Soft Systems Methodology in Action

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Chapter 1

Soft Systems Methodology and Action

Introduction

Consider the scope of the idea of 'managing' anything. The project manager in an engineering company responsible for developing a new product, the doctor running an ear, nose and throat clinic, the single parent with a child of school age, the secretary of a trade union branch, the leader of a guerilla band, all these are 'managers' in the broad sense of the term. To 'manage' anything in everyday life is to try to cope with a flux of interacting events and ideas which unrolls through time. The 'manager' tries to 'improve' situations which are seen as problematical—or at least as less than perfect—and the job is never done (ask the single parent!) because as the situation evolves new aspects calling for attention emerge, and yesterday's 'solutions' may now be seen as today's 'problems'.

Soft systems methodology (SSM) helps such managers, of all kinds and at all levels, to cope with their task. It is an organized way of tackling messy situations in the real world. It is based on systems thinking, which enables it to be highly defined and described, but is flexible in use and broad in scope. The account of it here is based on the last decade of experience, and is complementary to the earlier account of SSM which described its origins and emergence, as well as the systems thinking upon which it is based and the nature of systems thinking in general (Checkland, 1981).

The ideas in this first chapter underpin the whole book. It starts from, but does not dwell on, the basic assumptions behind SSM which make its scope so broad, and describes without going into detail the mature view, after twenty years of research, of the shape and nature of the methodology. Finally an account is given of the shape of the book itself.

Organized Purposeful Action

One of the most obvious characteristics of human beings is their readiness to attribute meaning to what they observe and experience. Indeed, human

beings are not simply ready to attribute meanings, they cannot abide meaninglessness. The very existence of the world religions, and the fact that every culture develops its own myths concerning the nature of the world and our place in it, show how important it is to *homo sapiens* to create answers to the most fundamental—ultimately unanswerable—questions. Mankind finds an absence of meaning unendurable. We are a meaning-endowing animal, on both the global long-term and the local short-term level. Members of organizations, for example, tend to see the world in a particular way, to attribute at least partially shared meanings to their world. And that is equally true of corporate members of the Warsaw Pact and individual members of the Batley Ladies Sewing Circle.

Given the creation of an interpreted, not merely an experienced world, we can form *intentions*, we can decide to do one thing rather than another, in the light of how we are interpreting our situation. This seems to be a uniquely human characteristic. The chemist investigating how hydrogen and nitrogen combine to form ammonia never finds it necessary to attribute intentions to the molecules. And if we observe the behaviour of the cuckoo, though we may say casually that 'the cuckoo has the intention of laying her eggs in the nest of another bird', this is an observer's language, not meaningful to the cuckoo. To explain what is observed, we only have to assume that the cuckoo is programmed to a certain behaviour; it has not been found necessary to attribute self-consciousness to cuckoos. But to explain human behaviour, much more erratic than that of cuckoos, we need the additional concept of the 'intentions' which the human beings can formulate, act upon, and change for themselves.

Thus, on this argument, human beings cannot help attributing meaning to their experienced world; and they can then decide to do some things and not do others. They can take *purposeful action* in response to their experience of the world. By purposeful action we mean deliberate, decided, willed action, whether by an individual or by a group.

Now it would seem a good idea if purposeful action deriving from intentions were also based on knowledge rather than consisting merely of random thrashing about—though observation suggests that there may be no shortage of that in human affairs! Where might the knowledge to guide action be found? Probably the most respected source of knowledge is scientific investigation, since it produces 'public knowledge' which can be subject to public refutation (Ziman, 1968; Popper, 1963; Checkland, 1981, Chapter 2). But while the status of scientific knowledge gained in repeatable experiments concerning natural phenomena is unimpeachable in Western culture, the status of knowledge gained in the so-called social or human sciences is much less sure. This is precisely because, as Caws (1988) neatly puts it:

> the causal determinants of the objects of the social sciences always include human intentions, while those of the natural sciences do not (p. 1).

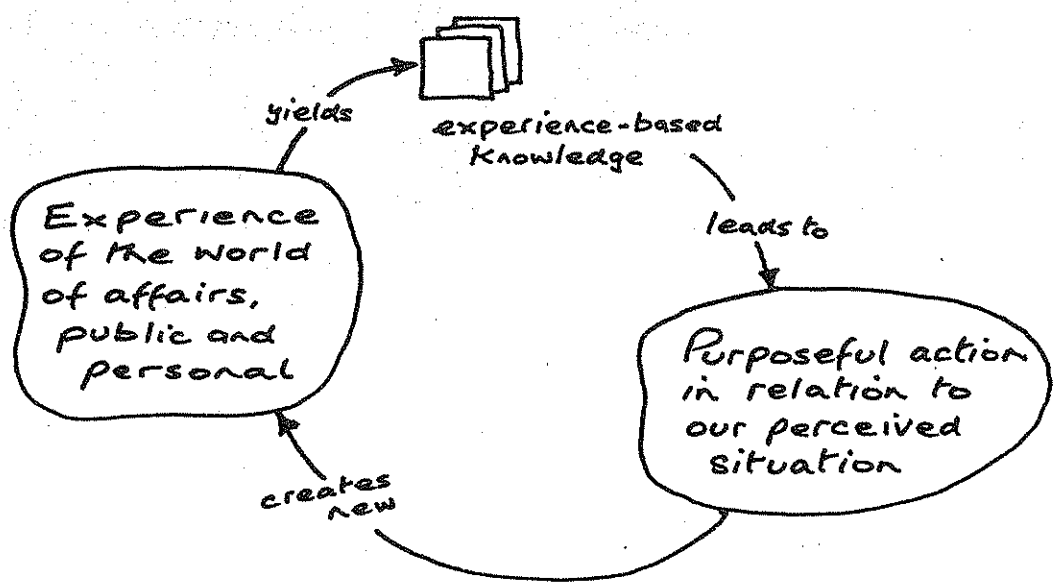

Figure 1.1 The experience–action cycle

In the social sciences repeatable experiments are difficult to achieve and virtually all knowledge gained by social science is heavily meaning-bearing.

If we cannot aspire to a natural-science-like knowledge, perhaps what we seek in human affairs might be described as 'wisdom-based knowledge'. But what one observer sees as wisdom may to another be blinkered prejudice. 'Insight-based knowledge' might be another candidate, but again we have to ask: Insight in relation to whose meaning? The most neutral expression would be 'experience-based knowledge', and this accords at least with the everyday observation that we are all the time taking purposeful action in relation to our experience of the situations we find ourselves in, and the knowledge (shared or individual) which that experience yields.

This, of course, places knowledge acquisition in a cycle, namely that shown in Figure 1.1, since the purposeful action derived from experience-based knowledge will itself result in new experience. This is a cycle whose content will continually change: each time round the cycle the world experienced is a somewhat different place, and hence the cycle embodies fundamentally the possibility of *learning*. If this happens then the purposeful action can be aimed at intended improvements, improvements, that is, in the eyes of those who take the action.

The cycle of Figure 1.1 can itself be seen as the object of concern of so-called 'management science'. This is a curious field, as is indicated by problems surrounding both of the words in its name! Management science clearly ought to be relevant to managing anything, in the same broad sense in which the word is being used here; in fact, management science has devoted itself almost exclusively to the concerns of only one kind of manager: professionals conducting the affairs of private and public enterprises.

Secondly, whether or not management science is a science, or whether it could or should aspire to scientific status has been much debated in the last twenty years, as part of the wider debate about whether natural science and social science are or could be scientific in the same sense (see Checkland, 1983a, for a discussion of the management science debate in Operational Research circles, and Checkland, 1981, for discussion of the broader debate). However, these problems have not been too inhibiting to practitioners in the field. Much work has been done, and one very useful legacy from management science has been its demonstration that a particular kind of language can be very helpful in understanding and articulating the operation of the cycle of Figure 1.1. We refer to the language of systems thinking.

Systems thinking will be discussed briefly in Chapter 2, in which its role in SSM will be made clear. Here it is sufficient to say that in spite of the fact that there are many definitions of the word system in the literature (Jordan, 1965, p. 44–65, for example, offers fifteen) all take as given the notion of a set of elements mutually related such that the set constitutes a whole having properties as an entity. Secondly comes the crucial idea that the whole may be able to survive in a changing environment by taking control action in response to shocks from the environment. We can see at once that the cycle of Figure 1.1 can itself be viewed as 'a system', one which, if self-reflective, could learn, adapt and survive through time. So it is not surprising that systems thinking has had an important role in developing an organized approach to describing and making operational the cycle of Figure 1.1.

For that is where this argument has led us: firstly to the idea that it is probably worth trying to find ways of *formally* operating the learning cycle in which purposeful action is taken in real-world situations in order to bring about what are deemed to be improvements by those carrying out the process; and secondly to the idea that systems thinking may be helpful in this task. SSM is just such a methodology for operating the endless cycle from experience to purposeful action.

Some might deny, either in principle or from despair, that any *formal* account of the necessary process should or could be given. Surely any formal account might either be inhibiting if used prescriptively, cutting off exciting lines of thought, or inadequate if used descriptively, given the glorious richness which human beings can bring to any task? An echo of such concerns surfaced recently in a discussion in the Operational Research Society concerning the extent to which OR embodied a version of the methodology of natural science. Rivett (1989), reiterating thoughts expressed at a conference on 'Systems in OR' a few years earlier (1983), argued that formal accounts of the 'OR process' bore no relation ('complete nonsense' is Rivett's phrase) to the reality, which actually consisted of:

> a complex process which is a mixture, in practice, of fumbling, mind-changing, chaos and political intervention (p. 17).

Critics were quick to respond. Lord (1989) argued that this denied OR's 'aspiration to be a disciplined subject', that is to say, presumably, one in which critical debate can be conducted on explicit and understood premises; while Jones (1989) saw talk of the OR process as a *post hoc* effort to understand what is happening and what developments are taking place through OR work.

The authors here would argue that in SSM a process of tackling real-world problems in all their richness has been developed; that it has benefited considerably from being formally expressed, which enables lessons to be learned and also enables users to know what they are talking about; and that the particular form which SSM takes (helped here by its use of systems thinking) both enables it to be used descriptively to make sense of a complex situation, in Jones's sense, and prescriptively to control Rivett's 'chaos'. This book will seek to illustrate all these themes. Meanwhile we can define its focus using the language of the above argument: the focus is on an organized set of principles (methodology) which guide action in trying to 'manage' (in the broad sense) real-world problem situations; it is systems-thinking-based and is applicable to taking purposeful action to change real situations constructively.

The Basic Shape of SSM

Let any purposeful activity be represented by an arrow (A in Figure 1.2). Such an action, being purposeful, will be an expression of the intention of some person or persons B (also Figure 1.2). Since A is a human action there will be someone (or several people) who take the action: they are C in the figure. The action will have an impact on some person or group, D, and it will be taking place in an environment which may place constraints upon it. These constraints are represented by E. Finally, since human autonomy is rarely total, we can add some person or group F who could stop the action being taken. Of course in real life the same person or persons could be one or more of the elements B, C, D, F, since they are roles, not necessarily individuals or groups. Overall, Figure 1.2 is a simple emblematic model of a purposeful action; it represents one way of thinking about that concept.

Now let A be the purposeful act of you, the reader, reading this book. You are B in the figure, and could now name the other elements. For example, the nature of A could be that you are preparing for an examination in management science, or that you are satisfying a curiosity about SSM, or preparing a critique of it. Given the definitions so far you would also be element D, since reading the book will have a direct effect on you yourself. In the role F might be someone from whom you have borrowed the book, who wants it back, or you might be F yourself if the copy is your own. If someone wants the book back within a week then that might be one of the constraints E. And so on . . . It is clear that you could investigate, or prepare an account of, or intervene to

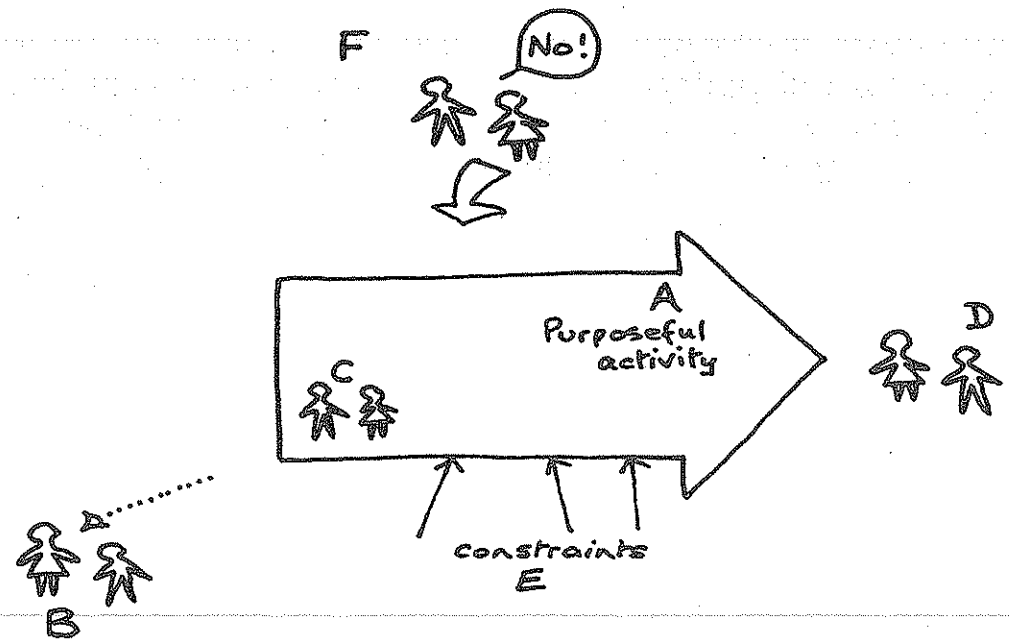

Figure 1.2 An emblematic model of purposeful activity

change your reading of this book by using Figure 1.2 as a tool. This would be an example of using a model, which is itself a pure concept, to investigate or intervene in a part of the real world.

This simple thought experiment in fact illustrates the core nature of SSM. The basic shape of the approach is to formulate some models which it is hoped will be relevant to the real-world situation, and use them by setting them against perceptions of the real world in a process of comparison. That comparison could then initiate debate leading to a decision to take purposeful action to improve the part of real life which is under scrutiny. In SSM the models are not quite like that in Figure 1.2; in fact they are carefully built models of systems to carry out purposeful activity (known as 'human activity systems') and are somewhat more elaborate than the model used in the thought experiment. But the principle is the same: find out about a situation in the real world which has provoked concern; select some relevant human activity systems; make models of them; use the models to question the real-world situation in a comparison phase; and use the debate initiated by the comparison to define purposeful action which would improve the original problem situation. Taking the action would itself change the situation, so that the whole cycle could begin again . . . and is in principle never ending. (Of course your first choice of relevant system might turn out not to be relevant. You will learn your way to true relevance by trying out a number of models.)

The shape of SSM is thus as shown in Figure 1.3, which is a slightly more elaborate version of Figure 1.1. Systems thinking is involved here in two

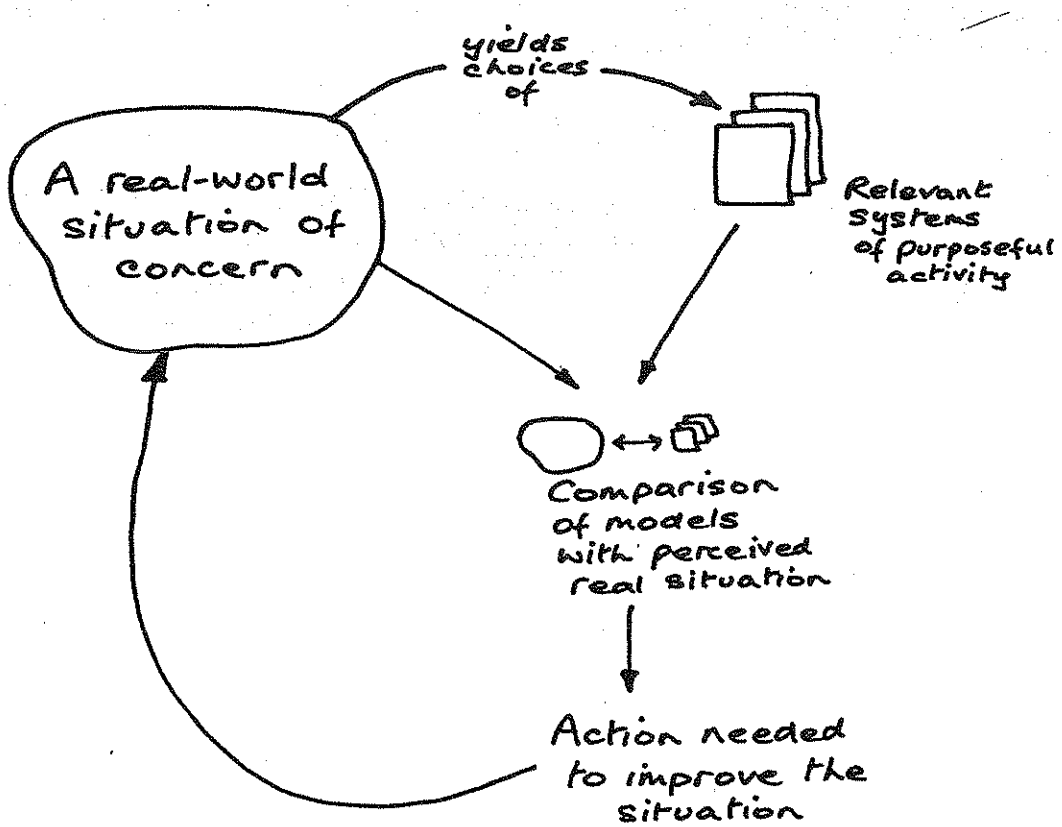

Figure 1.3 The basic shape of SSM

different ways, which make SSM doubly systemic. Firstly, the process of Figure 1.3 can itself be viewed as the operation of a cyclic learning system (a point to be discussed later in Chapters 3 and 10, in the guise of formulating ' a system to use SSM'); secondly, within the process of Figure 1.3, systems models are used to initiate and orchestrate the debate about purposeful change. The first use of systems ideas, that the whole enquiring process can be articulated as a system, is more fundamental than the second, the fact that within SSM the models used to set up a comparison/debate happen to be systems models.

We have now set out the basic ideas which underlie this book. The basic concept of Figure 1.1 has been elaborated in Figure 1.3, and the process of the latter figure has been naively illustrated using the simple model of Figure 1.2. In later chapters the process of Figure 1.3 will be expressed in more sophisticated terms, and the sequence of systems studies described in Chapters 3–9 illustrate it in action, showing it in very different contexts and making the point that the formal expression of SSM does not mean that it has to be used rigidly. It is there to help in the face of real-life's richness, not constrain. Chapter 10 then summarizes the learning from the last decade of the use of, and research into, SSM which the chosen studies illustrate. It remains to set

out the structure of the book. Meanwhile the argument of this introduction can be condensed in the following way:

(1) Human beings cannot help but attribute meaning to their perceptions of the world.
(2) Those meanings constitute interpretations of the world which can be thought of as deriving from experience-based knowledge of the world.
(3) The interpretations can inform intentions which can translate into purposeful action to improve situations perceived as lying somewhere on a scale from 'less than perfect' to 'disastrous'.
(4) Purposeful action when taken changes the world as experienced (as indeed does the mental act of interpreting it) so that 1, 2, 3, above constitute a cycle.
(5) The cycle can be expressed and operated by making use of systems thinking as an epistemology.
(6) SSM does that in a coherent process which is itself an enquiring or learning system (and within the process uses models of purposeful activity systems).
(7) SSM seeks to provide help in articulating and operating the learning cycle from meanings to intentions to purposeful action without imposing the rigidity of a technique.

The Structure of this Book

Although any of the systems studies described in Chapters 3 to 9 can be read on its own and will make sense to anyone with a basic knowledge of SSM, the intention is that the book as a whole conveys a sense of the overall learning achieved during the second decade of the development of the methodology. This chapter has laid foundations. Chapter 2 gives an account of SSM in its 'late-80s' form. It stands in line with three other accounts. The first is the initial coherent account (Checkland, 1972) which was seminal but now reads as too close to the functionalism of the 'systems engineering' which was its parent. The second and third are those in *Systems Thinking, Systems Practice* (1981) and Wilson's *Systems: Concepts, Methodologies, and Applications* (1984).

Chapters 3, 4 and 5 then illustrate SSM in use in three different contexts: industry, the National Health Service and the Civil Service. The authors worked together in the study in Whitehall (in the Central Computer and Telecommunication Agency) and then carried out a sequence of studies in ICL. This sequence is described in Chapters 6, 7 and 8. The experiences in ICL changed and enriched the authors' perception of SSM: in particular the work showed that SSM is not necessarily a methodology for carrying out a special highlighted study, but can be applied to any situation in which

purposeful action to bring about improvement is sought—such as in the day-to-day work of managers of any kind at any level.

Chapter 9 describes another industrial study, one which illustrates a sophisticated flexible use of SSM in its modern form, although some would see this as a 'post-modern' form of SSM!

Finally Chapter 10 summarizes the learning from the last decade, a decade in which every use of a basically established SSM has also been a piece of research on its development.

For ease of reference the shape of the book is summarized in Table 1.1

Within the accounts of uses of SSM, in Chapters 3 to 9, *inset tinted*

Table 1.1 Soft systems methodology in action

Section	Focus	Comment
Intro Chapter 1	this book	This concerns the context of this book and its shape.
Chapter 2	*methodology* of SSM	Here is an updating of SSM *as a methodology*, bringing up to date what was in *Systems Thinking Systems Practice* (1981)
Chapter 3 Chapter 4 Chapter 5	SSM in three different *application areas*	These accounts look at SSM in action in *Industry, NHS* and *Civil Service*. They enrich the account of SSM in Chapter 2, exemplifying its development to the position in Chapter 2.
Chapter 6 Chapter 7 Chapter 8	*using SSM* in a sequence of studies in one company	These accounts focus not on methodology or application areas but on *learning from use*; they happen to be based in the computer industry but that is incidental. The studies led the authors to a new view of SSM and its use. This material sheds light on what has gone before in Chapter 2–8.
Chapter 9	*current late 80s SSM in action*	Current work is described which exemplifies what has been learnt in the last decade.
Chapter 10	*more general lessons* and *future directions*	This discussion gathers the learning, reviews it, discusses the changes of perspective, and points to future directions of research and use.

paragraphs indicate a *meta-level commentary* on the content of the work, usually focused on aspects of methodology.

In 1988 Wang and Smith suggested that SSM could be combined with IDEFO, a procedure for modelling functionality developed as part of the US Air Force programme on computer-aided manufacturing. They wrote of SSM that it is

> . . . very sophisticated and mature: it requires highly experienced analysts and is dependent on a high intellectual input. Its sophistication tends to obscure the rigour. (Wang and Smith, 1988, p. 17).

It is the authors' intention to dispel the kind of fears that such a statement may evoke. They hope to establish absolutely that SSM does not require 'highly experienced analysts'; and while any use of SSM will probably benefit from 'high intellectual input' it is not dependent upon it. SSM can work with whatever 'intellectual input' is available! After reading *SSM in Action* interested persons should be well able to use the approach in a way comfortable for them in relation to situations about which they are concerned.