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Chapter 1 : Project Management: Tools and Trade-Offs - Ted Klastorin - Google Books

*The authors describe the basic analytical tools and project management methodologies and show how to apply these tools and methodologies to realistic problems. * Offers a unique balance of theory and practice, with emphasis on the uncertain, risky projects that managers have to manage in the real world.*

At the same time, I began working on several projects as a manager and consultant. As I continued working in the PM area, I became increasingly frustrated by a "disconnect" that I saw between the tools that have been developed to assist project managers and the complex problems and issues faced by real-world project managers. As a result, I started developing materials that I felt would deal with the complex issues and trade-offs faced by most project managers and would illustrate how and when PM tools might be helpful to managers dealing with these issues. To test these materials, I developed an MBA elective course in project management at the University of Washington and began to refine the course materials with the help of colleagues, students, and practitioners. Given the increasing emphasis in most university curricula on spreadsheet modeling, we based many of these materials on spreadsheet templates. The materials that proved successful in our educational experiments form the basis of this book. Finally, I have tried to include many new ideas reported in recent research; much of this work has been invisible to practicing managers but has significant implications and needs to be brought into classrooms, executive programs, and conference rooms. It has been very gratifying to see how well this course has succeeded; it is now one of the most popular elective courses in the MBA program at the UW Business School. It is evident that this is an area of significant and increasing importance. I hope that this book and related materials encourage and assist other instructors to develop and teach their own PM courses. In addition, it emphasizes the "disconnect" between the commercially available methodologies and tools and the uncertain, risky projects that project managers have to manage in the real world. This link between theory and xvi PREFACE practice is illustrated in a variety of ways, including case studies, games, and study problems. In addition, I have tried w to present the fundamental concepts of project management in a concise fashion with an emphasis on the difficult trade-offs that must be made by most project managers, to describe the tools and methodologies that have been developed to assist project managers using spreadsheet models and templates, to show how these tools and methodologies can be extended to deal with more realistic problems, and to integrate current research into PM educational materials. The book uses spreadsheets to explain many PM concepts and methodologies. Most students today are familiar with spreadsheets and can easily relate to their use and application. I have tried to include all models that have important applications or present valuable insights for students and practitioners. These models are described analytically using both basic algebraic notation as well as spreadsheets. I hope that these spreadsheet models will allow students to explore PM issues that are not addressed by commercial PM software e. I have tried to relate the material in the book to other business and engineering courses; for example, there is material on budgeting relating to managerial accounting , the impact of organization design on project success relating to organizational theory , project teams courses in organizational behavior , project scheduling relating to operations management courses , new product development relating to marketing courses , and considerable material throughout the book on sofhuare project management relating to courses in information systems. As such, the subject matter should relate to students in a variety of areas, including information systems, marketing, industrial engineering, and operations management students, among others. For this reason, I have included much of this material into the text, including project taxonomies, recent work done on the effects of uncertainty on subcontracting and bidding, work on material management and purchasing in projects, work on software project management, and current research on risk management. Finally, I have included a number of new cases, games, and study problems that have proven helpful in illustrating some of the complex issues faced by project managers. The game is especially useful for relating the concepts of project management to the problems of new product development in a high-tech environment the game is based on the development of a hand-held marine radar unit. This game can be played in one class session or used as a case study. This book is intended for use in undergraduate and graduate project

management elective courses at most universities and colleges. In addition, it is expected that the book will serve as a general reference text and could be used in executive programs. This book is written so that it can be used with a minimum number of prerequisites I assume that the reader has had some basic exposure to linear and integer programming, understands basic concepts of probability and statistics, and is familiar with basic spreadsheets. Finally, I welcome your comments and suggestions. I want to create a text that will provide a substantive and meaningful project management course that will motivate all stakeholders to consider issues beyond a superficial level. Any assistance that you can provide in this regard will be sincerely appreciated and acknowledged. In doing so, we can address the issue of a possible "disconnect" between most PM software that assumes everything is deterministic and real-world proiects - - that are subject to randomness in both time and cost. Chapter 2 discusses the issues of project initiation and selection and. Chapter 2 also introduces project planning, including work breakdown structures and time and cost estimation. Chapter 3 discusses organizational and behavioral issues, including several issues relating to the formation and supervision of project teams. Chapter 4 presents the basics of the critical path method CPM and shows how they relate to managing project schedules. Chapter 5 extends the CPM to deal with costs e. The issue of randomness is further discussed in Chapter 6, including a discussion of the Classic PERT model and current methods e. Chapter 8 discusses resource leveling and resource allocation, both when resource requirements are deterministic and when such requirements are uncertain. Chapter 9 deals with monitoring and control systems, and the final chapter Chapter 10 deals with the management of multiple projects. In addition to the cases and study problems that are included in the text, I generally use a number of field case studies. I have tried to select cases that both reinforce the trade-offs discussed in the book and bring real-world complications and behavioral aspects into the classroom. In addition, I have found that careful selection of outside speakers can reinforce many of the concepts emphasized in the book and give students who have not been directly involved in managing a complex project a good sense of the difficulties and issues involved in managing messy real-world projects. A student version of the popular project management s o h a r e package. An add-in to Microso!? Project that increases the functionality of MS Project by letting the user easily construct powerful Monte-Carlo simulations. A PowerPoint presentation with over slides prepared by the author supports the material in the text. Excel spreadsheetstternplates for all models discussed in the text. Solutions for all homework problems and suggested teaching guides for case studies. I have learned much from my colleagues at the University of Washington, with special thanks to Professor Karen Brown. As mentioned previously, I have learned a great deal and developed enormous respect for those managers who are "on the line" managing complex projects with real costs and real risks; two of the best are Steve Levy Microsoft and Brian Cline Boeing Corporation. Many of my MBA students over the years have served as guinea pigs with this material; I am especially grateful to Jack Eisenhower and Robert Barrick for their contributions to this book. For all other students who offered many helpful suggestions and comments, I sincerely and collectively thank them. I would also like to thank Christianne Thillen for her valued suggestions. And last, but never least, my family truly created a project team that provided support and motivation that can never be adequately acknowledged. He holds a B. His current research projects include the study of uncertain disruptive events e. Professor Klastorin has consulted with numerous organizations, including Boeing, Starbucks, Fluke Corp, and Microsoff where he has assisted with the design of Microsoft Project. Why are so many people focusing on project management today? What can project management offer that other management methodologies cannot? The reasons for the rapidly increasing focus on project management PM are evident from a careful examination of the current business landscape. Perhaps most important, project management is synonymous with change management. Organizations that want to change their focus or direction increasingly recognize that implementing real change requires the introduction of new products, processes, or programs in a timely and costeffective manner. Rapid change has become an essential survival requirement for most organizations today. As product life cycles continue to decrease, new products and services must be developed and implemented as quickly and efficiently as possible. In addition, products are becoming obsolete at an increasing rate. Shorter product life cycles require that the selection and development of new products be managed in a cost-effective manner that maximizes the chances of commercial success. In some industries,

managers have considerably less than five years to develop, produce, and market new products. Yang stated the case for new product development very succinctly: The nature of projects has changed in the past decade as well. Project management has been used since the time of the Egyptian pyramids almost five thousand years ago. Many of these projects, especially information technology IT projects, represent significant investments to an organization such that project failure can mean organizational demise. Project managers must use methods that will maximize the probability that these projects will be successful. Given the increasing importance of managing complex projects, it is disturbing to see the high number of projects that fail to meet their basic goals. The statistics reported by the Standish Group are disturbingly consistent with other studies. Bounds reported that only 26 percent of IT projects were completed on time and within budget. Yeo reported that approximately 31 percent of the two hundred thousand software development projects undertaken by U. Yeo also reported that only 13 percent of IT system projects were considered successful by sponsoring managers, while only Additional examples illustrate the importance of PM success and the high costs of PM failure. On the success side, BC Hydro recently completed a power plant replacement project in British Columbia, Canada on time and 21 percent under budget by using professional PM techniques. Effective PM not only saved BC Hydro millions of dollars but also demonstrated how these "techniaues ensure that vroiects succeed technicallv. In Germany, archaeologists have found that PM tools offer an effective wav to manage the exvloration and excavation of archaeological sites Walker, In another success story, Taco Bell managers described how they completely rebuilt a Taco Bell restaurant that had been destroyed by fire. The managers were able to dramatically reduce the normal time for this project h m sixty days to forty-eight hours by carefully applying PM techniques in fifteen-minute time increments Industrial Engineering, These examples indicate what PM can accomplish when there is thorough planning, skillll implementation, and good luck. Conversely, there have been many notable project failures. The project to build a tunnel under the English Channel cost f3 billion more than its original estimate and took two years longer than planned. Given this recent history of project experience, professional project management offers a methodology that has been carefully defined, refined, and successfully applied over the past fifty years. Project management is a well-developed system that can help organizations meet their goals in a timely fashion. As a result, project management has become an essential part of high-technology management, a critical element of electronic commerce, and an important part of the globalization movement that has transformed the world economy in the past ten years. Given the size and scope of all projects undertaken annually, it is clear why project management has become a major focus of global business and government. This book introduces the basic concepts of project management in order to give managers a clear understanding of the tools and trade-offs that complex projects require. Throughout the book, we focus on the problems faced by managers who must complete complex projects. In this first chapter, we consider the following issues: What is a project? How do you define project success and failure? How do IT projects differ from other projects? What is a PM life cycle? What are some common life-cycle models? How can you consider project risk?

Chapter 2 : Best Project Management Software and Tools | Reviews of the Most Popular Systems

PROJECT MANAGEMENT TRADE-OFFS Project management can be viewed as a series of trade-offs among multiple goals; managers must decide which goals are most important and which goals can be relaxed in order to achieve overall success for the organization.

Estimate project costs and schedules. Establish a dependable project control and monitoring system. Tools Project management is a challenging task with many complex responsibilities. Fortunately, there are many tools available to assist with accomplishing the tasks and executing the responsibilities. Some require a computer with supporting software, while others can be used manually. Project managers should choose a project management tool that best suits their management style. No one tool addresses all project management needs. Both of these project management tools can be produced manually or with commercially available project management software. Both charts display the total project with all scheduled tasks shown in sequence. The displayed tasks show which ones are in parallel, those tasks that can be performed at the same time. The activities are the tasks of the project. The milestones are the events that mark the beginning and the end of one or more activities. Determine the proper sequence of activities. This step may be combined with 1 above since the activity sequence is evident for some tasks. Other tasks may require some analysis to determine the exact order in which they should be performed. Construct a network diagram. Using the activity sequence information, a network diagram can be drawn showing the sequence of the successive and parallel activities. Arrowed lines represent the activities and circles or "bubbles" represent milestones. Estimate the time required for each activity. Weeks are a commonly used unit of time for activity completion, but any consistent unit of time can be used. For each activity, the model usually includes three time estimates: Optimistic time - the shortest time in which the activity can be completed. Most likely time - the completion time having the highest probability. Pessimistic time - the longest time that an activity may take. From this, the expected time for each activity can be calculated using the following weighted average: Determine the critical path. The critical path is determined by adding the times for the activities in each sequence and determining the longest path in the project. The critical path determines the total calendar time required for the project. The amount of time that a non-critical path activity can be delayed without delaying the project is referred to as slack time. If the critical path is not immediately obvious, it may be helpful to determine the following four times for each activity: The earliest start and finish times of each activity are determined by working forward through the network and determining the earliest time at which an activity can start and finish considering its predecessor activities. The latest start and finish times are the latest times that an activity can start and finish without delaying the project. LS and LF are found by working backward through the network. The critical path then is the path through the network in which none of the activities have slack. The variance in the project completion time can be calculated by summing the variances in the completion times of the activities in the critical path. Given this variance, one can calculate the probability that the project will be completed by a certain date assuming a normal probability distribution for the critical path. The normal distribution assumption holds if the number of activities in the path is large enough for the central limit theorem to be applied. Update the PERT chart as the project progresses. As the project unfolds, the estimated times can be replaced with actual times. In cases where there are delays, additional resources may be needed to stay on schedule and the PERT chart may be modified to reflect the new situation. An example of a PERT chart is provided below: Improved forecasting of resource requirements. Identification of repetitive planning patterns which can be followed in other projects, thus simplifying the planning process. Ability to see and thus reschedule activities to reflect interproject dependencies and resource limitations following know priority rules. It also provides the following: Gantt charts are used to show calendar time task assignments in days, weeks or months. The tool uses graphic representations to show start, elapsed, and completion times of each task within a project. Gantt charts are ideal for tracking progress. The number of days actually required to complete a task that reaches a milestone can be compared with the planned or estimated number. The actual workdays, from actual start to actual finish, are plotted below the scheduled days. This information helps

target potential timeline slippage or failure points. These charts serve as a valuable budgeting tool and can show dollars allocated versus dollars spent. For each task, show the earliest start date, estimated length of time it will take, and whether it is parallel or sequential. If tasks are sequential, show which stages they depend on. Head up graph paper with the days or weeks through completion. Plot tasks onto graph paper. Show each task starting on the earliest possible date. Draw it as a bar, with the length of the bar being the length of the task. Above the task bars, mark the time taken to complete them. Schedule them in such a way that sequential actions are carried out in the required sequence. Ensure that dependent activities do not start until the activities they depend on have been completed. Where possible, schedule parallel tasks so that they do not interfere with sequential actions on the critical path. While scheduling, ensure that you make best use of the resources you have available, and do not over-commit resources. Also, allow some slack time in the schedule for holdups, overruns, failures, etc. In the final version of your Gantt chart, combine your draft analysis 3 above with your scheduling and analysis of resources 4 above. This chart will show when you anticipate that jobs should start and finish. An example of a Gantt chart is provided below: Benefits of using a Gantt chart include: Makes it easy to develop "what if" scenarios. Enables better project control by promoting clearer communication. Becomes a tool for negotiations. Shows the actual progress against the planned schedule. Can report results at appropriate levels. Allows comparison of multiple projects to determine risk or resource allocation. Rewards the project manager with more visibility and control over the project. The Future Project management tools have evolved from simple spreadsheet products to sophisticated, Web-based project information portals. The obvious trend in project management software, as with almost everything in information technology, is a move toward Web-based systems. Most project management tools can be accessed via browsers and those that do not currently have this capability are moving in that direction. The product acts as a portal development tool that allows firms to view information from products such as Microsoft Project over the Web. These project management portals are becoming more common as the collaboration capabilities of project management tools improve. WorkLenz is a software application that serves as a virtual project manager with intelligent agent features. The general direction is toward more integrated process and knowledge management systems, and user interfaces with a "Web" look. It is important for project management software vendors to keep things simple and easy to use.

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Chapter 4 : What does it mean to make project trade-offs? - racedaydvl.com

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Chapter 6 : Project Management: Tools & Techniques

Both of these project management tools can be produced manually or with commercially available project management software. PERT is a planning and control tool used for defining and controlling the tasks necessary to complete a project.

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Trade-offs are the result of a process where the team evaluates options for the project and decides which approach best meets the project's goals.

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