

Beyond hard and soft modelling. An social-scientific application of system dynamics

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The paper seeks to suggest an alternative use of system dynamics based on social-scientific discipline. The practice of system dynamics has been dominated by the hard modelling school which emphasises the use of simulation to suggest a leverage policy (see, for example, Sterman et al., 1997). However, the hypothesis-testing approach of the hard school seems to provide singly prescriptive solutions, rather than adequately explaining the problem situated in a firm-specific context. Although a growing recognition of soft (or qualitative) modeling is advocated by a few system dynamics scholars (e.g. Wolsteinholme, 1990; Senge, 1990; Coyle, 1996), this soft approach seems to include simply social factors (such as culture, conflicts or leadership) into the model. The soft school maintains that it is feasible to produce policy insights without the necessity of quantification, but in fact the soft approach still adopts a similar modelling process to generate normative system dynamics models, thus oversimplifying organisations dynamics by the use of unreadable influence diagrams. Even some attempts have been made to incorporate other system thinking methods into the soft approach, such as cognitive mapping (Eden, 1994), soft OR (Lane, 1994) and Soft System Method (Coyle and Alexander, 1997), these methods tend to add to confusion rather than clarification. By and large the current practice of system dynamics modelling seems to be confined by instrumental rationality, and ignores the interaction between purposive social actors and contexts.

Therefore, it requires not just another mix of methods to resolve the intellectual dilemma, but shall urge a shift of worldview in rethinking the craft of system dynamics modelling. What is needed is a worldview that appreciates social actors' frames of references and their co-production of action and context, over time. This study represents such an attempt -- to adopt contextualism perspective (Pettigrew, 1990), a sociological conception of organisation and change, to undertake the intellectual challenge within the system dynamics field. Using the case study method, the paper proposes a "reflective transfer framework" to illustrate a social-scientific application of system dynamics. It suggests that the social-scientific modelling approach may open a way for system dynamics researchers to participate effectively in the debate of organisational and strategic management studies.