



GST 62 – Pre-Systemic Assemblies

Formal Description

A pre-systemic assembly is an assembly whose components exhibit significant and increasing causal organisation but which has not yet developed the stable emergent properties, behaviours or outputs required to constitute a system. Pre-systemic assemblies represent transitional stages in the formation of systems and may either develop into functioning systems or disperse before systemhood is achieved.

Plain English Explanation

Not every assembly immediately becomes a system. As components are brought together, they often begin to interact in increasingly organised ways. During this stage, the assembly may exhibit growing coordination and complexity while still lacking the emergent capabilities that define a functioning system. Such an assembly is called a pre-systemic assembly.

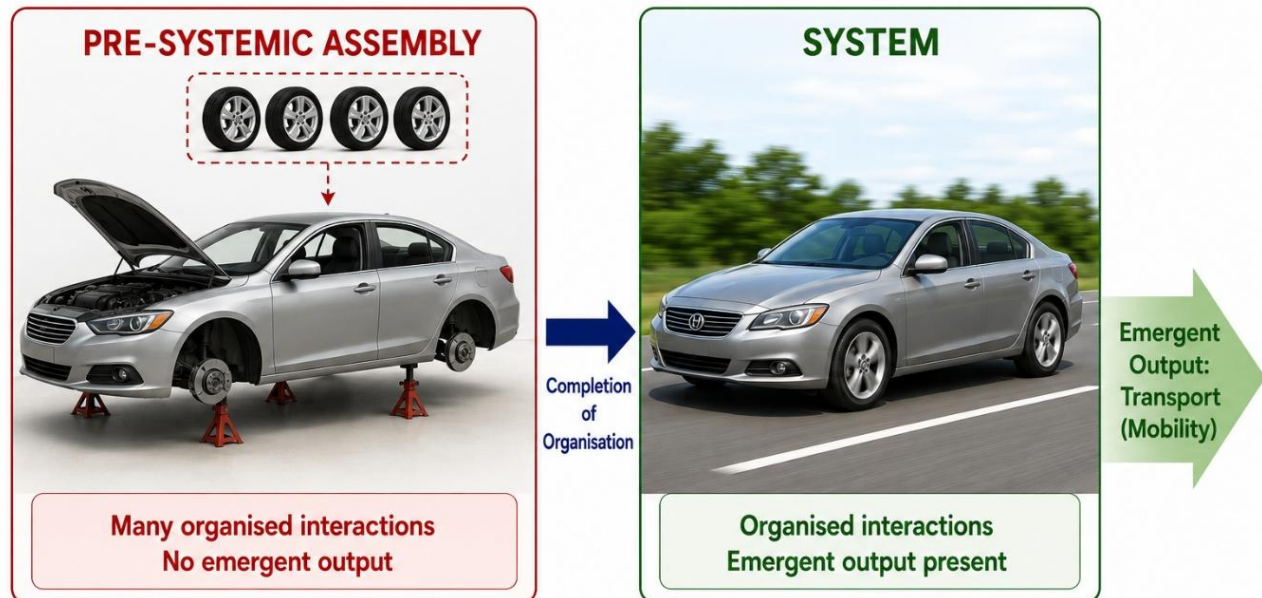
A pre-systemic assembly is therefore more than a simple collection of parts. Its components already influence one another through organised causal interactions, and those interactions may become increasingly structured over time. However, the organisation has not yet reached the point where the assembly behaves as an integrated whole with capabilities beyond those of its individual components.

This stage is common throughout nature, engineering and society. During the construction of a bridge, partially completed sections interact mechanically and support one another, yet the bridge cannot perform its intended function until construction is complete. During embryonic development, cells communicate continuously and organise into tissues and organs long before the organism becomes capable of independent life. A newly formed project team may begin to communicate and allocate responsibilities but may require time before it operates as an effective organisation.

Pre-systemic assemblies are often unstable. Some continue to develop, becoming increasingly organised until emergent properties appear and a functioning system is established. Others fail to achieve sufficient organisation and eventually disperse or are reorganised into different assemblies. Recognising pre-systemic assemblies helps us understand that system formation is usually a gradual process rather than a single event. It also reminds us that increasing causal organisation does not guarantee that a stable system will emerge.



PRE-SYSTEMIC ASSEMBLY vs SYSTEM



A pre-systemic assembly may contain many organised interactions.
It becomes a system only when organised interactions generate an emergent property, behaviour or output.

Examples

When engineers assemble a wind turbine, the tower, nacelle and blades become progressively connected and begin to interact mechanically. Before commissioning, the assembly possesses considerable causal organisation but cannot yet generate electricity. It therefore represents a pre-systemic assembly.

A newly established research collaboration may begin with researchers sharing ideas, allocating tasks and developing methods of working. These organised interactions may continue for some time before the group develops the coordinated capabilities of an effective research team. During this period, it exists as a pre-systemic assembly.

Provenance and Links

Many disciplines recognise transitional stages during the formation of complex organisations, although they often use different terminology. Engineering distinguishes between assembly and commissioning, developmental biology studies progressive organisation during embryogenesis, and organisational studies examine the formation of effective teams and institutions. Within General Systems Theory, the concept of a pre-systemic assembly highlights the importance of increasing causal organisation prior to the emergence of stable system-level capabilities.



Practical Exercise

Choose an example of a system that forms gradually, such as a construction project, a biological organism, a business or a community organisation.

Identify the stage at which you would regard it as a pre-systemic assembly rather than simply an assembly.

Describe the causal interactions already present and explain why they are not yet sufficient to produce the emergent properties, behaviours or outputs that characterise the completed system.

Finally, identify the changes that would mark the transition from a pre-systemic assembly to a functioning system.