Project Decisions: The Art and Science

By Lev Virine & Michael Trumper
(A book review by R. Max Wideman)

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Introduction

We venture to suggest that this book, *Project Decisions: The Art and Science*, by authors Lev Virine & Michael Trumper, published in 2008, is different. It has been said that an inordinate amount of a project manager's time, perhaps 70 to 80%, is taken up with communication. And a large part of that time is involved in decision-making. The majority are perhaps routine day-to-day decisions reflective of the requirements of sound project leadership, but a significant few will be major, strategic and complex challenges that defy our typical gut-feel-based-on-our-past-experience type responses. Authors Lev Virine and Michael Trumper tell us that the answer to this dilemma is *structured decision analysis* ("SDA"). In fact the authors go further and state that while most of us think we are good at making decisions, which may be true, for the most part the decisions we make are poor ones.

We gave our readers a taste of the sort of challenges that project managers face when, back in July 2008, we published *Testing Your Judgment in Making Decisions,* [link to previous paper] a set of ten questions extracted from the front of this book. If you are anything like us, our results were a miserable failure compared to the optimum answers established by rigorous SDA. However, the set of ten questions are general and typical, so that it is clear that SDA can be useful at any time, not just for big problems on large complex projects.

Why is project decision-making in particular so complicated and fraught with error? Because, according to the authors:[1]

- Most problems in project management involve multiple objectives.
- Project managers deal with uncertainties and predicting the future is not an easy task.
- Project management problems can be complex and the number of alternatives you face in managing a project can be significant.
- Most projects include multiple stakeholders, each with different objectives and preferences.

To tackle such decisions there are, in general, three approaches:[2]

1. **The intuitive approach**: After a period of reflection, the project manager selects the option that "feels" best.
2. **The advocacy-based approach**: The project manager states the problem and asks team members to perform an evaluation, or at least give their opinion. This is the most common way that decisions are made in most organizations. Incidentally, if the manager does not like the response, it is not unusual for the manager to call for a rethink!
3. **The decision analysis approach**: In this case, choices are made based more on the results of analysis and less on the intuition of the decision-maker.

The decision analysis approach entails a logical analysis of a correctly structured problem, identification of creative alternatives based on reliable information, implementation of the selective alternative, and an evaluation of the results. Thus the process includes four major phases:[3]

1. Decision framing, or structuring the problem
2. Modeling the alternatives
3. Quantitative analysis
4. Implementing, monitoring, and a review of the decisions made

Readers familiar with the Project Risk Management knowledge area as described in the Project Management Institute's Project Management body of Knowledge will instantly recognize the similarity. However, the authors hasten to point out that decision analysis is not only dependent on logic and mathematics, but also on psychology for which the authors describe many useful tools. This book introduces the reader to these tools and the extensive information available within SDA.

This raises the interesting question of whether SDA should be incorporated into PMI's Project Risk Management; or Human Resources Management; or Communications Management or even into Cost or Time Management since it involves estimating? Or should it be a new and separate knowledge area altogether? Further, it should be mentioned here that SDA is equally important to Project Portfolio Management. So, given the subject's pervasiveness and the impact of improved decision-making leading to more successful project outcomes, perhaps it should be a new and separate knowledge area.

Indeed, the authors believe that SDA has now become a practical framework that helps to solve many problems in different areas, including project management. So, whichever is your primary interest, this book is easy to read and is well illustrated with well-established business case examples, diagrams, humor, and illustrative cartoons.

Book Structure

This book is arranged in five parts containing twenty-one chapters. In addition there are useful appendices, all as described below, and each chapter concludes with a brief bulleted summary.

The book structure is as follows:

Preface
Acknowledgements
Test Your Judgment Quiz
Part 1 – Introduction to Project Decision analysis
1. Project Decision Analysis: What is it
2. "Gut Feel" vs. Decision Analysis: Introduction to the Psychology of Project Decision-Making
3. Understanding the Decision Analysis Process
4. What is Rational Choice? A brief introduction to Decision Theory
5. Creativity in Project management
6. Group Judgment and Decisions
7. Are You Allowed to Make a Decision? Or the "Frustrated Developer's Syndrome"

Part 2 – Decision-Framing
8. Identifying Problems and Assessing Situations
9. Defining Project Objectives
10. Generating Alternatives and Identifying Risks

Part 3 – Modeling the Situation
11. The Psychology and Politics of Estimating
12. Project Valuation Models
13. Estimating Probabilities

Part 4 – Quantitative Analysis
14. Choosing What Is Most Important: Sensitivity Analysis and Correlations
15. Decision Trees and the Value of New Information

Decision Analysis is a *process* that maybe described as:[4]

> "A practical framework of methods and tools to promote creativity and help people make better decisions."

Or alternatively:[5]

> "An integrated set of procedures, rules, preferences, and tools that help the organization make a rational choice."

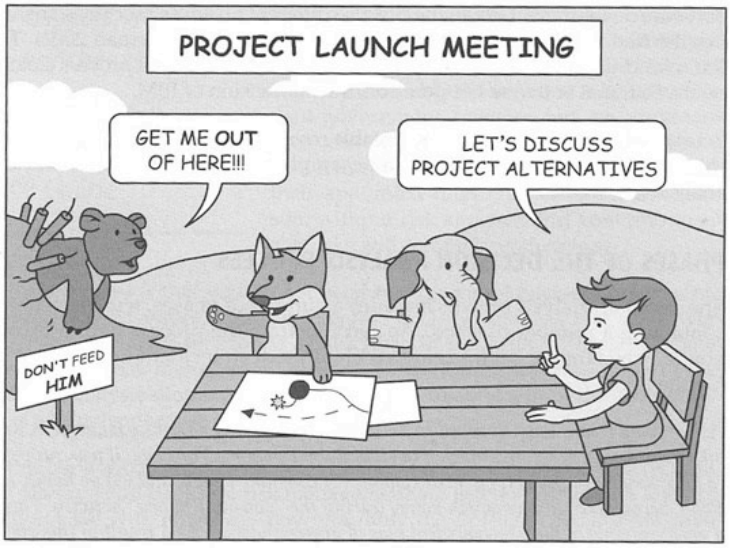
And, as noted in the Introduction, this practical framework consists of the four major phases of Decision Framing; Modeling; Quantitative Analysis; and Implementation. So, from the foregoing it will be noted that each of these phases is dealt with in Parts 2, 3, 4, and 5 of the book respectively. Further, each phase involves several steps that are dealt with in the ensuing chapters.

What we liked

A valuable lesson in structured decision analysis

To explain the decision analysis process, the authors quote an incident from the well-known children's' book *Winnie the Pooh.*[6] Because it is so illustrative of the process as well as being charming, we have extracted the authors' description of the story, with corresponding decision analysis headings:[7]

> ***Phases of the decision analysis process***
> As you may recall, Pooh dropped in on Rabbit one day and ended up jammed in Rabbit's doorway after helping himself to all of Rabbit's honey. For Pooh, it was supposed to be a very short project:
> 1. Visit Rabbit;
> 2. Consume honey; and
> 3. Go home.
>
> But Pooh, being Pooh, ate too much honey during the "consume honey" activity.
>
> This is a good example of the psychological bias of overconfidence. As a result of this event, the trivial activity ("go home") could not be accomplished as scheduled, for Pooh was firmly wedged in the doorway. Now Pooh and his friends had a decision to make: They had to select the best alternative to solve this problem



Christopher Robin's project team

PHASE 1 - Decision Framing

Step 1.1 Identifying potential problems and opportunities

In our Pooh example, the problem was clear. Pooh was stuck and was not happy about it (neither was Rabbit). Both of them need Pooh to be removed from Rabbit's house as soon as possible.

Step 1.2, Assessing the Business Situation

Who or what could be used to get Pooh out of his predicament? Of course, it could be Christopher Robin and Pooh's other friends. Wise Owl also had some project management experience. In addition, Gopher had the expertise and tools to provide some engineering work.

Step 1.3, Determining project objectives, tradeoffs and success criteria

In Pooh's situation the success criteria were:

- Remove Pooh from the doorway as soon as possible.
- Do not harm Pooh during this process (safety concern).
- Do not damage Rabbit's dwelling.

Step 1.4 Identifying Uncertainties

In this project, i.e. removing Pooh, we primarily have uncertainties in time, as well as uncertainties in cost.

Step 1.5 Generating Alternatives

Pooh needed to be removed one way or another. He could not be stuck in Rabbit's doorway forever. Therefore, project scope was a constraint. There was, however, the possibility of bringing in additional resources to accelerate the project. As a result, we have three potential project scenarios:

- External contractor Gopher digs out Pooh.
- Gopher blasts Pooh out with dynamite.
- Christopher Robin's suggestion waiting until Pooh loses enough weight and is slim enough to slip through the doorway.

PHASE 2 – Modeling the situation

Step 2.1 Creating Models for each project alternative

In the Pooh removal project, a schedule for each alternative was needed.

- Based on Owl's request, Gopher estimated the duration of the excavation alternative. He did a review of the site and performed some exploratory excavation. He estimated that the work would take two or three days. He also performed a cost analysis. He based his calculation on his hourly rate and estimated project duration. He also added overtime and 10% for contingency.
- Gopher estimated that using dynamite would lead to a quick removal of Pooh, but with uncertain effects on Rabbit's doorway and Pooh's rear end.
- The slimming alternative, suggested by Christopher Robin, seemed to have the least risk and cost, but the longest duration.

Step2.2 Quantifying the uncertainties

- Gopher estimated the uncertainty in duration of the excavation as a range (between two and three days).
- The blasting alternative had minimal uncertainties in estimating duration.
- There were several uncertainties with the last alternative (Pooh's slimming down). Nobody knew for certain how long before Pooh's stout frame would melt away enough to free him from the door. They were also faced with the prospect that Pooh would continue to eat (on the sly) during the course of the project. That risk, which should be given both a high impact and a high probability, could significantly increase project duration.

PHASE 3 – Quantitative analysis

Step 3.1 Determining what is most important

In the Pooh situation, the risk associated with feeding Pooh would probably have the most effect on the project duration and was therefore a critical risk. To mitigate this risk, Rabbit set up a poster, "Do Not Feed Bear."

Step 3.2 Quantifying risks associated with the project

Here is the result of the analysis of Pooh's project based on the success criteria identified during the decision framing stage. There were three alternatives:

1. "Excavate Pooh." There was a 100% chance of damaging Rabbit's home, a significant chance of harming Pooh, and a very significant chance that the project would be completed within a few days.
2. "Blast out Pooh." There was a 100% chance of damaging Rabbit's home, a very significant chance of harming Pooh, and a very significant chance that the project would be completed almost instantly.
3. "Slim down Pooh." There was zero chance of damaging Rabbit's home, zero chance of harming Pooh (although he might have an extended period of relative deprivation), and large uncertainties in the project duration.

Step 3.3 Determining the value of new information

For example, Gopher needed to estimate the duration of the excavation project to remove Pooh from the doorway. Gopher could perform exploratory excavation, but it could be costly and time consuming. This analytical technique helps establish the value of new information how much money can be saved if additional information is obtained through

an exploratory excavation.

Step 3.4 Deciding on a course of action
In the Pooh example, the decision was based on multiple criteria. The safety of Pooh was the first priority; therefore, the blasting alternative had to be rejected. The excavation alternative was also rejected because it did not provide adequate safety and could cause substantial damage to Rabbit's house. Therefore, despite concerns about project duration, the slimming down alternative was selected.

Interestingly, in a Russian cartoon version of the same Pooh story made in the early 1970s, Pooh's friends and Pooh himself decided that he would not be able to withstand the deprivation imposed by the slimming alternative, so they just yanked him out, causing a great deal of structural damage to Rabbit's house in the process.

Does this say something interesting about the differences between Western and Soviet psychology? Or perhaps the producers of the cartoon were on a limited budget and decided that having the characters forcefully dislodge Pooh was cheaper to produce and therefore a better choice.

PHASE 4 – Implementing, monitoring and review
Step 4.1 Project implementation and monitoring
Pooh's friends continually checked Pooh's slowly shrinking girth, trying to estimate when he would be slim enough to pop out. Eventually, when their measurements indicated that the time was ripe, they managed to extract Pooh without damage to either Rabbit's home or Pooh himself

Step 4.2 Review of the decision experience
Apparently, in this situation, the decision was correct. Some small things could have been done better. For example, the sign "Do Not Feed Bear" could have been installed at the beginning of the project rather than after Gopher's offer of food to Pooh.

Interestingly, it is not until page 214 that we learn that activities can have different "states"[8] and that this "state" can serve as a precondition for a certain event. A precondition implies that an event can occur only if the activity is in a certain state. In addition, preconditions can be related to certain environmental factors.

So, in our Winnie the Pooh example, Pooh was trying to exit Rabbit's house and became stuck after consuming too much honey. The event "Pooh stuck" has the precondition "very narrow doorway." As you can see, "very narrow doorway" is not an event; it is an environmental factor. But without a narrow doorway, the risk "Pooh stuck" could not have occurred.

Sometimes, if you want to mitigate a risk, it is enough to remove the preconditions required for it to occur. In this case, if Rabbit had widened his doorway before Pooh's visit, or hidden his honey, the event "Pooh stuck" would not have occurred!

But in any case, we ourselves are not satisfied. It is our view that in Step 1.5, Generating Alternatives, Christopher Robin's project team failed to do due diligence in identifying all the feasible alternatives. There is one that would have had immediate effect, do no more than temporary discomfort to Bear, and

release him in short order with the added advantage of teaching him a lasting lesson. That choice? Give Bear a massive dose of purgative!

Downside

The authors observe that the driving forces behind Project Decision Analysis is that:

> "Investors need to see assurances that money was spent wisely. Therefore, many companies have started to establish structured decision analysis processes. Many organizations use decision support tools such as Enterprise Resource Management or Project Portfolio Management systems to improve their efficiencies. Six Sigma is a proven methodology to improve decision-making related to quality. One of the main areas of improvement, especially in the area of new product development, is the ability to successfully select which projects should go forward."

However, none of these decision support tools currently address the issue of checking to see whether the products were used and performed up to expectations and that, therefore, the money was well spent.

One of the authors' recommendations to organizations in their decision-making is to establish consistency. That is:

> "The decision analysis process should be standardized for similar kinds of problems and opportunities [because] inconsistency in decision-making can cause projects to change directions unnecessarily, which can lead to failure. This necessitates that organizations must have the same set of rules and preferences for making decisions in all similar types of projects."

Unfortunately, we have worked for such organizations where those "rules and preferences" were patently wrong. But at least all of the resulting projects were consistent failures. Our point is that the 'consistency' established must also be the right sort of consistency.

This book is as much about the psychology of project decision-making as it is about making rational choices based on analysis and logic. In fact, in their introduction to the psychology of project decision-making, the authors assert that the root cause of almost all project failures is human error or misjudgment and quote Hall's[9] list of reasons why projects are not successful:

- Sloppy requirements and scope creep
- Poor planning and estimation
- Poor documentation
- Issues with implementation of new technology
- Lack of a disciplined project execution
- Poor communication
- Poor or inexperienced project management
- Poor quality control

This list is the result of a survey of hi-tech managers so is not necessarily representative of all types of projects. But in any case, we are not told what constitutes "success" and whether we are talking of the success of the project (management) or the success of the project's product. In fact, in this list the two types of shortcomings are intertwined yet the two are not the same. You can have a "successful project" but the *product* is not successful, not because of any failure by the project manager, but as a result of management failure in the deployment of this product.

The authors point to Malcolm Gladwell who, in 2005, wrote a best-seller book called *Blink: The Power of Thinking without Thinking*.[10] This book focuses on the idea that most successful decisions are made intuitively, or in the "blink of an eye". However, in 2006 Michael LeGault responded with a book called *Think! Why Critical Decisions Can't Be Made in the Blink of an Eye*.[11] This book argues that in our increasingly complex world people simply do not have the mental capabilities to make major decisions without a comprehensive analysis. Where projects are concerned, we subscribe to the latter position, because the more factors that are involved, the more difficult it is to make the best choice.[12]

As a bad choice, the authors cite the following example:[13]

> "In 2004-2005, Governor Arnold Schwarzenegger of California involved himself in the design process for the $6.3 billion project to replace the existing Bay Bridge in San Francisco. Although the construction of the foundations for the suspension span had started a few years earlier, the governor's office insisted that a simple viaduct would be cheaper and faster to build. [Consequently], work on the foundation was halted and the contract terminated. Following a detailed analysis, both sides agreed to follow the original design. The fight over the bridge design cost $81 million [resulting in a burden on] State funds and [the need to] increase toll revenue."

With this example, the authors observe that: "If you don't live in Northern California, you may not be directly affected by the Bay Bridge cost overrun. But, directly or indirectly, at some time you will pay for somebody's wrong decision regardless of where you live or what you do."[14]

The authors do not explain why they think this was a wrong decision, i.e. to get involved. We suggest that it was not the purpose of getting involved, i.e. to find a cheaper solution and save money, but rather the timing of the decision. Interfering in a project in its execution phase caused massive uncertainty to the point of progress being aborted. Perhaps this is a point the authors overlooked, that iterative development in some types of project simply does not work!

The authors go on to describe Cognitive and Motivational Biases in our decision-making. Cognitive biases are those that are introduced by the way that people process information. It is a mental error or a distortion in the way humans perceive reality.[15] Motivational biases are caused by the personal interest of the person expressing the judgment.[16] We see what we want to see. Perhaps the governor or his office in the example above just saw an opportunity to win political points?

Summary

As indicated by the book's Table of Contents cited earlier, the authors describe many familiar tools and techniques, but they also introduce the reader to ones not so familiar. Also introduced are many new terms specific to the field of structured decision analysis. Indeed, they have invented a new term called "Frustrated Developer's Syndrome" (FDS).

They say "FDS manifests itself when managers and members of project teams are unable to contribute to major project decisions and are not properly rewarded for showing extra initiative and making good decisions."[17] FDS affects the very central nervous system of an organization, i.e. its corporate culture.

The authors also state that they often hear this question: "Does a decision analysis process bring any benefits or is it just extra paperwork?"

According to the authors:

> "Clement and Kwit studied the use of decision analysis at the Eastman Kodak company.[18] They analyzed the decision-making in 178 projects that were carried out over a period of ten years. The projects included new product brainstorming, vendor selection, emission-reduction analysis, process analysis, and others. The project durations varied from 20 hours to one year. Clement and Kwit were trying to determine an incremental dollar value generated by decision analysis.
>
> In most cases it was hard to measure the actual value added to Eastman Kodak's business, but their estimate was that for all the projects combined, decision analysis added more than $1 billion in value. The average value per project was between $6.65 million and $16.35 million. In addition to the monetary benefits, the decision analysis added value by promoting careful thinking about strategies, facilitating discussion among stakeholders, and providing a common framework for risk analysis and decision-making within the company.
>
> Clement and Kwit concluded that even though it was hard to measure value in specific projects, decision analysis brought substantial value to the company."

Well, they would come to that conclusion, wouldn't they – as a result of their own "Motivational Biases"! But don't take our word for it – buy the book and reach your own conclusion. Reading the book might even help you to reach your own better decisions.

Meanwhile, the authors conclude that:[19]

> "While resources will always be limited, we exacerbate resource scarcity through poor decision-making. If decision-makers in business and government can learn and practice proper decision analysis processes, this alone will lead to a major acceleration in technological innovation and productivity."

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Fellow, PMI

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[1] Virine, Lev, & Michael Trumper, *Project Decisions – The Art and Science, Management Concepts*, VA, 2008, p7
[2] Ibid, p7-8
[3] Ibid, p9
[4] Ibid, p8
[5] Ibid, p35
[6] For those old enough to remember it, *The Complete Tales of Winnie-the-Pooh* by A. A. Milne
[7] *Project Decisions – The Art and Science, Management Concepts*, pp39-47
[8] Useful in Event Chain Methodology calculations
[9] Ibid, pp15-16. This listing is quoted from a paper by David C. Hall *Lessons Discovered but Seldom Learned or Why Am I Doing This If No One Listens*, Proceedings of Space Systems Engineering, October 2005. The list includes only the results of human factors.
[10] Gladwell, M., New York, Little, Brown & Co. 2005
[11] LeGault, M., New York, Threshold Editions, 2006
[12] The authors have responded to this paragraph with the following observation:
"It seems that in the above paragraph you are arguing that we are positioning ourselves in the Blink camp. Our position is much more nuanced, in that we believe for relatively simple, short-term issues, intuitive decisions can

be quite useful, i.e. 'Intuition can work well for most short-term decisions of limited scope'. However, for most project decisions, we are very much in the 'Think' side of the argument, i.e. 'In complex situations, intuition may not be sufficient for the problems you face. This is especially true for strategic project decisions that can significantly affect the project and organization. In addition, intuitive decisions are difficult to evaluate: when you review a project, it is difficult to understand why a particular decision was made'."

[13] *Project Decisions – The Art and Science, Management Concepts*, abstracted from pp3-4

[14] Ibid

[15] Ibid, p302

[16] Ibid, p308

[17] Ibid, p88

[18] Clement, R., & R. Kwit, *The Value of decision analysis at Eastman Kodak Company*, Interfaces, 2001

[19] *Project Decisions – The Art and Science, Management Concepts*, p273