

Book Review:
Value Engineering: A Plan for Invention

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Title: Value Engineering: A Plan for Invention
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Author: Richard J. Park

Value Engineering: A Plan for Invention is related to TRIZ through its intense focus on rigorous function definition and analysis and a structured job plan application process as a pathway to improvement and creativity for products, systems and projects. It further gives considerable attention to various forms and expressions of value equations (principally $\text{Value} = \text{Function} / \text{Cost}$) that may help students of TRIZ gain deeper understanding of Ideality. Discussions of barriers to creativity are reminiscent of the TRIZ concerns with psychological inertia.

The book is divided into four sections and includes extensive appendices:

Section I: The World Around Us

The author presents Value Engineering as a management system, and offers a review against capsule summaries of other popular management systems for organizing, defining, identifying and improving diverse operations. These reviewed systems include Management by Objectives, Kepner-Tregoe, Taguchi Methods, Quality Function Deployment, Kaizen, TQC, FMEA, Simultaneous Engineering, Benchmarking, and TRIZ. These systems all together are considered as tools for a toolbox. All are scored by the author for their utility to a broad set of business applications and criteria. He predictably finds VE by far the most powerful. Unfortunately, only limited and elementary versions of several of the systems are described and used as a basis for comparison.

Section II: The Economics of Profit

Discusses Cost, its elements, and various techniques to estimate, analyze, and determine the costs of products, systems, and projects.

Chapter 5 in this section is titled "Function: The Foundation of Clarity". It is likely this chapter, together with its application in chapter 12, are the most important in the text. Mr. Park observes that function definition and function analysis are the elements of VE that set it apart from other management systems. He introduces and defines the concepts of Function as the objective of an action, and emphasizes that two-word, verb-noun definitions of a function are imperative for in-depth understanding. The author offers this

requirement as a forcing technique to help assure “maximum creative opportunity is achieved.” The author provides guidelines for defining verb-noun function statements (which may not include the word ‘provide’), emphasizes they should be measurable in unit terms, should offer creative opportunity, and introduces example statements for both products and operations.

This section also includes a chapter on Value, its definition and measurement, and a chapter on Quality, as a component of Value. These discussions, always related to function, may be useful to those students of TRIZ who are seeking a deeper understanding of the concepts of Ideality.

Section III: The Human Element

This section includes four survey chapters on communications, motivation, teams and teamwork, and creativity. The discussion of creativity espouses brainstorming and a technique named Blast-Create-Refine as the principal recommended methods. No mention is made of TRIZ, even though it was explicitly reviewed earlier in the book.

These chapters do not present themselves as new work. They do offer a concise and potentially useful introductory guide for students of TRIZ who are not practiced in facilitating problem solving or innovation teams.

Section IV: The Sum of the Parts – A Practical Method

Described by the author as the objective of the book, this section brings together all the elements that have been developed in previous sections, and presents them in a very workable guide to Value Engineering application. The Job Plan, a multi phase structured team approach to guide analysis and creativity, is introduced and developed. The Argus chart, the author’s version of FAST diagramming, is demonstrated. This provides a graphical representation of an entire product / process / project, based on a why-how-when analysis of functional relationships.

Chapter 12 – “Value Engineering: A Total System” provides an extensive product based case study example illustrating the use of the job plan and function definition and analysis. The case study is a multi-year application of VE, with work sheets, showing the progression from analysis of an existing product to implementation of a new design. The case is well illustrated and informative.

Approaches to organize and implement a VE system in a business are discussed, and the book closes with a collection of mini-case study examples of applications ranging from industrial equipment, to construction projects, to automotive assemblies, to business re-engineering and social studies, to a small parts analysis.

Appendices

An extensive appendix contains methods summaries, worksheets for the elements of the author's approach to Value Engineering applications, and "Park's Catalog of Frequently Used Functions In Value Engineering". This catalog is based on the author's varied project experiences. It includes 277 verbs and 446 nouns, and is organized for multiple applications in ten categories. The categories are:

- Administration/Management Information Systems
- Capital Equipment Product Analysis
- Government/Community Affairs
- Hospitals/Healthcare
- Manufacturing
- Personnel
- Product Analysis
- Product Planning/Marketing/Advertising
- Real Estate/Building Management/Construction
- Technical Operations

Alphabetic listings of all the function verbs and nouns utilized in these categories are also provided. These listings are offered as example, and to demonstrate process. The author has previously cautioned that teams or individuals cannot just copy lists of functions for similar applications, but must actually follow the process to get real results. These examples and listings should be extremely valuable to the TRIZ practitioner who is not already highly experienced in function analysis.

Value Engineering: A Plan for Invention overviews the concepts and methods the author has utilized in an extensive consulting practice, especially his Argus chart methodology of constructing FAST diagrams, and his particular approach to job planning. As noted above, VE is presented as a management system. The author repeatedly expresses his opinion that it is the most complete and powerful of all the systems he catalogs.

The book is readable, well illustrated with case studies and examples, provides both background and working tools, and should be of considerable interest to students and practitioners of TRIZ.