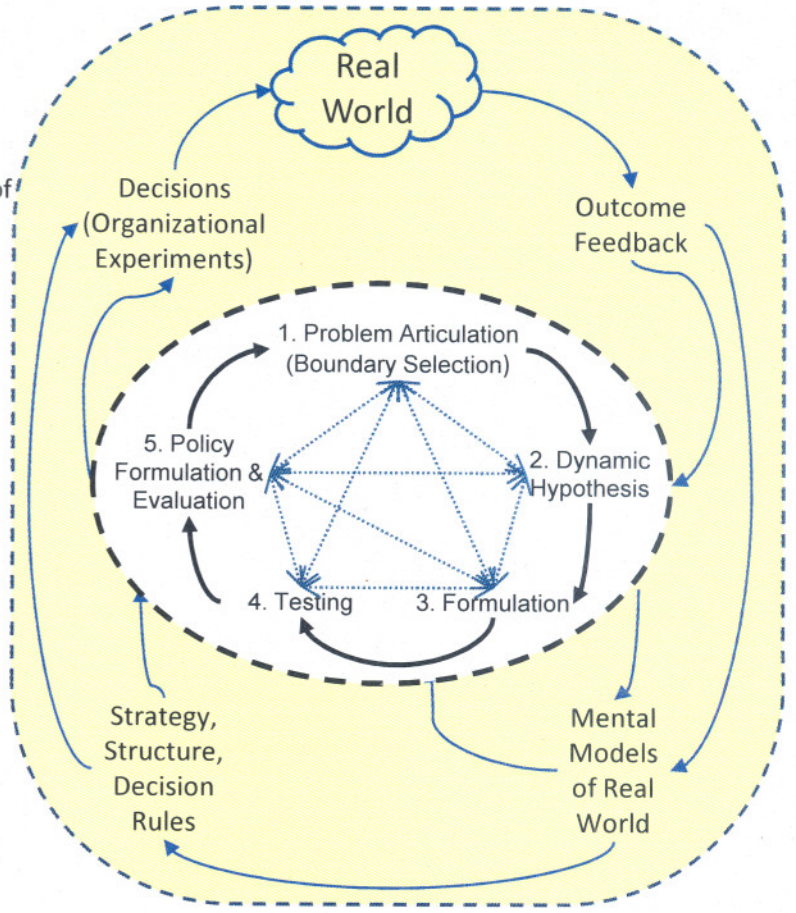
The inquiry/learning cycle of System Dynamics

Source: Sterman. J. D., (2000)

Principles:

- Defining problems dynamically, in terms of graphs over time.
- Striving for an endogenous, behavioral view of the significant dynamics of a system, a focus inward on the characteristics of a system that themselves generate or exacerbate the perceived problem.
- Thinking of all concepts in the real system as continuous quantities interconnected in loops of information feedback and circular causality.
- Identifying independent stocks or accumulations (levels) in the system and their inflows and outflows (rates).
- Formulating a behavioral model capable of reproducing, by itself, the dynamic problem of concern. The model is usually a computer simulation model expressed in nonlinear equations, but is occasionally left unquantified as a diagram capturing the stock-and-flow/causal feedback structure of the system. Deriving understandings and applicable policy insights from the resulting model.
- Implementing changes resulting from model-based understandings and insights.

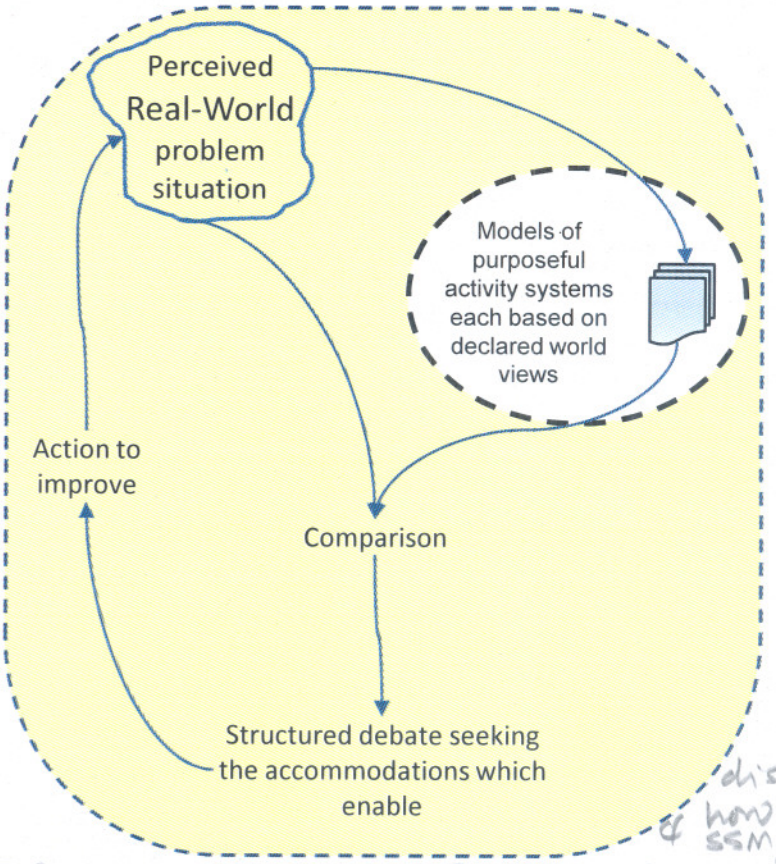


The inquiry/learning cycle of Soft Systems Methodology

Source: Sterman. J. D., (2000)

Principles:

-Real world: a complexity of relationships
- relationships explored via models of purposeful activity based on explicit world-views
- Inquiry structured by questioning perceived situation using the models as a source of question
- Action to improve based an finding accommodations (versions of the situation which conflicting interests can live with)
- Inquiry in principle never-ending; best conducted with wide range of interested parties; give the process away to people in the situation.

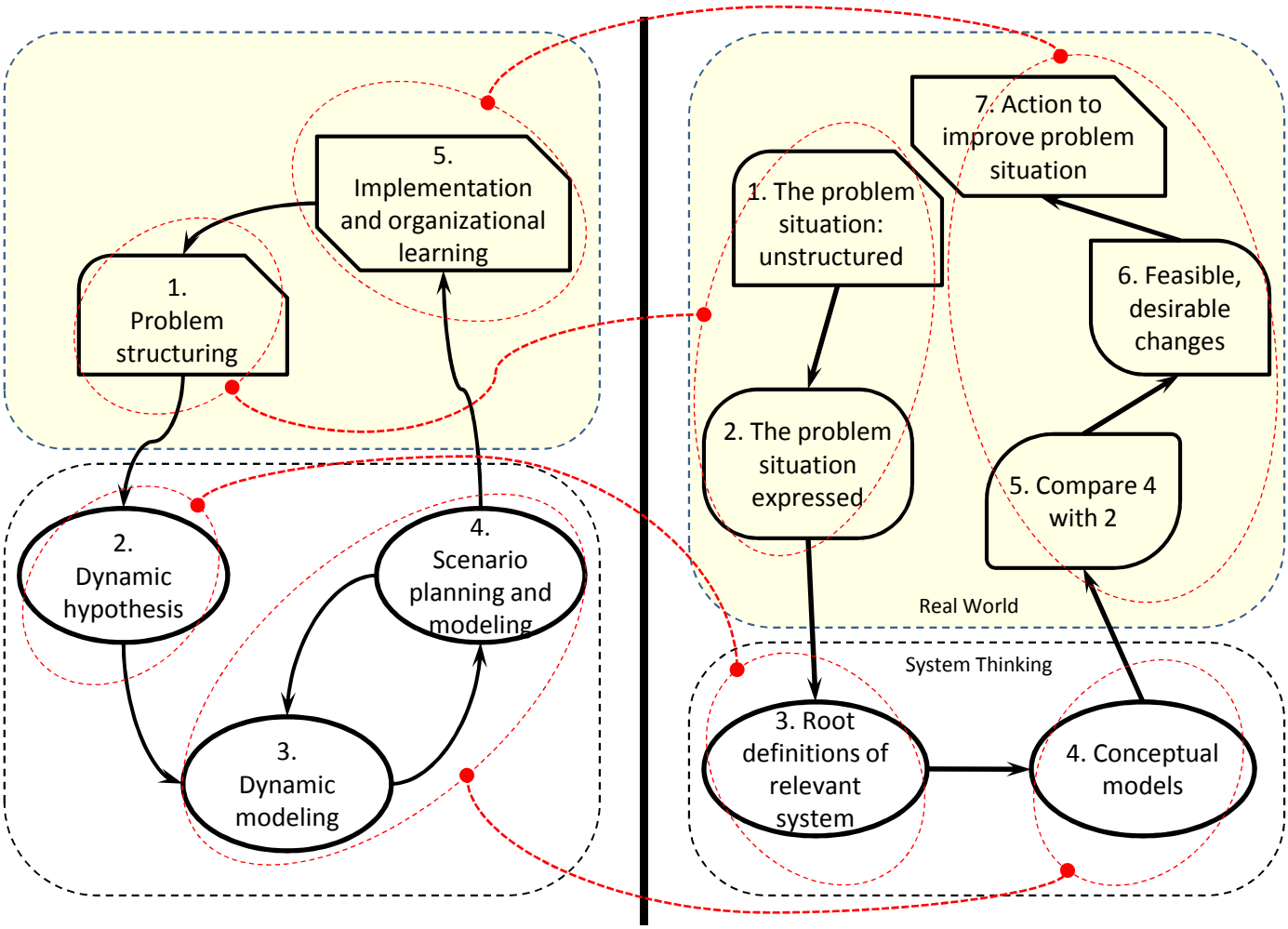


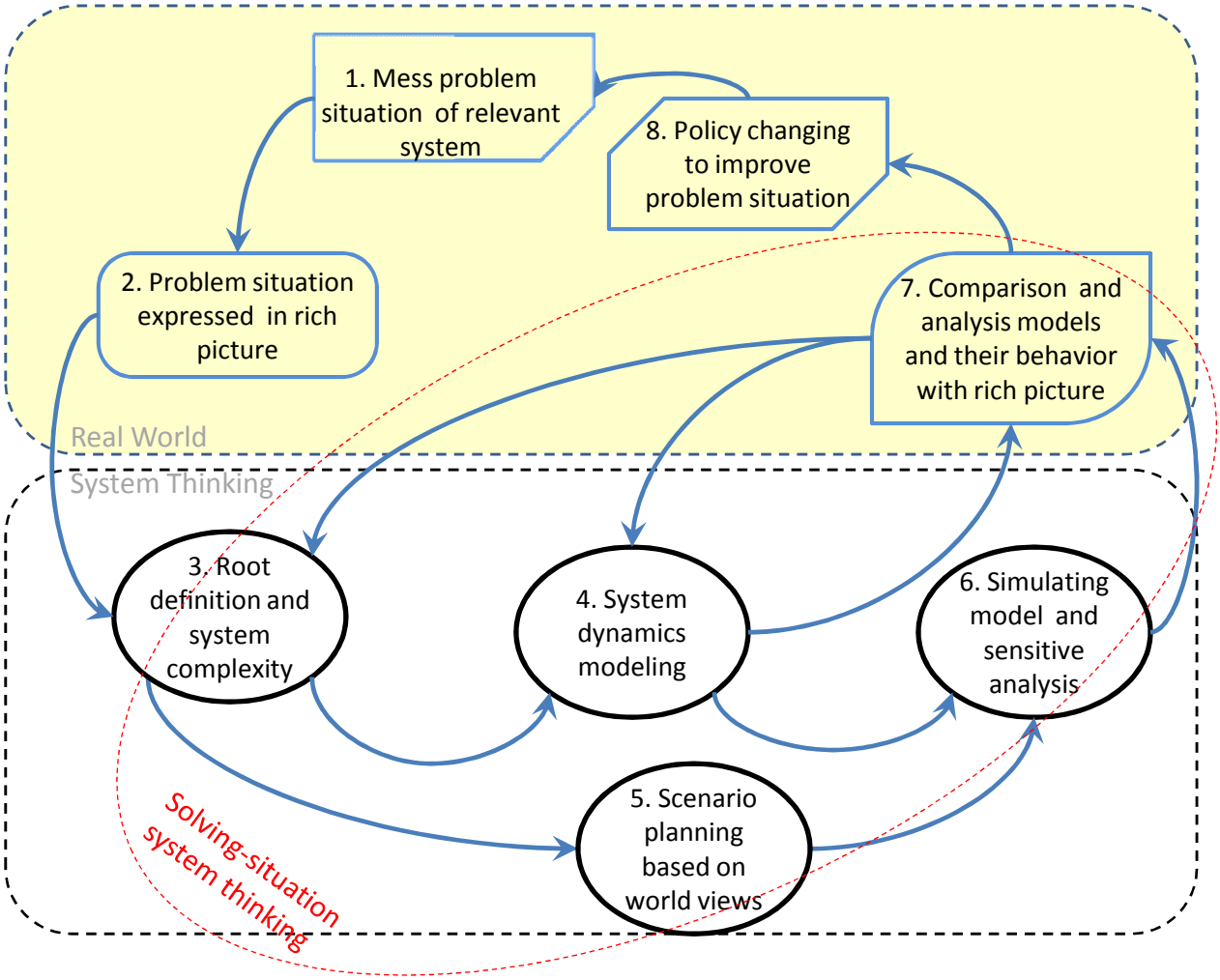
1. Explain the existing approach of mixing SD & SSM
2. Explain the S/2 Limit of SD & SSM
3. SSM → Propose different approach of mixing SD & SSM

discuss how SD & SSM complimented each other

(4) Justify your proposed approach

(2) further research


5. Implementation and organizational learning
1. Problem structuring
2. Dynamic hypothesis
4. Scenario planning and modeling
3. Dynamic modeling
7. Action to improve problem situation
1. The problem situation: unstructured
6. Feasible, desirable changes
2. The problem situation expressed
5. Compare 4 with 2
Real World
System Thinking
3. Root definitions of relevant system
4. Conceptual models


1. Mess problem situation of relevant system
8. Policy changing to improve problem situation
2. Problem situation expressed in rich picture
7. Comparison and analysis models and their behavior with rich picture
Real World
System Thinking
3. Root definition and system complexity
4. System dynamics modeling
6. Simulating model and sensitive analysis
5. Scenario planning based on world views
Solving-situation system thinking

step	activities
1. Messy problem situation of relevant social system	1. work with a open mind for impression of a problematical situation that is unclear in power structure, types of relationship, relevance system and its boundaries, conflicts, beliefs, attitudes, habits and human relationships. 2. Collect as much data as we can neither qualitative or quantitative with the appropriate method.
2. Problem situation expressed in rich picture	1. Express situation in all richness: structures, processes, climate, people, issues, conflicts. 2. All the elements become linked, shaping the structure of problem situation in rich picture.
3. Root definition and high level system maps	1. Understanding the concept of different perspectives 2. Understanding the complexity of relevance human activity system 3. Address key perspective 4. Diagram the first level of complexity
4. System dynamics modeling	1. Identifying main variables 2. Preparing behavior over time graphs (reference mode) 3. Developing causal loop diagram at second resolution level of complexity 4. Analyzing loops behavior over time 5. Identifying system archetypes 6. Identifying key leverage points 7. Defining variable types and construct stock-flow diagrams 8. Collecting detailed information and data
5. Scenario planning based on world- views	1. Planning general scope of scenarios 2. Identifying key drivers of change and keynote uncertainties and modeling 3. Constructing forced and learning scenarios 4. Designing and analyzing scenario for each world-view
6. Simulating model and sensitive analysis	1. Developing the simulation model 2. Simulating stead-state/stability conditions 3. Reproducing reference mode behavior (based on view world) 4. Validating the model 5. Performing sensitivity analysis 6. Simulating scenarios with the model
7. Comparison and analysis models and their behavior with rich picture	1. Comparing the system dynamics models with rich picture 2. Analyzing the behavior simulated in real world situation 3. Structuring discussions and analyses of the model using in real world 4. Running through the models again using different perspectives and scales 5. Trying to find the greatest leverage to solve real world problem situation
8. Policy changing to improve problem situation	1. Developing a micro world and learning lab based on the simulation model 2. Implementing feasible and desirable changes in the real world.