PROJECT RISK MANAGEMENT

- Simplified concepts and tools to assess, rank, and manage high-risk projects and tasks
- Clear templates and models
- Proven methods of integrating risk management into business and project planning
- Techniques for monitoring risk using earned value
- Practical models for strategic and project risk planning

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Introduction

The demystification of risk involves a whole new perspective on a business-wide process that has been looked at for many years as a separable, quantitative, and project specific exercise. The overkill in quantification comes from the attempt to replicate scientific, mathematical models of probability, but most projects do not need such rigor. The issue in project risk management is simple awareness of risks and intense management. As Fig. I.1 indicates, this book changes the paradigm for risk management while recognizing the value of current approaches.

Setting up for risk management means preparing the organization and not the project first. The issue is establishing the value of risk analysis as part of the normal project planning process.

Finding out where risks are is built into the work breakdown structure (WBS) and scheduling process; risk is an input to risk-based scheduling.

Dimensioning risk is qualitative, ranking and ordering, usually not quantitative.

Corrective action is not preparing separate task-based contingencies and kicking them in when necessary, but rather building them into the baseline schedule.

Postmortem audits by outsiders are rarely helpful because they are not accepted and do not reflect the insights of those who did the work; lessons learned meetings are far more helpful.

What Is Risk?

Risk, which is uncertainty that has been defined, is a simple concept, a way of thinking through and planning a program or project. There are many treatments of risk in the literature, but most tend to overdo the quantitative tools and understate the softer, more people-oriented issues in risk management. This book stays with the middle ground, touching all aspects of risk hopefully in a readable way.

The *demystification* of project risk involves some new assumptions about project planning and control.

First, risk has been narrowly treated in the context of projects and project tasks, but the sources of risk are more appropriately addressed at the business and industry level first. The prevailing notion about project risk management

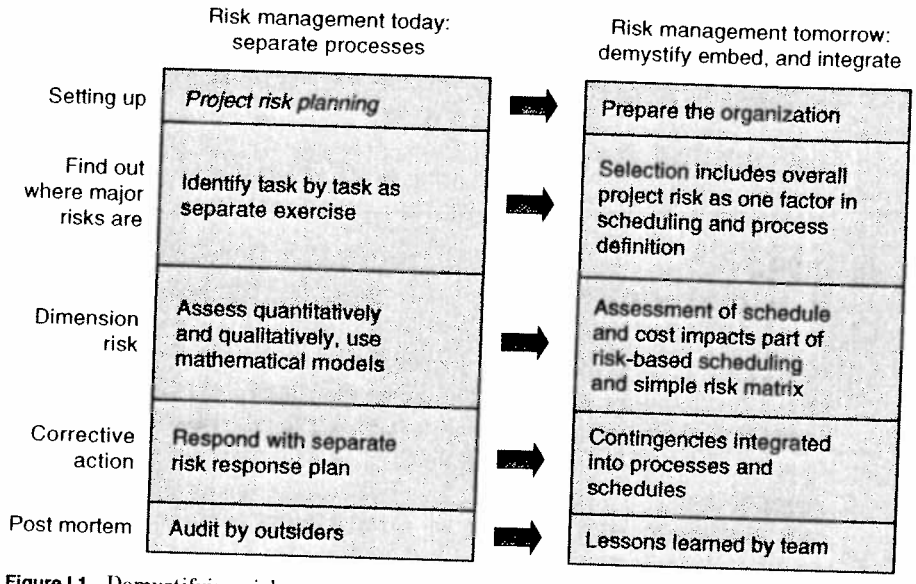

Figure I.1 Demystifying risk management: today and tomorrow.

has been the assumption that knowledge of internal, project-oriented planning and control issues was most important in forecasting and managing risks and costs. This assumption has driven the subject of project risk management in directions that focus on internal project tasks and risks. But business analysts increasingly find that emerging external business issues often have a much greater impact on the future of their organizations—and on project success—than *any* internal issues. Thus the roots of project risk lie in the forces acting on the company, and the customer, as a whole.

Second, and as a consequence of the first point, project risk cannot be separated from business planning, project selection, planning, and control. It is integral to these processes. Risk is the core planning challenge at the heart of business development and later, project management. The separation of risk management process from the rest of the broader business and project management paradigm is the wrong approach to the subject because it implies that somehow risk is largely internal to a project and therefore controlled by the project team. Since project risk is business risk, the whole business strategic planning, marketing, and risk analysis process is directly relevant to project risk. Risk applied to a business framework produces SWOT (strengths, weaknesses, opportunities, and threats) analysis and other outputs that support identification of project risks. These risks include competition, unanticipated technology change, market shifts, business finance, workforce issues, and changes in the customer base.

Third, risk management is largely a leadership and management challenge first, not fundamentally a quantitative process as portrayed in texts on the

subject. Organizational culture drives the approach to risk. Risk is actually qualitative and intuitive and brings out the most creative juices of project process. It is risk that generates the passion of business achievement; to overcome risk is to overcome a competitive challenge and create opportunity. Overcoming risk equals business success.

This book addresses *the process* of identifying, analyzing, and responding to business and project risk in order to minimize the consequences of adverse risk-based events. The PMI *PMBOK* processes of risk planning, identification, quantification, response planning, and control are covered, as well as risk factors, contract types, assessment techniques, tools to quantify risk, procedures to reduce threats to project objectives, and contingency.

Risk definitions

The Software Engineering Institute defines risk management as "A successful risk management practice is one in which risks are continuously identified and analyzed for relative importance. Risks are mitigated, tracked, and controlled to effectively use program resources. Problems are prevented before they occur and personnel consciously focus on what could affect product quality and schedules."

You can see that this definition is fairly broad and describes a process that goes through the whole project life cycle. The definition addresses the way project team members think and act in the planning and organizing process.

There are five principles underlying the definition of risk in this book:

1. Risk is any uncertainty in a project plan that you can potentially control, or at least track. This means that there are many risks in any project. The trick is to identify the most critical risks—the ones that could make or break your project—and control them. Overcoming a risk—that is being able to complete a project or project task despite the risk—creates opportunity. The other side of risk is opportunity—if a business is *better, faster, and cheaper* in producing its products and addressing customer needs and reducing the risk in the process at the same time then the payoff opportunity is market share and business growth.
2. Risk is integral to the business and the project planning process; therefore don't think of risk as something different or separate from management. Risk is why you do business and plan projects— if there were no risk, there wouldn't be a project. And addressing risk simply means that you are always looking around you to find things that can go wrong in defining and scheduling work.
3. Focus only on the high-risk, resource-consuming tasks because you can't focus on all of them all the time. Assessing risk is a question of rank-ordering risks and keeping your eye on them. While we will exercise some quantitative tools in this course, such as probability analysis, these tools have very selective applications when you have a very complex project and you have background data on technical probabilities.

4. Monitoring risk is a question of identifying key risk milestones or points in the project schedule where risk decisions need to be made. These milestones would mark whether a piece of equipment worked, or a key resource was available, or a key technology in a new product worked as designed.

5. Planning a response to risk involves understanding the project and impacts of various corrective actions midstream. You create risk scenarios and schedule impacts. An "expected" scenario is the best guess at what actually will happen, a "pessimistic" scenario is the worst case, and an optimistic scenario is the "best case."

Risk, Process, and the Myth of Control

There is a natural tendency to study risks as separate problems, to see risk as one shot points-in-time when risks are systematically identified, assessed qualitatively and quantitatively using sophisticated mathematical models, and controlled through conceived contingency plans. But real-world experience teaches us that risk is, in truth, an inseparable aspect of the whole project life cycle and its daily irrationality and interpersonal dynamic. In a way, risk events are a result of bad planning. In that sense, risk can be seen as a continuous series of individual and collective decisions in planning and managing a project. The process is not mystical and quantitative; it is organic and intuitive. You head off some risks while creating others—you mitigate a technology risk with information on impacts, and address the potential disease, but there may be risk in the cure as well. Some risks occur despite mitigation, while others do not, despite being ignored. Sometimes neglected risks never happen.

Many decisions add up to a successful management of risk. The tyranny of small decisions adds up to success or failure. Thus risk is part of the planning cycle—planning is designed to reduce risk, but in fact the role of planning is to see risk coming and to address it *in the plan.*

Risk and quality are as cost and benefit. Quality may be defined as the extent to which the road taken (the process) conforms to the proven road already taken successfully. To know your process and follow it consistently is to produce a quality product. This suggests that if you know the correct process, you can produce quality at minimum risk and cost, simply because you know how the process works.

But if the process and product are new, the cost of quality increases as you incur costs of waste, redundancy, and inspection/appraisal. Risks unattended create costs because they imply repetition, error, and delay. But these costs are not simply costs of delay and schedule; they are costs of actions, contingencies.

For example, in the design and production of a complex, electronic, digitized avionics instrument, there is an inherent risk at every step in the process:

1. *Customer requirement.* There might not be a "customer" per se, or if there is, the customer has no idea what is needed. Thus customer requirement itself

is a risk and that is why we spend time trying to identify requirements. Requirements analysis is a risk reduction tool. Each time we assume that we have the requirement down and choose not to test it out with the customer—or each time we do test it out but the customer falsely assures us that the specification is correct—we add incrementally to the totality of the customer requirement risk. Checking with the customer is not the simple solution, as the customer changes expectations; risks that they may be unrealizable change, sometimes for the better. In other words, as the customer is educated on risk, the customer is liable to make decisions, which lessen his or her risk and sometimes the risk the project itself faces.

2. *Concept.* The concept might be flawed because it is not feasible. Innovation in project concept leads to creative vision of what is possible, but it might not be possible or even desirable in the eyes of the customer or the key stakeholder. Thus there is inherent risk in designing a concept but there is also opportunity. The more options are presented to the customer in the concept stage, the more the probability that one or another will delight the customer, at least in principle. Thus innovation applied in the concept stage is a risk mitigation step in the sense that it is in this stage where ideas and visions can be addressed without substantial cost.
3. *Design.* The design might not meet the requirements, or the design might be feasible in production and assembly. Design, putting a concept into a drawing or rendering, involves a myriad of steps that are inherently risky; from misstating tolerances to choosing unavailable components, to designing correctly to an inaccurate requirement or specification.
4. *Prototype.* The development of the prototype may not be aligned with the requirements, so testing the prototype does not assure success either in conformance to specifications or customer satisfaction. In building a physical model of the product and testing it, there is inherent risk that the prototype is not representative of the (unexpressed) expectations of the customer, or that the prototype is not exactly like the product that is to be manufactured. Or the costs of the prototype may not be accurate so that when the time to produce it arrives, the company cannot afford it at the price used in justifying it.
5. *Production.* The product process might not be consistent with the time and resources needed to put the product together and produce it in volume.

Risk/Benefit

It is important to see risk as a tradeoff with benefits, opportunities, and payoffs. In other words, risk is the reason for investment—to seek out profitability by reducing uncertainty and gaining benefits in terms of customer value and profitability. The following matrix (Fig. I.2) illustrates the tradeoffs involved in categorizing and selecting projects for a business portfolio.

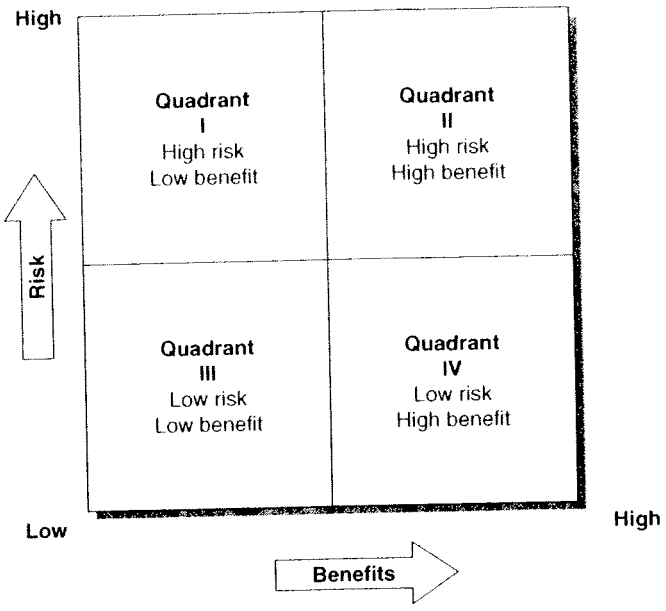

Figure I.2 Risk/benefit template.

Quadrant I: High risk, low benefit

Projects which fall into this quadrant are not worth doing simply because there is great uncertainty about outcomes and little foreseeable payoff. Of course, companies typically support a limited number of exploratory R&D projects, some of which can move from this quadrant to the next when unexpected payoffs are uncovered.

Quadrant II: High risk, high benefit

Projects here are major investments with high risks of failure, but with outcomes that could substantially improve market share, company growth, and profitability. A good example of such a project would be an investment project in the field of space exploration.

Quadrant III: Low risk, low benefit

Projects in this quadrant are not worth doing simply because there is no foreseeable payoff, even though the cost or risk involved is minimal. An example would be a superficial landscaping improvement to a plant location when the permanence and viability of the plant itself is in question.

Quadrant IV: Low risk, high benefit

Here the projects are very attractive because for minimal risk there is a potential high benefit. An example would be installation of a proven technology in manufacturing that promises to double productivity of a current plant or facility.

A Way of Thinking

Risk is a way of thinking first, a balanced worldview that looks critically at business, program, and project decisions in terms of both sides of the question. In this book, we will explore various ways of *embedding* this way of thinking into the organization so that risk and benefit tradeoffs are part of all key decisions.

Demystifying Business and Project Risk Management

Risk management involves a whole set of activities that are embedded into the project planning process. Appendix D summarizes the kinds of risk checklist actions that are covered in this book.