AACE INTERNATIONAL RECOMMENDED PRACTICE

71R-12

REQUIRED SKILLS AND KNOWLEDGE OF DECISION AND RISK MANAGEMENT

AACE INTERNATIONAL

June 17, 2013 (Ed. Rev. November 4, 2024)

AACE International Recommended Practice No. 71R-12

REQUIRED SKILLS AND KNOWLEDGE OF DECISION AND RISK MANAGEMENT

TCM Framework: 3.3 – Investment Decision Making
7.6 – Risk Management

Rev. June 17, 2013 (Ed. Rev. November 4, 2024)

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Any terms found in AACE International Recommended Practice 10S-90, *Cost Engineering Terminology*, supersede terms defined in other AACE work products, including but not limited to, other recommended practices, the *Total Cost Management Framework*, and *Skills & Knowledge of Cost Engineering*.

Contributors:

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November 4, 2024 Revision:
Sagar B. Khadka, CCP DRMP PSP FAACE (Primary Contributor)

June 17, 2013 Revision:
John K. Hollmann, PE CCE CEP DRMP (Primary Contributor)
David C. Brady, P.Eng. DRMP
Dr. James C. Guo
Dennis R. Hanks, PE CCE DRMP
Banning Stack, CCE

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REQUIRED SKILLS AND KNOWLEDGE OF DECISION AND RISK MANAGEMENT

TCM Framework: General Reference
3.3 – Investment Decision Making
7.6 – Risk Management

June 17, 2013 (Ed. Rev. November 4, 2024)
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TABLE OF CONTENTS

June 17, 2013 (Ed. Rev. November 4, 2024)
(QAR November 4, 2024)

1. INTRODUCTION

This recommended practice (RP) is intended to serve as a guideline, not a standard. As a recommended practice of AACE International, the intent of the guideline is to define the required skills and knowledge to perform decision and risk management. It serves as the foundation of the skills and knowledge of an AACE certified Decision and Risk Management Professional (DRMP) and provides an outline for its study guide. [1]

Decision and risk management (DRM) requires knowledge ranging from analytical (e.g., statistics and modeling) to socio/psychological (e.g., risk elicitation and communication) to management (e.g. risk response planning and management). DRM is practiced within the context of all the processes and practices of total cost management (TCM). All TCM practices have elements of uncertainty and the need to make some decisions, and interfaces with all the associated disciplines working in a TCM process. [2]

1.1. Purpose

This RP highlights the necessary skills and knowledge of a decision and risk management practitioner from a high-level viewpoint. It identifies competencies for a risk management practitioner as it relates to their broad business and technical perspectives and senior-level experience in life cycle asset and project management. Detailed skills, knowledge, and methodology are excluded from this recommended practice. These skills and knowledge are applicable to the decision and risk management professional across any industry, portfolio, program, or project in which TCM applies. It is aligned with RP 11R-88, *Required Skills and Knowledge of Cost Engineering* [3] and the *Total Cost Management Framework*. [2]

1.2. Background

AACE's skills and knowledge of decision and risk management can be distinguished from other treatments of risk management, by the following:

- Specifically incorporates decision analysis and support of decision making, not just risk management (all risk assessments result in decisions, and all significant decisions require assessment of risk)
- Focuses on the entire asset life cycle (as addressed by TCM), not just projects
- Includes a strong quantitative focus (e.g., contingency, modeling, etc.)

1.2.1. Why are Decision and Risk Management Combined?

In asset and project management, making decisions and managing risks are largely inseparable topics. While they can and are shown separately in processes such as TCM; in fact, quality decisions of any complexity cannot be made effectively without considering risks. All risk process steps support decision making (e.g., to treat, price or otherwise deal with risks in plans and actions). The decisions may be of minor or major consequence from deciding on a risk response action to funding a mega-project. The risks considered in any decision may similarly be of minor or major consequence. The success or profitability of a project is largely determined by the quality of the sanction decision and the planning and analysis behind it, including risk analysis. Once the asset, portfolio, program, project or activity decision is made, failure to manage risks during execution can lead to loss of planned value and the diminished success of the specific work or the profitability of the entire enterprise depending on the scope and impact of the risk. So, decision-making and risk management are entwined in the asset and project management arena and are equally important.

June 17, 2013 (Ed. Rev. November 4, 2024)
(QAR November 4, 2024)

1.2.2. What is Risk Management?

The *TCM Framework* (Section 7.6) defines risk management as a systematic and iterative process comprised of four steps:

1. Plan - establish risk management objectives;
2. Assess - identify and analyze risk;
3. Treat - plan and implement risk responses; and
4. Control - monitor, communicate and enhance risk management effectiveness.

The goal of risk management is to increase the probability that a planned asset, project or portfolio achieves its objectives. In TCM, potential deviations from plans are all considered potentially adverse to overall performance. In this sense, perceived opportunities may also pose a threat. However, if properly managed, the project or asset management team may be able to capitalize on opportune uncertainties. As discussed in TCM, a key challenge in planning is bringing an awareness of risk and probability concepts to decisions whether they are implemented or not. Traditional deterministic analysis often used in decision making may be somewhat meaningless when there are significant risks.

In addition to decision making, the risk management process is applied in conjunction with the other TCM processes. In the context of TCM's strategic asset management process, the term enterprise risk management (ERM) recognizes that the risk management process should be applied to overall enterprise, portfolio and program level objectives, not to just a single business unit, asset or project.

1.2.3. What is Decision Management?

According to the *TCM Framework* (Section 7.3), investment decision making is a process to analyze investment alternatives and determine whether, how and when to allocate the enterprise's limited resources to them. In TCM, decision making specifically addresses investment decisions during enterprise planning (e.g., capital planning and budgeting). This general process is applicable to other strategic or tactical decisions that may be made in any process described in the *TCM Framework*. In other words, decision management can be viewed as a systematic way of planning, making, implementing, monitoring and improving major investment decisions; however, the process of decision making and the practices of decision analysis in consideration of risk can be applied to any decision (e.g., to take a corrective action as part of project control) for which an objective methodology is practical.

The most prevalent general methodology for decision making is decision analysis (DA) — a systematic and typically quantitative process for selecting the optimum of two or more alternatives in order to address a problem or opportunity. These alternatives can take the form of two or more actions (i.e., "buy vs. don't buy", "divest vs. don't divest", etc.) or two or more options (i.e., choice between projects, equipment types, vendors, contractors, etc.). In addition, alternatives can be high profile and strategic such as whether to divest a corporate subsidiary or infuse it with additional capital in an attempt to increase competitiveness and profitability or, conversely, as low-level as the selection between two sources of machine parts. The purpose of the DA process is making good decisions. A good decision is one that is logical and consistent with the strategy and objectives of the enterprise and is consistent with the information available at the time. In this regard, it is likely to be compatible with the enterprise's decision policy. Owing to inherent uncertainty or risk, a good decision does not guarantee a good outcome but making good decisions over the long term can be expected to maximize the enterprise's progress toward its objectives.

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2. RECOMMENDED PRACTICE

2.1. Basis of Decision and Risk Management Required Skills and Knowledge

This RP outlines those skills and knowledge topics required for a professional to be able to effectively perform the processes and steps outlined in the *Total Cost Management Framework* chapters on *Investment Decision Making* (TCM 3.3) and *Risk Management* (TCM 7.6). As these processes are highly integrated with and sometimes practiced within the other TCM processes, elements of those are also included.

The required skills and knowledge of cost engineering are documented in RP 11R-88, *Skills and Knowledge of Cost Engineering* [3], which is a structured outline including performance statements for most topics (e.g., "Be able to define…"). The scope or topic headings for this RP and 11R-88 largely overlap; the difference is primarily in emphasis or the level of required skills. For example, the cost engineer should have application knowledge of schedule model development (e.g., given a schedule network with durations, perform CPM forward and backward pass calculations to determine float) while the DRM practitioner must have comprehension (e.g., understand the concept of logic networks and CPM). On the other hand, the DRM practitioner must have application knowledge of a range of probability distribution functions (PDF) while a cost engineer need only have comprehension.

In summary, this RP looks at the process and steps of TCM 3.3 and TCM 7.6 and summarizes those in a topic outline focused solely on DRM, adding the missing priority designations. In some cases, additional detail is added (e.g., typical PDFs) and/or performance statements are modified to address specific DRM requirements.

2.1.1. Skills and Knowledge Priority Designations

When assessing the level or degree of skills and knowledge, the following are some generic performance statements that apply:

- Knowledge: Recalls facts and information (e.g., define, list, state, identify, label, name)
- Comprehension: Demonstrates understanding of facts and terminology (e.g., describe, explain, predict, interpret, summarize)
- Application: Can use information in concrete situations (e.g., apply, solve, show, make use of, modify)
- Analysis: Can break material down into its parts, identifying both the parts and their relationships to each other (e.g., differentiate, compare, contrast, distinguish)
- Synthesis: Can put the parts together to produce a unique entity, generate a plan, or derive new relationships (e.g., design, construct, develop, formulate)
- Evaluation: Can use evidence and criteria to judge the value of a thing for a given purpose (e.g., appraise, evaluate, justify, judge, recommend)

This RP only has two designations: primary and secondary (P or S). A primary (P) skills and knowledge topic will be one that the DRMP should be able to understand and perform at any of the levels in the list above. A secondary (S) skills and knowledge topic will be one where the expected understanding is only knowledge and comprehension.

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(QAR November 4, 2024)

2.2. Outline of Decision and Risk Management Skills and Knowledge

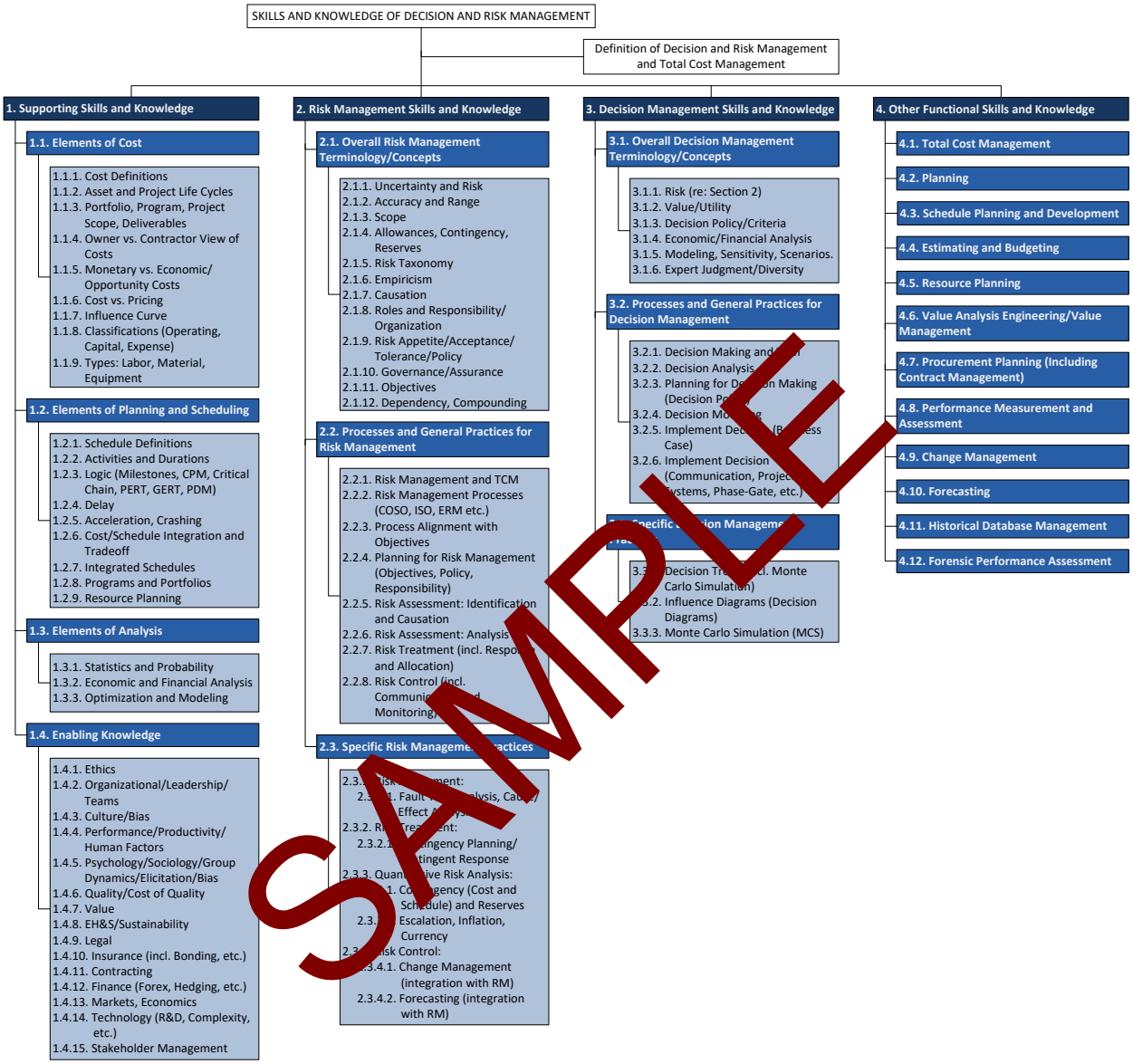

Figure 1. High Level Outline of Decision and Risk Management Skills and Knowledge

A detailed table that correlates the decision and risk management topics and performance statements to the skills and knowledge areas described in 11R-88, *Required Skills and Knowledge of Cost Engineering* is included as an appendix. This table includes additional skills and knowledge required specifically for DRM.

June 17, 2013 (Ed. Rev. November 4, 2024)
(QAR November 4, 2024)

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CONTRIBUTORS

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November 4, 2024 Revision:
Sagar B. Khadka, CCP DRMP PSP FAACE (Primary Contributor)

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John K. Hollmann, PE CCE CEP DRMP (Primary Contributor)
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Banning Stack, CCE

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APPENDIX – OUTLINE OF THE SKILLS AND KNOWLEDGE OF DECISION AND RISK MANAGEMENT

In the following detailed outline, a "P" in the leftmost column indicates key concepts that form the major emphasis for the AACE International Decision and Risk Management Professional (DRMP) certification examination; while an "S" identifies concepts with less emphasis in the examination (although not necessarily of less importance).

OUTLINE OF THE SKILLS AND KNOWLEDGE OF DECISION AND RISK MANAGEMENT [P = Primary, S = Secondary]

P/S	
P/S	**1. Supporting Skills and Knowledge**
S	**1.1. Elements of Cost**
S	1.1.1. Cost Definitions
S	Resources.
S	Time.
S	Cost.
S	1.1.2. Asset and Project Life Cycles
S	Lifecycle: Be able to describe this term and differentiate the life cycle of an asset and a project.
S	1.1.3. Portfolio, Program, Project Scope, Deliverables
S	Process (product vs. project): Be able to describe and differentiate the cost characteristics and types (see cost types below) that make up product and project costs.
S	Be able to distinguish among products, co-products, and byproducts.
S	1.1.4. Owner vs. Contractor View of Costs
S	Responsibility: Be able to describe and differentiate the cost perspectives of an owner and a contractor/supplier.
S	1.1.5. Monetary vs. Economic/Opportunity Cost
S	Valuation: Be able to describe and differentiate cost from cash/monetary versus economic/opportunity costs (also see economic analysis) perspectives.
S	1.1.6. Cost vs. Pricing
S	Pricing
S	Cost vs. pricing: Be able to explain the difference.
S	Price strategy:
S	Be able to describe how business strategy and market forces may affect pricing.
S	Be able to describe from an owner or buyer perspective concerns about pricing (i.e., risks, competitiveness, cash flow, etc).
S	Be able to describe how profit affects pricing.
S	Be able to describe how profit may be determined how the different types of contracts may influence the amount.
S	1.1.7. Influence Curve
S	Influence: Be able to explain the concept of the cost influence curve.
S	1.1.8. Classifications (Operating, Capital, Expense)
S	Cost classifications: For the following classifications, be able to:
S	Explain the general differences between the ways costs are classified for various cost management purposes.
S	Given a problem with appropriate cost classification inputs (e.g., indirect cost using ABC classification method), be able to calculate how the cost would be accounted for in a project or product estimate.
S	Operating (production, manufacturing, maintenance, etc.) vs. capital.
S	Capital vs. expense.
S	Depreciation.
S	Amortization.
S	Accrual.