During the past 25 years, the discipline of OR has become increasingly self-conscious and self-critical of its foundations (Dando and Bennett, 1981; Jackson and Keys, 1987). Whereas problems were thought to exist out there, in the world, a growing number of OR academics and practitioners now believe that traditional, 'hard' OR is itself as much a source of problems as it is a means of resolving them. Specifically, it has been suggested that these problems arise from an incapacity to appreciate the reflexive, socially constructed nature of problem situations. As faith in the assumptions of 'hard' OR has been shaken, alternative, 'softer' methodologies have emerged to challenge its supremacy. In turn, these efforts to break out of the traditional mould of OR have stimulated a critical evaluation of the adequacy of their challenge.

The architects of 'softer' methodology as well as their critics, have sought inspiration from critical thinkers in the social sciences (e.g. Habermas, 1972) who, during the same period, have been engaged in a major intellectual struggle over the question of what is to count as 'scientific' in the study of the social world. Reviewing the developing fragmentation of methodologies within the social sciences, Giddens (1979) observes how, during the 1950s and 1960s, there was a widespread belief in the adequacy of functionalist thinking in which biology was seen to provide 'the proximate model' for the study of the social world', a view underpinned by a faith in logical empiricism as a unified (positivistic) methodology for all forms of science (Giddens, 1977).

In the past two decades, however, reflection upon the claims of the 'hard' sciences has been inspired above all by Critical Theory (Adorno et al., 1976; Bernstein, 1976). Critical studies of science have questioned whether logical empiricism actually does underpin natural scientific enquiry (e.g. Barnes, 1974); and philosophers of social science have doubted the (exclusive) legitimacy of logical empiricism as a foundation for the social sciences (e.g. Keat and Urry, 1977; Johnson et al., 1984). As a consequence, there has been a rather dramatic fracturing of the orthodox consensus within both the social sciences and the management disciplines (e.g. administrative science, accounting as well as OR), so that it is now increasingly difficult to deny that 'the logical empiricist view of science represents only one possible philosophy of science among other available philosophies' (Giddens, 1979: 238).
In the vanguard of this challenge, 'softer', more qualitative methodologies present an alternative, and increasingly legitimate, to the logical positivism of 'hard' systems thinking (Dando and Sharp, 1978). Although a scan of the journals reveals that the credentials of 'soft' methodologies, both in practice and in theory, are not universally accepted, 'softer' approaches are in the ascendant. Many 'hard' OR practitioners are clearly unconvinced of their value. At the same time, the theoretical foundations of these methodologies have been subjected to a critical examination by those who are skeptical of its theoretical and practical claims. In general, the critiques of the theoretical foundations of 'soft' methodologies are not made by defenders of 'hard' thinking who, it appears, seem content to ignore the challenge. Rather, the most penetrating critiques have been developed by those who draw upon Critical Theory to argue that 'soft' methodology is insufficiently penetrating in its critique of orthodox, 'hard' systems thinking. More specifically, it is insufficiently reflexive about its own values and problem-solving capacities, a deficiency which is at once a condition and a consequence of its lack of a social theory necessary to grasp why problem situations become defined in particular ways (e.g., Mingers, 1980; Jackson, 1982; Tinker and Lowe, 1982; 1984; Ulrich, 1983).

The purpose of this paper is to review and advance the debate about the adequacy to the 'soft' systems challenge to 'hard' systems thinking. More specifically, the paper explores the use of Critical Theory (Held, 1980; McCarthy, 1978; Roderick, 1986) in assessing the theoretical foundations of 'soft' methodology before considering its practical application. In the course of the paper, three uses are identified. The first is Checkland's use of Habermas' work to interpret and legitimate the commitment and contribution of his 'soft' system methodology (SSM). I have not paid much attention to this as I believe it to reflect and expose the very limitations of SSM which are exposed by those who used Critical Theory to critique 'soft' methodology. Much of the chapter is taken up with the debate on SSM provoked by Jackson's (1982) critical review of the work of the major proponents of 'soft' methodology: Ackoff, Churchman and Checkland. Focussing upon the debate between Jackson and Checkland, the paper seeks to shed light upon the strengths and weaknesses of their respective arguments. In essence, Jackson is criticised for failing to provide a more explicit and convincing rationale for his critique of SSM, while Checkland is criticised for using this failure as a defence against the force of Jackson's argument. In the remainder of the paper, a third application of Critical Theory is briefly considered in which Habermas' work provides the inspiration for an alternative 'soft' methodology for OR developed by Ulrich.

THE CHALLENGE TO 'HARD' METHODOLOGIES OF OR

Three of the most influential figures in OR - Ackoff, Churchman and Checkland - have urged, and made major contributions to, the development of an alternative, 'softer' methodology (Ackoff, 1974; 1979a; Checkland, 1981; Churchman, 1979a; 1979b). Questioning the ontological identity of natural and social reality, their arguments reflect a greater awareness of the presence of reflexivity in producing, defining and resolving problem situations. This awareness they seek to develop among practitioners and users of OR in order that the complexity and dynamics of these situations may be more adequately appreciated and addressed. Before examining the case for 'soft' methodology more closely, however, it may be helpful to give a definition of OR in which the basic contours of the 'hard' approach are traced. The following is the official definition of OR offered by the U.K. Society in Operational Research Quarterly: