

# **Decision Making with Dependence and Feedback: The Analytic Network Process**

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## From the Preface:

Our lives are the sum of our decisions - whether in business or in personal spheres. Often, when we decide is as important as what we decide. Everyday life and history are full of lessons that can help us recognize that critical moment. We learn by trying and by example. Deciding too quickly can be hazardous; delaying too long can mean missed opportunities. In the end, it is crucial that we make up our mind. What we need is a systematic and comprehensive approach to decision making.

Decision making is fundamental to furthering our goal of survival and ensuring the quality of our life. To be a person is to be a decision maker. Life is worth little if we are not free to make our own choices. Today feverish activities surround decision making: multicriteria decision societies, psychological decision-making groups, decision aids, and all kinds of software proliferate. Competing theories of decision making contend for attention in the hope of setting the tone for the future. But a useful theory of decision making needs to be in harmony with human needs and human nature. It should not require long years of training to implement with contrived and massaged techniques that only a fanatic could appreciate.

The Analytic Hierarchy Process (AHP), described in several of my earlier works and now widely used in decision making, and its generalization, the second-generation Analytic Network Process (ANP), developed in detail here, are general theories that depend on the values and judgments of individuals and groups. The ANP feedback approach replaces hierarchies with networks and was first described in my book *The Analytic Hierarchy Process*, MacGraw-Hill, 1980. In both approaches to decision making, judgments are brought together in an organized manner to derive priorities. A team of experts develops a scale to represent the judgments through which the recommended decision comes out as best, or a group of alternatives is prioritized and resources are allocated in proportion to these priorities.

Science is advanced the furthest when we dare to embrace new ideas that may not fit well with preconceived notions. In fact science is advanced the most by creating new techniques to solve old problems. The use of ratio scales is a technique that enables us to look at decision problems in terms of benefits, costs, opportunities, and risks separately and then combine them appropriately into a single ratio scale. Ratio scales are of our essence.

Tradeoffs can be seen everywhere in the context of hierarchies and network synthesis. This book is about ratio scales and their tradeoffs to attain equilibrium. Its purpose is to show how we can use the intrinsic involvement of the mind with ratio scales in a very general way to connect our experiences and discoveries to our goals.

Science and reason improve our understanding of who we are and in what kind of environment we live. But the facts and understanding we obtain through science and reason are fundamentally related to our values and needs and to the judgments which serve our values. Because values and judgments vary among individuals, we need a new science of judgments and values to help us achieve universality and objectivity. Then we will be able to understand, cooperate, survive, and fulfill ourselves. The Analytic Hierarchy (Network) Process - a mathematical theory of value, reason and judgment based on ratio scales, is developed here and applied extensively to bring scientific and rational findings together, with a myriad of intangibles, to help us synthesize our "qualitative" human nature with concrete part of our experience captured through science

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