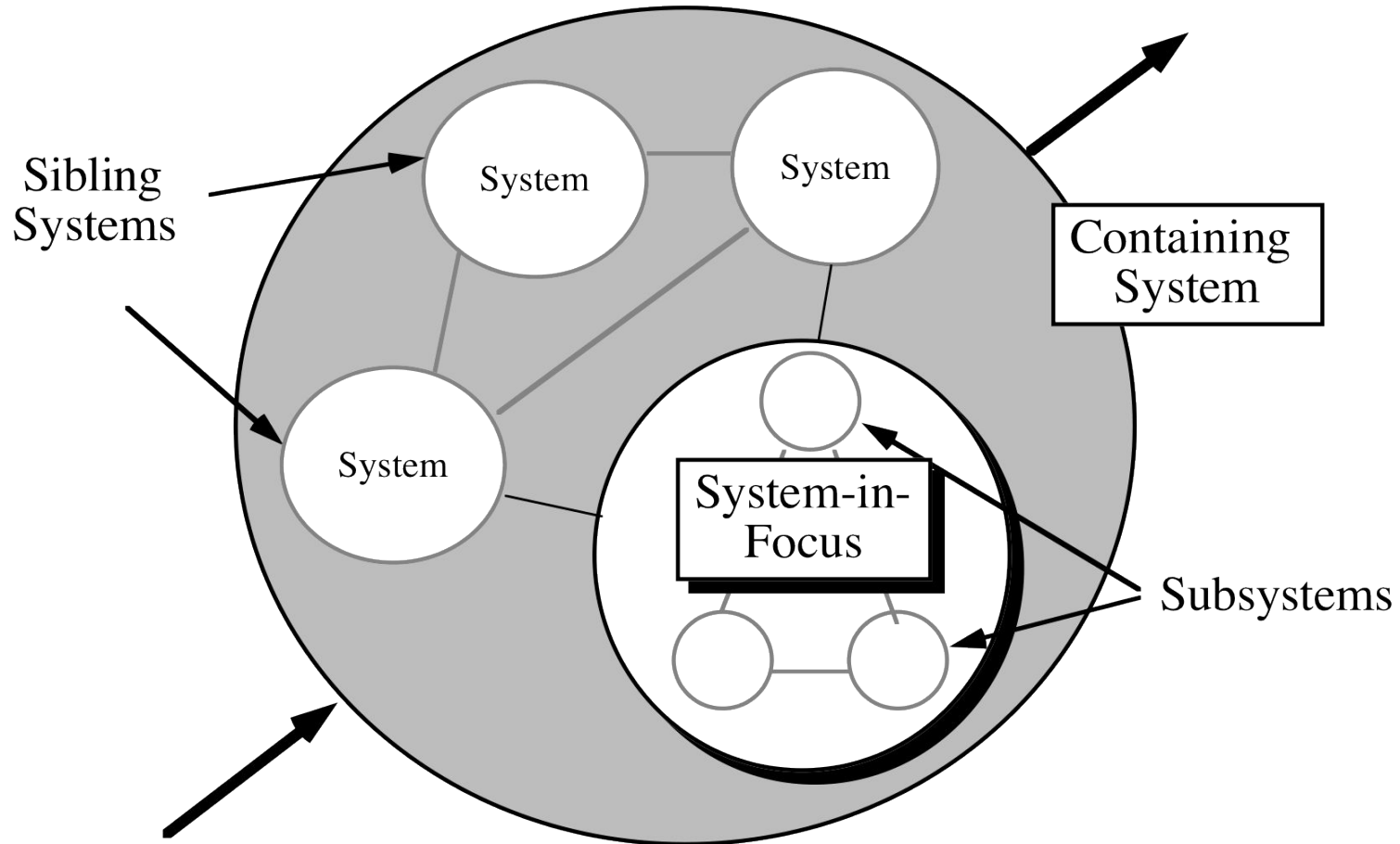


# Systematic Data Analysis



# 1. INTRODUCTION: BASIC DEFINITIONS



**The system** is an object or a process where elements are related by some connections and relationships.

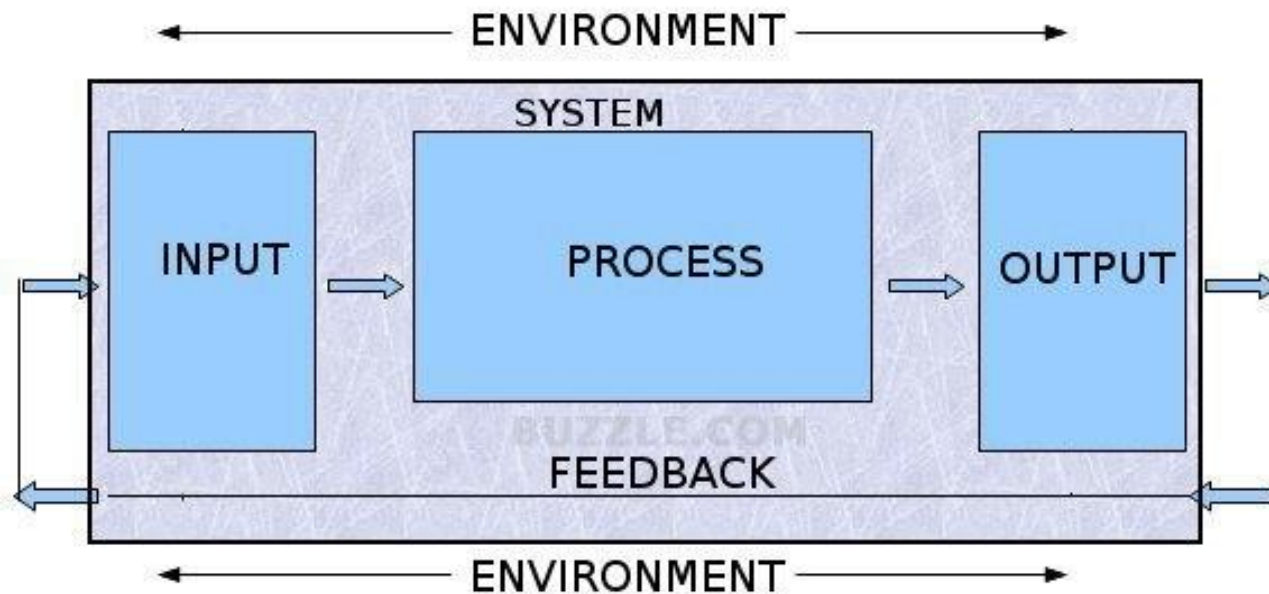
The need for the "system" definition occurs in those cases where it is impossible to portray, represent (for example, using a mathematical expression), but it have to be emphasized that this will be a big, complex, not fully understood at once (the uncertainty) and the whole, unified. For example, "the machine control system".



Features of the "system" term such as **ordering, integrity and availability of certain laws** - appear to display mathematical expressions and rules - "the system of equations", "numbering system", "system of measures", etc. We do not say: "the set of differential equations" or "set of differential equations" - namely, "a system of differential equations", to emphasize the ordering, integrity, availability of certain laws.



Interest in system representations is evident not only as a convenient the generalizing term but also as means of setting goals with great uncertainty. the




Illustrated by Binduswetha

A SYSTEM



## Four **basic properties of the system** can be identified:

- ❖ system is a set of elements that could be considered as a system under certain conditions;
  - ❖ existence of significant relationships between the elements and (or) their properties, superior in power (force) the relationship of these elements to the elements not included in the system. Under significant relationships are understood those that naturally, with the need to determine the integrative properties of the system. This property distinguishes the system from a simple conglomerate and distinguishes it from the surrounding environment;
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- ❖ availability of a specific organization;
- ❖ the existence of integrative properties, i.e., inherent in the system as a whole, but not typical to any of its components separately. Their existence indicates that although the system properties depend on the elements properties, but they are not completely surround them. I.e. the system is not limited to a simple set of elements, and by breaking the system into separate parts, it is impossible to know all properties of the system as a whole.



**System approach** - direction of scientific knowledge methodology and social practice, which is based on the consideration of objects as systems. Systematic approach orients researchers to disclose integrity of the object, to identify the multiple relationships and bringing them into a single theoretical picture.

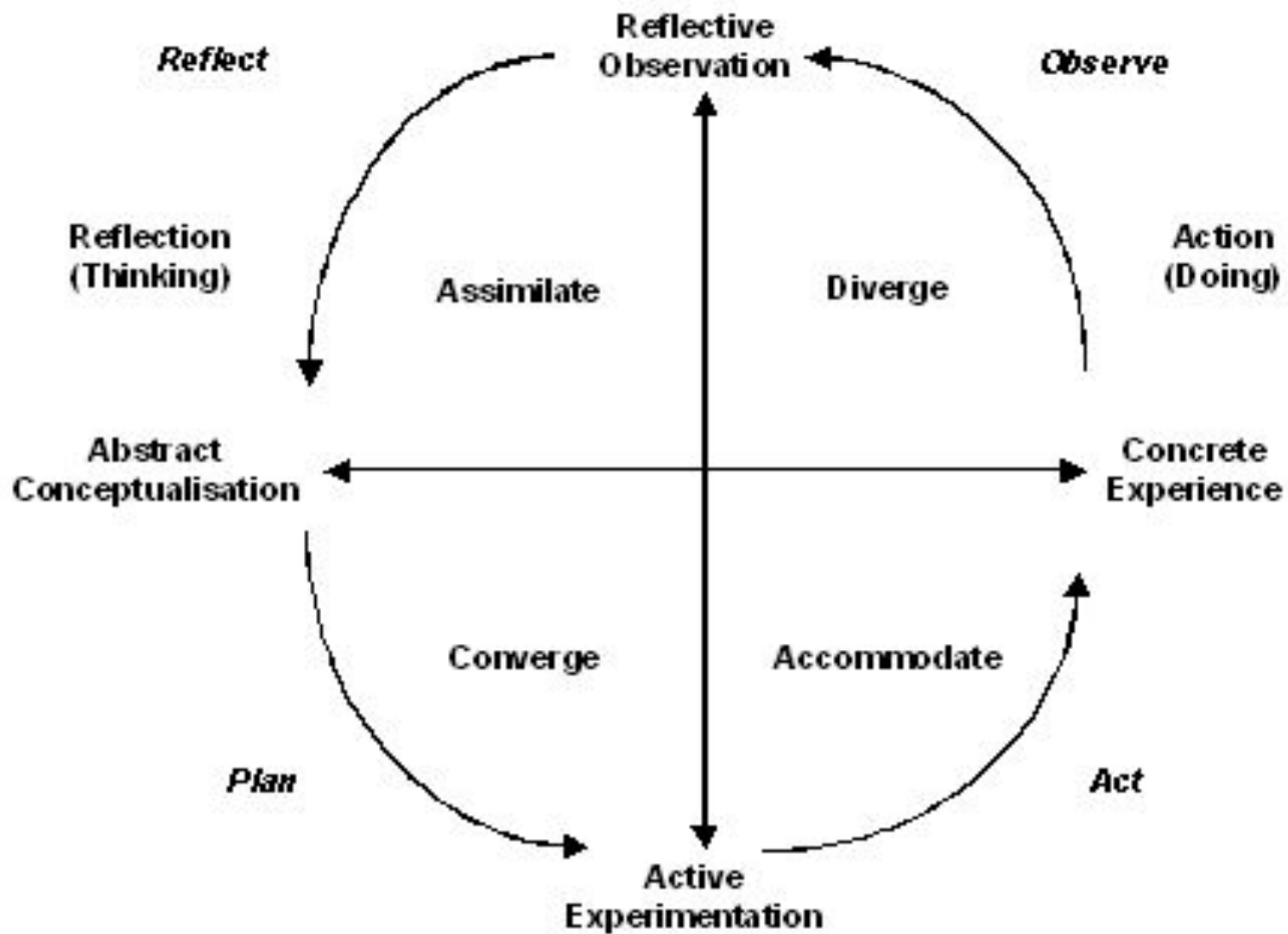




Systemic approach requires in the study of any object or phenomenon, the Systemic approach may be represented as a sequence of **the following stages**:

- ❖ allocation of the study object from the total mass of phenomena or objects. Determination the contour system limits, its major subsystems, components, relationships with the environment;
- ❖ establishment of research objectives: the definition of system functions, its structure, management and operation mechanisms;

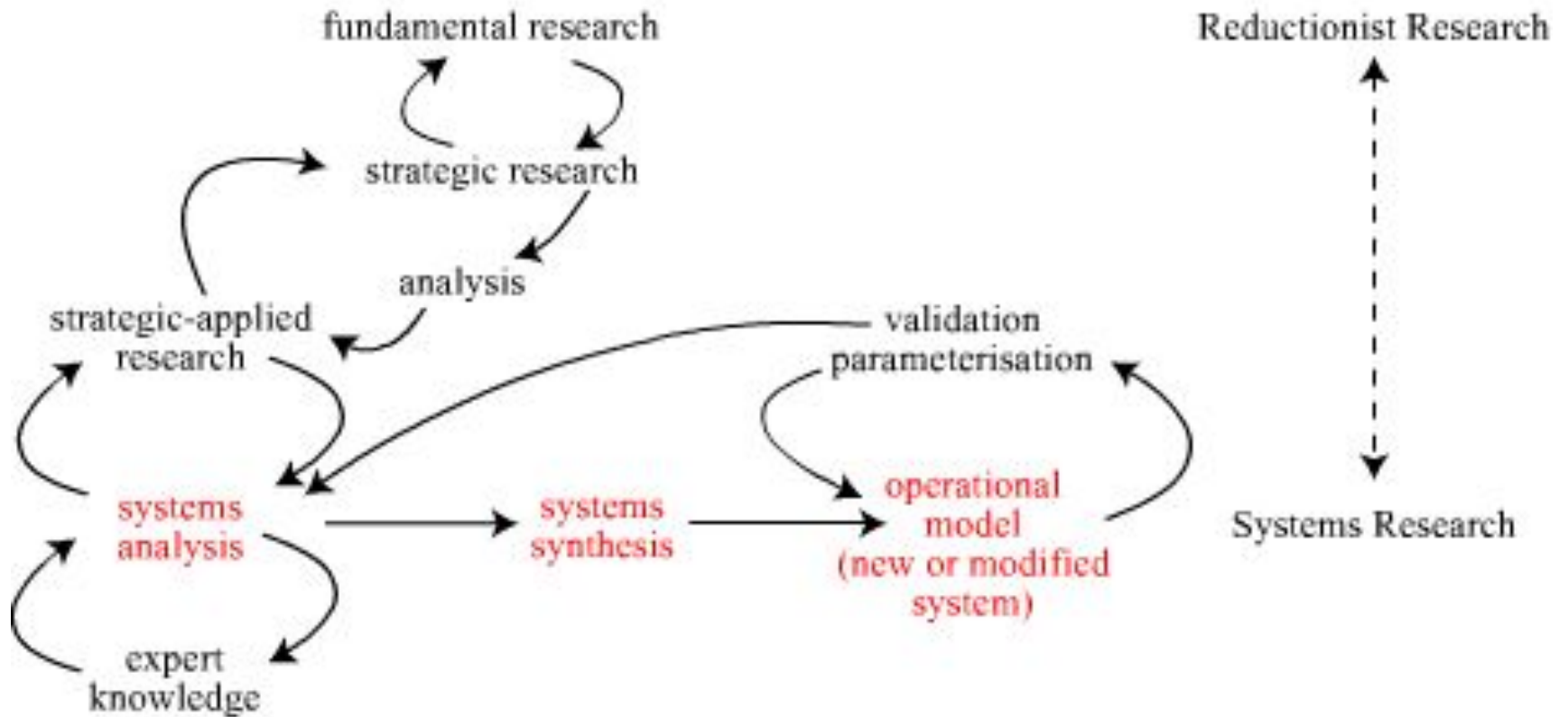




- ❖ definition of the basic criteria describing a targeted operation of the system, the main restrictions and conditions of existence (functioning);
- ❖ identifying alternatives when choosing structures or elements to achieve a given goal. If possible, it is necessary to take into account factors that affect the system, and solutions to the problem;



# The Systems Approach



- ❖ preparation of the system model functioning, taking into account all significant factors. The significance of factors determined by their influence on determining the target criteria;
- ❖ optimization of the functioning of the system or model. Selecting solutions based on their performance in achieving objectives;



- ❖ designing of optimal structures and functional activities of the system. Determination of the optimal scheme of regulation and control;
- ❖ supervision of the system, determination of its reliability and efficiency.
- ❖ establishing a reliable feedback on the results of the operation.



