

BOOK REVIEW

Project Risk Management: Essential Methods for Teams and Decision Makers

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ABSTRACT

Risk management of capital projects is a relatively new discipline. There is an obvious lack of consistency in and credibility of risk methodologies used by the industry when managing risks of capital mega-projects. This book outlines all components of an efficient, practical and lean project risk management system applicable for any capital project. It comprises most relevant deterministic and probabilistic risk methods.

Keywords: *Bias, Bow-Tie Diagram, "Broiler Black Swan", Impact, Monte Carlo Method, Probability, Risk Assessment Matrix (RAM), Risk-Based Decision Making, Risk Management, Uncertainty, Unknown-Unknowns*

*Project Risk Management: Essential Methods
for Teams and Decision Makers*

Yuri Raydugin

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INTRODUCTION

This is a book review of Yuri Raydugin's (2013) *Project Risk Management: Essential Methods for Project Teams & Decision Makers*. Dr. Yuri Raydugin is a professional engineer with a doctorate from Russia. He has a long track record of successfully managing risks in projects so it is relevant to review his most recent book for the readers of this journal. The rest of this review is written from an empirical perspective based on the prior knowledge of Dr Raydugin as drawn from his book.

REVIEW AND DISCUSSION

This book is not written as an academic study. Instead, the author declares that it is attempt of experience and lessons learned sharing.

According to the author, most of specialists ("us") involved in management of capital projects observed a situation when some key project team members were not comfortable enough in selection and application of right project risk management methods. Moreover, despite decision makers at the divisional and corporate levels might have tons of project experience they might not pay due attention to certain categories of uncertainties. In both cases situation could be exacerbated by some types of psychological or organizational bias stemming from a degree of overconfidence and explainable desire to push a project through decision gates to sanctioning.

These two observations should lead us to a quest for few simple but really effective,

relevant and practical methods of project risk management. Those methods should be fully understandable by both project teams and decision makers. To simplify, input - “black box” - output engagement relations between project teams, risk management and decision makers could be contemplated and established.

Namely, project team members should provide high quality unbiased information related to their disciplines to feed few relevant risk methods. To do this they should know logic behind required input information as well as its specifications. Similarly, decision makers should be utterly comfortable with interpretation of results coming from the “black box” as outputs to use them in informed, risk-based and, again, unbiased decision making.

This book outlines all aspects of project risk management that project team members and decision makers should be aware of to make risk management meaningful and credible. Apparently, the experience of several capital mega-projects of Royal Dutch Shell, TransCanada Pipelines, SNC-Lavalin, etc. was amalgamated and utilized when this book was written.

Needless to say that methods and insights described in this book are applicable not only to capital mega-projects as the same risk principles are applicable to projects of any size and type.

This book is not a quest for full completeness of all known project risk management methods. On the contrary, this is a quest for *selective incompleteness*. Only few but practically important risk methods that make real difference in real mega-project environment are part of this book. The rest of them are either briefly discussed just to outline the “edge of practical importance” or not even cited at all. On the other hand, there is a sort of completeness of risk methods in a sense that they represent sufficiently minimal set that covers all main aspects of modern project risk management of capital projects and all types of relevant uncertainties called “objects” in this book. No more and no less than that! Attempts to include all risk methods known to authors and produce a sort of risk management “War and Peace” is

one of the major reasons that practitioners are reluctant to read academic books.

Despite the title of this book contains words “Project Risk Management” we should understand this as “Project Uncertainty Management”. This contradiction is explained by the fact that purpose of “Risk Management” is to reduce uncertainty of project outcome through increasing the outcome predictability. “Risks” in narrow understanding of this term are just one of several uncertainty factors defining overall outcome uncertainty. The term “Risks” in wider understanding could mean almost everything and nothing. As the term “Uncertainty” is less often used in project management and less searchable in World Wide Web for the time being, it was decided to keep the word “Risk” in the book title. As a result of this observation, this book is based on few “first uncertainty principles” that are introduced in Part I.

First, three-dimensional (3D) nature of risk management was introduced (Figure 1). The organizational context of risk management in each particular case defines what “cells” of the pyramid of Figure 1 are relevant and why.

Second, it was shown that to be adequate in risk management we needed to talk about uncertainty management, not risk management. “Degrees of freedom” of uncertainties were introduced, with *an uncertainty understood as possible deviation from project objectives*. As a result, a comprehensive list of uncertainty management “objects” was formulated to assure that we missed or overlooked nothing major. As each “object” could make either negative (downside) or positive (upside) impact on project objectives or might even stay unidentified by various reasons, following four “uncertainty degrees of freedom” were used:

- **Probability:** Certain (100%) versus uncertain (<100%);
- **Impact:** Certain (one-point) versus uncertain (“range”);
- **Favourability:** Upside (favourable) versus downside (unfavourable);
- **Identification:** Known (identified) versus unknown (unidentified).

Figure 1. Three-dimensional (3D) nature of risk management

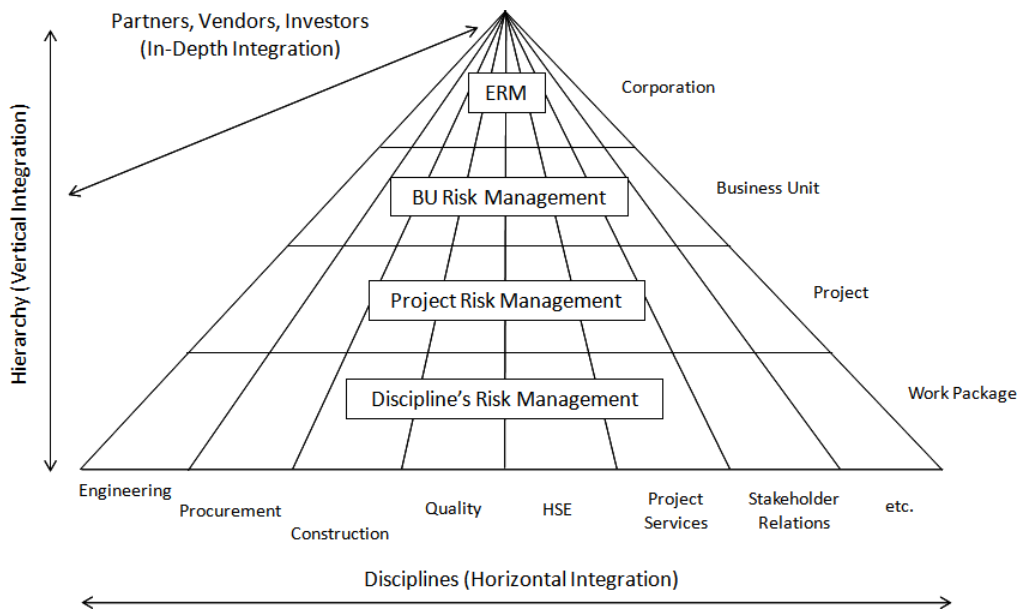


Figure 2 depicts combined realization of first two “degrees of freedom” (probability versus impact) and puts to an end previously endless discussion about main “objects” related to risk management.

Third, main external and internal uncertainty changers were introduced that should transform project uncertainty exposure in the course of project development and execution. Uncertainty addressing actions were positioned as one of key internal uncertainty changers and risk management controls.

Fourth, each of uncertainty objects needed adequate but constructively simple methods to get managed. Minimal but comprehensive set of most efficient methods (both deterministic and probabilistic) was selected. Those are discussed one by one in Parts II and III of the book.

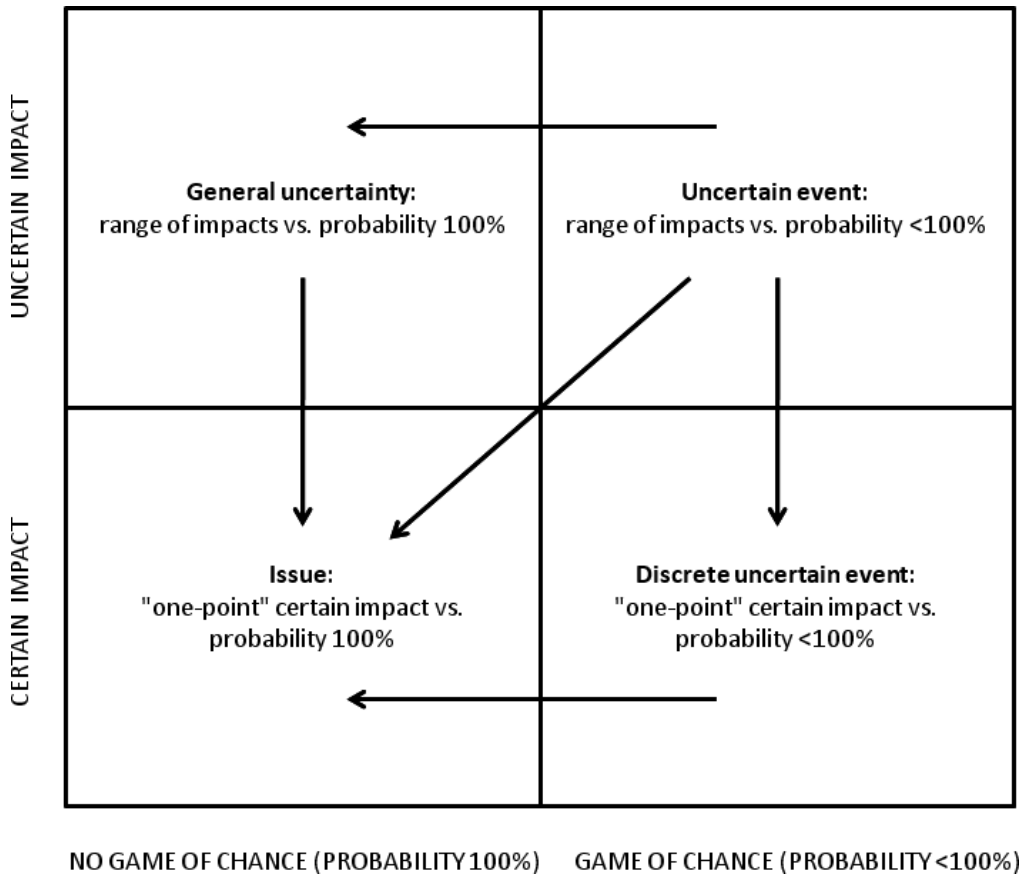
Selection of an adequate method for managing a particular category of uncertainty depends on nature of the challenge (organizational context). As a case in point, physicists like to speculate about method’s or model’s “distance to reality”. In other words, a selected risk method should be simple enough to be understandable

by practitioners but adequately sufficient to produce meaningful results: a robust “golden trade-off” between simplicity and adequacy is required. It depends on particular risk management topics. So some readers may find some topics too simple and some too complicated due to a call for the “golden middle” between simplicity and adequacy of corresponding methods.

As a case in point, features of robust deterministic methods for initial identification, assessment and addressing project risks are discussed in Part II of the book. Required deterministic tools such as risk assessment matrix (RAM), bow-tie diagram, risk breakdown structure (RBS), risk register, etc., along with methodologies of their development are discussed. It is pointed out that the deterministic methods are also good for selection of engineering design and procurement options, managing procurement risks and evaluating cost escalation being quite straightforward but pretty informative for these tasks.

However, using purely deterministic methods are utterly useless for identifying project sensitivities, developing and allocating project

Figure 2. Four main uncertainty “Objects”



reserves and evaluating overall uncertainty associated with a project. They have too big a distance to reality for these challenges. We cannot help but weighing up probabilistic (Monte Carlo) methods instead in Part III including discussion on required inputs and using results in decision making. However, we should refrain from making their distance to reality too short in order to avoid pointless complexity remembering what Leonardo da Vinci said once upon a time: “Simplicity is ultimate sophistication”. However again, quest for adequacy of discussed methods defined the exact level of acceptable simplicity. It’s like simple supply & demand curves in economics that define how much is required and at what price. “Everything should

be made as simple as possible, but not simpler”, as Albert Einstein used to say.

It is also pointed out in the book that it is counter-productive to impose probabilistic methods in situations when deterministic methods are adequate enough or better than probabilistic ones. It’s the same as jolly old mechanical engineering does not require methods of quantum mechanics!

A lot of attention is paid in Parts I, II and III to various types of psychological and organizational bias that is considered a systematic error in identification, addressing and evaluations of various uncertainty “objects”. A new type of unknown unknowns (“broiler black swan”) associated with role and bias of some project external stakeholders is introduced.

Finally, Part IV puts forward a simplified “straw man” case study of a hypothetical mega-project Curiosity where key concepts and methods introduced in Parts I - III are demonstrated practically showing their power and value. Simplified sample project base estimate, project schedule, risk register and integrated cost & schedule risk model are introduced to link the deterministic and probabilistic methods. A notion of “primary accuracy range” and its link with AACE classes of estimates was introduced to properly evaluate project cost uncertainties. Risk-based decision making at a hypothetical decision gate review of project Curiosity concludes the book.

Several risk related topics are not included to this book on purpose to stay focused. For instance (see Figure 1), features and detail comparison of risk management in owners and EPC environments, risk management in business development, integration of project risk management with corporate risk management,

probabilistic project economics, PHA/HAZOP, etc. are not discussed in this book at all.

This book could be used not only by project practitioners but also by instructors who teach courses related to project risk management. To facilitate teaching, additional instructor’s ancillaries could be found at John Wiley & Sons’ web-site www.wiley.com in a form of Power Point Presentations. These presentations are developed on chapter-by-chapter basis for all four Parts of the book.

Information put forward in this book is fully sufficient for development and implementation of lean, highly effective and comprehensive risk management system of a capital project.

REFERENCES

Raydugin, Y. G. (2013). *Project risk management: Essential methods for project teams and decision makers*. John Wiley & Sons, Inc.

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