

II

Managing Processes

6. The Principle of Limited Reduction

7. Mixed Approaches

8. Risk Management

9. Attention Shaping

Part II addresses the following question: How can we support analysis, design, and management of development processes? Below, I introduce four of my own contributions to help answer this question and I summarize other contributions of my Danish colleagues that support process management (see table 3 and reference list in chapter 1). The literature related to systems development management is extensive and provides a number of fundamental insights: project management is a key to successful development projects (Humphrey 1989); most difficulties related to project management can be traced to the uncertainty related to the task (Zmud 1980); the most important resource to be managed are the people in the development group (Weinberg 1982, 1986); and political perspectives are needed to support negotiations and manage conflicting goals (Robey *et al.* 1984; Newman *et al.* 1985). The contributions presented here focus on managing the uncertainty related to systems development.

Chapter 6 describes a theoretical framework for understanding design situations and for combining different approaches to support the development process. Inspired by Simon's work on bounded rationality and satisficing behavior (Simon 1955, 1956, 1957, 1982) we propose a fundamental principle for management of systems development which we call The Principle of Limited Reduction. This principle can be used to understand and manage the relation between the uncertainty and complexity related to specific development tasks.

Boehm and his colleagues have conducted an experiment comparing two specialized approaches, specifying and prototyping (1984). In chapter 7 we present a supplementary experiment that illustrates the practical usefulness of The Principle of Limited Reduction and shows how mixed approaches to systems development benefit from the strengths of both specifying and prototyping leading to systems of a quality that is at least comparable to the products of specialized approaches.

The key technique to mix specifying and prototyping is risk management as suggested by Boehm (1988). Chapter 8 combines Simon's ideas on bounded rationality with Leavitt's classical approach to organization (Leavitt 1964) to develop a model of the environments and dynamics involved in systems development. The model is used to present and interpret practical cases of systems development and it is proposed as a generic framework to support risk management practices.

Chapter 9 offers further insights on how risk management approaches shape the attention and guide the actions of software managers. The model presented in chapter 8 is used to compare and contrast classical approaches to risk management. We show how these approaches differ in attention focus and intervention target and we suggest ways to combine such approaches to contingently establish comprehensive risk management practices under different environmental conditions.

In addition, (Andersen *et al.* 1986,1990) offers an elaborate framework for understanding systems development processes together with principles and practical guidelines for project management; (Munk-Madsen 1987) presents some of the key insights on project management from the MARS project (1984a, 1984b, 1985); (Munk-Madsen 1996) offers principles and guidelines to support strategic thinking in project management; (Andersen *et al.* 1996) presents a comprehensive framework for analysis, design, and management of the contractual relationships between a customer or user organization and a supplier of systems development services; and (Baskerville *et al.* 1996) presents an approach to control prototype development based on risk management.