

# 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

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## Conceptual Model (CM)

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### What is it and what does it do?

A Conceptual Model (CM) is a diagrammatic representation of what logical activities need to be undertaken to achieve a system purpose. The idea behind building a model of what is necessary to deliver a system's purpose is a key step of the Soft Systems Methodology. However, a Conceptual Model can stand alone as a very powerful and universal Systems Thinking Tool.

Figure 1 shows a Conceptual Model created for my company's marketing system. When generated the organization did not have, in any form, a marketing system, and therefore it is not a model of what was happening. Indeed, it is a logical model of what we needed to do to successfully market our products and services. By comparing this model with reality, we were able to identify a number of successful and positive actions that brought reality closer to the "theoretical" perfection of the Conceptual Model. In other words, a Conceptual Model is an abstract description of "perfection".

This does not mean that we can only use Conceptual Modelling to describe future states, but rather a logically deduced model of what is needed to achieve a system purpose.

### Why do it?

Building a Conceptual Model can have many purposes ranging from its original intent through to problem solving. Its strength lies in the use of what Brian Wilson (2001), one of its originators, coined the term "defensible logic". When constructing Conceptual Models and it is important to remember, we are NOT modelling the real-world system but those activities that are necessary to deliver a system's purpose.

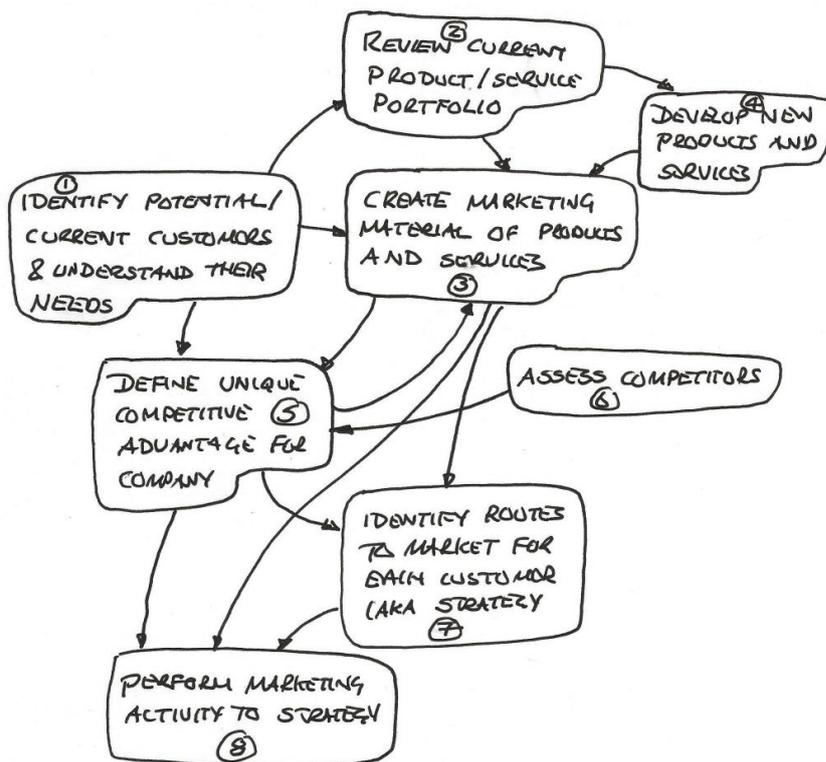


Figure 1: Draft Conceptual Model of the BHW Marketing System.

## Where and when to use it?

Probably the best way to explain this is by example. I constructed Figure 1 because we did not have a marketing system. We had undertaken numerous marketing activities, they were not a system and that was the problem: there was nothing to fix, and therefore classic problem solving approaches (including systems approaches) were not going to deliver. It is the classic messy or foggy situation that often occurs in human activity systems.

## 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 is 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 2 pictorially shows the transformation concept:

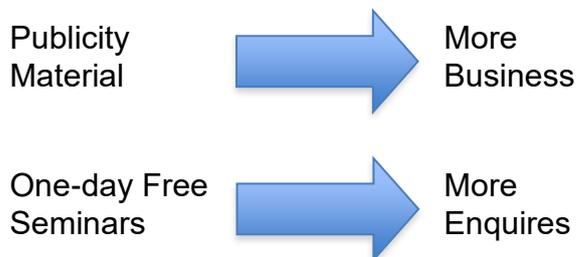


**Figure 2: The Transformation Process**

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 Figure 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.