
Preface

What This Book Is About?

In this book, we present a method for estimating the effort required to successfully complete a software development project. The method is called Cost Estimation, Benchmarking, and Risk Assessment—CoBRA for short—and combines human judgment and measurement data in order to systematically create a custom-specific effort estimation model.

The book provides a comprehensive specification of processes for developing the CoBRA effort model and for applying the model in a number of different project management scenarios. For each of these processes, we describe detailed activities that need to be performed as well as associated techniques. We illustrate the presented concepts with a number of examples and graphical illustrations. Moreover, we provide a series of practical guidelines on how to apply these processes, based on industrial experiences regarding project effort estimation in general, and on using the CoBRA method in particular.

Furthermore the book reports several real-world cases where the CoBRA method was applied in various industrial contexts in order to illustrate the practical usage of the method. The cases represent different estimation contexts in terms of software project environment, estimation objectives, and estimation constraints.

Objectives of This Book

The main objective of this book is to present the Cost Estimation, Benchmarking, and Risk Assessment Method (CoBRA) in a way that allows for applying it successfully in practical situations. Consequently, the key goals we are aiming at with this book include:

- Complete and comprehensible specification of all relevant CoBRA processes such as developing and applying the effort estimation model. This includes the

description of process activities, their inputs and outputs, the personnel involved, and the theories and techniques employed.

- Comprehensive explanation of the presented concepts through practical examples, graphical illustrations, and guidelines from practice.
- Illustration of real-world CoBRA usage through exemplary application cases from various industrial contexts.

After reading this book a reader should understand the principles of the CoBRA method, know the basic CoBRA processes, and be able to adapt and use the method in a specific context.

To Whom This Book Is Addressed

Software Practitioners

We addressed this book to all software practitioners who deal with planning and managing software development projects as part of their daily work. This group includes primarily—but is not limited to—project managers and project estimators. In order to facilitate understanding and practical application of the concepts presented in the book, we illustrate them with a number of practical examples and guidelines. In particular, the book is addressed to those software practitioners who would need an alternative to expensive estimation based on expert judgment, yet who do not have sufficient measurement data to employ analytical effort estimation.

Students

The book is also addressed to students of software engineering and of associated courses. In order to support in-depth study of the concepts presented in the book, we include descriptions of associated theoretical foundations and refer to appropriate further readings.

Key Terminology Used in This Book

In this book, we use several basic terms that in other literature and in practice are often used interchangeably, although they do have different meanings. In order not to confuse the reader, we would like to start by clarifying the most important terms we will use throughout the text. For a more comprehensive dictionary of the employed terms, please refer to the Glossary at the end of the book.

Cost Versus Effort

Although principally and intuitively different, the terms “cost” and “effort” are usually used as synonyms in the software project management area. Webster’s dictionary defines cost as “the amount or equivalent paid or charged for something” and effort as “conscious exertion of power” or “the total work done to achieve a particular end.” In the software engineering domain, cost is defined in a monetary sense, and with respect to a software development project, it refers to the partial or total monetary cost of providing (creating) a certain product or service. Effort, on the other hand, refers to manpower spent on performing activities aimed at providing a certain product or service. In consequence, project cost includes, but is not limited to, project effort. In practice, cost includes such elements as fixed infrastructure and administrative costs. Moreover, depending on the project context (e.g., currency or cost of manpower unit), project costs may differ even if the project effort is the same.

In software engineering literature and practice, “cost” is often used as a synonym for “effort.” One way to notice the difference is to look at units used. Cost in a monetary sense is typically measured in terms of certain currencies (e.g., \$, €, ¥, etc.), whereas cost in an effort sense is typically measured as manpower (e.g., person-hours, person-days, person-months, etc.).

In this book, we focus on estimating software development effort, and we consistently differentiate between cost and effort.

Estimation Versus Prediction Versus Planning

In software engineering, effort estimation, prediction, and planning are related to each other; yet, they have different meanings, i.e., they refer to different project management activities. Actually, the dictionary definitions perfectly reflect the differences between these three processes:

- *Estimation*: “the act of judging tentatively or approximately the value, worth, or significance of something”
- *Prediction*: “the act of declaring or indicating in advance; especially foretelling on the basis of observation, experience, or scientific reason”
- *Planning*: “the act or process of making or carrying out plans; *specifically* the establishment of goals, policies, and procedures for a social or economic unit”

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<http://www.springer.com/978-3-642-30763-8>

Software Cost Estimation, Benchmarking, and Risk
Assessment

The Software Decision-Makers' Guide to Predictable
Software Development

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2013, XXVI, 322 p., Hardcover

ISBN: 978-3-642-30763-8