Chapter 2
Decision-Making Under Uncertainty, Complexity, and Chaos

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ABSTRACT

The complex interdependence of modern world makes global governance both at micro and macro level very difficult. Almost all decisions of individuals, companies, governments and international institutions are taken under a great risk or uncertainty. The world is becoming more interconnected and complex.Numerous key systems incorporated in the life of humans exhibit diverse complexities. Markets compromised of various buyers and sellers all categorized in groups participating in mutual funds, economies with hierarchies of workers, departments, firms, and industries;, the internet with users, stations, servers, and websites. Each of these complex systems exhibits a distinctive property called "emergence" roughly described by a phrase "the whole is more than the sum of the actions of the parts. Decision making is not merely a science; there is a requisite for creative and individuality aspects of it to be examined. In the development of technologies, the human nature, psychological and sociological impacts of these technologies must be analysed in a holistic way.

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INTRODUCTION

Managerial Sciences are mainly study problem-solving and decision-making in organizations.

Decision-making can be defined as the process of identifying and choosing alternatives based on the values and preferences of the decision maker deriving from several perspectives (psychological, cognitive, and normative). Decision theory (or the theory of choice) is the study of the reasoning that underlies the choices adopted by an agent. Traditionally they can be categorized under two branches: Normative (Prescriptive) decision theory and Descriptive Decision Theory. Normative Decision Theory gives advice on how to make the best decisions with a set of uncertain beliefs and a set of values. Descriptive (positive) decision theory analyses how existing, possibly irrational agents make decisions (Grunig and Kuhn, 2013).

In post-normal times instead of having a mechanistic view of life, we can start teaching complexity and chaos theories to make people more resilient and antifragile against many unknown unknowns of the future. We need to explain the novelties of complexity theory and chaos theory first.

Complexity, that is describing objects with many interconnected parts, can now be observed not only in natural events but in many other systems. A tropical rainforest, multi-celled organisms consisting of proteins, membranes, cells, organs are good examples of a complex system. But many other systems important to humans exhibit similar complexities; markets with their varieties of buyers and sellers, groups participating in mutual funds, economies with hierarchies of workers, departments, firms, industries, the internet with users, stations, servers, websites and more (Holland, 2014).

Despite the fact that scientific discoveries and inventions invariably enhance life to a large degree as well as being accredited with expanding the expected lifespan of humans, scientific and technological improvements may equally precipitate alienation, loss of privacy, environmental problems (chemical and electronic waste), and a greater uncertainty or a black swan event.

Scientists depend on the law of rationality; however, the fact that emotion habitually dominates humans on innumerable occasions is well recognized. Perhaps a more effective method for solving the problems of humanity should include deciphering the laws of human nature.

As an alternative to the law of rationality, consideration could be given to whether it is preferable for scientists use the law of bounded rationality which may entail radical paradigm shift in scientific studies.

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