

The following is an extract from the manuscript to *Analytical Activism*, chapter one, online at [thwink.org](http://thwink.org). For much more on this subject, please see the manuscript to *A Model in Crisis*, which devotes an entire chapter on this process and organizes its table of contents around the process.

## **The System Improvement Process**

This is a simple, generic, highly analytical process designed to apply to all complex social system problems. It has four main steps. The first step defines the overall problem. The process then decomposes the overall problem into three subproblems, and uses steps 2, 3, and 4 to solve each of them. Here is an outline of the process:

**1. Problem Definition** – What is the problem?

**2. System Understanding** – Why are the three subproblems occurring?

2.1 Why is there such strong resistance to adopting the solution?

2.2 Why is the system not naturally in the goal state?

2.3 Why is the system not staying in the goal state?

**3. Solution Convergence** – How can the three subproblems be solved?

3.1 How can adoption resistance to the solution be overcome?

3.2 How can we move the system to the goal state?

3.3 How can we keep the system in the goal state?

**4. Implementation** – Once a solution is found, this uses three sequential substeps to solve the three subproblems:

4.1 Overcome resistance to solution adoption.

4.2 Move from the present state to the goal state.

4.3 Stay in the goal state indefinitely.

Use of a process like this changes everything. It allows problem solvers to more easily pick up an engineer's hat, put it on, and proceed in an analytical fashion, one much more likely to solve the global environmental sustainability problem in time.

The four main steps are:

✓ **Step 1. Problem Definition** – First the problem to solve is formally defined, in terms of the symptoms to be alleviated. This gives a clear, unambiguous definition of exactly what system behavior must change to consider the problem solved. The result is all problem solvers are now working on the same problem, with a minimum of effort. All work is now very focused.

✓ **Step 2. System Understanding** – Next the system is examined, with a single guiding question: *Why are the three subproblems occurring?* This question decomposes one large problem into three smaller, distinctly different problems, each of which is much easier to solve. For a difficult complex system problem, this has the effect of taking a giant Gordian knot of incomprehensible complexity and deftly turning it into three much simpler and therefore potentially solvable problems. *In practice this decomposition is so powerful it can transform a problem from insolvable to solvable.*

Unless the guiding question is answered deeply and correctly for all three subproblems, any solution selected cannot be anything more than an educated guess. The solution also cannot get to the root of the problem. These of course are the prime reasons why past solutions have failed—they were no more than intuitive hunches combined with political expediency, and failed to get to the fundamental causes of the problem.

The output of this step is a comprehensive model of understanding based on systems thinking, the core of which is a computer simulation model of the system and how it behaves. Note this is precisely what Jay Forrester had to do to solve the urban decay problem. [This was presented earlier in the chapter this extract is from.]

✓ **Step 3. Solution Convergence** – Only after a high level of system understanding is reached does the Solution Convergence step begin. If the previous step has been done well, then this step is almost trivial. This is because system behavior is now predictable. It is now so predictable that solution search can very quickly converge on the solution with the preferred outcome. Once that happens the problem is “solved.” The key output of this step is a collection of solution elements and an Implementation Plan.

✓ **Step 4. Implementation** – The Implementation Plan is carried out. It uses three sequential and slightly overlapping phases to solve the three subproblems.

In the first phase, resistance to adopting the solution is overcome. Adoption resistance is related to the phenomenon of *change resistance*, which is very common in complex social system problems. While resistance to new methods of solving a problem are sometimes part of change resistance, such as the need to adopt the use of formal process and systems thinking, the main resistance is usually to the aspects of the solu-

tion that will force agents to change their behavior. For example, many corporations appear to be strongly resisting becoming sustainable because they perceive it will reduce short term sales and profits.

*In social systems, solution adoption resistance is usually the crux of the problem.* For example, in the global environmental sustainability problem, civilization knows by now what must be done: live sustainably. But it doesn't want to take the next step and actually do it, for an intricate variety of reasons. Those reasons cause "change resistance," which is the social side of the problem. This is what the first phase of the Implementation Plan overcomes. The second and third phases are much easier, and are explained elsewhere.

There are three keys to the success of the System Improvement Process. One is decomposition into the three subproblems. The second is the presence of the System Understanding step. It is usually almost totally absent from popular problem solving approaches. Yet this is where problem solvers should spend about 80% of their time. The third and most important is the process addresses the *social side* of the problem.