AN INSIGHT INTO SYSTEMS APPROACH TO MANAGEMENT IN RELATION TO CYBERNETICS COMPUTER SYSTEMS

"The whole is more than the sum of its parts'- Aristotle

Ms . Anne Martin
Ph.D, Research Scholar,Dr.MGR University, Maduravayal, Chennai
Dr .V. Prince Martin
Professor, School of Management, Sri Krishna College of Engg &Tech, Coimbatore

Introduction

Systems Approach to Management

In order to evaluate the modern systems approach it is advisable to look at the systems idea not as an ephemeral fashion or recent technique but in the context of the history of ideas. Man in early culture and even primitives of today, experience themselves as being" thrown" into a hostile world. Philosophy and its descendant science were born when the early Greeks learned to consider or find in the experienced world an order or kosmos.

A more detailed search would reveal that a long array of thinkers who in one way or the other contributed notions to what nowadays we call systems theory. Nicholas of Cusa a profound thinker, linking medieval mysticism with the first beginnings of modern science introduced the notion "coincidentia oppositorum", fight among parts within a whole which nevertheless forms a unity of higher order. Example life communities and the entire earth thus romantically anticipating the ecosystems of modern parlance. We say "replaced not eliminated for the Aristotelian dictum of the whole that is more than its parts still remained. We must strongly emphasise the order or organisation, transcending its parts when these are considered in isolation, is nothing metaphysical; it is a fact of observation encountered whenever we look at a living organism, a social group or even an atom".

The second maxim of Descartes, "Discours de la Method", was to break every problem into as many separate simple elements as might possible". This similarly formulated by Gallileo as the resolute method was the conceptual paradigm to resolve complex phenomena into elementary parts and processes.

Thus the fight on the concept of organism in the first decades of the twentieth century. This was expressed in the question of "organisation" found in every living system; whether "random mutations" cum natural selection provide all the answers to the phenomena of evolution and in the question of goal directedness which may be denied but in some way or other raises its ugly head.

Trends in General Systems Theory

The General Systems Theory may be broadly used in a way similar our speaking of the Theory of evolution .The goal obviously is to develop systems theory in mathematical terms because mathematics is the exact language permitting rigorous deductions and confirmation of the theory. A system may be defined as a set of elements standing in interrelation among themselves and with the environment.

One approach or group of investigations may somewhat loosely be circumscribed as axiomatic in as much as the focus of interest is a rigorous definition of system and the deviation, by Mesarovic (41) Maccia and Maecia (40) VC = set of all couplings between elements and the elements and environment;

ST= set of all states and the transitions between states. Geometrically, the change of the system is expressed by the trajectories that the state variables traverse in the state space that is n-dimensional space of possible location of these variables. There are three types of behaviour

1. A trajectory is called asymptotically stable if all the trajectories sufficiently close to it t=to approach it asymptotically t->00.
2. A trajectory is called neutrally stable, if all trajectories sufficiently close it at t=0 remain close to it.
3. A trajectory is called unstable if all the trajectories close to it at t=0 do not remain close to it as t->00.

Systems Philosophy

Modern technology and society have become so complex that traditional branches of technology are no longer sufficient; approaches of a holistic or systems and generalist interdisciplinary nature becomes necessary. Modern engineering includes fields such as circuit theory, cybernetics as the study of communication and control.

The concept of a system constitutes a "new paradigm" in Thomas Kuhn's phrase as a 'new philosophy of nature" in the present writers' words, contrasting the blind laws of nature. Entities perceived in or inferred from observation and the existing independently of an conceptual systems such as logic or mathematics with abstracted systems (science).

Systems Approach to Management

The systems approach to management is a way of thinking about organisations and management problems. The approach views an organisation as interrelated parts with a unified purpose, surviving and ideally thriving in its environment. From the systems perspective management should focus on efficiency and effectiveness in each part of the organisation, with the understanding that actions taken in one part of the organisation affect other parts of the organisation. Example implementing a strategy in the production department of a company will likely affect other aspects of the company such as marketing, finance and personnel. Each part is linked to other organisational parts no single part of the organisation operates in isolation from others. In their day to day activities, managers must view the organisation as a dynamic whole and try to anticipate unintended and intended impacts of their decisions. The organisation is linked to its environment. Organisations effectiveness, even survival depends on the organisations interaction with the environment.

Dell computer, In an open system that interacts with its environment. It has to obtain resources from its environment. The company needs motivated and skilled employees with the ability to design and manufacture innovative, high quality and personal business computers. Financial inputs are needed to build manufacturing facilities; to fund research and other expenses. Raw materials are obtained from outside manufacturers suppliers in the environment. Information is obtained from the environment, from research journals, computer conferences and other external contacts.

The inputs are employed, used, coordinated and managed in a transformation process that produces output personal and business computers. Negative feedback provides Dell with a response to act to a failing products design or features based on customer responses. Neglecting developments in the environment will doom the company.

Not all organisations are open systems. Some like a Catholic monastery are closed systems. Developments in the outside world have little impact on the organisation .Today organisations must operate as open systems to survive and utilize a systems perspective to management. Managers must

think broadly about a problem and not concentrate only on the desired results because these results will impact other problems and parts of the environment beyond the organisation. The objectives of individual parts must be balanced with the parts of the firm.

Cybernetics Systems

Artificial intelligence (AI) uses computer technology to strive toward the goal of machine andconsiders implementation as important as result; cybernetics uses epistemology (the limits of how we know what we know) to understand the constraints of any medium (technological, biological or social) and considers powerful descriptions as the most important result.

The term originated in 1947 when Norbert Weiner used to name a discipline apart from established disciplines such as electrical engineering. Early cybernetic researchers quickly realised that the "science of observed systems" cannot be divorced from the "science of observing systems". The cybernetic approach is centrally concerned with this unavoidable limit of what we can know: our own subjectivity cybernetics is aptly called epistemology. Its utility is the production of useful descriptions that include the observer in the description cybernetic descriptions of psychology, language, arts, performance or intelligence. Implementation may then follow in software or hardware or in the design of social, managerial and other classes of interpersonal systems.

Philosophy of Cybernetics

Artificial Intelligence is predicted on the presumption that knowledge is a commodity that can be stored inside of a machine and that the application of such stored knowledge to the real world constitutes intelligence. Cybernetics in contrast has evolved from a constructive view of the world where objectivity derives from shared agreement about meaning and from where information or intelligence is an attribute of an interaction rather than a commodity stored in a computer. These differences are not meanly semantic in character.

Conclusion

Cybernetics deriving from the Greek word for steersman (Kybernetes) introduced by the mathematician Weiner as the science of communication channels and control in the animal and machine, grew into designs of transmission of information through communication channels and the feedback concept used in engineering control systems. Cybernetics and Systems Theory study the same problem that of the organisation independent of the substrate in which it is embodied. Systems Theory has focused more on the structure of systems and their models whereas Cybernetics has focussed more on how systems function. They should be viewed as two facets of a single approach.

References

1.Heylighen F- " Relational closure, a mathematical concept for distinction and complexity analysis" in Cybernetics and Systems. 1990 (World Science Publishers)

2. Management Principles and Concepts , Thomas N Duenning, John M . Ivancevich, Atomic Dog Publishing USA.

3. Havel I (1995) "Scale dimensions in Nature ", International Journal of General Systems, 23.

4. The History and Status of General Systems Theory., Ludwig Von Bertalanffy , Center for Theoritical Biology . State University of New York at Buffalo.