

# Chapter 12

## Chaos and Complexity Approach in Management

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### ABSTRACT

*In business management literature, chaos and complexity approaches came into sight in 1990's. Fundamental changes have been made by chaos and complexity approaches in understanding of scientific methodology. In social sciences, especially in management and organization fields these notions should be seen as supplementary to the general systems theory. Chaotic management approach also revealed dramatic changes in management understanding chaotic management perspective has brought up the consideration of human both in organisational and humane perspective, which has only been considered within organisational perspective. In other words, placing human in the centre as the essential element of living humanely again has been provided. In this study effects of chaotic theory starting from basic mathematical and scientific findings, were investigated on production, economy, service and social sciences. Also we worked on influence of the theory on management and organization area.*

### INTRODUCTION

Our observations may indicate that events in life appear irregular with no clear cut relationship with each other, thus giving the impression of such events happening by coincidence. However, part of the fact is that this viewpoint as discussed above qualifies as a massive scheme of transition from classical science to chaos.

Let us consider the behavior of floating leaves in a stream. When a leaf, is caught during a vortex movement, it assigns a time schedule around the tour. Swirl leave survivors will continue their journey from where they left off until the next vortex of bombs. A very small change in position of the leaf changes its future behavior completely. Chaos, sometimes confronts us quite naturally and everywhere just like a dripping tap and sometimes like the beating of the human heart. Under certain conditions the human heart beat reveals a chaotic nature of behavior. The rate of heart beat and rhythmic activity is

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controlled by an organ. But in some cases, due to the incompatibility between this organ and the heart, one of the heart beat rates may occur in long and short spaces.

In more extreme conditions, heartbeat rhythm becomes rather erratic. Every small change that happens to the timing of the heart beat will cause a major change in the next form of heartbeat. In this case therefore, heartbeat becomes chaotic and life threatening. This example, thus, is an interesting example of how chaos prevails when the initial conditions of a regular behavior change. (Koçak, 2000, p. 94-95)

Organizations as open systems are always in constant communication and relationship with the environment, as a result of this interaction, they are obliged to comply with the environmental conditions. Today, unexpected results may occur in organizations due to rapid change and transformation of environmental conditions. Such changes can be observed even within the most distinguished and respected firms the moment they seek entry into the business or market operations. This shows that the environment in organizations is never static, and thus every time they survive in a chaotic environment where any moment could lead to very complex scenarios and far-reaching impact.

## **CHAOS AND COMPLEXITY APPROACH AS A NEW SCIENTIFIC APPROACH**

### **Emergence, Definition, Content, and Features**

The conceptual meaning of the word Chaos in everyday language evokes such statements as ‘complexity, irregularity, uncertainty’ even ‘anarchy’. The concept comes from the Greek word ‘Khaos’ which means gap, cleft, and borderlines. Unlike the use of chaos in daily language, in true sense the concept refers to ‘order in irregularities’. In short, there are very important differences in the use of chaos between scientific and daily language.

Lorenz, tried to explain chaos theory with two distinct characteristics or features: chaotic systems appear as irregular and disorganized from the outside but having an internal level of organization or regularity (Gleick, 2000, p. 67). After this study by Lorenz chaos theory was defined as a system appearing irregular from the outside but having an incredible internal order. This puts forward two important aspects:

1. Sensitivity to initial conditions.
2. Status of randomness.

With a more clear explanation, many events in the world actually allude to a chaotic structure (everything is not that linear or straight as taught to us) such as, the formation of a snowflake, the rise of cigarette smoke, the development of tree roots, flight of birds, as well as the movement of waves of the sea. All these chaotic embodiments have regularity in their chaotic nature and are not random. This form of behavior obeys the laws of the new science. This view has breathed a new life in the process of understanding classical science coupled with dynamism in which causation and determinism are downplayed and largely destroyed.

Imperative to note is that two very different experiments and observations made in mechanical science at the end of the 19<sup>th</sup> century and at the beginning of the 20<sup>th</sup> century, showed in many cases that contrary to all expectations, measurement of hitting cannot be done, implying that they will always be subject to a certain margin of error in both estimates.

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