Chapter 5
Organizational Performance-Design Process:
A Discrete-Events Simulation Approach

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ABSTRACT
Inverse simulation involves finding the control inputs required to achieve a particular performance measure. The designer simulates the process numerically by varying the controllable input for generating desirable output. Clearly, this trial and error is not efficient and effective. This chapter proposes a “stochastic approximation” algorithm to estimate the necessary controllable input parameters within a desired accuracy given a target value for the performance function. The proposed algorithm is based on iterative Newton’s method using a single-run simulation to minimize the expected loss function (i.e. risk function). The validity of the input parameter estimates are examined by applying it to some reliability and queuing systems with known analytical solutions. (Keywords: Performance management by simulation; prescriptive analysis for parameter setting; decision support for product and service design; data analysis and design; inverse business performance measure.)

1. INTRODUCTION
Business models transform managerial inputs into useful information for managerial decisions of performance measures.

A Short Review of Business Decisions and Performance Measures

The following provides a brief review of literature on business decision-making, the linkage between decision-making and business performance evaluation. This review is focusing on three basic elements that are the forces and conditions surrounding decision-making, the scope and nature of business decision-making, and the impact of that decision-making on business performance.

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Harnish (2012) looks at a dozen companies that made decisions that changed their businesses. The authors trace circumstances in which the decision happened and the results. Making Smart Decisions by Harvard Business Review on (2011) is a collection of ten articles and is not focused on any central theme. The book is instructional in nature and is aimed at helping business leaders to make bold decisions that challenge the status quo. It offers the best practices and ideas for smart decision-making. Davenport (2012) focuses on presenting the use of analytics in optimizing business performance and includes guide to analytics strategy, planning, organization, implementation and usage. It covers building better analytics, as well as gathering data. This is not an empirical study but an application of principles for working managers.

There are some books focusing on business performance measurement that connect to decision-making. Neel (2007) is a textbook for MBA students and practitioners; it examines the leading ideas in business performance measures. It contains well-written chapters on measuring performance from different functional areas of business, theoretical foundations of performance, frameworks and methodologies, practical applications, specific measures and emerging issues and trends. Davenport (2012) provides a guide to business performance analytics strategy, implementation, and management. It utilizes large amounts of data and analytics to implement effective actions. It helps managers to understand what are the consequences of their actions by providing analytical techniques, practices and research for competitive advantage. This book is intended to improve performance on a case-by-case basis by focusing on the individual firm.

Hope & Player (2012) are concerned with improving organizational efficiency. The premise is to highlight and answer the question: “what is the practice and how effective is it? What is the performance potential of the practice? What needs to be done to maximize the potential of the practice?” The authors believe the tools the performance measures may be sound in theory; however, they are misused by most organizations. Tools are often used without asking what is the problem that needs to be solved.

Taticched (2010) discusses measuring and managing the performance of a business. The book introduces new contexts and themes of application and presents emerging research areas, such as sustainability. This textbook is highly specialized with its focus on new performance measurement techniques that are aimed at students, academics, and practitioners.

What the immediately preceding compilation shows is that most books on measuring performance are recent.

Recognizing that many enterprises have been pursuing process innovation or improvement to attain their performance goals by aligning business process with enterprise performances. Hana et al. (2009) proposes a two-stage process analysis for process (re)design that combines the process-based performance-measurement framework and business process simulation. Target business processes that need improvement are identified and processed for a newly designed and then using simulation to predict the performance.

Bourne (2003) et al., reviewed the different performance-measurement system-design processes published in the literature and created a framework for comparing alternative approaches. He reviewed journal articles on performance-measurement systems and concluded that, the performance-measurement literature is at the stage of identifying difficulties and pitfalls to be avoided based on experience and the performance-measurement literature lacks consideration of implementation.