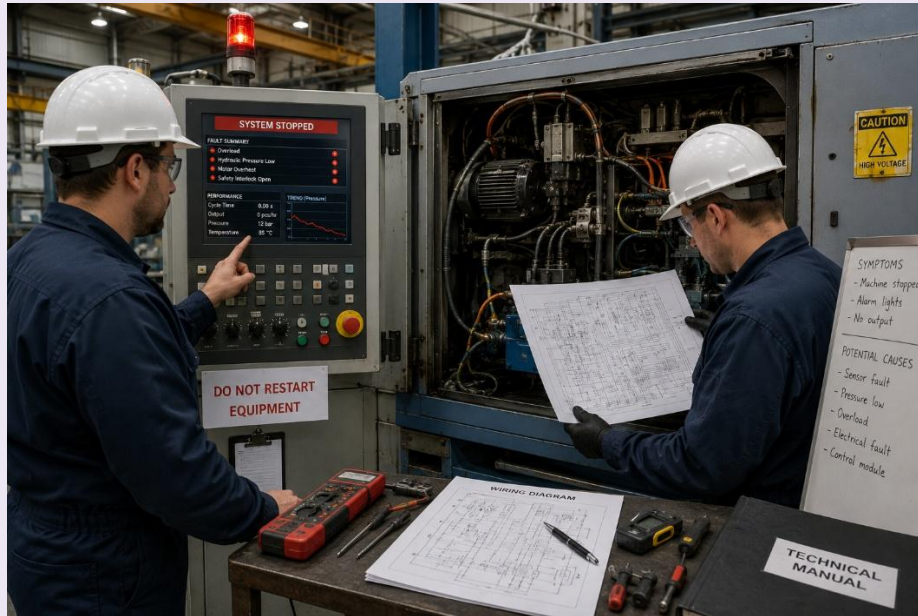




SST 42 – From Diagnosis to Constraint Analysis



A manufacturing plant begins experiencing repeated equipment failures. Production slows, delays increase, and costs begin to rise. Managers quickly recognise that a problem exists because the symptoms are becoming increasingly visible.

At first, attention focuses on the symptoms themselves. Machines are stopping unexpectedly. Output is falling. Customers are experiencing delays.

However, simply knowing that these symptoms exist does not reveal why they are occurring.

Engineers are therefore asked to investigate. They examine maintenance records, inspect equipment, analyse operating conditions, and review recent changes to the production process.

Eventually, they discover that several critical components have been wearing out more quickly than expected because of a lubrication problem. The machine failures were symptoms. The lubrication problem was one of the underlying causes.

Only after identifying the cause can an effective solution be designed.

The same principle applies to social systems. Indicators and diagnostic assessments help us recognise that problems may exist. However, understanding why those problems exist requires a deeper investigation into the constraints and processes responsible for system behaviour.

This transition from symptoms to causes marks the movement from diagnostics to Constraint Analysis.



Formal Description

Systemic Diagnostics identifies areas requiring further investigation by assessing viability dimensions and diagnostic indicators.

Constraint Analysis seeks to identify the constraints, constraint components, significant constraint components, and patterns of alignment or misalignment responsible for observed system behaviour.

Diagnostics identifies where investigation should begin. Constraint Analysis identifies the causal structures responsible for the observed condition.

Plain English Explanation

Diagnostics and explanation are closely related, but they are not the same thing.

Diagnostics helps us recognise that a problem may exist. It narrows our attention towards particular aspects of a system that appear to require further investigation.

For example, we might discover that an organisation has poor communication, declining innovation, low trust, or increasing staff turnover. These observations tell us something important about the condition of the organisation, but they do not explain why these conditions have emerged.

To answer that question, we need to investigate the underlying constraints that shape behaviour. A constraint is anything that enables, inhibits, or regulates what a system can do. Social systems are influenced by many interacting constraints, including physical constraints, economic constraints, institutional constraints, cultural constraints, technological constraints, and behavioural constraints.

Constraint Analysis examines how constraints interact, combine, and influence system behaviour.

In practice, this means moving beyond symptoms and asking deeper questions.

Why is trust declining?

Why is innovation slowing?

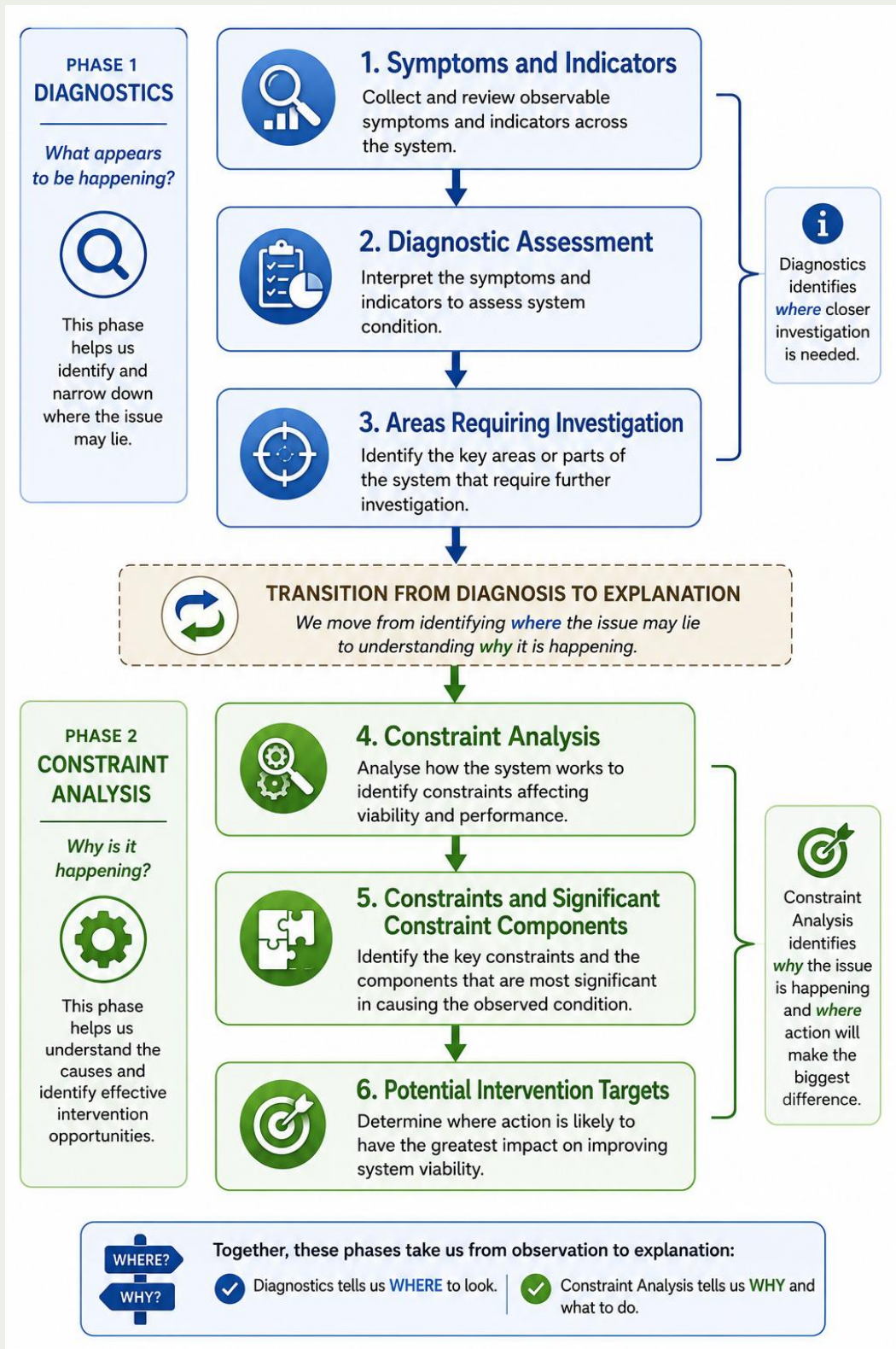
Why are decisions taking longer?

Why is performance deteriorating?

Different symptoms may arise from the same underlying constraints. Equally, the same symptom may arise from many different constraint configurations.

For this reason, effective intervention requires explanation as well as diagnosis. If we attempt to solve problems without understanding their causes, interventions may fail or produce unintended consequences.

Diagnostics therefore narrows the search space. Constraint Analysis then investigates that space in order to identify the causes of the observed condition.





Example 1 – Education

A school experiences declining examination results. Diagnostics identifies poor educational outcomes. Constraint Analysis investigates possible causes such as staffing shortages, curriculum problems, resource limitations, attendance issues, or wider social factors.

Example 2 – Business

A company experiences declining productivity. Diagnostics identifies the symptom. Constraint Analysis investigates whether the underlying causes involve communication failures, inadequate training, obsolete technology, conflicting incentives, or ineffective management structures.

Example 3 – Public Services

A healthcare service experiences increasing waiting times. Diagnostics identifies reduced performance. Constraint Analysis investigates demand pressures, staffing constraints, administrative bottlenecks, information systems, governance arrangements, and resource allocation processes.

Provenance and Links

The distinction between symptoms and causes is fundamental to medicine, engineering, science, and systems thinking. Herbert Simon emphasised diagnosis as a precursor to deeper investigation. Peter Checkland explored structured inquiry into complex situations. Donella Meadows highlighted the importance of understanding underlying system structures before attempting intervention.

Within the Systemic Diagnostics framework, diagnostics and Constraint Analysis are treated as complementary stages of a unified investigative process. Diagnostics identifies areas requiring attention, while Constraint Analysis provides the explanatory framework needed to understand and improve system behaviour.

Practical Exercise

Consider a real or hypothetical organisation experiencing declining performance.

1. Identify three observable symptoms.
2. Identify which viability dimensions appear to be affected.
3. List at least five possible underlying constraints that could be contributing to the problem.
4. Which of these constraints would you investigate first and why?
5. Explain why an intervention based solely on symptoms might fail.