensures that they are employed to tackle only the issues they are best suited to. (Flood, 1995: 393)

While still based on a critical systems philosophy, and still having the achievement of human freedom as a basic principle, TSI mainly orients itself to the domains of consultancy and management (Flood, 1995: 393)—*A Potent Force for Effective Management*, as the book's subtitle proclaims. In fact, in the most recent characterization (Flood, 1996) the name has been changed to local

systemic intervention (LSI) based on a postmodernist dislike of totalizing discourses.

Given that the critical systems approach and TSI are forms of multimethodology (Mingers and Brocklesby, 1996), and that they are well developed both theoretically and practically, is there any need to pursue other possible types of multimethodology? I would argue that the answer is yes because TSI represents only one possible example of multimethodology as the next section will show.

### TYPES OF MULTIMETHODOLOGY

The essence of multimethodology is to utilize more than one methodology, or part thereof, possibly from different paradigms, within a single intervention. There are several ways in which such combinations can occur, each having different problems and possibilities. Table 1.1 provides some examples that can be seen either as a set of logical possibilities, or as the preferred *modus operandi* of particular agents.

The first dimension is simply whether more than one methodology is used or not. If not, then there is clearly no possibility of multimethodology—possibility A, *methodological isolationism*. The next two dimensions specify whether the methodologies used come from the same or from different paradigms, and whether or not they are used within the same intervention. Where the methodologies are all from within the same paradigm there is little philosophical difficulty, it is just a question of the most effective way of fitting the methodologies or techniques together. When they come from different paradigms, however, the situation is much more complex. Similarly, using several methodologies in different interventions is conceptually much simpler than combining them in one.

The final two dimensions focus on whether whole methodologies are used or parts are taken out and combined (methodological partitioning), and, in the latter case, whether a single methodology is given overall control or whether the parts are linked to form a multimethodology particular to that situation. The last columns name the different possibilities and give literature references where known.

Table 1.1 covers the main combinations of these dimensions although some less interesting ones are omitted for simplicity, for example using parts of methodologies in different interventions. Each possibility will now be briefly characterized. Possibility B, *paradigmatic isolationism*, is where several methodologies may be used by an agent but all from the same paradigm and not in the same intervention. For example, SSM may be considered most appropriate for one situation, and strategic choice for another. Possibility C, *methodology combination*, is where several complete methodologies, from the same

Table 1.1 Different possibilities for combining methodologies

	One/more methodologies	One/more paradigms	Same/different intervention	Whole/part methodology	Imperialist or mixed	Example	Name	Literature (Theoretical Case Study)
A	One	One	-	-	-	SSM only	Methodological isolationism	Checkland and Scholes (1990)
B	More	ditto	Different	Whole	-	SSM   Strat. choice	Paradigmatic isolationism	Ormerod (1995, 1996a)
C	ditto	ditto	Same	Whole	-	Simulation + queueing theory	Methodology combination	Mingers and Taylor (1992)
D	ditto	ditto	Same	Part	Imperialist	Cognitive mapping in SSM	Methodology enhancement	Ormerod (1994, 1996b), Holt (1993), Taket (1993), Bennett (1985, 1990)
E	ditto	ditto	Same	Part	Mixed	Cog. map. + root definition	Single paradigm multimethodology	Jackson and Keys (1984), Jackson (1987, 1989, 1990)
F	ditto	More	Different	Whole	-	Simulation   SSM	Methodology selection	Flood and Jackson (1991)*, Flood (1995)*, Ulrich (1991)
G	ditto	ditto	Same	Whole	-	VSM + interactive planning	Whole methodology management	Savage and Mingers (1996)
H	ditto	ditto	Same	Part	Imperialist	JSD in SSM	Methodology enhancement	Eden (1994), Lehaney and Paul et al (1994), Hocking and Lee (1994), Midgley (1989a, 1989b, 1990, 1992), Flood (1995)*
I	ditto	ditto	Same	Part	Mixed	Cognitive map + systems dynamics	Multi-paradigm multimethodology	Mingers and Brocklesby (1996)

In the Example column + means combined in the same intervention, | means used in separate interventions.  
\* These textbooks have both theory and case studies.

paradigm, may be combined within the same intervention, for example using both queueing theory and simulation, or SSM and SODA. Possibilities D, *methodology enhancement*, and E, *single-paradigm multimethodology*, are where parts of a methodology are split off and combined. In D, one main methodology is enhanced with part of another, for example using cognitive mapping within SSM. In E, parts of several are combined to create a new multimethodology, for example using cognitive mapping together with root definitions/conceptual models. The literature contains a number of such examples.

Possibilities F to I repeat B to E but with the complication that the methodologies involved may be from different paradigms. F is essentially the situation assumed by Jackson and Keys' system of systems methodologies (SOSM), that is that methodologies from different paradigms make particular assumptions about the contexts within which they will be used so that a methodology is most appropriate for a context matching its assumptions. This implies that, generally, only one methodology will be used in a particular intervention (there has been some debate about the proper interpretation of the SOSM and certainly the originators themselves differ on the matter. (See Mingers and Brocklesby (1996) for references to the debate and Chapter 13 for the most recent exposition of Jackson's view.) G is similar to Flood and Jackson's total systems intervention (TSI) in which different methodologies may be used within the same intervention to deal with different issues (there is debate about the interpretation of TSI, and it is still changing and developing, but certainly in the first book on the subject no mention is made of partitioning methodologies and combining parts together. (For recent developments see Flood (1995) and Flood and Romm (1995a, b) as well as Chapters 10 and 11 in this book.) H is a multi-paradigm version of methodology enhancement, for example taking SSM as the main methodology and using some parts of a hard methodology within it such as VSM, or Jackson System Design. The main problem is the legitimacy of transferring a technique developed within one paradigm to another. Finally, the most complex situation, I, is one in which parts of methodologies from different paradigms are brought together to construct an *ad hoc* multimethodology suitable for a particular problematic situation. An example would be combining cognitive mapping with developing a systems dynamics model.

### DESIRABILITY OF MULTI-PARADIGM INTERVENTION AND RESEARCH

This section puts forward arguments as to why multimethodology (sometimes called "methodological pluralism", or "multi-paradigm intervention and research") is desirable. Landry and Banville (1992), within the context of IS, have put forward strong arguments in favour of pluralism in general, but it

should be noted that the term "methodological pluralism" may be conceptualized in a number of different ways.

- (i) *Loose pluralism*, holds that a discipline as a whole should support and encourage a variety of paradigms and methods within it, but does not specify how or when they should be used.
- (ii) *Complementarism* (as advocated by Jackson (1991b)), where different paradigms are viewed as internally consistent, and based on different assumptions about their context of use, such that each paradigm would be seen as more or less appropriate for a particular research situation.
- (iii) *Strong pluralism*, as advocated in this chapter, which argues that most if not all intervention situations would be dealt with more effectively with a blend of methodologies from different paradigms.

Three main arguments in favour of strong pluralism (multimethodology) are put forward. First, that real-world problem situations are inevitably highly complex and multidimensional. Different paradigms each focus attention on different aspects of the situation and so multimethodology is necessary to deal effectively with the full richness of the real world. Second, that an intervention is not usually a single, discrete event but is a process that typically proceeds through a number of phases. These phases pose different tasks and problems for the agent. However, methodologies tend to be more useful in relation to some phases than others, so the prospect of combining them has immediate appeal. Even where methodologies do perform similar functions, combining a range of approaches may well yield a better result. Third, further consideration of the philosophical and theoretical aspects of multimethodology is timely since many people are already combining methodologies in practice as the practical case studies in this book show.

#### The Multidimensional World

Adopting a particular paradigm is like viewing the world through a particular instrument such as a telescope, an X-ray machine, or an electron microscope. Each reveals certain aspects but is completely blind to others. Although they may be pointing at the same place, each instrument produces a totally different, and seemingly incompatible, representation. Thus, in adopting only one paradigm one is inevitably gaining only a limited view of a particular intervention or research situation, for example attending only to that which may be measured or quantified, or only to individuals' subjective meanings and thus ignoring the wider social context. This argument is a strong one in support of multi-paradigm research suggesting that it is always wise to utilize a variety of approaches.

A framework developed from Habermas (1984: 75-101, 1987) is shown in Figure 1.1. It suggests that it is useful to distinguish our relations to, and

interactions with, three worlds—the material world, the social world, and the personal world. A similar position was advocated some years ago by Linstone (1984) who suggested three “perspectives”, technological (T), organizational (O), and personal (P). However, these were all interpreted from within a positivist or functionalist perspective rather than from the multi-paradigm perspective underlying this book. Midgley (1992) also utilizes, in a different way, Habermas’s framework. This framework also draws on ideas from Searle (1996) who distinguishes between the objective, the institutional, and the subjective worlds.

Each domain has different modes of existence and different means of accessibility. The material world is outside and independent of human beings. It existed before us and would exist whether or not we did. We can shape it through our actions, but are subject to its constraints. Epistemologically, our relationship to this world is one of external *observation* rather than participation (as with social activities) or experience (as with our personal mental states). But such observations are always theory- and subject-dependent. We

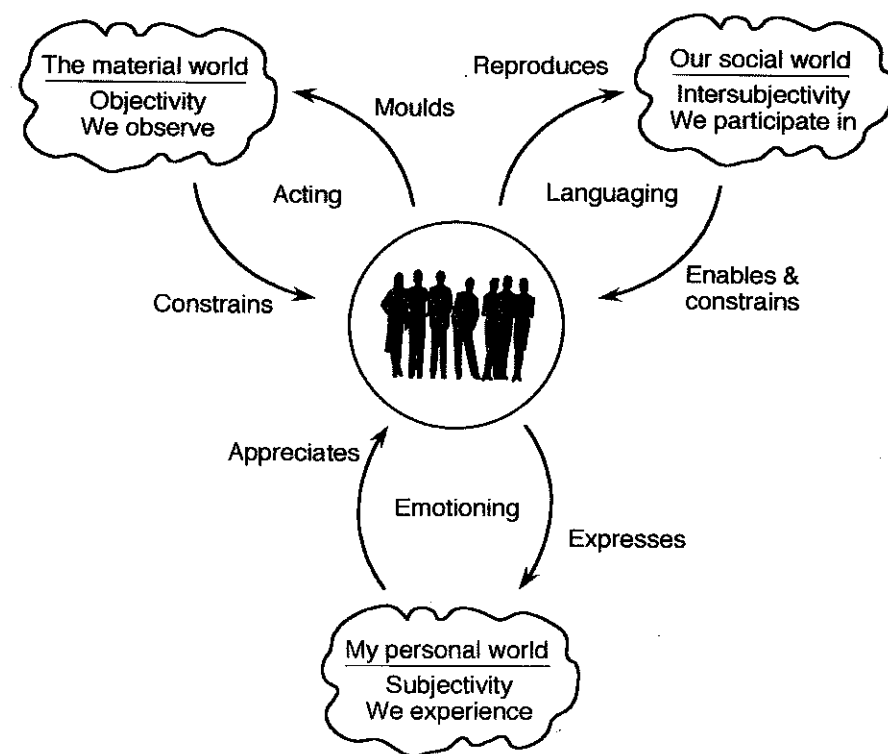


Figure 1.1 A framework based on Habermas’s three worlds

can characterize this world as *objective* in the sense that it exists independent of the observer, although clearly our observations and descriptions of it are not. It is the totality of all things that are or could be *true*.

From this material world, through processes of evolution, linguistically endowed humans have developed, capable of communication and self-reflection. This had led to the social and personal worlds. The personal world is the world of our own individual thoughts, emotions, feelings, experiences and beliefs. We do not observe it externally as we would a table or a mountain; rather we *experience* it. This world is *subjective* in that it is generated by, and only accessible to, the individual subject. We can aim to express our subjectivity to others and, in turn, appreciate theirs. It is the totality of experiences to which an individual has privileged access.

Finally there is the social world that we (as members of particular social systems) share and *participate in*. Our epistemological relation to it is one of *intersubjectivity* since it is, on the one hand, a human construction and yet, on the other, it goes beyond and pre-exists any particular individual. It consists of a complex multi-layering of language, meaning, social practices, rules and resources that both enables and constrains our actions, and is reproduced through them. One of its primary dimensions is that of power (Mingers, 1992). It is the totality of normatively valid interpersonal norms and relationships (this trilogy of worlds is related to, but distinct from, Popper’s three worlds, see Habermas (1984: 75–80)).

Thus, any real-world situation into which we are intervening or researching will be a complex interaction of substantively different elements. There will be aspects that are relatively hard and observer-independent, particularly material and physical processes, that we can observe and model. There will be aspects that are socially constituted, dependent on particular cultures, social practices, languages, and power structures, that we must come to share and participate in. Finally, there will be aspects that are individual such as beliefs, values, fears, and emotions that we must try to express and understand.

**Intervention and Research as a Process**

The second argument is that intervention and research is not a discrete event but a process that has phases or, rather, different types of activities, that will predominate at different times. Particular methodologies and techniques are more useful for some functions than others and so a combination of approaches may be necessary to provide a comprehensive outcome. To help do this in practice some categorization of the phases of an intervention would be useful, against which could be mapped various methodologies’ strengths.

An SSM analysis of the general process of research and intervention led to the following activities:

- *Appreciation* of the situation as experienced by the researchers involved and expressed by actors in the situation.
- *Analysis* of the underlying structure/constraints generating the situation as experienced.
- *Assessment* of the ways in which the situation could be other than it is; of the extent to which the constraints could be altered.
- *Action* to bring about appropriate changes.

At the beginning of an intervention, especially for an agent from outside the situation, the primary concern is to gain as rich an appreciation of the situation as possible. Note that this cannot be an "observer-independent" view of the situation "as it really is". It will be conditioned by the researcher's previous experience and his/her access to the situation. The next activity is to begin to analyse why the situation is as it appears. To understand the history that has generated it, and the particular structure of relations and constraints that maintain it. Next, in cases where change to the situation is sought, consideration must be given to ways in which the situation could be changed. This means focusing attention away from how things are, and considering the extent to which the structures and constraints can be changed within the general limitations of the intervention. Finally, action must be undertaken that will effectively bring about agreed changes. We should emphasize immediately that these activities are not seen as discrete stages that are enacted one by one. Rather, they are aspects of the intervention that need to be considered throughout, although their relative importance will differ as the project progresses. This is illustrated in Figure 1.2.

It is clear that the wide variety of methodologies and techniques available do not all perform equally well at all these activities. To give some brief examples: collecting data, carrying out questionnaires and surveys, developing rich pictures and cognitive maps, and employing the 12 critical systems heuristics questions all contribute to finding out about the different aspects of a particular

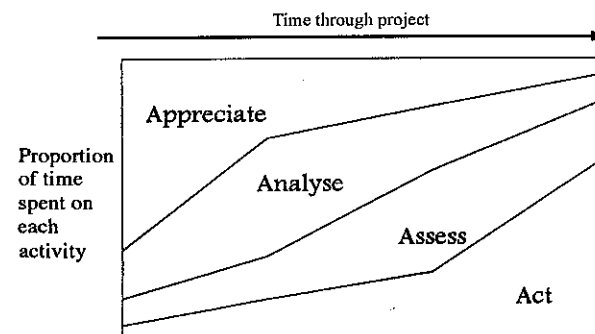


Figure 1.2 Phases of an intervention

situation. Whereas building simulation or mathematical models, constructing root definitions and conceptual models, using role-playing and gaming, or undertaking participant observation help to understand *why* the situation is as it is, and to evaluate other possibilities. A framework that helps to map the strengths and weaknesses of different methodologies will be presented in Chapter 15.

## FEASIBILITY OF MULTI-PARADIGM RESEARCH

Having put forward arguments for the desirability of multi-paradigm methodology we must also recognize the inherent problems, and assess its overall feasibility. We should remember that we are concerned particularly with linking research methods together across different research paradigms. Three different levels of problems can be identified:

- Philosophical*—particularly the issue of paradigm incommensurability.
- Cultural*—the extent to which organizational and academic cultures militate against multi-paradigm work.
- Psychological*—the problems of an individual agent moving easily from one paradigm to another.

Each of these is a major research area in its own right and in this chapter all we shall do is to outline the main debates and provide at least *prima facie* evidence that the problems are not insurmountable. More detailed arguments will be found in Mingers and Brocklesby (1996).

### Philosophical Feasibility—Paradigm Incommensurability

The paradigm incommensurability thesis asserts that because paradigms differ in terms of the fundamental assumptions that they bring to organizational inquiry, researchers must choose the rules under which they do research from among the alternatives on offer. They must then commit themselves to a single paradigm, although sequential movement over time is permissible. Multi-paradigm research is proscribed for a number of reasons, the most notable of which is the supposed irreconcilable objectivist/subjectivist ontological and epistemological dichotomies that exist between the empirical-analytic and interpretive paradigms respectively. However, as Burrell and Morgan (1979) and Astley and van der Ven (1983) have shown, there are other related dichotomies such as structure versus agency, determinism versus voluntarism, causation versus meaning, and object versus subject. The opposing positions in each dichotomy represent alternative competing "truths" about the world, and, as such, they resist reconciliation or synthesis.

In recent years, however, several arguments have been put forward within philosophy, social theory, and organization studies against a strong view of



paradigm incommensurability. First, it is argued that the characterization of paradigms as separate and mutually exclusive domains may have been overstated (Gioia and Pitre, 1990; Weaver and Gioia, 1994). Although the central prototypical characteristics are incommensurable, paradigms are permeable at the edges, in their so-called "transition zones". It is possible, these authors argue, to "construct bridges" across paradigm boundaries that are ostensibly impenetrable. Moreover, the distinctions between different paradigms are themselves fuzzy and highly questionable (Smaling, 1994). Second, it is not necessary to accept that research methods are wholly internal to a single paradigm (Smaling, 1994; Mingers and Brocklesby, 1996). Rather, it is quite possible to disconnect a particular method from its normal paradigm and use it, consciously and critically, within another setting. For example, the use of quantitative data need not imply the acceptance of a positivist, objectivist epistemology. Rather, such data can (and arguably should) be interpreted in the light of relevant social meanings, and their production as a social construction.

Third, it is claimed that the whole idea of paradigm incommensurability based upon the objective/subjective duality is fundamentally flawed (Orlikowski and Robey, 1991; Weaver and Gioia, 1994). Giddens' structuration theory (Bhaskar's (1989, 1994) "critical realism" could also be employed to similar effect) can be used to demonstrate that it is not possible to separate out objective and subjective dimensions. Reality, according to structuration theory, emerges out of the dialectic interplay of forces of structure and meaning—structural regularities are created out of subjective meanings, and through socialization processes, structures then "act back" upon individual meanings. Finally, generalizing the previous argument, different paradigms provide us with different perspectives or insights into a reality that is forever more complex than our theories can capture (Booth, 1979; Guba, 1990; Smaling, 1994; Mingers and Brocklesby, 1996). It is therefore quite wrong to wholly accept the postulates of any one paradigm.

Although the paradigm incommensurability issue has to be taken seriously in debates about methodology, there are grounds for believing that cross-paradigm research is philosophically feasible. What is required is an underpinning philosophical framework that can encompass the different paradigms,<sup>1</sup> and guidance on appropriate ways to mix different research methods.

#### Cultural Feasibility—Paradigm Subcultures

The question here is whether the existing cultural constitution of the management science community—the extent to which it is split into paradigm

<sup>1</sup> Such a framework should not be seen as somehow meta-paradigmatic, making no assumptions of its own. Rather it will be a new paradigm, subsuming existing ones, and with its own commitments (Mingers and Brocklesby, 1996).

subcultures—will facilitate or act as a barrier against the widespread adoption of multimethodology as a strategy. Obviously this depends upon the size of the "cultural gap" between where we are now, and where—in relation to multi-paradigm research—we would like to be. This issue has been discussed in some detail elsewhere (Brocklesby, 1994, 1995; Brocklesby and Cummings, 1995).

Certainly research within information systems (which is, arguably, very similar to Management Science in general) (Harvey and Myers, 1995; Banville and Landry, 1989; Orlikowski and Baroudi, 1991; Landry and Banville, 1992; Galliers, 1994; Myers, 1994; Walsham, 1995) does show that it has a fragmented character with general dominance, particularly in the US, of a positivist subculture. Although we know of no specific research, it would seem that few of our colleagues are trained across two or more paradigms or work in groups where the sorts of multi-paradigm research we have described are widely practised. Most have hard science or strongly technological backgrounds although some have moved into IS from social science. Only a small number appear to have shifted their allegiances from hard systems to soft systems and thereby develop competencies that span two major paradigms. The majority align themselves with either the hard or the soft paradigm. Within these broad paradigm groupings individuals often specialize in a single research approach, and in a specific type of situation. Arguably, practitioners are more methodologically eclectic than academics.

Individuals' methodological preferences are not randomly distributed, but often they are reinforced by institutional, physical, and geographic boundaries in which communities of like-minded people tend to congregate. These communities, perhaps as small as two in number and of which there may be several within a particular institutional grouping, may be thought of as subcultures for two reasons. First because the shared beliefs and preferences of their members are often unique to the group itself, and not always shared by the wider community. Second because the beliefs operate tacitly—they are powerful "taken-for-granted" forces that are rarely questioned or subject to debate.

If we accept that these are not particularly bold generalizations, the prospects for those wishing to develop a dominant culture sustaining multi-paradigm research do not look that bright. Culture research shows that pre-existing cultures can be remarkably resistant to change. In some business organizations "new" cultures can be manufactured over relatively short periods of time simply by bringing in new people who possess the sorts of characteristics that are valued and dispensing with those who do not. But generally this is not the case in the academic and scientific communities where most OR academics are employed. Here cultures tend to develop slowly over time in particular physical and historical settings, and cultural behaviours—including people's beliefs, values, methodological preferences and

accumulated expertise—tend to emerge out of the day-to-day interactions of people going about their daily business rather than as a response to some “grand plan”, even if the logic of the plan is compelling to its creators.

This does not mean that the institutionally entrenched single-paradigm, even single-method subcultures that pervade OR are inviolable. Cultures do change, albeit often slowly and in response to specific conditions and events. Perhaps the most basic condition that might trigger the sort of transformation we are talking about would be an unexpected failure in traditional ways of working combined with a consciousness of the limitations of one's preferred paradigm and knowledge of what other options might be available. Then, of course, there is the question of capability. Changes would have to be made in the curriculum to develop a better awareness of the range of ontological and epistemological options that are available, and to broaden knowledge and research skills. Changes would need to be made in the criteria required to recruit staff. These changes present a number of challenges, but they do not represent insurmountable obstacles.

#### Psychological Feasibility—Cognitive Barriers

The next potential difficulty in multimethodology concerns the cognitive feasibility of moving from one paradigm to another. Spanning a wide range of disciplines, there is now an extensive literature that has explored the extant links between personality traits, cognitions and research preferences, and the production of knowledge. A major issue raised in this literature is the question of whether entrenched cognitive predilections may be altered to facilitate multi-paradigm research. As this question forms the basis of John Brocklesby's chapter in this book, it will not be pursued here.

### CONCLUSIONS

The purpose of this introductory chapter has been to set the scene for the rest of the book. It has made clear that the theme of the book—multimethodology—is about developing ways of mixing together or integrating a range of methodologies or techniques, from different paradigms, in the course of a particular intervention. It has shown how this forms a logical development both in terms of the history of critical systems thinking, and the wider context of other disciplines such as social theory and organizational studies that are grappling with similar problems of methodological pluralism.

Arguments have been put forward as to why this is a desirable development in terms of improving the effectiveness of OR/systems; and the potential problems of philosophical and cultural feasibility have been addressed, if not entirely solved. This leaves the stage open for the collaborating authors to put

forward their own contributions to this complex problem in order to stimulate interest and debate. Some will be recounting and reflecting upon their own practical experiences in multimethodology, while others will be exploring the theoretical and philosophical problems of such an enterprise. The authors will differ among themselves, and no consensus will be arrived at for the subject is still at a very exploratory stage. Indeed no such consensus may even be possible. But the following chapters provide both a stimulating intellectual challenge and much of practical value to those who descend into the “swampy lowland [of] messy, confusing problems [that] defy technical solution” (Schon, 1987).

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# Part 1

## Practice of Multimethodology