

The Systems Thinking Tool Box

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“.. bump, bump, bump, on the back of his head. It is, as far as he knows the only way of coming downstairs, but sometimes he feels that there really is another way, if only he could stop bumping for a moment and think of it.”

Winnie the Pooh - A. A. Milne

Rich Picture

What is it and what does it do?

Before explaining what is and what it does, it is important to understand that a Root Definition is central to the application of the Soft Systems Methodology. However, a Root Definition can stand alone as a very powerful and universal Systems Thinking Tool.

The Root Definition is a statement of purpose that captures the essence of the particular situation of a situation (system) of interest. Key to understanding a situation or system of interest is the recognition that all systems do something, they transform inputs into outputs. This is captured by the main verb in the Root Definition. A Root Definition also captures context by expressing the main constraints and the people associated with the transformation.

Box 1 shows a Root Definition of the Marketing System of my company.

Box 1

Root Definition for the BHW Marketing System

A company owned system to market the products and services of the company to existing and future clients by the most appropriate cost effective means.

As a key tool in the Soft Systems Methodology, a Root Definition is used to logically deduce what the system will have to **do** in order to deliver the transformation.

Why do it?

People who use, or are part of, a system are often totally unaware of its purpose and context. Moreover, when asked, different users have different, and even sometimes conflicting, views as to the exact nature of the purpose. The Root Definition provides a way of achieving clarity and a common understanding as to the purpose and context of a system.

Where and when to use it?

The Root Definition can be used when investigating a situation to obtain a common and clear understanding of any System(s) of Interest.

Who does it?

An individual or team can undertake the construction of a Root Definition. In general, the outcome is more complete if performed by a team. It is important to emphasise that the quality of the outcome is dependent upon the experience of the team or individual.

How to do it?

When developing the Soft Systems Methodology, Checkland and his co-workers discovered that a “good” Root Definition was essential. To help ensure high quality the mnemonic CATWOE was developed where:

- [C] The Customer: The individual(s) who receive the output from the transformation (in recent times it has been recognised that the output of the transformation may be “negative” for some customers and “positive” for others. This has led to a refinement of CATWOE to BATWOVE where the C is broken into Beneficiaries and Victims!
- [A] The Actors: Those individuals who would DO the activities of the transformation if the system were made real.
- [T] The Transformation: The purposeful activity expressed as a transformation of input to output.
- [W] Weltanschauung: It's a German word that literally means “world view”. It is the belief that makes sense of the Root Definition.
- [O] Owner: The wider system decision maker who is concerned with the performance of the system.
- [E] Environmental Constraints: The key constraints outside the system boundary that are significant to the system.

Let's return to the Root Definition drafted for the marketing system and see how CATWOE fits:

[C] Existing and future clients

[A] The company

[T] Market the products and services of the company

[W] Providing the most appropriate marketing to a particular client will promote company products and services

[O] The company

[E] Appropriate means

If you experience difficulty in applying CATWOE to a draft Root Definition, then it needs re-drafting. Personally, I tend to have a go at the Root Definition and then use CATWOE as a test of quality. Some people recommend using it to help construct the draft.

What is important is getting the transformation correct, particularly the inputs and outputs. Here Checkland, Wilson and the other Soft Systems Methodology originators are quite strong in their views of what the transformation should be like. They argue that the concept is frequently misunderstood with many inadequate representations of system inputs and outputs. Figure 1 pictorially shows the transformation concept:

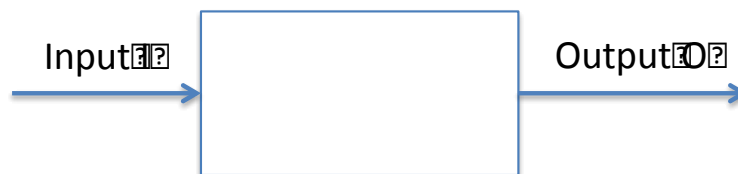
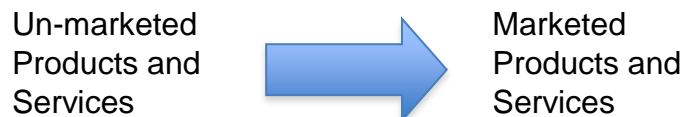


Figure 1: The Transformation Process

The usual error is to confuse the system input (that entity which gets changed into the output) with the resources needed to bring about the transformation. For example, for the marketing system a relevant transformation would be:



Whereas the following are wrong!



Checkland produced some simple (but often forgotten) rules when defining transformations:

- T transforms I into O.
- I must be present in O but in a changed state.
- An abstract I must yield an abstract O.
- A concrete I must yield a concrete O.

Hence from these I hope you see why my marketing transformation is correct, but the other two are not.

What Goes Wrong: The limitations of Root Definition

Whether you are using the Root Definition as part of a Soft Systems approach or just to obtain clarity about a particular situation of interest, it is vitally important that you get the transformation correct. Here the application of Checkland's "transformation rules" and CATWOE are strongly recommended. This is sometime not easy as people often regard the transformation as obvious; yet confuse the resource or control inputs as the transformation input. The key here is Checkland's second rule of definition a transformation:

The input must be present in the output but in a changed state

The outcome, quite often, is almost a statement of the obvious with people viewing it as trivial or unnecessary.

Another aspect of the Root Definition that causes concern is the *Weltanschauung*. The *Weltanschauung* or "world-view" is really providing the bigger picture for the transformation – it provides the justification often as a belief that makes sense of the root definition. Returning to the Marketing example in Box 1. Here the *Weltanschauung* is:

Providing the most appropriate marketing to a particular client will promote company products and services

It answers the question: "why do we want to transform *Un-marketed Products and Services* into *Marketed Products and Services*?" The answer: because providing the most appropriate marketing to a particular client will promote company products and services.

Success Criteria

The following list represents a set of criteria that have been found to be useful when developing a Root Definition.

- Team size between five and eight.
- Team constitution covers system life cycle and potential technology.
- Use an experienced independent facilitator, particularly when attempting to combine individuals' efforts.
- Do use CATWOE.
- Do use Checkland's rules for defining transformations.