Only Connect!

Part I: An Annotated Selection from the Literature on the Problem Structuring Methods of 'Soft' Operational Research

David C Lane
City University Business School
Frobisher Crescent
Barbican Centre
London, EC2Y 8HB, UK
Tel: 71 477 8619
Fax: 71 477 8880
E-mail: d.c.lane@city.ac.uk

Jonathan Rosenhead
The London School of Economics and Political Science
Houghton Street
London, WC2A 2AE,
UK
Tel: 71 405 7686
Fax: 71 955 7416
E-mail: rosenhej@vax.lse.ac.uk

Abstract

What other activities and techniques exist that are of interest to system dynamicists? Are there possibilities for system dynamics itself to contribute to them? These questions have been of interest to the authors for some time and now the 1994 System Dynamics Conference is helping to advance the debate. This paper tries to help things along.

We consider two areas of interest: the problem structuring techniques of 'soft' operational research and the wide range of systems thinking concepts employed in the systems movement. Both involve valuable ideas and experiences. Both have a more European-orientated perspective, in contrast to the mainly-US viewpoint of system dynamics. In this two-part paper we therefore offer a selection from the literature of the two as well as brief annotations.

In this first part we consider the emergence of a range of practical problem structuring methods, their grounding in respective theories of organisational interventions and group processes, their creators concern with participation and the political and power consequences of their work and, finally, the current debates in the area. In the second part (*q.v.*) we turn to systems thinking.

Of course, this is only our own selection but our aim is to encourage connections between these areas of activity. We have no doubt that they will be mutually beneficial.

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INTRODUCTION

The motivation of this two-part paper is twofold. Firstly, it results from the current interest in the commonalities between the theory and practise of system dynamics modelling and those of similar approaches more widely discussed in the UK and the rest of Europe. These commonalities were first explored in detail by DCL[a] and are a key theme of the 1994 International System Dynamics Conference to which both authors were invited as speakers. Secondly, this paper arose because of a survey of the system dynamics literature[b]. After the discussion in Cancun concerning this paper, John Sterman suggested to DCL that a similar piece on soft OR and systems thinking might be a valuable contribution to the system dynamics community.

Out intent is therefore to provide system dynamicists with the opportunity of exploring two literatures which we believe have much to offer. We refer to the written material on both problem structuring methods (PSMs) and to the broad range of activities that Europeans describe as 'systems thinking'. Those involved with this dual piece had initially intended to write a single paper but this has not proved to be a useful format. Although both literatures provide opportunities for valuable engagement, their natures are too different to be embraced within one paper without confusion. Instead, we have attempted our task in two parts, making a somewhat arbitrary division. In the second part[g], we consider the systems thinking sources. In the first part, the document that you are now reading, we consider PSMs.

With this set of sources on PSMs, the detailed points of interest for the system dynamics community have been studied in some detail elsewhere[a], so for the purposes of this selection, we need only make the following brief comments. PSMs grew out of increasing concern within the Operational Research community that more needed to be done to support managerial decision and policy making than providing mathematical tools for the increasingly accurate solution of defined, tactical problems. An additional concern was that the benefits of Operational Research were only available to those who had both access to the decision making forum (and the power to influence it) and the ability to pay the increasing cost of these approaches. What some saw as a crisis of 'hyper-rationalism' and others as an opportunity for more socially-grounded and richly inter-disciplinary Operational Research practice, yielded a shift in ideas (§1). Much theoretical work has been done on the nature of group activities and the difficulties involved with addressing the real world 'messes' that constitute strategic issues, this work being strongly influenced by the social (rather than the natural) sciences (§2). What has appeared is a set of techniques which can be used with groups to help clarify and structure the issues that confront then and which facilitate participative an exchange of ideas and views which lead to action (§3). These have been applied in practical situations (§4). A variety of debates have occurred to advance the area and they continue now. In particular, there is much concern regarding the nature of participation, the

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α. Lane, D.C. 1993. With A Little Help From Our Friends: How third generation system dynamics and the issue structuring techniques of 'soft' OR can learn from each other. In *System Dynamics 1993: The role of strategic modelling in international competitiveness* (E.Zepeda and J.A.D.Machuca, Eds.), pp.235-244. System Dynamics Society, Boston.
    This paper is more widely available as:
    Lane, D.C. 1994. With A Little Help From Our Friends: How system dynamics and 'soft' OR can learn from each other. *System Dynamics Review* 10(2-3):1-34.

β. Sastry, M.A. & J.D.Sterman. 1993. Desert Island Dynamics: An annotated survey of the essential system dynamics literature. In *System Dynamics 1993: The role of strategic modelling in international competitiveness* (E.Zepeda and J.A.D.Machuca, Eds.), pp.466-475. System Dynamics Society, Boston.

γ. Lane, D.C. & M.C.Jackson. 1994. Only Connect! Part II: An Annotated Selection from the Literature on the Breadth and Scope of Systems Thinking. In *System Dynamics 1994: Exploring the boundaries*, this volume.

effects of unequal power and the limits to democratic access involved in sessions involving PSM:
- whether they concern a management team or a debate on public policy. Similarly, there i:
interest in how one can choose between the different PSMs, whether they can be combined anc
whether new ones can be usefully crafted. The attachment to social science concerns is also :
crucial element in these debates (§5). In our last section we have located collections of material:
spread across the previous five sections (§6). This indicates the difficulty of the quasi
chronological structure that we have chosen for our selection. To surmount this further, we havı
tried to show the connections between works in different sections by numbering each selection
The primary emphasis is on the aspects which seem most clearly related to system dynamic:
practise - in particular group decision support - or those which contrast with the system dynamic:
approach in the most striking, challenging and illuminating way. Some historical works arı
included in order to provide a perspective on the evolution of the approaches.

We should state again that the division of systems thinking from PSMs is difficult and artificia
because of the areas of overlap. Some items are, in fact, repeated, though the differences in thei
annotations reflect the different emphases of the two bibliographies. We would thereforı
encourage interested readers to consult the sibling selection§.

A final, and perhaps unnecessary, comment is that this selection is just that: a selection. It doe:
not aim to be definitive or authoritative. It is a partial account of the literature of PSMs and wı
mean partial in two senses. Firstly, the authors themselves are not impartial: the selection tha
we offer draws on our own knowledge and research interests. Secondly, in the space available, wı
cannot hope to do full justice to the enormous efforts that researchers have invested in this area
Nor can we directly contribute here to the discovery and mapping of the terrain shared b
system dynamics, systems thinking and the PSMs of soft Operational Research. Our hope cai
only be that our paper might add to the exploration of mutually interesting areas by supplying :
crude signpost to possible destinations and connections. If it does so then it will have served it:
purpose. The exploration itself must continue elsewhere but we would commend it to ou
colleagues. With this paper, we can only connect.

§1 THE SHIFT OF IDEAS

1. C.W.Churchman. 1967. Wicked problems. *Management Science* 14(4):141-142.
    In this short piece Churchman takes up the idea of 'wicked' problems from his Berkeleɣ
    colleague, design professor Horst Rittel. Wicked problems are those which are capable o
    conflicting interpretations by interested parties with different perspectives. Analysis maɣ
    be used to support one viewpoint, but not to 'solve' a problem on which all are agreed
    Operational Research has tended to deal with 'tame' problems, for which a consensu
    exists (or is assumed). See 22.

2. J.K.Friend and W.N.Jessop. 1969. *Local Government and Strategic Choice: An operationa
    research approach to the process of public planning.* Oxford: Pergamon.
    Classic study of decision-making in a large British city. The authors (operational researcl
    observers) come to the conclusion that decision-makers need help, not in finding optima
    answers, but in managing uncertainty and the process of commitment. This realisation leı
    to the development of the Strategic Choice Approach, the first early version of which i
    described in this book. See 21.

3. H.W.J.Rittel and M.M.Webber. 1973. Dilemmas in a general theory of planning. *Polic
    Sciences* 4:155-169.
    Provides an extended account of the notions of 'wicked' and 'tame' problems summariseı
    by Churchman. The authors propose the notion of 'second generation' design methods, tı
    be used argumentatively. See 10 & 22.

4. R.L.Ackoff. 1979. The future of operational research is past. *Journal of the Operational Research Society* **30**(2):93-104.
   Ackoff argues that Operational Research has lost its way, becoming enmeshed in mathematical sophistication while remaining naive about the context in which decisions must be taken. The result is that Operational Research has been relegated to lower and lower levels of the corporate hierarchy to deal with relatively minor issues where technical considerations predominate.

5. R.L.Ackoff. 1981. The art and science of mess management. *Interfaces* **11**(1):20-26.
   Ackoff describes how Operational Research has seen its subject matter as discrete 'problems', whilst the managerial reality is better conceived of as 'messes'. These are interacting systems of problems, where steps taken to 'solve' one of them are likely to have knock-on effects on others. Different approaches are necessary, therefore, to make progress. See 10.

6. P.B.Checkland. 1983. O.R. and the systems movement: Mappings and conflicts. *Journal of the Operational Research Society* **34**(8):661-675
   Shows how Operational Research can be seen as one of a family of systems-based approaches to practical problems. These include systems analysis, systems engineering and Soft Systems Methodology. Operational Research, though by no means alone in this respect, is seen as a 'hard' rather than a 'soft' systems approach, in that it conceives of a single objectively defined problem for which a technical solution should be sought. See 19 & 27.

7. J.Rosenhead. Custom and practice. 1986. *Journal of the Operational Research Society* **37**(4):335-343.
   Rosenhead describes how the practice of Operational Research has been one-sided, serving managerialist interests using methods which seek solutions to well-formulated problems. There are many other groups which could benefit from formal analysis of their situations, notably interest groups of the disadvantaged. Equally there are big strategic problems in the public domain to which Operational Research has made little contribution. 'Problem structuring methods' have the potential to make Operational Research more relevant and accessible. See 23 & 45.

8. J.Rosenhead and C.Thunhurst. 1982. A materialist analysis of operational research. *Journal of the Operational Research Society* **33**(2): 111-122.
   An early and striking plea for sensitivity to the hidden ideological commitment of Operational Research and the provision of its analytical capability to a wider audience. The paper asserts that capitalist society is filled with coercive systems which the practise of OR supports and legitimises. The authors lament its consequent manifestation as 'management science', not a workers' science. They advocate an alternative role in the provision of 'self-management science' for participative, socially orientated processes involving workers. (As published, this paper has an 'Editor's note' inserted which seeks to justify the appearance of an open political stance in the journal!). See 23 &45.

9. M.Dando and P.G.Bennett. 1981. A Kuhnian crisis in management science? *Journal of the Operational Research Society* **32**(2):91-103
   Employing the ideas of Thomas Kuhn - that in 'normal science', dominant paradigms of what constitute a meaningful problem, method of attack and form of solution are periodically challenged and overthrown by new paradigms- the authors reflect on management science. Three contending paradigms are identified: official, reformist and revolutionary. They predict that the reformist approach, typified by the work of Ackoff and Checkland, is likely to win out. A particularly important paper.

§2 THEORETICAL UNDERPINNINGS

10. J.R.Ravetz. 1971. *Scientific Knowledge and its Social Problems.* Oxford: Oxford University Press.
    This weighty contribution to the history and philosophy of science offers numbers o: insights to, or on, Operational Research. One is the distinction between 'technical' an('practical' problems, which parallels that between 'tame' and 'wicked' problems, and tha between problems and 'messes'. Another is the importance of craft elements in analyti(practice. This work has been cited in support by Miser, Quade and Majone in their IIASA based methodological publications. See 3, 5 & 49.

11. A.Sandberg. 1976. *The Limits to Democratic Planning.* Stockholm: LiberForlag.
    In this book Sandberg explores the question of whether, and how, planning methods cai serve a society in which democracy is taken seriously. Relevant to the debate abou Operational Research are: the inescapable importance of 'perspective' when framini planning questions; the danger of 'colonising the future' by projecting out into the futur(the continuance of the social relationships which have generated current data sets; th(consequent need to engage in 'conditional projections', which examine possible futur(behaviours if certain present 'givens' are replaced by new arrangements.

12. C.Eden. Problem construction and the influence of OR. 1982. *Interfaces* 12(2):50-60.
    Problems are not 'given', argues Eden. They are constructed by a social process within th(organisation. Operational Research needs to be more sensitive to the dynamics of th(decision-making process among managers. If it can achieve this, then it has grea potential for managing the debate among managers.

13. C.Eden. 1987. Problem solving or problem finishing? In M.C.Jackson and P.Keys (eds. *New Directions in Management Science.* Aldershot: Gower. 1987.
    Just as with problem construction, so the end of an involvement of analysts witl managers is a process rather than an event. There is a process of disengagement, witl managers detaching themselves from the activity as they feel that it has produced enougl to meet their current needs, or on the basis of expectations of the likely return from th(investment of further time.

14. J.W.Bryant. 1989. *Problem Management: A guide for producers and players* Chichester: Wiley.
    Bryant's book is hard to describe! Its subject matter is the practical business of managini problems, its approach is eclectic (drawing on many disciplines), and its emphasis is oi process. Of particular interest is the use of a theatrical metaphor for the engagemen between analysts and managerial participants. Full of thought-provoking ideas an(comments.

15. L.D.Phillips. 1984. A theory of requisite decision modelling. *Acta Psychologica* 56.
    When building models for use in helping managers to reach agreement, the model shoul(be no more elaborate or detailed than is required by the decision at hand. See 35 & 36.

16. L.D.Phillips and M.Phillips. 1993. Facilitated work groups. *Journal of the Operationa Research Society* 44(6):533-549.
    Internal or external consultants assisting work groups to reach agreed decisions need : different range of skills than those associated with conventional Operational Research They need to be sensitive to group dynamics, internal politics, suppressed anxieties *etc* While managing this process to a constructive resolution, the authors hold that th(facilitator should absolutely avoid making any contribution relevant to the content of th(group task. See 35 & 36.

§3 DESCRIPTIONS OF PROBLEM STRUCTURING METHODS

17.   C.Eden, S.Jones and D.Sims. 1983. *Messing About in Problems.* Oxford: Pergamon.
       Provides the most recent, book-length account of Strategic Options Development and
       Analysis (SODA). This employs cognitive mapping to surface the concepts which
       individuals involved in a situation use to make sense of it. The maps of the concepts
       employed by different participants are merged, and the resulting 'strategic map' is used to
       provide a framework for group discussion, and to take the group forward towards
       commitment to a coherent package of commitments. The book does not cover more
       recent developments, especially those based on the sophisticated software now available.
       See 26.

18.   F.Ackermann, S.A.Cropper and C.Eden. 1991. Cognitive mapping for community OR. In
       A.G.Munford and T.C.Bailey (eds.) *OR Tutorial Papers 1991.* Birmingham: Operational
       Research Society. 1991
       A practical guide to the nuts and bolts of conducting SODA. The explanation is within the
       application area of Community Operational Research, but applies more widely. See 26.

19.   P.B.Checkland. 1981. *Systems Thinking, Systems Practice.* Chichester: Wiley.
       This classic text provides both a survey of the philosophy and concepts underlying Soft
       Systems Methodology (SSM), and an account of the methodology itself. SSM involves
       constructing idealised models of alternative systems each of which, from at least one
       perspective, might be of interest. These are used to generate debate about the systemic
       and cultural appropriateness of possible changes to the organisation. See 6 & 27.

20.   J.Mingers. 1992. Questions and suggestions in using Soft Systems Methodology. *Systemist*
       14.
       A sympathetic but critical account based on the experience of using SSM in practice.
       Guidance is provided on the choices which a practitioner must make, and there is
       discussion of the validity of claims and assumptions associated with SSM.

21.   J.K.Friend and A.Hickling. 1987. *Planning Under Pressure.* Oxford: Pergamon.
       Beautifully organised and presented account of the Strategic Choice Approach. This
       methodology is concerned to assist decision-making under uncertainty. A range of 'soft'
       decision technologies, evolved out of practice, are deployed to take groups through the
       various stages of decision-making. The emphasis is on managing uncertainty, and the
       visible end-product is a 'commitment package' of shorter term actions and explorations,
       and of longer-term possibilities for action based on those explorations, plus contingency
       plans. See 2.

22.   R.O.Mason and I.I.Mitroff. 1981. *Challenging Strategic Planning Assumptions: Theory,
       cases and techniques.* New York: Wiley.
       This book describes Strategic Assumptions Surfacing and Testing (SAST). This is a
       methodology the purpose of which is to expose policy to dialectical debate. Different
       groups of participants develop alternative strategies, and identify their key assumptions.
       Discussion of these between the assembled groups aids a broader understanding, and the
       consequential adjustment of assumptions. A consensual strategy, or at least a clarified
       disagreement, should emerge. See 1.

23.   J.Rosenhead. 1980. Planning under uncertainty 2: A methodology for robustness analysis.
       Journal of the Operational Research Society 31(4):331-341
       A description of Robustness Analysis, a methodology concerned to identify initial
       decisions which preserve useful flexibility. The approach is relevant under conditions of
       high uncertainty, and when there is the possibility of sequential commitment. It rates
       alternative initial commitments in terms of their abilities to keep useful future options
       open, and to exclude possibly damaging routes into the future.

24.   P.G.Bennett and S.A.Cropper. 1986. Helping people choose: Conflict and other perspectives. In V.Belton and R.M.O'Keefe (eds.) *Recent Developments in OR.* Oxford: Pergamon. 1986.
An introduction to Hypergame Analysis, an approach to the management of conflict situations. The special feature of this methodology is its treatment of the possibility that different 'players' in the situations may have differing perceptions of the strategies available, or even of the preferences which other players may have over possible outcomes.

25.   N.Howard. 1993. The role of emotions in multi-organisational decision-making. *Journal of the Operational Research Society* **44**(6):613-623.
An account of Metagame Analysis, an approach to situations of potential conflict and co-operation which integrates within one framework both threats and temptations, and the emotional dimension which may be crucial to persuasion. See 46.

§4 APPLICATIONS OF PROBLEM STRUCTURING METHODS

26.   C.Eden. 1985. "Perish the thought!". *Journal of the Operational Research Society* **36**(9):809-819
A richly described case study of the application of SODA in the publishing industry. See 17 & 18.

27.   P.B.Checkland and J.Scholes. 1991. *Soft Systems Methodology in Action.* Chichester: Wiley.
This book provides the most extended account so far of SSM applications, with detailed case studies of work in government agencies, major corporations and other bodies. It also updates the methodology. The new form responds to various criticisms, not least that of cultural conservatism(see 37 & 38) which is (partially) addressed by the introduction of a 'stream of cultural analysis'. See 6 & 19.

28.   J.Mingers and S.Taylor. 1992. The use of soft systems methodology in practice. *Journal of the Operational Research Society* **43**(4):321-332
A survey among potential users of SSM reveals quite widespread adoption. It also shows where it is being used and where it is not, and those aspects of the approach which do, and do not, meet with general approval. See 19.

29.   M.Moulin. 1991. Getting planners to take notice: An operational researcher's experience of helping a community group to influence the design of a new maternity hospital. *OR Insight* **4**(1):25-29.
An unusual case study in Community Operational Research in which women dissatisfied with what the health services had to offer them, were helped by an operational researcher to articulate their demands for better birthing facilities. The Strategic Choice Approach enabled the group to crystalise what they wanted. Their greater effectiveness enabled them to influence provision. See 21 & 45.

30.   A.Gains and J.Rosenhead. 1993. Problem Structuring for Medical Quality Assurance. *Working Paper 93.8, Operational Research, London School of Economics.*
A hybrid case study dealing with the application of SODA and SSM in the National Health Service. The work was carried out with a specialty medical audit team at a local hospital. SODA was employed to identify relevant dimensions of how the introduction of audit was viewed by team members, and SSM was then used to explore possible system re-designs. See 17, 18 & 19.

31.   G.Best, G.Parston and J.Rosenhead. 1986. Robustness in Practice: The regional planning
       of health services. *Journal of the Operational Research Society* 37(5):463-478.
       An application of Robustness Analysis to the planning of health services for Ottawa and
       the surrounding region of Ontario. DELPHI analysis and cluster analysis were used in
       conjunction to generate alternative possible futures. Extensive consultation with health
       care deliverers and with the public were other features of the study. See 23 & 45.

32.   N.Howard. 1992. Dealing with other parties. *OR Insight* 5(1):18-24.
       A paper which discusses and compares three applications of metagame analysis.

33.   R.Parry and J.Mingers. Community Operational Research: Its context and its future.
       OMEGA 19(6):577-586.
       Gives a broad view of the provision of Operational Research techniques to community,
       voluntary and other non-hierarchical organisations. Also offers a restatement of the
       sense of social responsibility that lead to the initiative. See 7 & 8.

34.   C.Thunhurst, C.Ritchie, J.Friend and P.Booker. 1992. Housing in the Dearne Valley:
       Doing community OR with the Thurnscoe Tenants' Housing Co-operative Part 1 - the
       involvement of the Community OR Unit. *Journal of the Operational Research Society*
       43(2):81-94
       The largest community Operational Research project carried out to date has been with
       the Thurnscoe Tenants Housing Cooperative. This paper tells the story of that work,
       which included the use of a range of soft and problem structuring methods. Some
       preliminary conclusions are drawn,including on the appropriateness of hard and soft
       methods. See also Part 2, in the same volume, for more extensive discussion. See 45.

35.   Phillips, L.D. 1982. Requisite Decision Modelling. *Journal of the Operational Research
       Society* 33(4): 303-312.
       See 36.

36.   Phillips, L.D. 1989. People-centred group decision support. In G.Doukidis, F.Land &
       G.Miller, (eds.) *Knowldge-based Management Support Systems*. Chichester: Ellis
       Horwood.
       Both 35 & 36 are case studies. The use of carefully designed room layout, non-
       threatening computer support and attention to group dynamics allows the facilitated
       application of decision theory with managers. See 15 & 16.

§5 ADVANCES AND DEBATES

37.   Mingers, J. 1980. Towards an appropriate social theory for applied systems thinking:
       critical theory and soft systems methodology. *Journal of Applied Systems Analysis,* 7:
       41-49.
       Examines the specific connections between SSM and Critical Theory and concludes that
       although there were many similarities, SSM at that time suffers in comparison because it
       lacks a political stance and because it would tend to conserve and support rather than
       challenge the *status quo*. See 27 & 44.

38.   M.C.Jackson. 1983. The nature of soft systems thinking: the work of Churchman,
       Ackoff and Checkland. *Journal of Applied Systems Analysis* 9:17-29
       A dissection of the assumptions underlying the work of three leading Operational
       Research/systems writers. The gist of the criticism is that the authors make strong claims
       for the capacities of their respective methods to deliver radical change which cannot be
       justified. Their approaches are characterised as supportive of the status quo, and
       compromised by the relationship with management necessary for them to be put into
       operation. In the same issue the objects of criticism respond - Churchman testily,

Checkland reasonably, Ackoff going for the jugular. See Volume **10** for Jackson's response.

39.   M.C.Jackson and P.Keys. 1984. Towards a system of systems methodologies. *Journal of the Operational Research Society* **35**(6):473-486.
The first version of an attempt to categorise both problem situations and the methodologies appropriate to tackle them. Subjected to sustained criticism (and robust defence) the categorisation and its justification have shifted periodically. The typology is based on whether the systems involved are relatively simple ('mechanical') or complex ('systemic'); and on whether the participants are in agreement ('unitary') or have divergent views ('pluralist'). Later a third type of context ('coercive'), in which the exercise of power between participants is significant, was added and used to create 'total systems intervention' (TSI). The major disputes have been over whether such problem contexts can be objectively identified, and then used to choose methods; and over whether the authors claimed this in the first place. See 44 & 47.

40.   M.C.Jackson. 1987. Present positions and future prospects in management science. *Omega* **15**(6):455-466
Operational Research and related approaches, from being relatively monolithic, are seen as having now achieved a striking diversity. Jackson lays out the varieties on offer, and discusses the various ways in which the component parts could decide to co-exist (or not). He suggests that 'imperialism', the persistent, uncritical advocacy of one method over any other, is likely to be destructive. A 'pluralism' in which we all learn from each other is to be preferred.

41.   J.Bryant. 1988. Frameworks of enquiry: OR across the hard-soft divide. *Journal of the Operational Research Society* **39**(5):423-435.
As discussed, as a general rule Operational Research's traditional optimising techniques are seen as dealing with the content of problems, while problem structuring methods attempt to handle issues of the process of decision-making as well as those of problem content. However, this paper demonstrates that this demarcation line is not absolute, using as evidence reported work in which process issues were addressed while working with a linear programming formulation.

42.   P.G.Bennett and S.A.Cropper. 1990. Uncertainty and conflict: combining conflict analysis and Strategic Choice. *Journal of Behavioural Decision Making* **3**.
An exploration of the possibilities of combining different problem structuring methods in joint use.

43.   S.R.Watson. 1992. The presumption of prescription. *Acta Psychologica*, **80**:7-31
Details the assumptions behind methodologies purporting to structure 'rational' choice. Concentrates on various forms of decision theory and their implicit axioms - presumptions about human judgement - before discussing SODA and SSM. Concludes that the idea that any unique prescriptive decision making methodology can be shown to be better than any other is itself a false presumption. Any choice is probably based on personal experience and conviction; research programs intended to understand this are fraught with difficulties. This has implications for attempts to categorise the situations in which a particular methodology may be 'best' for decision making. An interesting alternative to the TSI approach.

44.   J.Mingers. 1992. Recent developments in Critical Management Science. *Journal of the Operational Research Society* **43**(1):1-10.
Engages with the ideas Jürgen Habermas on the nature of knowledge to critique both traditional and soft practices of Operational Research. Reviews, predominantly unfavourably, attempts to utilise Habermas' Critical Theory to create empowering situations for participants, in particular TSI. Reference is also made to the problems of power in interventions and to post-modernist questioning of the notions of rationality. See 37.

45. J.Rosenhead. 1992. Into the swamp: the analysis of social issues. *Journal of the Operational Research Society* **43**(4):293-305.
     During the 1960s and 70s, policy analysis got a bad name through its overweening ambition. In the 1980s in Britain, the government demonstrated the alternative dangers of analysis-free policy formation. The middle way suggested here is multiple advocacy, with interest groups empowered to make their cases by widely distributed analytical capability. Problem structuring methods have the characteristics required to service a more active policy debate. See 23 & 31.

46. N.Howard, P.Bennett, J.Bryant and M.Bradley. 1993. Manifesto for a theory of drama and irrational choice. *Journal of the Operational Research Society* **44**(1):99-103.
     A powerfully argued case asserting that, to be useful in conflict situations, analysis must engage with the emotional dimension of decision making. It is suggested that 'drama theory' provides a more fruitful metaphorical framework than 'game theory' for the realisation of this ambition. See 25.

47. Tsoukas, H. 1993. The Road to Emancipation Is Through Organizational Development: A critical evaluation of Total Systems Intervention. *Systems Practice*, **6**(1): 53-70.
     A detailed, reasoned and carefully argued critique. Two numbers later, *Systems Practice*, **6**(3) provides a threefold response, of various degrees of quality, from TSI advocates and Tsoukas' witheringly unconvinced restatement of his position. Interesting - and good fun. See 39.

§6 COLLECTIONS

48. R.Tomlinson and I.Kiss (eds.). 1984. *Rethinking the Process of Operational Research and Systems Analysis*. Pergamon, Oxford: Pergamon.
     A collection of papers delivered at an IIASA workshop. Can be seen as the milestone which marked the point at which the mounting criticisms of the Operational Research orthodoxy, for its narrow focus on the objectively calculable, achieved international and authoritative recognition.

49. H.J.Miser and E.S.Quade (eds.). 1985. *Handbook of Systems Analysis Vol.1: Overview of uses, procedures, applications and practice*. Chichester: Wiley.
     Systems analysis fights back? A distillation of the sophisticated wisdom of widely experienced practitioners at, particularly, the RAND Corporation. That is a little unfair to the authors from other organisations and countries who contributed to this International Institute of Applied Systems Analysis (IIASA)-based compilation. However, the pages contain an unusual density of common and uncommon sense on how to practice relatively conventional analysis and stand a very good chance of being helpful - through knowledge of the technical repertoire, sensitivity to the organisational politics, etc. See 10.

50. J.Rosenhead (ed.). 1989. *Rational Analysis for a Problematic World: Problem structuring methods for complexity, uncertainty and conflict*. Chichester: Wiley.
     The first book to collect together a range of problem structuring methods - in this case SODA, SSM, Strategic Choice, Robustness Analysis, Metagame Analysis and Hypergame Analysis. It is designed to be an introductory text; each method has two chapters - the first for exposition, the second for a case study. Each method is described by its principal begetter. A very handy book.

51. C.Eden and K.J.Radford (eds.). 1990. *Tackling Strategic Problems: The role of group decision support.* London: Sage.
     The proceedings of a conference, this book provides, perhaps, the most concentrated collection of papers about the process aspects of analytic assistance to decision processes. The focus is on how support for decision making in groups using problem structuring techniques can take account of the dynamics of such situations.

52. C.Eden, M.C.Jackson, J.Rosenhead and R.Tomlinson (eds.). 1993. Special Issue on the interface between OR and the Social Sciences. *Journal of the Operational Research Society* 44(6).
     Over the years 1990-3, a series of 9 seminars on the interface between Operational Research and the social sciences was held in Britain. This issue contains papers given at two of the seminars, dealing with the nature of problem-solving interventions, and with approaches relevant to work across multiple organisations. The topics covered range from the process of facilitation to the analysis of conflict.