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Deandra Cassone

Operational Leadership Using Quantitative Decision Making

Springer

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Operational Leadership Using Quantitative Decision Making

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Preface

Throughout my career, I have had the privilege of being exposed to superior business leaders, academics and mentors and have welcomed every opportunity to learn from them. This book captures a part of the knowledge that I've gained from these individuals and applied in my own career leading to various accomplishments.

Dr. Ching-Lai Hwang was a professor in the Department of Industrial Engineering at Kansas State University. Dr. Hwang had a great mathematical ability, studied methods, and published numerous books and papers in the field of multiple objective decision making, multiple attribute decision making and group decision making as well as developing his own well-recognized multiple attribute method called the Technique for Order Preference by Similarity to the Ideal Solution (TOPSIS). He and his graduate students solved problems using the methods that were presented in each of his books.

Dr. Frank Tillman was head of the Industrial Engineering department at Kansas State University. Dr. Tillman had a strong mathematical, statistical, industrial engineering, finance and business background and was able to model a broad variety of problems by assessing aspects of problems, applying quantitative methods to the problem components, and aggregating the components into a model that represents a problem solution from a holistic perspective. These models provided robust solutions to real-world problems.

Dr. Tillman and Dr. Hwang were asked numerous times to solve problems for former students in the military and in industry and received a contract and investment that enabled them to start two consulting companies, one for private-sector projects and the other for government and military projects. After receiving several contracts and taking a year's sabbatical from the university, Dr. Tillman began running the consulting companies full-time. Dr. Hwang stayed in part at the university and in part as a principal of the consulting companies. The consulting companies used the techniques and approaches described in this book to solve industry, government, and military problems successfully.

After working in the mentioned consulting companies for nearly 20 years, I went back to school to pursue my Ph.D. It was an excellent opportunity to gain additional insights into data, methods, and the theory behind the applications we developed. I was 42 years old when I pursued my Ph.D. in Industrial Engineering. One of my committee members, a well-known and well-published professor, referred to me many times as "applied" and an

"excellent" student. I view myself as an "understudy" of the "masters" that I mentioned above. Having been exposed to and applied the approaches described in this book, I have attempted to leverage and expand upon the thought processes we used to model and solve complex problems.

After completing my Ph.D., I took a position at a high-tech firm. There I was able to apply this modeling approach to develop twelve awarded business process patents and receive an innovation leadership award at the company that is given to only one employee each year. I attribute this to studying the approaches that we used in our consulting companies and learning the application of tools and techniques as done by Dr. Tillman and Dr. Hwang. Being a consultant earlier in my career led me to ask why certain methods were used and combined to solve problems. The fundamental answer was that the methods selected addressed a specific component of the problem but many times, multiple methods were typically needed to solve a problem. There was really no one-size-fits-all approach to modeling real-world problems. I saw that the quantification of the data, application of methods and integration of decision maker's perspective was important in the problem-solving process. The unique use of methods in various situations was also interesting and, in many ways, provided a freedom to appropriately use methods where they may not have been used previously.

Dr. Tillman and I wrote a book, *A Professional's Guide to Decision Science and Problem Solving* and published it along with four of our consulting studies in 2011 and 2012. This book contains some of the same components that were presented in that book, but focuses on, in many ways, what was inherently known by Dr. Tillman and Dr. Hwang but was not drawn out as specifically in the other books. What was not as apparent in the other book was the essential knowledge of a broad group of quantitative methods and how those quantitative methods can be integrated into quantitative decision-making processes. I saw something great happen with modeling real-world problems with robust analytical and quantitative techniques and am attempting to communicate that thought process beyond our original books. Dr. Tillman and I were discussing the potential contents of this book prior to his passing but due to health issues, were not able to get started. I promised him that I'd write this book.

There is nothing "gimmicky" about this book. To holistically and robustly model problems, you need to have a good understanding of your environment, your data, your decision makers and methods that could and should be applied to your operating environment. Quantitative methods are only presented at a high level in this book. The great thing is that there are many experts in various fields that you can engage to help develop the specifics supporting quantitative decision making. Consulting firms, internal experts, university professors, graduate students and beyond have this additional exposure to the application of methods and can be engaged to assist in the development process. I hope that you find this book helpful in your quantitative decision-making processes.

Manhattan, USA Deandra Cassone

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About the Author

Deandra Cassone PhD, PMP, recently served as the Director of Research Activities, Biomedical Informatics at the University of Missouri and the Administrative Director of the PCORnet Clinical Research Network for the Greater Plains Collaborative. She received a B.S., M.S. and Ph.D. in Industrial Engineering from Kansas State University. Her twenty years of consulting experience involved working with Fortune 500 companies, government agencies, and the military applying decision science and analytical methods to solve complex problems. Her ten plus years of experience working for Fortune 100 companies includes serving as a subject matter expert and in management positions in domain areas such as technology development, logistics operations, operational excellence, strategic project management, and manufacturing operations. She has been awarded twelve business process patents and a corporate-wide innovation leadership award. Dr. Cassone has developed and taught eleven different graduate engineering courses over the last fifteen years as an adjunct professor for Missouri University of Science and Technology and a full-time professor at Kansas State University. Currently, Dr. Cassone is an Adjunct Senior Professor of Practice at Kansas State University and is the president of consulting and investment businesses. She has also published several books in the field of applied decision science.