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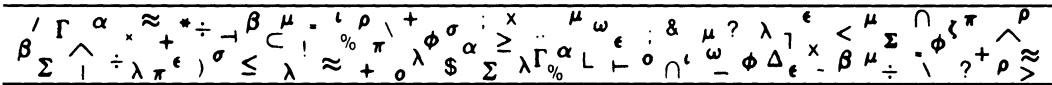


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Book Reviews

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The range of books reviewed is wide, covering theory and applications in operations research, statistics, management science, econometrics, mathematics, computers, and information systems (no software is reviewed). In addition, we include books in other fields that emphasize technical applications. Publishers who wish to have their books reviewed should send them to Professor Benjamin Lev. We list the books received; not all books received can be reviewed because space and time are limited. Those who would like to review books are urged to send me their names, addresses, and specific areas of expertise. We commission all reviews and do not accept unsolicited book reviews. Readers are encouraged to suggest books that might be reviewed or to ask publishers to send me copies of such books.

OULD, MARTYN 1999, *Managing Software Quality and Business Risk*, John Wiley and Sons, New York, 379 pp. (soft cover), \$94.95.

Software systems are a fact of contemporary organizational life. They have to be. Information Technology (IT) can enable organizational integration and coordination, or it can provide quantum improvements in efficiency. It can also expand the space of opportunity for creating wealth through knowledge-intensive value adding and by matching market needs with organizational capability. If it

is to achieve its potential, its technical possibilities must converge with the needs, dynamics, and context of the application domain. Domain experts can play direct roles in developing systems either as members of development teams or as informed clients. The operations research and management science profession (nebulous as it is) risks isolating itself in a professional peninsula of the body corporate if it ignores IT.

Ould provides a systematic approach to planning and managing the software-development process in a business context

with an emphasis on advancing software quality while controlling business risk. The three components of Ould's approach are the business problem and its analysis, the risk and quality plan, and the project resource plan. This structured approach helps cast project components against the context of the business case, providing a framework for partitioning ownership and responsibility among stakeholders and facilitating the translation from business-level requirements to system-level requirements.

The business problem translates to a project investment model that factors the business costs and benefits in terms of project-life-cycle costs, system goals, and system side effects (that is, the need for re-designing business processes). The investment model enables the organization to assess risk and quality requirements at the business level. The components of the risk and quality plan translate the business-level requirements to system-level requirements, which can be evaluated for their validity in the business context and for their technical correctness. The results of the risk and quality plan enable planners to estimate the effort and the resources needed to accommodate the risk-management plan. These then form the basis for resource planning with the guidance of a costed work breakdown structure (WBS—a hierarchic list of work activities).

At the core of Ould's risk-management strategy is a risk register. This is a database enumerating business level risks and their sources, probability estimates, impact and mitigation or avoidance strategies. A key inclusion is the owner of the risk, that is, the individual responsible for managing

the risk throughout the project life cycle. This is a logical extension of the modularization of tasks using a WBS. As the project proceeds, managers assess the performance of the risk-management measures and enter the residual risk for each measure into the risk register. The risk register functions as a tool for tracking risk throughout the project life cycle.

In Ould's approach, quality is the other white meat. The quality plan comprises components that outline the means for the achievement, control, and preservation of quality. In this way, Ould partitions the logically different activities related to the selection of a design methodology, ensuring that the organization meets specifications and that it manages system changes in such a way that the project doesn't evolve into something completely different from what it intended.

A key integrative mechanism for Ould's approach is the process model. He sees the process model as providing a framework for reducing risk and for maintaining quality. Implicit in Ould's approach is the capability of a particular process model to faithfully map business requirements (validity) onto system requirements (verifiability). This fit between problem and process model is what Ould refers to as the process' validation and verification potential. Although Ould discusses process model alternatives, he leaves readers somewhat to their own resources to assess the fit between business problem and process model.

Alternative approaches to the topic are either more management oriented, more technology focused, or simply the accumulated wisdom of an accomplished prac-

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tioner. Phillips [2000] exemplifies the management approach with the central theme of balancing the three P's (people, process, and product). Lorin [1998] is more technology focused with an emphasis on systems-integration, migration, and management issues. Phillips' and Lorin's books are complementary to Ould's but better suited to IT professionals. The accumulated wisdom approach is exemplified by McConnell [1998]. McConnell advocates staged delivery for quality and reduced risk, emphasizing the use of milestones and quality assurance. But McConnell lacks the structured approach of Ould which is precisely what makes Ould's book accessible to readers outside the IT profession.

Ould's book provides a very sound investment in time and thought on the issue of planning software-development projects. The book's structured approach provides a cross-disciplinary link between partners and stakeholders involved in software development. The book is self-contained and accessible. Ould describes his views and insights rather than simply compiling a logical sequence of established procedures and models. This gives the book coherence and lends credibility to the planning framework Ould proposes.

The book may also be considered for postgraduate courses where the aim is to prepare students for participation in software-development projects, either as team members with domain expertise or as clients.

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SILVER, EDWARD A.; PYKE, DAVID F.; AND PETERSON, REIN 1998, *Inventory Management and Production Planning and Scheduling*, third edition, John Wiley and Sons, New York, 754 pp., \$83.95.

This book is the third edition of *Decision Systems for Inventory Management and Production Planning* published in 1979 and 1985. David Pyke became a coauthor for this edition and played a key role in writing major updates of several chapters, including those on supply-chain management, multi-echelon inventories, just in time, and ERP (enterprise resource planning). In addition, the authors have added spreadsheet programs for each chapter as supplemental materials to enhance the readership and applicability for students in business administration programs, and for practitioners.

As the authors point out in the preface, the primary objective of the book is to bridge the gap between theories and real-world problems. The authors have incorporated their experiences with real-world problems in the book. They have also drawn on the findings of other scholars and practitioners who have successfully implemented theories in practice. They have developed spreadsheet programs for many procedures to achieve the objective.

One of the main strengths of this book is an extensive state-of-the-art review of

inventory management and production planning. Graduate students undertaking research projects or theses can save a lot of time if they use this book.

Another strength of this book is its breadth and depth. Undergraduates and master's-level students in engineering or in management could use this book for their first course in inventory management and production planning. They could skip the extensive literature surveys at the ends of chapters.

The main theme of this book is to "change the givens," a recognition of the possibility of changing the parameters. The authors' viewpoint is that, if quantitative models are to be more useful as aids for managerial decision making, they must represent and formulate more realistic problems. This theme pervades the book, for example, in setup cost or time reduction, and in lead-time reduction.

This book has 18 chapters grouped into five parts. Part One (Chapters 1–4) provides frameworks for inventory management and production planning. In addition, the authors introduce basic forecasting techniques. Part Two (Chapters 5–7) covers traditional decision systems for controlling inventories of individual items. These include economic order quantity models, lot-sizing for time-varying demands, and basic inventory models for probabilistic demands. Part Three (Chapters 8–10) concerns special classes of items, including Class A and Class C items. The authors devoted a chapter to the procedures for dealing with style goods and perishable items. Part Four (Chapters 11–12) concerns two types of coordination of groups of items. In Chapter 11, the au-

thors describe a family of items sharing a common supplier or common production equipment. They cover the well-known joint-replenishment problem and economic lot scheduling problem in this chapter. In Chapter 12, they provide an extensive and new treatment of supply-chain management. Finally, they treat decision making in a production environment, such as aggregate production planning, MRP, JIT, OPT, and short-term scheduling, in Part Five (Chapters 13–18).

A weakness of the book, compared with competitive textbooks on scheduling, is the relatively limited treatment of short-term production scheduling in a single chapter. However, this is a minor shortcoming compared with the strengths of this new, substantially updated edition of a widely adopted book.

In the next edition, the authors may include another chapter to introduce fuzzy knowledge-based approaches to treating uncertainty in inventory management and production planning. Until the 1970s, probability theory and statistics were the only methods to model uncertainty. But since the 1970s, additional theories have been suggested as tools. Among them, fuzzy set theory and genetic algorithms now play important roles. Many research articles have already been published dealing with EPQ model for fuzzy demand and production, supply-chain models using fuzzy sets, economic lot scheduling problem using genetic algorithms, and so forth. So, in my opinion, an overview of these powerful tools for handling inventory and production planning and scheduling problems may add further value to this book.

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In summary, this is a well-written and well-organized book and a must-read for students and practitioners interested in inventory management and production planning. I strongly recommend its use in courses dealing with inventories, production planning, and supply-chain management, and its acquisition by consultants and other practitioners.

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CLEMEN, ROBERT T. AND REILLY, TERENCE 2001, *Making Hard Decisions with Decision Tools*, Duxbury, Pacific Grove, California, 733 pp., \$88.95.

Making Hard Decisions with Decision Tools is intended for advanced undergraduate students and master's degree students of business management. The material covered corresponds to a one-semester course. Students without a strong mathematical background can easily understand the ideas and methods presented. The authors introduce the needed elements of probability theory and concepts of statistics. I think, however, that students should take a course in statistics before taking a course in decision analysis, as is the case in the curricula of many universities. The book consists of three parts of similar length dealing with models of decisions, uncertainty, and preferences. Although an in-

structor could use the 16 chapters as a schedule of lecture subjects during the 16-week semester, the presentation of material permits flexibility in designing a course.

The authors start by identifying the elements of a decision situation. Although the elements of a decision situation are obviously an important part of any decision analysis, they are not explicitly discussed in many textbooks. In this book, Clemen and Reilly define the elements of decision situations and illustrate them with intriguing real-world examples. I am sure the introduction will motivate students. These examples and the authors' discussion of the necessity of structuring decisions prepare readers for the introduction of influence diagrams and decision trees. The software included with the book permits the automatic creation of influence diagrams and decision trees. In the chapter on making choices, the authors introduce Decision Tools Suite by Palisade Corporation. Other tools are introduced and discussed in later chapters. Clemen and Reilly present sensitivity analysis in the traditional way. Less traditional is including a chapter on creativity in the part of the book covering rationality principles in decision making, although I think its inclusion is reasonable. I discussed the psychological aspects of creativity in my lectures on decision analysis before I read this book. I was pleased to find that the material the authors presented was similar, but their examples are much more expressive, for example, the one about a ping-pong ball in a pipe (page 227).

In the second part of the book, "Modeling uncertainty," the authors provide an

elementary introduction to classical probability theory, subjective probability and the properties of some distribution functions, fitting experimental data by distribution functions, and regression analysis. Almost all material presented in these chapters, except subjective probability, is normally covered in a course of statistics. Nevertheless, it is reasonable to include it in a textbook on decision analysis. While the authors cover material on statistics, they emphasize the goals of decision making and the use of the software package. They cover Bayesian methods and subjective probability and explain them with examples. A slightly more advanced theoretical presentation of these topics might be reasonable, even at the cost of violating the general style of the book. The chapter on subjective probabilities includes further discussion on the methods of fitting data by probability distributions using the Decision Tools Suite. Monte Carlo simulation is a powerful tool for attacking real-world decision problems, and I would have liked a broader presentation of its possibilities than some remarks on generating pseudo random numbers and instructions on using a spreadsheet. I prefer to teach such practical aspects of simulation using a course project. The chapter "Value of information" completes the second part of the textbook. In my opinion, this chapter is a pedagogic masterpiece.

The third part of the textbook covers preferences, utility functions, and conflicting objectives. The authors explain risk attitudes in detail using examples and plots of utility functions. A discussion of axiomatic utility theory requires mathematical maturity on the part of the reader. Clemen

and Reilly present no axioms of utility theory in the chapter "Utility axioms, paradoxes, and implications." Instead, they give their intuitive explanation. They discuss the well-known Allais paradox to show specific difficulties in assessing the individual utility functions. Two chapters on conflicting objectives, additive utility functions, and multiattribute utility models with interaction complete the textbook. In these chapters, the authors describe simple methods for assessing a utility function and examples of their application.

The authors use the software package Decision Tools by Palisade Corporation extensively to solve example decision problems. A CD with a student time-locked version is included with the book. It is an add-in to Microsoft Excel. Recently educational software packages, especially in statistics, have often been developed as add-ins. Students are usually familiar with Excel, which minimizes the time needed to teach it. However, orienting students to one software product has obvious disadvantages.

The current textbook inherited its structure and style from the earlier book *Making Hard Decisions* by R. T. Clemen published by Duxbury Press in 1991 and uses many of the same chapter titles, formulas, figures and examples. In the previous book, Clemen devoted almost 200 pages to explaining and demonstrating the solution of examples using Decision Tools.

Some teachers might argue for including material on collective decision making, or on negotiation models, or on fuzzy theoretic decision methods. I think this textbook covers classical decision theory well. Nowadays statistical packages are used to

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perform statistical computations; including statistical tables (40 pages) in a textbook on decision analysis seems old fashioned. The analysis of interesting practical cases is key to understanding decision theoretic methods. However, some examples in the book seem too complicated to be analyzed by undergraduate students who lack general life experience and professional training in the specific subject. For example, asking undergraduate students to analyze complicated problems in medicine seems a bit naive.

There is no shortage of textbooks on decision making. One [Goodwin and Wright 1998] is similar in goals, coverage, and pedagogic approach. Clemen and Reilly's *Making Hard Decisions with Decision Tools* will have a broad audience, since students like an emphasis on practical application and the analysis of intriguing cases of decision analysis.

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HIRSH, RICHARD F. 1999, *Power Loss: The Origins of Deregulation and Restructuring in the American Electric Utility System*, MIT Press, Cambridge, Massachusetts, 406 pp., \$50.00.

The ongoing restructuring of the electricity-supply industry in the United States provides fertile ground for management scientists. For the last few years, INFORMS meetings have included multiple sessions devoted to transmission pricing, congestion costs, power-plant valu-

ation, and related subjects. Worldwide management scientists have been involved in the design of new markets to facilitate trading in electricity.

Lately the deregulation program in electricity has seemed to falter in favor of mandated rate reduction, wholesale price caps, utility-sponsored curtailment programs and centrally directed "emergency" procurement. At such a point, it is valuable to take a step back and consider the historical context.

Hirsh presents his book as a history of deregulation and restructuring. He faces one unavoidable problem: his research goes up only to 1996. Many of the important developments in US electricity restructuring, especially on the retail side, occurred after that point and are therefore absent. Yet, the book can still provide valuable insights and background. First though I have to note one major weakness: the book is heavily footnoted but contains no overall bibliography or reference list.

This is a work of social science, not management science. Hirsh's interest is in the political and social interactions that drove these initial stages of electricity industry restructuring. He announces from the start that he takes an "elitist perspective." That doesn't mean he thinks he's smarter or better informed than the rest of us (although he may be, for all I know):

Elitism holds that a minority dominates society and presides over its governing institutions. Using resources available to their corporate, governmental, or military organizations, elites exert power through the manipulation of individuals and state institutions to obtain results that directly profit them (p. 2).

Hirsh analyzes events as they relate to a particular group's ability to maintain

power or control over some part of society. He sees power and authority, not any form of idealism or even the drive for wealth, as the primary motivators. The elite on which he focuses are “utility managers” (a somewhat imprecise term)—literally the power elite.

Hirsh is careful not to refer to a “regulatory compact,” which he considers to be “insider language employed by. . . parties to further their own interests” (p. 5). He prefers the term *utility consensus* to describe the relations between regulators, utility companies, and the public that prevailed especially in the mid-20th century.

In the first section of the book, Hirsh describes the development of that consensus, taking the position that by confirming their monopolies it served the interests of utility managers. Hirsh’s interpretation is that utility managers acted to “close the system,” that is, to confirm their control while excluding others from meaningful input, satisfying customers by building load whose satisfaction drove down average costs. He refers to the continuing development of steam-turbine generators as “conservative inventions” because they acted to entrench the existing elite. It is only when scale economies in generation stagnate (and nuclear power turns out to be much more expensive than expected) that threats to the power of power-company management arise.

The first threat Hirsh identifies is the Public Utility Regulatory Policies Act of 1978 (PURPA) and particularly its preferences for qualifying facilities (QFs). Hirsh points out that most parties thought PURPA’s key provisions had to do with rate making and successfully parried

them. The QF provisions were included almost as an afterthought, primarily because of the efforts of one senator with an interested constituent, yet Hirsh sees them as the first challenge to the elite’s power.

They certainly challenged utilities by providing legitimacy and financial credibility to nonutility generators. But more important, Hirsh says—and here he sounds like a historian of ideas rather than a chronicler of power relations—PURPA was the first step in the undermining of the intellectual justification of utilities as “natural monopolies.”

Hirsh then addresses conservation, demand-side management, and finally integrated resource planning. This section is much more personalized, with descriptions of the work of specific individuals, such as Arthur Rosenfeld, David Freeman, Roger Sant, and Amory Lovins. There seemed to be much less of the feel of a clash of concepts, even “megawatts vs. negawatts,” and much more of a contest for political power between utilities, regulators, and environmentalists or conservation advocates. Negawatts is a term Amory Lovins invented to emphasize his view that one should be willing to pay as much for conservation- or efficiency-based load reduction as for generation capacity, if each approach is equally effective in ensuring that generation is adequate to meet load. Each chapter ends with a summary of how the events described could have affected elite power. I considered this section to be the book’s weakest.

The final section of the book begins with a chapter about the “collaborative movement.” Hirsh says that the very existence of these collaboratives showed that the

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"distribution of power in the utility system had been altered dramatically" (p. 221). Yet the utilities certainly profited from the underlying acceptance that "the rat has to smell the cheese" (p. 213, credited to John Rowe). DSM (demand-side management) collaborative turn out to have been an opportunity for the power elite to regain some of the power it had lost. Hirsh then moves back to an intellectual history, describing the loss of faith in regulation and the search for market solutions. Finally, he considers the significant industry restructuring that appeared imminent in 1996 and the potential "passing of the power elites."

The elitist perspective provides a welcome skepticism towards the professed motives of all parties. Hirsh is refreshingly agnostic regarding "stranded costs," declining to affirm or deny customers' responsibility for paying them and admitting that the utilities' right to recover can be questioned. One of the flaws of the book is that the skeptical attitude toward utility managers and co-generators is not matched by equal skepticism towards the energy-efficiency community—and towards utilities when they acted to foster energy efficiency.

Hirsh's political-science approach sheds interesting light on the current industry restructuring, especially in California. Hirsh does not say that participants sought to break up the traditional utility system because it was poorly run (technologically inefficient) or because it allocated labor and capital poorly (economically inefficient). Rather he portrays industry restructuring as a struggle for power, perhaps for its own sake, made possible by a

change in the climate of ideas: the justifications for utility monopoly lost theoretical support.

Hirsh makes one key misinterpretation though. He thinks that industry restructuring and retail competition will be the death knell for utility managers' status as a dominant elite. That hasn't happened. In fact, the parties whom Hirsh says have been acquiring power from utility managers—regulators, environmentalists, intervenors—seem to have a vested interest in maintaining the importance of monopoly utilities, either as a way to control prices or for social engineering. Retail market structures have thus far discouraged customers from leaving utility "default service."

Power Loss is an overview of a critical period in the history of the electricity industry, and there are few such works available. The description of events, though, is not very detailed, and *Interfaces* readers who might pick it up based on this review may already be familiar with many of the key events. It is Hirsh's perspective on events that is valuable to those of us who normally work with mathematical descriptions of machines or markets—models of the surface of events. And although he portrays history as a power struggle, throughout the book Hirsh shows a healthy respect for the power of ideas—not models, but ideas.

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MILLER, RONALD E. 2000, *Optimization: Foundations and Applications*, John Wiley and Sons, New York, 653 pp., \$89.95.

In *Optimization: Foundations and Applica-*

tions, Miller treats a topic of increasing importance given the growing access of computational resources and the compelling need to frame all manner of technical and social problems in an optimization framework. The topic is an exceedingly complex one, and the mathematics involved is not always transparent. Ron Miller, professor emeritus at the University of Pennsylvania and former chair of the Department of Regional Science, has succeeded in his effort to provide a complete account that is also highly readable and engaging. *Optimization: Foundations and Applications* will surely be of interest to students, as Miller suggests in his preface. But academics and practitioners should also find much of value here.

The book covers all the main topics necessary in forming a broad working knowledge of the field of optimization mathematics in a static setting. Miller has divided his exposition into five parts. Parts 1 and 2 serve as an introduction to the linear algebra and calculus that are fundamental to solving optimization problems (although the later sections of Part 2 do move into the theoretical terrain of the Kuhn-Tucker conditions). Parts 3, 4, and 5 make up the heart of the text, addressing applications in iterative methods for nonlinear problems (Part 3), constrained optimization in linear models (Part 4), and constrained optimization in nonlinear models (Part 5). Of particular note are a complete account of numerical approaches to nonlinear optimization (Part 3) and the interior-point update to that old workhouse of the linear programming problem, the simplex method (Part 4).

This is a great deal of material to cover,

and by the time he is finished, Miller has written 653 pages. This length does not reflect a long-winded writing style or an inability to prune unnecessary text. To the contrary, each page counts. *Optimization: Foundations and Applications* is simply an exhaustive account of a wide-ranging field.

Although the book is organized logically, the parts can stand alone. That is, you need not digest it from front to back to understand the last 10 pages. A person interested in a nonlinear problem with inequality constraints can find the appropriate chapter and dive in. On the other hand, the beginner with only a curious mind (and a willingness to read and digest the math) can start with linear algebra and differential calculus in the first few chapters. Ronald Miller has an uncanny ability to identify what is essential and what is not in his mathematical exposition, which makes for an incisive account. Moreover, the mathematical groundwork in Parts 1 and 2 contains lucid discussion on a number of topics (for example, the Taylor series and convexity) that should be useful even to those with good mathematical training.

Miller's approach to presenting the subject matter is effective. He starts with an overview of the issue at hand (for example, constrained maximization), moves to an algebraic or analytical statement with examples, presents the mathematics graphically, works problems in the text, gives readers questions to work for themselves, and then provides them with solutions (in the text and via the Internet; 53 pages worth at the FTP site), some with step-by-step explanations. This is an ex-

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tremely effective way to get the material across. Although Miller envisions his book as a text for a course on the subject, a hardworking student should be able to grasp much of the material from studying the book alone.

One of the great values of *Optimization: Foundations and Applications* is that Miller has taken pains to connect the mathematical field to the available software, particularly for nonlinear problems. Optimization theory is interesting in its own right, but the numerical treatments are equally complex and deserving of a full account. Miller has done precisely this, and provided some extremely useful text describing succinctly the various algorithms a software user is likely to encounter in an optimization package. If we compare *Optimization: Foundations and Applications* with the relevant documentation from the widely used software, SAS, for example, we find explanations in Miller's text for the main optimization algorithms available through the SAS interactive matrix language, including conjugate gradient, double-dogleg, Nelder-Mead simplex, Newton-Raphson, quasi-Newton, quadratic, and trust-region optimization [SAS 1995]. Miller gives each of these methods (and others as well) a mathematical treatment, then presents numerical results (usually on more than one function), to show its strengths and weaknesses.

Those who are familiar with Ron Miller's earlier work, *Modern Mathematical Methods for Economics and Business* [1978], will recognize the many strengths of that book in *Optimization: Foundations and Applications*. The new book, however, is a greatly extended treatment, much more

satisfying in its mathematical and topical completeness, not to mention its real practical value for those who are applications oriented. *Optimization: Foundations and Applications* is a must-have book for anyone interested in the theory and mechanics of optimization mathematics. This is a book that should set a standard for texts treating difficult subjects in a manner that is complete, rigorous, and engaging.

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REMENYI, DAN 1999, *Stop IT Project Failures Through Risk Management*, Butterworth-Heinemann, Boston, Massachusetts, 225 pp. (soft cover), \$44.95.

Whether searching for an accessible entry into a new area or seeking new ideas in a familiar field, it often helps to identify a key theme to organize one's thoughts. The least common denominator in information technology (IT) (and other) projects is the element of risk. One way of looking at the problem is to identify the categories of project failures and reasons for them and to systematically identify, characterize, and plan for handling project risks. Remenyi attempts to do just that.

Remenyi envisages project success as encompassing the industry chestnuts of project completion, product relevance at completion, and the incorporation into the product of knowledge of the application

domain acquired during development. Nothing special here. Most authors (for example, McConnell [1998]) approach these objectives through judicious management. Other authors (for example, Ould [1999]) emphasize planning for risk and quality. Remenyi takes the failure conditions of a project as his starting point and develops a framework for identifying risks, their causes, their consequences, and the appropriate responses.

Remenyi argues that risk derives from two sources, project structuredness (how well the project is defined) and the client's and developer's degree of familiarity with the adopted technology. If these were the only sources of risk, then one could accommodate all risks inherent in a particular technology if one had sufficient familiarity. Even if that were the case, resource and time constraints would limit one's ability to avoid or mitigate technology-dependent risks.

Remenyi also argues that project failures should be viewed as project-conceptualization failures in which the business and technology levels of abstraction fail to converge. The conventional solution to this widely recognized problem has been to focus on validating requirements. Casting the problem as one of conceptualization doesn't detract from validation but has the added advantage of drawing attention to the distribution of ownership and responsibility between developer and client stakeholder groups.

Remenyi argues that the remedy for project-conceptualization failure is attention to project structuredness. His primary tool for ensuring a well-defined project is a system of grids comprising project and

risk dimensions. The risk dimension classifies risks as deriving from the system architecture, the development process, and the business environment. The project dimensions are knowledge (the managerial and technical skill endowments of the project), foundational (critical success factors with inherent risk), and timing (project transitions permitting risk propagation). Using these dimensions, Remenyi develops a series of grids for identifying project risk factors, risk drivers, and the consequences of risk with appropriate strategies for their avoidance or mitigation.

Remenyi's framework is augmented with some tools. Questionnaires address the risk dimensions for risk identification, audit, and action planning. Spider diagrams are useful for graphically displaying risk profiles and monitoring residual risk. He also describes a risk-management process, tying together all of the elements of his approach. Finally, he provides a case study as an example of the approach in action.

Remenyi's approach is a distillation of the key considerations in best-practice software development presented within a consistent risk-based framework. But he assumes familiarity with the software-development process and depends largely on reader insights for the success of its application. In that sense, Ould [1999] provides a more robust approach to planning for risk. Karolak [1996] provides an alternative risk-based framework. This is more comprehensive than Remenyi's approach but is better suited to practicing IT professionals.

Remenyi's book can be used to best advantage by teaming it up with a book such

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as Ould's [1999]. Remenyi provides practical steps while Ould helps place those steps in their correct context. The book could also be used independently by those familiar with the software-development process. In that mode, Remenyi's book provides a highly readable, compact insight into development issues from a risk-based perspective.

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Books Received for Review

Balsamo, Simonetta; Persone, Vittoria de Nitto; and Onvural, Raif 2001, *Analysis of Queueing Networks with Blocking*, Kluwer Academic Publishers, Dordrecht, The Netherlands, 255 pp., \$120.00.

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