



## SST-21 What is Constraint Analysis?



Imagine an organisation that suddenly begins to perform poorly. Staff are leaving, projects are delayed, and morale is low.

At first, people look for simple explanations: poor leadership, lack of resources, or external pressures. But each explanation seems incomplete. There are resources available, leadership is not obviously ineffective, and the external environment has not changed dramatically.

A closer look reveals something more subtle. Financial incentives discourage long-term investment. Organisational structures slow down decision-making. Staff expectations have shifted, but management practices have not. At the same time, employees differ in their skills, motivations, and capacity to respond to these conditions.

No single cause explains the situation. Instead, the organisation's behaviour emerges from a combination of conditions, some enabling, some inhibiting, that interact to shape what is possible. Constraint analysis provides a way of understanding situations like this. Rather than asking "What caused this?", it asks: *What conditions are enabling or inhibiting the system's behaviour?*



### Formal Description

Constraint analysis is a method for understanding the behaviour of a system by identifying and examining the causal conditions that enable or inhibit its processes.

Within this framework, constraints are understood as causally effective conditions that shape system behaviour. These include:

- **the presence of enabling conditions**, involving the transfer of matter, energy, or information and permitting processes to take place;
- **the presence of inhibiting constraints**, which restrict or disrupt system processes and behaviour.
- **the absence of enabling conditions**, which prevent processes and behaviours from occurring; and
- **the absence of inhibiting constraints**, allowing processes to proceed and permitting behaviours;

These four cases together define the basic logic of constraint analysis.

System behaviour is therefore explained in terms of both the **configuration of causal conditions** and their **state (present or absent)**, rather than by isolated causes.

Constraint analysis identifies:

- the constraints acting on a system,
- how they interact and align,
- and how they produce stability, instability, and transitions between patterns of behaviour.

### Plain English Explanation

Constraint analysis is a way of understanding how systems behave by looking at what allows things to happen and what stops them from happening.

Instead of focusing on a single cause, it looks at the set of conditions surrounding a system.

For example:

- Do people have the resources they need?
- Are there rules or structures that help or hinder them?
- Do shared beliefs support or conflict with what needs to be done?
- Do individuals differ in their abilities or decision-making?

All of these act as constraints.

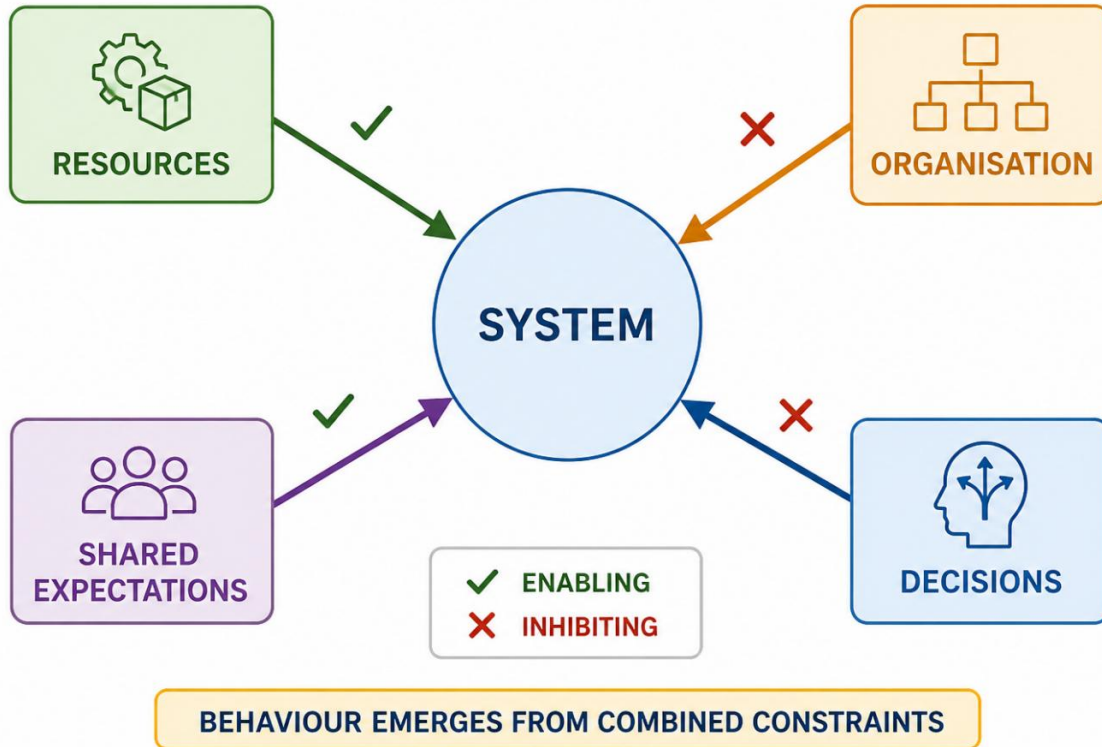
Some constraints:

- enable behaviour (they make things possible)
- others inhibit behaviour (they restrict or prevent it)

Importantly:

- Sometimes success or problems arise not because something is present,
- but because something important is missing (e.g. lack of information, lack of coordination).

Constraint analysis brings all of this together and asks: *How do these conditions combine to shape what the system actually does?*



### Example 1 – Organisation

A company struggles to innovate:

- Resources exist (enabler)
- Strict hierarchy slows decisions (inhibitor)
- Culture discourages risk (inhibitor)

Result:

→ Innovation is inhibited not by one cause, but by combined constraints

### Example 2 – Physical System

A plant fails to grow:

- Water absent (missing enabler)
- Soil nutrients low (inhibitor)
- Temperature suitable (enabler)

Result:

→ Growth fails due to constraint configuration, not a single factor



### Provenance and Links

This module is based on:

- The constraint framework developed in *Constraint Analysis: A Causal Framework for Understanding and Influencing Complex Systems* (Chaloner, 2026)
- General systems theory (e.g. Ludwig von Bertalanffy)
- Cybernetics and causal systems thinking (e.g. Norbert Wiener)

Key related concepts:

- Causality as transfer
- Enabling vs inhibiting conditions
- Presence vs absence
- Attractors and system stability

### Practical Exercise

Think of a system you are familiar with (e.g. workplace, school, organisation, or social group). What is its primary function?

1. For this function, identify:
  - One **enabling condition**
  - One **missing enabling condition**
  - One **inhibiting constraint**
  - One **missing inhibiting constraint**
2. Briefly describe how these affect the behaviour of the system.
3. Reflect:
  - Does the system's behaviour make more sense when viewed as a combination of constraints rather than a single cause?