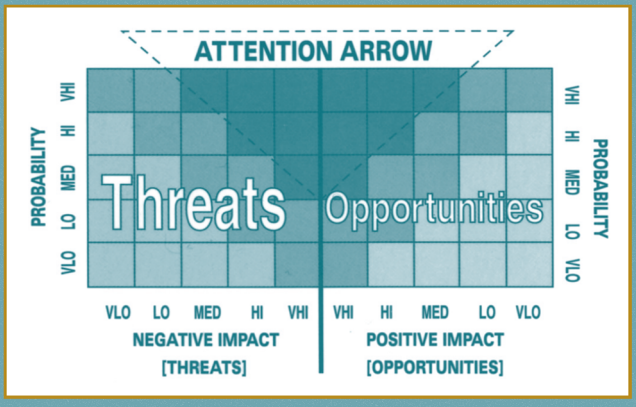
Effective Opportunity Management for Projects

Exploiting Positive Risk



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Effective Opportunity Management for Projects

Exploiting Positive Risk

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Foreword

David Hulett

In this major book David Hillson has given us a full treatment of risk management with a special and convincing rationale for including opportunities as well as threats in the process. He has provided an interpretation of opportunity management as it should be practiced that will benefit all mature project managers. In doing this, he treats project risk management as a profession. This should not be surprising to those of us who share his view, but it may be to those who believe that of all the project management disciplines, risk management is the one that may be "optional."

There is a lively debate among risk management professionals over whether the definition of "risk" includes both threats and opportunities or is limited only to threats to objectives. Two reasons are commonly cited for the "risk-as-threat" view. First, dictionary definitions emphasize the probability that bad things might happen. Second, many organizations "optimize" their project plans to incorporate most of the opportunities that could happen, resulting in a baseline plan that can succeed only if "everything goes according to plan." No wonder then that many people exclusively identify risk with all the bad things that can happen to the perfect project plan, but not with opportunities. David Hillson helps us to see the other side and to balance our efforts to include identifying and capturing opportunities.

One of the first benefits of this book is the comprehensive discussion of the risk definition issue. Defining risk as "any uncertainty which, if it

occurs, would affect one or more objectives," Dr Hillson demands that we explore and respond when we find opportunities as well as threats to the basic project plan. His review of the definitions of risk published by official bodies seems to favor this broader definition.

The second major insight of the book is that the most effective approach to project risk management is to deal with opportunities in the same process as threats. Most project risk management practitioners experience a bias on their own part or those of their sponsors toward looking at threats first, maybe exclusively. Some say, "We'll go back and look for opportunities later," but they hardly ever do. Using the same processes for managing opportunities and threats alike will be alien to some, but should be welcome to others who seek ways to make managing opportunities more accessible.

David Hillson puts the organization squarely in the middle of the process and emphasizes the need for organizational understanding and commitment to project risk management. Including opportunities should make some organizations more willing to explore proactively the uncertainties that affect their plans.

Practical issues may confound the practice of risk management for many people. Simply understanding "ordinary" risk management is hard enough. Incorporating opportunities may be a real stretch for some people and organizations. David's challenge in this book has been to put opportunities into the mix while telling us about good risk management processes generally, providing both the novice practitioner with the basic tools and the experienced professional with the added dimension of opportunity. His discussions of qualitative risk assessment and of risk response planning in particular include some of the most novel and useful concepts.

Clearly, an opportunity that is both highly likely to occur and provides the greatest benefit to the project if it were to occur should attract the greatest interest. The benefits would be more easily secured for the project by securing these "low-hanging fruit" risks, and organizations should exercise the most effort to get those. The profession has had some difficulty illustrating this concept, and David's "mirror probability and impact matrix" is an appealing graphical way to make opportunity-seeking choices evident.

Several ideas are introduced in Chapter 5 that require some added scrutiny by the profession. One of these is the notion that qualitative risk assessment can provide an assessment of total project risk "in absolute terms against some risk threshold that describes the amount of risk that

stakeholders deem acceptable." It is still not entirely clear how an assessment that considers risks one at a time can produce an overall risk measure for the project. Another issue in the same chapter is the suggestion that while qualitative risk assessment is required for the majority of the projects, quantitative risk analysis is an optional extra. This may arise from the fact that quantitative risk analysis uses specialized software and statistical terms that some find hard to understand, but this need not necessarily imply that Monte Carlo simulation is too sophisticated for most organizations. Finally, Dr Hillson offers different ways to describe probability levels (e.g. 5% is either "very low" or "1:20" or "1–10%"), and a useful addition may be to consider describing in words the relationship between a project's overall condition and the associated probability of a risk occurring. For example, if a technology has not been tested at the prototype level, the probability of related risks may be assessed as 50–75%.

Another of David's main ideas is that data quality is important—all the tools he describes are simple and their use should be transparent. An organization should be willing to spend the time and resources required to gather credible data by means that can be defended. A good example of this is the Risk Breakdown Structure, one of his recent breakthrough concepts which has been widely accepted as an aid to identifying risks.

David Hillson makes some of the most important contributions in this book in risk response planning. His opportunity-centric responses (comparable to typical responses that address threats) should be incorporated in any serious risk response plan. He identifies Exploit, Share, and Enhance as the opportunity analogues to Avoid, Transfer and Mitigate. These new response strategies will help practitioners understand how to address opportunities proactively, and I believe that the profession should coalesce around these or similar definitions and develop practical ways of implementing them.

The chapter on implementation issues identifies a number of Critical Success Factors, particularly focusing on individuals' risk attitudes and corporate cultures as they are and as they may be modified to make risk management (not just opportunity management) successful. These cultural issues as well as some more practical ones are brought together in the outline of a Risk Management Maturity Model that should help organizations understand where they are and what they should do to improve.

The final chapter emphasizes ways that risk management including opportunities can be done with minimum pain and maximum benefits to the organization. For some time, risk management professionals have

needed a concept of return on investment (ROI) for risk management, and this deserves further discussion, since it will be a major selling point to reluctant organizations (assuming it comes out positive).

While reading this book I have made many positive notes in the margins. The serious contributions made by David Hillson to advancing the concepts of risk management will now be available to all who read this very useful book.

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and Technical Director, PMI Risk Management SIG

Foreword

Chris Chapman

I think you should read this book. Stating the obvious, I would not have agreed to write a foreword for it if I thought otherwise. Reading this book will be good for you. But like taking risk when seeking opportunities more generally, reading this book will be good for you provided you understand that it comes with health warnings. David Hillson understands this. He asked three people each to write a foreword with this in mind, because *all four* of us have different views about what the health warnings should be, as well as different views about what are the best bits. I have one central health warning, and several other health warnings, which need to be explicit. But let us begin with why this book will be good for you.

Opportunity management is a key issue. There is currently no widely accepted approach for dealing with project opportunities, this book helps to fill the gap, and it captures part of the current debate on the future direction of project risk management. It is required reading to understand some of the directions project risk management is taking, how to keep abreast of current best practice, and some of the places where current best practice needs to get better.

This book provides a very rich understanding of alternative definitions of risk, institutional standards, and guidelines. It is a "must read" for this reason alone.

It also promotes a formal iterative approach to project risk management embracing both opportunities and threats. The iterative nature of

risk management processes matters. Approaches which are not iterative are shallow or ineffective or inefficient or all three, because when the process starts it will usually not be clear where effort is most effectively applied. The project risk management processes I developed with BP International in the 1970s targeted completion of the first complete pass in 20% of the time available, leaving 80% for further complete or partial iterations. This version of the 80:20 rule worked well for BP for the decade I was involved in their North Sea and other operations worldwide. It has worked well for a wide range of organizations since. Many other authors have independently observed the importance of iterative approaches, and iterative processes are established best practice in a minority of organizations which define the leading edge in my view. But some widely recommended approaches and many operational corporate processes still fail to apply this basic idea. So I warmly endorse its promotion in this book.

David also provides useful discussions of a number of important issues, like the need to define risk in relation to one or more objectives; integrate opportunity and threat management; use "onion ring diagrams" (Figure 6–9) to understand sensitivity and what is driving risk, a prerequisite to responding effectively and efficiently; resolve strategic issues before tactical issues; and recognize the importance of response management in general.

Further, useful discussion of a range of topics is provided, including: documenting requirements; gaining stakeholder approval; brainstorming; checklists; interviews; constraints analysis; and "qualitative assessment" using probability–impact matrices.

The absence of "risk efficiency" as a basic conceptual framework is my central health warning. Risk efficiency is recognized as a central concept in economics and finance. It is not generally given this central position in project risk management, although it is central to the BP processes mentioned earlier, and related processes used by a number of organizations worldwide, with published discussions dating from the 1970s. Risk efficiency involves maximizing expected reward (possibly by minimizing expected cost) for any given level of risk. Risk here is defined in terms of potential downside departures from expectations, and it is measured (if appropriate) by comparing overlaid cumulative probability distributions for two or three alternative choices between strategies or responses to opportunities or threats. More potential downside variability may mean more risk, but expected values and distribution shapes matter. Sometimes more risk for greater expected reward is appropriate, sometimes it is not, and the difference matters. Risk efficiency is an essential

concept for fully understanding how opportunities and threats can be jointly managed in any context. "Risk-reward efficiency" is an alternative term the reader may prefer. What you call it does not matter. Failing to understand it does matter, in direct practical terms.

Linked health warnings include the need to reflect a concern for risk efficiency in the definition of risk and uncertainty adopted; see "uncertainty that matters" as the starting point for understanding risk management, embracing uncertainty in terms of ambiguity as well as variability; understand that "quantitative analysis" in the terms used by this book is bad for your health, as is the usual underlying failure to understand the proper role of risk efficiency, subjective probabilities which may or may not use data, and the irrational behaviour which dependence on hard data and objective probabilities can induce; realize that "quantitative analysis" is not always necessary, but it is usually useful, and it should never be undertaken by those who do not understand it; recognize another version of the 80:20 rule in relation to surveys about best practice or reviews of standards - the 20% minority may be the ones who have got it right.

As a penultimate comment, I strongly agree with the importance of all of David's critical success factors in Chapter 9, but not with some of the details of his responses, because of the linked fundamental differences in conceptual frameworks noted above. But I close by citing from A. A. Milne's classic children's book *Winnie* the *Pooh*: "The Heffalump is a rather large and very important animal. He has been hunted by many individuals using various ingenious trapping devices, but no one so far has succeeded in capturing him. All who claim to have caught sight of him report that he is enormous, but they disagree on his particularities." There is more than a whiff of the Heffalump about the best way to approach processes for managing project opportunities and threats.

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Foreword

Stephen Grey

When project risk management began to emerge as a distinct discipline about fifteen years ago, it was generally greeted as a good idea but it was common to find that no two experts could agree on what it really meant, let alone how it should be addressed. Over the years, a lot of creative energy filtered through a process of trial and error has brought some shape to the subject. There are professional bodies, guidelines, and standards associated with project risk management, and there is even a degree of consensus on the best way to implement it.

However, project risk management is not yet a mature discipline. Project management itself is evolving into a broad-based business process in both the public and the private sector. This means that project risk management has to deal with increasing complexity and issues extending beyond project implementation into strategic planning and business operations while developing links to the growing general risk management and governance requirements of major organizations.

Three aspects of project risk management stand out as the sources of a lot of debate and implementation challenges at the moment:

- The interaction between qualitative risk assessment and quantitative methods
- Integration of risk management across large organizations and through hierarchical management structures

- Dealing with not only uncertainties that have negative consequences, the traditional definition of risk, but also potentially advantageous outcomes, often called opportunities

The last of these, dealing with positive and negative consequences of uncertainty, has been the spark of many heated debates. There are those who would like to confine the term *risk management* to negative consequences, those who want to consciously integrate risk management with opportunity management, and those, like David Hillson, who believe that they should be merged. These arguments can be traced back to disagreements about what to do, the processes being used, and arguments about how to describe it.

Being more concerned with what to do than how to talk about it, I am very glad to see this book enter into the debate. David has explored the language and definitional issues arising when negative and positive sources of uncertainty are addressed in the one process. For those willing to listen, he has set out what these issues are and suggested mechanisms for dealing with them. This should make a significant contribution towards minimizing the arguments about words so that attention can be focused on actions and process implementation.

It will be interesting to see how the processes of risk management develop over the next fifteen years and how the language used to talk about it evolves. Language can be an important element in the development of a discipline but there is a tendency for debates about definitions to absorb time and energy far out of proportion to the benefits they produce. This book should help to resolve some of these issues and move the subject forward.

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Preface

Projects are undertaken in order to gain business benefits, involving achievement of objectives in a world characterized by uncertainty. Some of that uncertainty is negative, representing threats to the project's objectives which must be avoided or minimized. But other uncertainties are potentially beneficial opportunities which need to be captured and exploited. While threats can be managed through the routine application of project risk management, there is currently no widely accepted approach for dealing with project opportunities.

This book helps to fill the gap, by extending the familiar threat-based project risk management process to include opportunities explicitly. It provides readers with a clear-thinking rationale and practical techniques for identifying, capturing, and managing opportunities proactively.

Other books on risk management reflect traditional thinking that "risk equals threat." This ground-breaking book is the first to provide a comprehensive and structured framework for opportunity management within projects as an integral part of the risk process. It captures part of the current debate on the future direction of project risk management, unequivocally making the case that definitions of risk must include both opportunity and threat, and risk processes must deal with both equally effectively if project objectives are to be achieved.

The underlying theme of this book is the need for all uncertainty affecting achievement of project objectives to be recognized and managed

proactively. Project managers are familiar with the traditional concepts of risk management, and a structured approach to managing risks within projects is increasingly being adopted across a wide range of industries. While precise details of specific methodologies may differ, most project management professionals would recognize a risk process including phases for Definition, Identification, Assessment, Response Planning, and Monitoring, Control, and Update.

There is, however, a systemic weakness in risk management as undertaken on most projects. The standard risk process is limited to dealing only with uncertainties that might have negative impact (threats). This means that risk management as currently practiced is failing to address around half of the potential uncertainties – the ones with positive impact (opportunities).

The implications for project success are clear. Without proactive management of opportunities, the only alternatives are to achieve the plan or to succumb to threats. Risk management becomes a one-way street, with the only option being to travel away from the objectives. However, when opportunities are recognized and addressed effectively, this introduces the "roundabouts and swings" effect where upside risks balance downsides, and it even creates the possibility of improving on the project plan to deliver enhanced benefits.

This book presents the case for extending the traditional risk management process to deal with opportunities explicitly. Starting from an accepted risk process, the reader is introduced to tools and techniques which expose and explore opportunities alongside threats. Project risk management is broadened to address all types of uncertainty, building on the familiar threat-based approach to create an integrated holistic process that includes opportunities. Taking a generic risk management process, each phase is discussed, indicating where modifications are required in order to cover opportunities as well as threats.

The result is an approach to project risk management which reflects the current understanding that risk can be good for you as well as bad. The techniques described in this book will give project management professionals the capability to deal with all types of uncertainty on their projects, both minimizing threats and maximizing opportunities.

All project management professionals will benefit from this book, as well as managers wishing to understand risk management in more depth. The approach is applicable to projects in any industry or country and will prove valuable to students and practitioners alike. Risk management specialists will find the discussion particularly helpful as they seek to

resolve the current debate over the definition of risk and the scope of the risk process.

For all readers, the aim is to extend awareness and offer an approach that allows upside uncertainty to be managed, so as to capture as much of the available benefits as possible. By applying the simple process, tools, and techniques described in this book, each reader should be able to prove that "risk can be good for you!" And a new proverb might be coined: "May all your risks be opportunities"

David Hillson, Ph.D.

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Acknowledgments

> If I have been able to see further, it was only because I stood on the shoulders of giants.
>
> *Sir Isaac Newton (1642–1727)*

Many people have played a part in bringing me to the place where this book could be written—too many to name individually. But some stand out as major influences at key milestones in my journey, and it is my pleasure to give them due credit.

My interest in risk management was initially kindled in the early 1980s at a software metrics conference in Coventry, United Kingdom, where two keynote presenters spoke with contagious passion about the importance of risk management. Dr. Robert Charette has remained a major figure in the risk world, but the untimely death of Paul Rook denied us his continued insights.

My mentors in project management at Ferranti in the late 1980s, Keith Jay and Bert Edyvane, both generously encouraged me to explore the contribution risk management can make to achieving project objectives, and I learned much from their different styles of leadership. I appreciated their willingness to try new approaches, and I believe our projects benefited from my experimentation.

Former colleagues (now competitors!) at HVR Consulting and PMProfessional extended my skills in practical application of the risk pro-

cess, notably Chris Thain and Peter Simon, and the mysteries of Monte Carlo simulation were unlocked for me by David Williamson of Euro Log.

I have been privileged to exchange ideas with a number of leading thinkers and practitioners over the years, who have considerably shaped my own thinking and practice. Chief among these gurus are the three other "risk doctors" who have kindly written forewords for this book: Dr. David Hulett, Dr. Chris Chapman, and Dr. Stephen Grey. I value their insights and friendship, and our ongoing constructive debates.

Membership of professional bodies has also provided a wealth of networking opportunities, particularly through the PMI Risk SIG under the inspirational leadership of Chuck Bosler, and the UK APM Risk SIG with its rotating chairmanship. Numerous fellow members have stimulated fruitful new directions for investigation, often unknowingly.

Finally, the most significant influence on my professional and personal development is undoubtedly my wife, Liz. She has my unstinting admiration, respect, and gratitude. During over 25 years of confronting life's uncertainties together, she has shown me how to find the upside, and I am eternally grateful.

To each of these colleagues and others, named and anonymous, I express my thanks for their contribution to my journey into the fascinating world of risk management. Where ideas in this book are derived from the input of another, I have endeavored to provide explicit acknowledgment. Any errors or omissions remain mine alone, in either concept or execution, and are perhaps forgivable as the natural consequences of operating at the leading edge of a fast-developing discipline.

David Hillson, Ph.D.

Contents

I

THE CASE FOR OPPORTUNITY MANAGEMENT

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1
The Nature of Risk

SOURCES OF UNCERTAINTY

Caius Plinus Secundus, better known as Pliny the Elder (A.D. 23–79), stated in his *Natural History*, "Solum certum nihil esse certi [The only certainty is that there is nothing certain]." In the year before he died, Benjamin Franklin (1706–1790) wrote, "In this life nothing can be said to be certain, except death and taxes." And more recently, Oscar Wilde (1854–1900) declared, "Only the past is certain; the future is at best only probable."

Nowhere is this more evident than in the ever-changing world of business. Today's managers are faced with a bewildering array of uncertainties, as the business environment within which they operate changes at an increasing rate. Perhaps unsurprisingly, many are looking for a solution to this problem, wondering whether it is possible to find a safe path through the fog of an uncertain future. Project management is an attempt to manage this uncertainty, since it is seen as offering a structured approach to produce managed change in a changing environment. The purpose of project management is to act as a change agent, delivering a change to the status quo, and achieving this in a controlled and managed way.

But is project management merely an act of blind faith, trusting to fate or chance in an unpredictable world? Or is there an alternative approach that takes a more responsible attitude to uncertainty? Much of

the typical project management process seems to be like trying to drive a car by looking in the rearview mirror, with the concentration on reporting, review, control, and monitoring. Instead projects and businesses need a forward-looking radar, scanning the murky and unclear future to identify the outlines of possible obstacles or shortcuts, allowing the driver to make necessary course corrections in time to avoid disaster and steer toward the desired destination.

The range of uncertainties faced by businesses and their projects today is huge, arising from a multitude of sources including those internal or external to the business, with a range of technical, management, operational, and commercial issues. Some uncertainty is related to the actual work to be done, with the possibility of changing requirements or scope of work, assumptions that may prove to be flawed or even false, use of new technology or novel approaches and methods. Other uncertainties arise from the people involved in the work, including variable skill levels or productivity rates, and the performance of members of the supply chain. Another set of sources are external factors outside the control of the project, including the environment in which the project is undertaken, market conditions, actions of competitors, changing exchange rates or inflation rates, or weather conditions. Then there are the other stakeholders in the project and the business, all of whom by definition are able to influence performance, and may therefore introduce uncertainties into the equation.

Some practitioners have analyzed these sources of uncertainty using hierarchical "breakdown structures." Often these are specific to an industry sector or project type, although it is possible to define generic sources that might affect any type of project in any sector (see Table 1 for a generic example).

Given this huge range of potential uncertainties, one may be tempted to wonder why organizations ever venture into the world of project management. The reason is that there is a clear relationship between uncertainty and risk, and it is a well-recognized and accepted fact that risk is inevitably associated with reward. Most people understand the link between risk and reward, from the simple wager or bet that risks losing the stake to win the prize, to investment in the stock market where prices can fall (the risk) as well as rise (the reward). Similarly, organizations undertake projects specifically to gain the associated benefits, recognizing that they need to manage the inevitable uncertainty to reap the rewards. And the bigger rewards await those who take more risk, as long as they are able to manage it effectively. This is well illustrated by the motto of the famous

Table 1 Sources of Uncertainty for Generic Projects[a]

Level 0	Level 1	Level 2	Level 3
Project risk	Management	Corporate	History/experience/culture
			Organizational stability
			Financial
			Other
		Customer and stakeholder	History/experience/culture
			Contractual
			Requirements definition and stability
			Other
	External	Natural environment	Physical environment
			Facilities/site
			Local services
			Other
		Cultural	Political
			Legal/regulatory
			Interest groups
			Other
		Economic	Labor market
			Labor conditions
			Financial market
			Other
	Technology	Requirements	Scope uncertainty
			Conditions of use
			Complexity
			Other
		Performance	Technology maturity
			Technology limits
			Other
		Application	Organizational experience
			Personnel skill sets and experience
			Physical resources
			Other

[a] After Hall DC, Hulett DT., 2002.

British Army special forces unit, the Special Air Service, or SAS, who fight under the banner "Who dares wins." Without daring to undertake risky projects, organizations will never win the benefits and rewards that those projects can deliver.

UNCERTAINTY AND RISK

Like everything else in life, all projects are inevitably subject to uncertainty. But "uncertainty" does not necessarily mean the same as "risk." How are these two related? The purist statistician or mathematician uses the terms quite differently, although for the man in the street they are regarded as synonyms. The theoretical difference between risk and uncertainty is perhaps best explained by decoding two jargon terms. Risk can be said to be *aleatoric*, whereas uncertainty is described as *epistemic*.

Alleatoric is derived from the Latin word *alea*, meaning dice. This indicates that a risk is an event where the set of possible outcomes is known, and the probability of obtaining each outcome can be measured or estimated, but the precise outcome in any particular instance is not known in advance. Thus "risk" strictly refers to an unknown event drawn from a known set of possible outcomes.

Epistemic comes from the Greek word *episteme*, meaning knowledge. The suggestion here is that uncertainty relates to a lack of knowledge about possible outcomes, including both their nature and associated probabilities. An "uncertainty" is thus an unknown event from an unknown set of possible outcomes.

The relationship between risk and uncertainty, and the distinction between *aleatoric* and *epistemic*, are captured in the following couplet:

> Risk is measurable uncertainty;
> Uncertainty is unmeasurable risk.

Another way of distinguishing these related terms of "risk" and "uncertainty" is to consider the relationship between knowledge and awareness, as illustrated in Figure 1 (this is similar in concept to the Johari Window, which describes self-awareness and perception by others). In the top right quadrant of Figure 1 lies *Certainty*, where both knowledge and awareness are present, and the extent of what is known is fully understood. Below this is the area of *Amnesia*, where there is no aware-

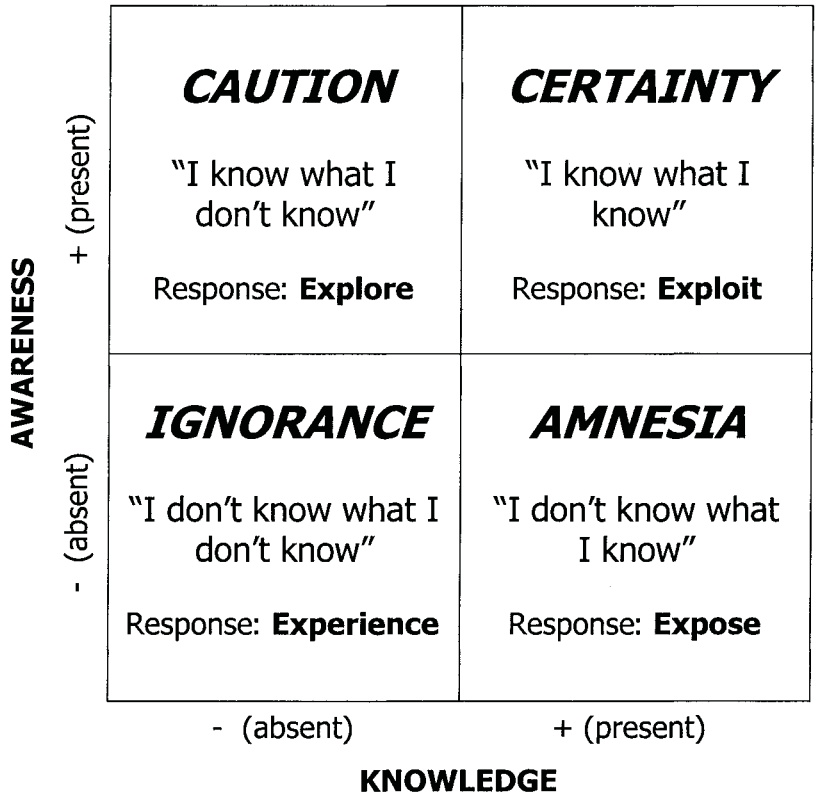


Figure 1 Knowledge and awareness.

ness or a blind spot regarding the knowledge actually possessed. The top left corner requires *Caution*, arising from being aware of an absence of knowledge, understanding the scope of the shortfall. And "unknown unknowns" reside in the bottom left section, with pure *Ignorance* of the situation faced.

In terms of aleatoric risk and epistemic uncertainty, we find risk in the Caution zone, with known unknowns, i.e., events and circumstances where we are aware that we do not have all the necessary facts. Uncertainty occupies the bottom two quadrants, including both Amnesia and Ignorance. (There is clearly neither risk nor uncertainty associated with the Certainty zone!)

Each zone warrants a different type of response:

Certainty should be *exploited*, playing to strengths and making full use of known facts to take well-founded decisions and actions.

Areas of *Caution* should be *explored*, seeking to understand the aspects where there is known to be a knowledge deficit or a recognized weakness.

Amnesia needs to be *exposed*, probably through a facilitated process, to unlock the knowledge that exists and allow it to be used effectively, avoiding wasted opportunities that might otherwise be missed.

Ignorance can only be tackled through *experiment* or by gaining *experience* (perhaps through training, mentoring, or on-the-job application), growing in both knowledge and awareness, to reduce the size of this danger area.

Clearly any risk management process must address these last three types of response, exploring and exposing areas of risk and uncertainty, and providing a means of gaining useful experience to counter ignorance.

It is clear therefore that the technical specialist in mathematics or statistics will use the terms "uncertainty" and "risk" quite differently. For businesses and projects, there is also a difference between these two, which is more pragmatic than the abstruse technical definitions used by specialists. It is important to understand and clarify this difference, to ensure that any risk management process is properly focused and targeted.

It is clear that there are some uncertainties that do not present risks to a given business or its projects. For example, variable exchange rates are irrelevant to an organization operating entirely within one currency regime. Weather conditions do not usually affect projects undertaken in an indoors office environment. Possible changes in regulatory frameworks are of little interest to businesses whose projects are outside the scope of those regulations. Clearly only a subset of all uncertainties are relevant as risks to a particular business or project. What determines which subset of uncertainties qualify as risks?

The key factor in transforming uncertainties into risks is the fact that organizations and projects have specified *objectives* to be met. For the organization, these objectives are the strategic aims of the business, whereas project objectives are defined in the project charter or business case. The objectives define the measures of success, and are usually expressed in fixed measurable terms—certain levels of profitability, rate of return, or market share, or meeting milestones, budget, and performance targets. Of all the

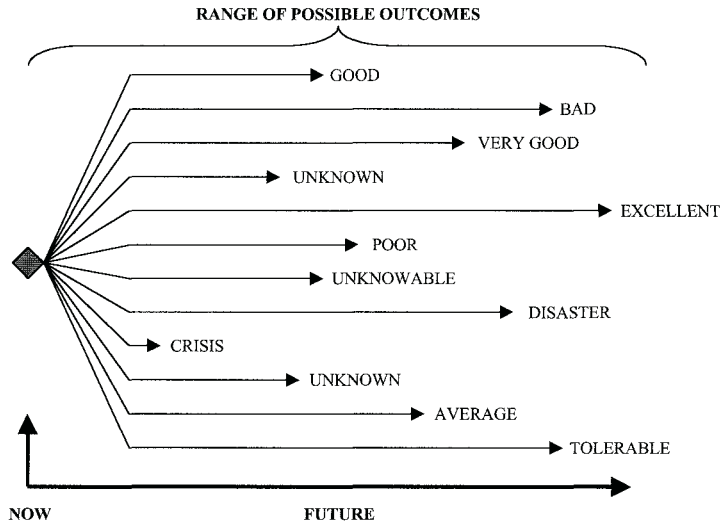
possible future states we might imagine as possible, the objectives describe our desired future, our goal or mission, the end to which our endeavors are reaching.

In project management, these objectives are most often expressed as a combination of time, cost, and quality/performance/scope, creating an "iron triangle" of fixed success criteria against which the project is measured. Yet all experienced project managers know that reality is not likely to be as simple as defining the objectives then meeting them. Trade-offs are common: as the brochure of one business puts it, "We offer low prices, rapid delivery, high quality—choose any two!"

Why do businesses and projects have difficulty in meeting defined objectives? Because, as Plato (427–347 B.C.) realized many centuries ago, "The problem with the future is that more things might happen than will happen." Science fiction writers have recognized this fact and used the device of parallel universes to explore alternative futures. Out of the almost infinite combination of events, circumstances, and conditions that might exist, only one specific combination will actually occur, and this one potential future will become reality, passing through the present into history. The problem for business planners and project managers is that we don't know today which one of the many possible futures will actually come to pass. Danish Nobel Prize-winning physicist Niels Bohr (1885–1962) recognized this when he said, "Prediction is very difficult, especially about the future."

This is illustrated in Figure 2, which shows a wide range of possible futures radiating out from the present moment in time. Some of these futures would be welcome, as they would meet our objectives and aspirations to a greater or lesser extent. Other futures would be less welcome, representing adverse circumstances that we would not wish to see. And some futures are currently unknown and/or unknowable, since they are dependent on combinations of events or conditions that do not exist.

Faced with this range of futures, we are constantly required to make choices, decisions, or actions (which also include refusals to choose, or deferral of deciding, or deliberate inaction). Each choice, decision, or action results in some of the set of possible futures ceasing to exist, as they become infeasible in the light of the new changed circumstances. But additional possible futures are also created by the choice, decision, or action, resulting in a new range of options to be considered. At each moment the range of possible futures is different from that which existed immediately prior to the choice, and different from all other ranges at any other time in the past. (The scenario-planning technique by which such



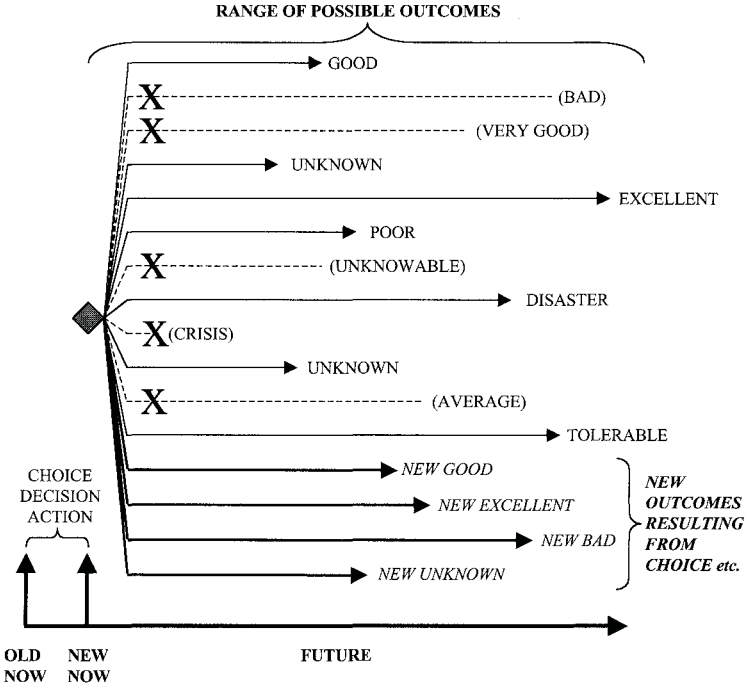


Figure 2 Future outcomes.