

## ISO 9000 Quality Systems Handbook Additional Resources

### Additional notes on the concept of a system)

The word 'system' is derived from the Greek word σύστημα *systema*, meaning a whole compounded of several parts or members and is used in several different ways but after consulting both The Oxford English Dictionary and the Merriam-Webster Dictionary it appears there are two basic uses of the word (a) a connected group of objects combined forming a complex whole and (b) an orderly way of doing something and it is this distinction that creates communication problems because when the term system is used, it may not be clear whether it is being used in sense (a) or sense (b). Further complication arises because with each of these uses there are many variations. Authors on systems theory, organizational behaviour and management define the word system in different ways e.g.

- set of components that work together for the overall objective of the whole (von Bertalanfy, 1968)
- a set of interrelated elements (Ackoff, 1971)
- a set of variables that influence one another (Senge, 1990)
- a series of functions or activities within an organization that work together for the aim of the organization (Deming, 1994)
- a community of connected entities (Sherwood, 2002)
- a complex whole the functioning of which depends on its parts and the interactions between those parts. (Jackson, 2003)
- an interconnected set of elements that is coherently organized in a way that achieves something (Meadows, 2008)

In a seminal paper by Russell Ackoff (Ackoff, 1971) he defined a system as a set of interrelated elements and refers to two types of system.

1. An abstract system is one all of whose elements are concepts. Languages, philosophic systems, and number systems are examples.
2. A concrete system is one at least two of whose elements are objects of which there are
  - a. State-maintaining systems the outcomes of which are fixed
  - b. Goal-seeking systems the outcomes of which are fixed
  - c. Multi-goal seeking and purposive systems the outcomes of which are variable but determined
  - d. Purposeful systems the outcomes of which are variable and chosen

All Ackoffs work was concerned with what he referred to as concrete systems and in another paper (Ackoff, 1998) he redefines the four types of "concrete" systems

1. Deterministic: systems in which neither the parts nor the whole are purposeful.
2. Animated systems in which the whole is purposeful but the parts are not.
3. Social: systems in which both the parts and the whole are purposeful.
4. Ecological systems in which some of the parts have purposes but not the whole.

Ralph Stacey identified 10 ways (Stacey, 2010) in which the term system is used some of which I have clipped

1. A coherent, systematic whole of thought.

2. A relative idea or hypothesis about the nature of the development of phenomena in nature. E.g., thinking of living phenomena as if they were wholes formed by interacting parts.
3. A particular kind of conceptual model as hard systems thinking with its general systems theory, cybernetic and systems dynamics models of human groupings as systems that actually exist. Individuals were understood as parts of organizational and social systems.
4. A way of thinking about individual mind as information processing devices.
5. A way of thinking about human communication as a cybernetic system of transmission consisting of senders and receivers
6. A living system. E.g., Serige and Burke both prescribe thinking about an organization as a system that is actually living
7. A particular kind of conceptual model as in soft, and critical systems thinking where the systems model is understood to be in the mind of the observer who thinks of organizations as if they were systems
8. A complex system in which self-organization at the level of the agents produces emergent order at the global level
9. A tool or technique specifying rational sequential steps which observers and decision makers should use to structure and shape the problem situations facing them, find rational solutions and make rational decisions. I have in mind here the aspects of soft and critical systems thinking that focus attention on tools and techniques for rational problem solving by free agents, rather than thinking of organizations 'as if' they were systems.
10. A bureaucracy and hierarchy, that is as a comprehensive, interlocking set of procedures and actions. For example, there are accounting systems, quality assurance systems, legal systems, property systems, health systems and transport systems.

There are probably more perceived uses of the word system or derivations on a particular theme, but now having acquired an awareness of the diversity of uses, one is more likely to pause on hearing the word system and question the sense in which it is being used before proffering a response.

#### Bibliography

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