



GST 75 – Function

Formal Description

A function is the organised causal transformation performed by a system whereby inputs of matter, energy and information are converted into outputs through the interactions of its components and processes.

Functions arise from the organised causal organisation of a system and therefore constitute emergent properties of the system rather than of its individual components.

Plain English Explanation

Every functioning system does something. In General Systems Theory, this "doing" is called the system's function.

A function is not simply an activity. It is the organised transformation that the system performs. Matter, energy and information enter the system as inputs, are transformed through the system's organised causal processes, and leave as outputs.

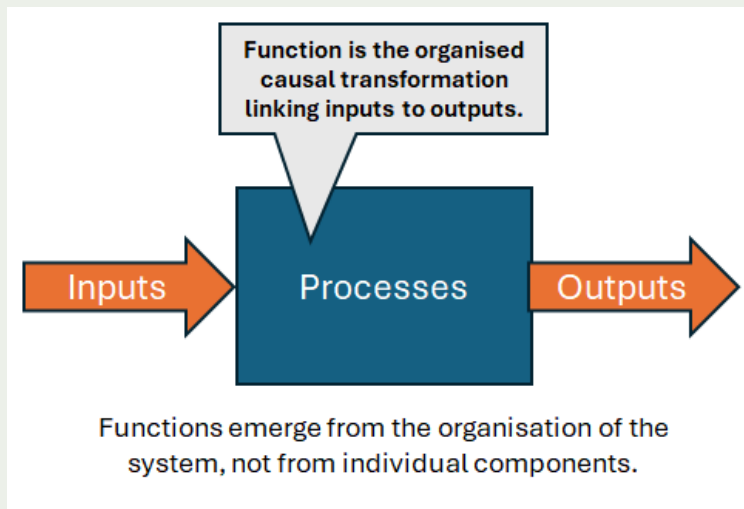
For example, the function of a power station is to transform the chemical or nuclear energy stored in fuel into electrical energy. The function of a water treatment plant is to transform untreated water into water that is safe to drink. The function of the human digestive system is to transform food into nutrients that can be used by the body.

Functions are emergent. No individual component performs the complete function on its own. Instead, the function arises from the organised interactions of many components working together. A piston cannot propel a vehicle by itself, nor can a single heart muscle cell pump blood around the body. Only the organised system possesses the function.

It is also important to distinguish function from purpose. A function describes what a system actually does. Purpose describes why the system exists or why someone believes it exists. A system may perform a function regardless of whether it was intentionally designed or whether anyone attributes a purpose to it.

Functions may also change over time. As systems develop, adapt or evolve, they may acquire new functions or lose existing ones. These changes reflect alterations in the system's causal organisation. Understanding function therefore helps us explain how systems contribute to larger systems and how the outputs of one system become inputs to others within a systems hierarchy.

In the next module we shall examine purpose, which concerns the goals or objectives associated with a system rather than the transformations it performs.



Examples

The function of a refrigerator is to transfer thermal energy from its insulated interior to the surrounding environment, thereby maintaining a lower internal temperature. This function emerges from the coordinated operation of the compressor, condenser, evaporator and control system. The function of a school is to transform educational resources, teaching and student effort into learning and the development of knowledge and skills. This function arises from the organised interaction of teachers, students, curricula, facilities and administrative processes rather than from any single component.

Provenance and Links

Function has long been recognised as a central concept within systems theory, biology and engineering. In General Systems Theory, functions are understood as emergent transformations performed by organised systems. By relating function explicitly to the transformation of inputs into outputs through organised causal processes, the concept is closely linked to system organisation, emergence and the transfer of matter, energy and information.

Practical Exercise

Choose a familiar system such as a business, a hospital, a transport system or a biological organism. For the chosen system:

- Identify its principal inputs of matter, energy and information.
- Describe the organised causal transformations performed within the system.
- Identify its principal outputs.
- State the principal function of the system.

Finally, explain why this function is an emergent property of the system rather than of any individual component.