Chaos complexity theory

Science

Chaos/complexity theory can contribute in bringing about self-organisation in the midst of change, turbulence, fluxedenvironmentboth inside and outside the modern-day organisation. Loose, disorganised systems can spontaneously acquire organisation, just as a shapeless liquid mass can, upon cooling, solidify into an exquisite crystal. Complexity theory underlines the importance of self-organisation, and such self-organisation appears, autocatalytically, through the interaction of its component elements (Magalhaes 2004).

In the book Managing Chaos (1992), Ralph Stacey proposes a paradigm shift to change the way managers think about the " route to business success. " Managers need to adopt a " far-from equilibrium mindset" based on a dynamic systems perspective, in order to cope with the unknowable future of innovative organisations. The first step on this path involves acknowledging that one does not really know what the long-term future holds for one's organisation. Anything can happen!

The theme that the specific future of organisational systems is inherently unpredictable is a fundamental notion in complexity theory and derives from the properties of non-linear feedback systems in thescienceandmathematicsof chaos. Chaos theory or complexity theory is based on the notion that even fixed inputs into deterministic rules can generate non-linear feedback loops giving rise to the inherently unpredictable pattern of behaviour which is considered as chaos.

Such loops abound in constantly evolving and expanding organisations, and any links between cause and effect, actions and outcomes, can get lost in

that complexity and a radical unpredictability results. Moreover, according to the ‘ butterfly effect’, which we would be discussing shortly, complex systems are extremely sensitive to small difference in initial conditions. Tiny changes in such conditions can escalate into major consequences. Complexity theory propounds, therefore, that the long-term future of organisations is essentially " unknowable. "

Some kinds of assumptions are inevitable and necessary too, but managers should generally stay clear from making rigid assumptions about the long-term future because such predictions are impossible in our turbulent and chaotic world. The adjectives “ turbulent” and “ chaotic” are actually not adequate to describe the present situation of our world, because there have been turbulent and chaotic times throughout history, especially during wars and revolutions, but we live in an age where the growth ofscience and technologyis peaking and astounding possibilities are going to open up before us in every direction.

Today, more than ever, we truly live on a planet of impossible possibilities. There is much that is positive, inspiring and exciting about the “ chaos” and “ turbulence” of our times, unlike the chaos and turbulence of, say, even the Second World War Europe, or the France ofFrench Revolution. Above all, it is this most unique characteristic of our times, poised as we are on the brink of grand revelations and revolutions, that brings out the particular relevance of chaos theory to the management thinking and organisational behaviour our day.

The pace of change is expected to grow at such a pace that much of the kind of long-term planning that managers used to typically engage in is rendered pointless. The strategic planning processes may not only be of much use, but they could even be damaging. Only short-term predictions are possible. Long-term planning can even be damaging if it is taken very seriously and adhered to adamantly, because tying an organisation to a particular vision which limits what it is prepared to do, is exactly the opposite of what is required in an uncertain and flux-like world.

In the place of a definite and focused (confined) vision, therefore, there is a need for a powerful vision which is nonetheless based on a certain openness and freedom of thinking. It is a vision that can go with the flow and continuously adapt to the changing times, while also being in a position to make most of the new opportunities as and when they arise — which is not too infrequent in our world of breathtakingly accelerated technological change.

This point will be illustrated by an example involving IBM and Microsoft in the following section. The notion that an organism/organisation interacts dynamically with its environment, influencing and, in turn, being influenced by its environment, is a key principle of the emerging science of complexity. Complexity theory is a theory of evolution, development and adaptation. Chaos is a property of dynamical system. Systems are in constant flux, rather than in stability.

The science of chaos is important because it helps us to cope with unstable systems by improving out ability to describe, to understand, and to the

extent possible, even to forecast certain aspects of the flux-like existence. 1. The Implications of Chaos Theory Chaos theory does not imply complete randomness, and if it did there would not have been any theory in the first place because science can only be based on some kind of order. Underlying chaos it is possible, over time, to recognise patterns occurring in the way the system develops.

Complexity theory can help us understand how such patterns evolve. As a result of a small difference, the past and present of a system can differ dramatically form one another. In the terminology of chaos theory, ‘ bifurcations’ are the abrupt changes that can take place in the behaviour of a system when the value of a constant is altered slightly (Guastello 2002). This idea is known as sensitive dependence. Chaotic systems exhibit sensitive dependence. Besides, they are also nonlinear and, rather surprisingly, deterministic.