Systems Theory

Systems theory or systems science argues that however complex or diverse the world that we experience, we will always find different types of organization in it, and such organization can be described by concepts and principles which are independent from the specific domain at which we are looking. Hence, if we would uncover those general laws, we would be able to analyze and solve problems in any domain, pertaining to any type of system.

Thinking and talking about systems. . .

"The systems view looks at the world in terms of relationships and integration. Systems are integrated wholes whose properties cannot be reduced to those of smaller units. Instead of concentrating on basic building blocks or basic substances, the systems approach emphasizes basic principles of organization. Every organism- from the smallest bacterium through the wide range or plants and animals to humans is an integrated whole and thus a living system. ...But systems are not confined to individual organisms and their parts. The same aspects of wholeness are exhibited by social systems- such as an anthill, a beehive, or a human family- and by ecosystems that consist of a variety of organisms and inanimate matter in mutual interaction. What is preserved in a wilderness area is not individual trees or organisms but a complex web of relationships between them.
All these natural systems are wholes whose specific structures arise from the interactions and interdependence of their parts. The activity of systems involves a process known as transaction- the simultaneous and mutually interdependent interaction between multiple components."
- Fritjof Capra
The Turning Point

"A system is a network of interdependent components that work together to try to accomplish the aim of the system. A system must have an aim. Without an aim, there is no system. ...A system must be managed. The secret is cooperation between components toward the aim of the organization. We cannot afford the destructive effect of competition."
- W. Edwards Deming
The New Economics

"A 'system' can be defined as a complex of elements standing in interaction. There are general principles holding for systems, irrespective of the nature of the component elements and the relations of forces between them. ...In modern science, dynamic interaction is the basic problem in all fields, and its general principles will have to be formulated in General Systems Theory."
- Ludwig von Bertalanffy
Problems of Life

"A company is a multidimensional system capable of growth, expansion, and self-regulation. It is, therefore, not a thing but a set of interacting forces. Any theory of organization must be capable of reflecting a company's many facets, its dynamism, and its basic orderliness. When company organization is reviewed, or when reorganizing a company, it must be looked upon as a whole, as a total system."
- Albert Low
Zen and Creative Management

"Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots. It is a set of general principles- distilled over the course of the twentieth century, spanning fields as diverse as the physical and social sciences, engineering, and management. ...During the last thirty years, these tools have been applied to understand a wide range of corporate, urban, regional, economic, political, ecological, and even psychological systems. And systems thinking is a sensibility- for the subtle interconnectedness that gives living systems their unique character."
- Peter Senge
The Fifth Discipline

"All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in that community, but his ethics prompt him also to cooperate (perhaps in order that there may be a place to compete for)."
- Aldo Leopold
The Land Ethic

"General Systems theory should be an important means of instigating the transfer of principles from one field to another (so that it would) no longer be necessary to duplicate the discovery of the same principles in different fields."
- Ludwig von Bertalanffy

"It appears that all units of reality are comprised of two basic elements in an asymmetrical binary relationship in dynamic interaction... As noted above, one of the basic ideas that underlies my thinking, one of the images I have in mind when I contemplate the universe, is that it is constructed upon a simple pattern of order that may be seen in any and all phenomena, no matter how complex. The simple pattern is that of a binary relationship, recognized in a binary system. The implication here is that everything in nature, everything in the universe, is composed of networks of two elements, or two parts in functional relationship to each other..." "The most fundamental phenomenon in the universe is relationship."
- Jonas Salk

" . . . there are systems whose rules are simple enough to describe in just one sentence that are nevertheless universal. And this immediately suggests that the phenomenon of universality is vastly more common and <u>important</u>—in both abstract systems and nature—than has ever been imagined before."
- Stephen Wolfram
A New Kind of Science