

Book Review

Johannes LEDOLTER and Arthur J. SWERSEY (2007). **Testing 1-2-3** *Experimental Design with Applications in Marketing and Service Operations*. Stanford, Stanford University Press, XII+300 pp, \$65,-. ISBN 13:978-0-8047-5612-9

Experimental design methods play a role of growing importance in different areas of application. Most existing books are concentrated on employments in manufacturing and industrial processes. However, this seems to be the first book which is particularly devoted to applications in marketing, service operations and general business problems. The authors give an easy to read non-technical treatment of full and fractional factorial designs supplemented by 13 cases based on real world applications. The monograph is intended as textbook for undergraduate and medium level graduate engineering courses and may also be used as source for self-study by quality managers, consultants and others.

Chapter 1 introduces the philosophy and outline of the book, and gives a short sketch of the history of experimental design. Chapter 2 collects the basic statistical concepts (probability distributions, description of data, statistical inference) necessary for the developments in the book. Chapter 3 starts with the simplest factorial models: completely randomized and randomized complete block experiments with one factor of several levels.

Full factorial designs with two-level factors are introduced in Chapter 4 and it is shown how main and interaction effects are estimated and tested for their statistical significance. Chapter 5 deals with two-level fractional factorial designs where the experiment requires only a fraction of the number of runs demanded for a full factorial design. The authors discuss illustrative examples with many factors and demonstrate their usefulness in connection with suitable follow-up-experiments.

Chapter 6 deals with Plackett-Burman designs where the number of runs is a multiple of four, in contrast to the fractional factorial designs which demand a power of two. Several examples show the characteristics and some advantages of this approach. Chapter 7 analyzes designs with factors having more than two levels preferably by regression methods. Finally, Chapter 8 describes an instructive example of a non-orthogonal design: 10 mixed-level factors with 45 runs are studied and the corresponding results are interpreted. Some comments on the utilization of the two software packages Minitab and JMP are also included. The 13 cases of real-world applications in the Appendix allow the reader to pass through the whole cycle of the experiment: to develop a design, to analyze it, to interpret its results and occasionally to consider a follow-up experiment.

Each chapter ends with a section of exercises (without solutions). The references are listed in the order of the chapters. A subject index is also a matter of course.

In summary, this book is a valuable addition to the experimental design literature. It may be recommended for readers with at least an undergraduate background in statistics and who are interested in applications of experimental design to marketing problems. There is sufficient material to provide a sound introduction to the subject area for students of economics and practitioners in marketing and service.

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