

Litterature review of Soft Systems Methodology

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The primary ressource for this reivew is Peter Checklands article 'Soft Systems Metodology', secondary ressources are the book 'Soft Systems Methodology in Action' by Checkland & Scholes, and the research paper 'Soft Systems Methodology: A Thirty Year Retrospective' by Checkland.

Checkland introduces the focus of his work, the concept of understanding a problem and finding a solution, by recapping what to some may seem obvious, but to the unknowing may be the cause of all project related problems.

Namely that "A project implies the exercise of a combination of engineering and management skills"[1]. Even though large projects has been initiated, and often completed, throughout human history, it was fint in the 1950s that system engineering and methodologies where thoroughly formalized. But formalization generally did not improve the fault statistics of project succes, often because the problem at hand where to complicated to fit into any distinct formalization. Checkland summarises these approaches as what generally are known as hard systems thinking in [1]:

They (the fundamental thinking underlying typical systems engineering) all assume that an important class of real world problems can be formulated as a search for an efficient means of achieving objectives known to be desirable. The search can be conducted systematically by the defining the objective to be achieved and manipulating models of the situation or of alternative forms it might take.

This approach encountered problems when people where confused about what the contents and objectives of the system at hand. Soft systems thinking marks a shift in this approach, as the word 'system' no longer applies to the realities of the surrounding world, but instead points to the process of dealing with the world [3].

Soft Systems Methodology (SSM), claimed to be the solution to the fault ridden system engineering projects. Hence it is a problem solving methodology suitable for messy problems. And is in [1] defined by five characteristics,

which will briefly be summarised here.

SSM is a foremost a learning system which seeks to finde accomodations in a environments of potential conflicting views, and taking purposeful action in that situation. Learning leads to a new situation which is not necessarily the end point, unless you choose it to be. Learning changes the system since it broadens the viewers perspective on it, and purposeful actions changes the problem situation. Thus SSM can essentially be described as a learning cycle methodology.

Second, SSM is a process for managing, which in this context means achieving organised action. As people are individuals and autonomous, managers are facing a never ending fluxating environment.

SSM recognises that system ideas/metaphors can be helpfull in understanding the problem and the situation.

It defines a new system type, old system types are the underlying approaches for hard systems thinking, which is named the 'human activity system'. This describes the way purposfull actions themselves constitute a system. Human activity systems are typically interpreted by the observers monitoring and analyzing them. Thus it is important to understand the observers context and world view, completely objective models does not exist. Checkland internationalizes the world view by preffering the name Weltanschauug, and states that "Systems engineering ignores Weltanschauug, Soft Systems Methodology cannot afford to" [1].

SSM learns by comparing pure models of human activity systems with the realised ones. It is an essential part of the process to understand the models that drive the conception of the real problem.

A very important aspect of SSM is its reliance on being a participative process where knowledge and resultets can only be gained through debate.

In understanding the problem domain, SSM supplements experience with an explicit use of systems thinking. Systems thinking starts by naming some systems of purposeful activities, which are relevant to the exploration of the problem situation. SSM recognises that a real world situation can never be described definitively. Ensuring the best understanding of a real world situation requires a collaborative debate. Through this debate, possible improvements to the problem domain may emerge and determined.

The actual change implementations cannot avoid being an accomodation between different conflicting views. The purpose of debate is finding a compromise everyone can accept. Figure 1 from [3] illustrates the flow and learning model of SSM.

In SSM the process of analysing and modelling the problem has been modified and reinvented over the years (SSM used on SSM...). The normal analysis model today includes three related analyses model. The first model focuses on identifying clients, the problem domain and the problem owners.

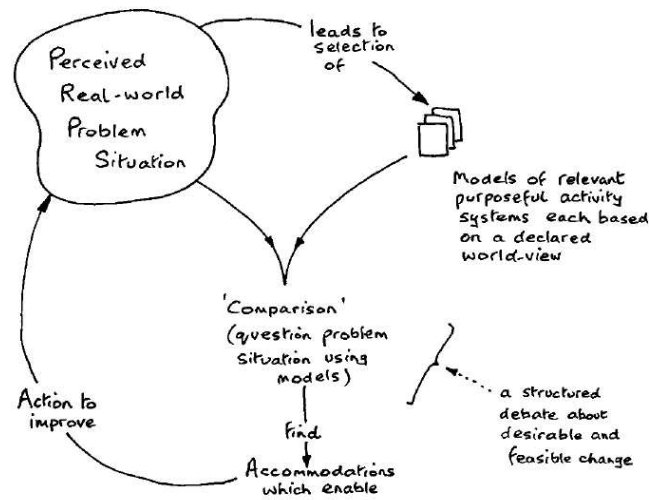


Figure 1: Soft representation of SSM

The list derived from this approach constitutes a qualified list for potentially relevant systems for later modelling. The second model looks at the problem situation from a social viewpoint, focusing on values, roles and the social system. This analysis ensures that attention is given to the important aspect of the problem situation as a culture. The last analysis method looks at the problem from a political angle by analysing the decomposition of power, how it is obtained, preserved and passed on.

These three analysis methods together constitute a way of finding out about a complex human situation. SSM relies on 'rich pictures' to describe a situation or as defined in [2] are a way to express in a condensed way relationships which would require much prose to expound.

SSM strives to define root definitions which describes the essence or core of the system perception to be modelled. Rich pictures are often used to express and visualise root definitions. These root definitions should preferably be constructed from a mnemonic model called CATWOE, which points to important elements in the system:

- C: Customer; Who would be victims/beneficiaries of the purposeful activity?
- A: Actions; Who would do the activities?
- T: Transformation Process; What is the purposeful activity expressed as input -> T -> output
- W: Weltanschauung; What view of the world makes this definition meaningful?

- O: Owner; Who could stop this activity?
- E: Environmental Constraints; What constraints in its environment does the system take as given?

The core of understanding root definitions is getting hold of understanding the transformation process. But in this context is it important to remember that system input is not necessarily the ressources needed to bring about the transformation. Looking back, there has been a historic tendency to focus on systems alone, forgetting the importance of actors and owners in CATWOEs transformation process.

The process of building models in SSM consists of assembling the verbs describing the activities which are necessary to make the system function. Checkland describes any system model as a combination of an operational system and a monitoring and control system. The monitoring and control parts may be analysed by defining three kinds of system criteria:

1. Effectiveness: Is this the right thing to be doing?
2. Efficacy: Does these means work?
3. Efficiency: Is there a minimum use of ressources?

Taking these factors into consideration avoids unfortunate isolation of sub-systems by taking the enclosing system into account. In constructing a SSM model, the objective is to describe a model which is coherent and defensible rather than correct or valid in some sense. Building models refreshes the constructors view on the situation and provides new input for analysis and debate. In working with SSM, Checkland has found four ways of conducting model/real-world analysis.

The first way is also the least formal, it suggests to simply record which differences stand out between the models and the current perceptions of the system. The second approach is slightly more formal by looking at and defining a series of specific questions concerning activities and links between activities. The questions focus on how the activities happen in the real situation, how, and by what criteria it is evaluated.

The third approach is to 'simulate' the activity system by constructing a written scenario which describes how things might happen in the system. The last comparison method tries to build a model of a part of the reality similar to the model thought to be relevant, preferable as precisely as possible since the next step is to overlay this model with the constructed one. Using this method requires a system which has a direct manifestation of the activities analysed.

In conclusion, SSM treats 'what to do' as well as 'how to do it' as a part of the problem. This indicates that SSM is a learning and not an optimizing system. Hard systems thinks of the worlds as a set of systems, whereas soft systems moves the system focus from the world to the process itself and the enquiring approach itself.

References

- [1] Peter Checkland. Soft systems methodology. *unknown*.
- [2] Peter Checkland. Soft systems methodology: A thirty year retrospective. *Systems Research and Behavioral Science*, 2000.
- [3] Jim Scholes Peter Checkland. *Soft Systems Methodology in Action*. John Wiley and Sons, 1993.