

# Preface

This book is a collection of selected applications of the Analytic Hierarchy Process (AHP) in economic, social, political and technological areas. This volume along with other volumes on decision making, planning, conflict resolution and forecasting, rounds out the diversity of application areas of the AHP.

We have been particularly interested in three themes: economics, the social sciences and the linking of measurement with human values. The AHP offers economists a substantially different approach to deal with economic problems through ratio scales. The main mathematical models on which economics has based its quantitative thinking up to now are utility theory which uses interval scales and linear programming. The axiomatic foundation of utility theory uses gambles or lotteries to elicit judgments about utilities from decision makers. Over the years, practitioners of utility theory have encountered paradoxes that contradict the basic axioms of their theory. Some of the developers of the paradoxes have even won Nobel prizes for their findings. We hope that the variety of examples included here can perhaps stimulate some readers to try applying this new approach.

The second theme is concerned with the social sciences. The AHP offers psychologists, sociologists and political scientists the methodology they have sought for some time to quantify and derive measurements for intangibles. We hope that the examples included in this book will induce them to study the theory. It should quickly become clear that the AHP is the kind of instrument they have been seeking.

The third theme is concerned with providing people in the physical and engineering sciences with a quantitative method to link hard measurement to human values. In such a process one needs to interpret what the measurements mean. A number is useless until someone understands what it means. It can have different meanings in different problems. Ten dollars are plenty to satisfy ones hunger but are useless by themselves in buying a new car. Such measurements are only indicators of the state of a system, but do not relate to the values of the human observers of that system.

Many of the applications in this book were sponsored, co-authored or supervised by the first author in his classes and in his research, and some by the second author. Our friendship has often brought us together to carry out a project that would otherwise be onerous for one person to do. We enjoy thinking of the topics, motivating the works and performing the task of collecting and bringing together what appears to us of potential interest to readers and users of the Analytic Hierarchy Process. Most of these studies have been edited and shortened but their essence preserved. We believe that the AHP is a general tool that is helpful in assisting the mind to organize its thoughts and experiences and to elicit judgments recorded in memory.

The first author has already put together another volume on applications with feedback and dependence using the network version of the AHP known as the Analytic Network Process (ANP). That topic is also studied by the first author in a chapter of his book “Fundamentals of Decision Making in Priority Theory with the Analytic Hierarchy Process” published in 1994 as the sixth volume of the AHP series and in a new book entitled “The Analytic Network Process” first published in 1996 and revised in 2001.

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Some of the chapters in this volume were reports prepared for graduate courses taught by the first author ([Chaps. 3, 5–7, 9, 10, 16–21, 23](#) and [24](#)) and by the second author ([Chap. 12](#)). We are grateful to these authors for permission to include their edited materials in the book. The excellent collection of articles included here has been made possible because of their contributions.

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