

Preface

It has been a long time since I first thought of writing a book. I told my friends that when I retire I would write a book. They laughed and said that academic people working at universities, who really want to write a book, do not wait until their retirement. I do not write easily. It takes me a long time to write a paper, but I enjoy doing it. On the other hand, writing a book is a complex and big work, so I decided to wait until my retirement. However, upon my retirement from Tel Aviv University the Rector of a college asked me to join the academic staff as Head of the Industrial Engineering and Management Department in order to enable the students to get an academic degree similar to that of universities, i.e., Bachelor of Science (B.Sc.). Therefore, again the book had to wait.

The idea of writing a book came back to me after a few more years. The editor of an important professional journal asked me, as member of its editorial board, to write a paper for a special volume commemorating 50 years of the journal first issue.

He mentioned that I was free to select any topic for the paper, eventually expressing my specific experience related to the topic. I selected ‘*Flexibility*’ as the topic to write about. The paper title became *Flexibility development—a personal retrospective*. It integrated several of my published papers emphasizing my personal views and experience on the topic.

Since the publication of this paper, the road toward writing the book became clear to me. As the papers I had published dealt with many topics, I started to write building blocks for the book, in terms of papers integrating my main research topics. The book had to provide the relationships between them.

At the beginning of the 1980s, ***Quality*** started to become an important topic in industry. That was before *Quality Management* or *Total Quality Management* emerged as vital strategies. At that period, I started my research on quality-oriented organizations through a survey, investigating Quality Assurance Systems in Israeli industries. I selected a particular industrial area, Electric and Electronics industry because this area made use of the highest developed technologies, sensitive to

quality aspects. Hence, it seemed the most promising area for the development of quality-oriented organizations and for application of quality methods. However, even in that area, we found out that managers were not aware enough of the economic opportunities of quality systems. They acted toward their development because of the pressure exerted upon them by strong buyers.

Since that period, I continued intermittently to study and research this topic using various techniques such as *Design of Experiments* and later on *Quality Function Deployment*. I also published invited chapters on Total Quality Management in several encyclopedias.

In the meantime, a more exciting topic emerged, ***Flexibility***. For many years, flexibility has been my main topic of research. It is a complex and challenging topic with never-ending research possibilities. It is important in the human body, and according to recent research works, it seems that it is important in the brain performance as well. In manufacturing and other man-made systems such as information, logistics, or supply chains, there is consensus that flexibility means adaptations to changes.

The early approaches to flexibility research were associated with Flexible Manufacturing Systems (FMSs). These early approaches to flexibility had a bottom-up structure related to a manufacturing hierarchy, i.e., from basic flexibility types, such as ‘machine flexibility,’ to system flexibility such as ‘volume flexibility,’ or ‘mix flexibility.’ My first research on flexibility used a bottom-up structure described in two papers published at the end of 1980s. Both papers used *Petri nets* to model flexibility in manufacturing systems. By the end of the 1990s, the importance of flexibility got its main recognition from a strategic perspective. Accordingly, my next research projects were devoted to flexibility-oriented strategies, through a top-down approach. Many of these projects used *Quality Function Deployment*.

Chapter Organization and Topical Coverage

The book has two parts and six chapters.

Part I is about ***strategies***. It is an overview on *Quality* and *Flexibility* as linked to my professional development and comprises three chapters.

Chapter 1 has one section that includes some general *Definitions of Strategy* and its importance. Chapter 2 describes *Quality-oriented Strategies* and contains seven sections. Chapter 3 describes *Flexibility-oriented Strategies* and comprises six sections.

Part II is about ***techniques***. It describes several of my published papers that apply multipurpose techniques for assessing quality and flexibility and contains three chapters as well.

Chapter 4 is about *Design of Experiments* (DOE) and has five sections. Chapter 5 describes *Petri Nets* and contains six sections. Chapter 6 is about *Quality Function Deployment* (QFD) and contains six sections as well.

At the end of each chapter, there is a list of references.

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<http://www.springer.com/978-3-319-68399-7>

Strategies and Techniques for Quality and Flexibility

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2018, XV, 121 p. 20 illus., 1 illus. in color., Softcover

ISBN: 978-3-319-68399-7